
APPENDIX F.5

Survey and Manage Species Persistence Evaluation

Jordan Cove Natural Gas Liquefaction and
Pacific Connector Gas Pipeline Project
Draft EIS

**Appendix F.5. Survey and Manage Species Persistence
Evaluation**

Pacific Connector Gas Pipeline

**Umpqua, Rogue River-Siskiyou and Fremont-Winema
National Forests**

Draft

Prepared for:
U.S. Forest Service Agency Review

Prepared by:



5000 Bechelli Lane, Suite 203
Redding, California 96002
(530) 222-5347

April 2018

Summary

This report analyzes the impacts of the Pacific Connector Gas Pipeline Project (PCGP Project) on Survey and Manage (S&M) species on National Forest System (NFS) lands in southern Oregon. The PCGP Project includes construction of a 230-mile-long, 36-inch diameter high pressure natural gas pipeline that would extend from interconnections with other interstate pipelines near Malin, Oregon to the Jordan Cove natural gas liquefaction and terminal at Coos Bay, Oregon. The purpose of this analysis is to determine if the PCGP Project would threaten the persistence of any S&M species within the range of the northern spotted owl (NSO) or otherwise not meet the persistence objectives in the 1994 Northwest Forest Plan Record of Decision (ROD) and 2001 S&M ROD. If the PCGP Project is certificated by the Federal Energy Regulatory Commission, the U.S. Department of Agriculture, Forest Service (Forest Service) is proposing to amend the respective land management plans for the Umpqua, Rogue River-Siskiyou, and Fremont-Winema National Forests to waive the Management Recommendations that require protection of known S&M species sites on lands directly affected by the PCGP Project.

The analysis entailed background research on S&M species that could be affected by the PCGP Project; a review of survey reports prepared by others for the PCGP Project; and processing and analysis of spatial data obtained from the Bureau of Land Management (BLM), Forest Service, and other sources, including S&M species site data created using a Feature Manipulation Extract tool consistent with the guidance and definitions used in annual species reviews and other planning and analysis purposes over the past 12 years. The site data were used to describe the distribution patterns and abundance of S&M species in the NSO range, as well as at local (5th field watersheds) and project area scales, and to assess project-related effects on the species (i.e., their sites). Background information was used in combination with new information available as a result of surveys for the PCGP Project and recent surveys in other portions of the NSO range to discuss the currently known distribution of the species in the NSO range. Impacts to sites as a result of the PCGP Project were analyzed to determine if the species would continue to have a reasonable assurance of persistence in the NSO range following implementation of the PCGP Project, taking into consideration the status and distribution of the species and general habitat in the NSO range.

Based on the analyses presented in this report, the conclusions summarized below were made for the 38 S&M species from the 2001 S&M list that could be affected by the PCGP Project.

The species listed below appear to be more common than previously documented or are relatively common across the NSO range based on new information available from surveys for the PCGP Project and/or other sources since the species were listed in the 2001 S&M ROD. For these 27 species, the PCGP Project would affect individuals or habitat at one or more sites and could affect site persistence, but the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence:

Fungi:

Albatrellus ellisii

Clavariadelphus occidentalis

Clavariadelphus sachalinensis

Clavariadelphus truncates

Collybia bakerensis

Gomphus kauffmanii

Mycena overholtsii

Polyozellus multiplex

Ramaria araiospora

Ramaria coulterae

Cortinarius olympianus
Cudonia monticola
Galerina atkinsoniana
Gastroboletus subalpinus
Gomphus clavatus

Ramaria rubrievanescens
Ramaria rubripermanens
Rhizopogon truncatus
Sparassis crispa
Spathularia flavida
Tremiscus helvelloides

Lichens:

Chaenotheca subroscida
Leptogium teretiusculum

Mollusk:

Monadenia chaceana

Vascular Plant:

Cypripedium fasciculatum

Vertebrates:

Arborimus longicaudus
Strix nebulosa

The species listed below are not necessarily more common than previously documented despite new information available from pre-disturbance surveys for the PCGP Project and/or other sources since the species were listed in the 2001 S&M ROD. For these 10 species, the PCGP Project would affect individuals or habitat at one or more sites and could affect site persistence, but the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence:

Fungi:

Arcangeliella crassa
Boletus pulcherrimus
Choiromyces alveolatus
Collybia racemose
Cortinarius magnivelatus
Cortinarius verrucisporus
Gymnomyces abietis
Hygrophorus caeruleus
Sedecula pulvinata

Mollusk:

Deroceras hesperium

The species listed below is not necessarily more common than previously documented despite new information available from pre-disturbance surveys for the PCGP Project and/or other sources since the species were listed in the 2001 S&M ROD. For this species, the PCGP Project would affect site persistence at one or more sites, and the remaining sites in the NSO range may not provide a reasonable assurance of species persistence. The species is known from a low number of sites within a part of the NSO range, has specialized or somewhat limited habitat requirements, and has a distribution pattern in which every site may be important for dispersal opportunities to ensure the persistence of the species in the NSO range:

Fungi:

Sarcodon fuscoindicus

A route modification is recommended for the single species listed above so that it has reasonable assurance of persistence following project implementation.

These conclusions will be used by the Forest Service to provide a recommendation to the decision-makers regarding the finding of species persistence for each S&M species evaluated in this report, and the findings will ultimately be documented in the Forest Service Record of Decision for the PCGP Project.

Table of Contents

| | |
|---|------------|
| Summary | i |
| List of Acronyms/Abbreviations | i |
| 1.0 Introduction | 1-1 |
| 1.1 Purpose of This Document..... | 1-1 |
| 1.2 Project Overview | 1-1 |
| 1.3 Regulatory Background | 1-4 |
| 1.4 Other Listing and Species Status Categories | 1-8 |
| 1.5 Methodology for Persistence Evaluation | 1-8 |
| 1.6 Agency Decisions | 1-22 |
| 2.0 Fungi Species | 2-1 |
| 2.1 Albatrellus ellisii | 2-1 |
| 2.1.1 Regulatory Status and Ranking | 2-1 |
| 2.1.2 Background Information | 2-1 |
| 2.1.3 Persistence Evaluation..... | 2-3 |
| 2.1.4 Conclusions | 2-15 |
| 2.2 Arcangeliella crassa | 2-16 |
| 2.2.1 Regulatory Status and Ranking | 2-16 |
| 2.2.2 Background Information | 2-16 |
| 2.2.3 Persistence Evaluation..... | 2-18 |
| 2.2.4 Conclusions | 2-30 |
| 2.3 Boletus pulcherrimus | 2-31 |
| 2.3.1 Regulatory Status and Ranking | 2-31 |
| 2.3.2 Background Information | 2-32 |
| 2.3.3 Persistence Evaluation..... | 2-34 |
| 2.3.4 Conclusions | 2-49 |
| 2.4 Choiromyces alveolatus | 2-50 |
| 2.4.1 Regulatory Status and Ranking | 2-50 |
| 2.4.2 Background Information | 2-50 |
| 2.4.3 Persistence Evaluation..... | 2-52 |
| 2.4.4 Conclusions | 2-63 |
| 2.5 Clavariadelphus occidentalis..... | 2-64 |
| 2.5.1 Regulatory Status and Ranking | 2-64 |
| 2.5.2 Background Information | 2-64 |
| 2.5.3 Persistence Evaluation..... | 2-66 |
| 2.5.4 Conclusions | 2-78 |
| 2.6 Clavariadelphus sachalinensis..... | 2-79 |
| 2.6.1 Regulatory Status and Ranking | 2-79 |

| | | |
|--------|--|-------|
| 2.6.2 | Background Information | 2-79 |
| 2.6.3 | Persistence Evaluation..... | 2-81 |
| 2.6.4 | Conclusions | 2-93 |
| 2.7 | <i>Clavariadelphus truncatus</i> | 2-94 |
| 2.7.1 | Regulatory Status and Ranking | 2-94 |
| 2.7.2 | Background Information | 2-94 |
| 2.7.3 | Persistence Evaluation..... | 2-96 |
| 2.7.4 | Conclusions | 2-108 |
| 2.8 | <i>Collybia bakerensis</i> | 2-109 |
| 2.8.1 | Regulatory Status and Ranking | 2-109 |
| 2.8.2 | Background Information | 2-109 |
| 2.8.3 | Persistence Evaluation..... | 2-111 |
| 2.8.4 | Conclusions | 2-121 |
| 2.9 | <i>Collybia racemosa</i> | 2-122 |
| 2.9.1 | Regulatory Status and Ranking | 2-122 |
| 2.9.2 | Background Information | 2-122 |
| 2.9.3 | Persistence Evaluation..... | 2-124 |
| 2.9.4 | Conclusions | 2-137 |
| 2.10 | <i>Cortinarius magnivelatus</i> | 2-138 |
| 2.10.1 | Regulatory Status and Ranking | 2-138 |
| 2.10.2 | Background Information | 2-138 |
| 2.10.3 | Persistence Evaluation..... | 2-140 |
| 2.10.4 | Conclusions | 2-155 |
| 2.11 | <i>Cortinarius olympianus</i> | 2-156 |
| 2.11.1 | Regulatory Status and Ranking | 2-156 |
| 2.11.2 | Background Information | 2-156 |
| 2.11.3 | Persistence Evaluation..... | 2-158 |
| 2.11.4 | Conclusions | 2-174 |
| 2.12 | <i>Cortinarius verrucisporus</i> | 2-175 |
| 2.12.1 | Regulatory Status and Ranking | 2-175 |
| 2.12.2 | Background Information | 2-175 |
| 2.12.3 | Persistence Evaluation..... | 2-177 |
| 2.12.4 | Conclusions | 2-191 |
| 2.13 | <i>Cudonia monticola</i> | 2-192 |
| 2.13.1 | Regulatory Status and Ranking | 2-192 |
| 2.13.2 | Background Information | 2-193 |
| 2.13.3 | Persistence Evaluation..... | 2-194 |
| 2.13.4 | Conclusions | 2-206 |
| 2.14 | <i>Galerina atkinsoniana</i> | 2-207 |
| 2.14.1 | Regulatory Status and Ranking | 2-207 |
| 2.14.2 | Background Information | 2-207 |
| 2.14.3 | Persistence Evaluation..... | 2-209 |
| 2.14.4 | Conclusions | 2-220 |

| | | |
|--------|-------------------------------------|-------|
| 2.15 | Gastroboletus subalpinus | 2-221 |
| 2.15.1 | Regulatory Status and Ranking | 2-221 |
| 2.15.2 | Background Information | 2-221 |
| 2.15.3 | Persistence Evaluation..... | 2-223 |
| 2.15.4 | Conclusions | 2-235 |
| 2.16 | Gomphus clavatus | 2-236 |
| 2.16.1 | Regulatory Status and Ranking | 2-236 |
| 2.16.2 | Background Information | 2-236 |
| 2.16.3 | Persistence Evaluation..... | 2-238 |
| 2.16.4 | Conclusions | 2-249 |
| 2.17 | Gomphus kauffmanii..... | 2-250 |
| 2.17.1 | Regulatory Status and Ranking | 2-250 |
| 2.17.2 | Background Information | 2-250 |
| 2.17.3 | Persistence Evaluation..... | 2-252 |
| 2.17.4 | Conclusions | 2-264 |
| 2.18 | Gymnomyces abietis | 2-265 |
| 2.18.1 | Regulatory Status and Ranking | 2-265 |
| 2.18.2 | Background Information | 2-265 |
| 2.18.3 | Persistence Evaluation..... | 2-267 |
| 2.18.4 | Conclusions | 2-279 |
| 2.19 | Hygrophorus caeruleus | 2-280 |
| 2.19.1 | Regulatory Status and Ranking | 2-280 |
| 2.19.2 | Background Information | 2-281 |
| 2.19.3 | Persistence Evaluation..... | 2-283 |
| 2.19.4 | Conclusions | 2-298 |
| 2.20 | Mycena overholtsii..... | 2-299 |
| 2.20.1 | Regulatory Status and Ranking | 2-299 |
| 2.20.2 | Background Information | 2-299 |
| 2.20.3 | Persistence Evaluation..... | 2-301 |
| 2.20.4 | Conclusions | 2-313 |
| 2.21 | Polyozellus multiplex..... | 2-313 |
| 2.21.1 | Regulatory Status and Ranking | 2-314 |
| 2.21.2 | Background Information | 2-314 |
| 2.21.3 | Persistence Evaluation..... | 2-316 |
| 2.21.4 | Conclusions | 2-326 |
| 2.22 | Ramaria araiospora | 2-327 |
| 2.22.1 | Regulatory Status and Ranking | 2-327 |
| 2.22.2 | Background Information | 2-327 |
| 2.22.3 | Persistence Evaluation..... | 2-329 |
| 2.22.4 | Conclusions | 2-341 |
| 2.23 | Ramaria coulterae | 2-342 |
| 2.23.1 | Regulatory Status and Ranking | 2-342 |
| 2.23.2 | Background Information | 2-342 |

| | | |
|--------|--------------------------------------|-------|
| 2.23.3 | Persistence Evaluation..... | 2-344 |
| 2.23.4 | Conclusions | 2-358 |
| 2.24 | <i>Ramaria rubrievanescens</i> | 2-359 |
| 2.24.1 | Regulatory Status and Ranking | 2-359 |
| 2.24.2 | Background Information | 2-360 |
| 2.24.3 | Persistence Evaluation..... | 2-362 |
| 2.24.4 | Conclusions | 2-373 |
| 2.25 | <i>Ramaria rubripermanens</i> | 2-374 |
| 2.25.1 | Regulatory Status and Ranking | 2-374 |
| 2.25.2 | Background Information | 2-374 |
| 2.25.3 | Persistence Evaluation..... | 2-376 |
| 2.25.4 | Conclusions | 2-388 |
| 2.26 | <i>Rhizopogon truncatus</i> | 2-389 |
| 2.26.1 | Regulatory Status and Ranking | 2-389 |
| 2.26.2 | Background Information | 2-389 |
| 2.26.3 | Persistence Evaluation..... | 2-391 |
| 2.26.4 | Conclusions | 2-403 |
| 2.27 | <i>Sarcodon fuscoindicus</i> | 2-404 |
| 2.27.1 | Regulatory Status and Ranking | 2-404 |
| 2.27.2 | Background Information | 2-404 |
| 2.27.1 | Persistence Evaluation..... | 2-406 |
| 2.27.2 | Conclusions | 2-418 |
| 2.28 | <i>Sedecula pulvinata</i> | 2-419 |
| 2.28.1 | Regulatory Status and Ranking | 2-420 |
| 2.28.2 | Background Information | 2-420 |
| 2.28.3 | Persistence Evaluation..... | 2-422 |
| 2.28.4 | Conclusions | 2-433 |
| 2.29 | <i>Sparassis crispa</i> | 2-434 |
| 2.29.1 | Regulatory Status and Ranking | 2-434 |
| 2.29.2 | Background Information | 2-434 |
| 2.29.3 | Persistence Evaluation..... | 2-436 |
| 2.29.4 | Conclusions | 2-448 |
| 2.30 | <i>Spathularia flavida</i> | 2-449 |
| 2.30.1 | Regulatory Status and Ranking | 2-449 |
| 2.30.2 | Background Information | 2-449 |
| 2.30.3 | Persistence Evaluation..... | 2-451 |
| 2.30.4 | Conclusions | 2-462 |
| 2.31 | <i>Tremiscus helvelloides</i> | 2-463 |
| 2.31.1 | Regulatory Status and Ranking | 2-463 |
| 2.31.2 | Background Information | 2-463 |
| 2.31.3 | Persistence Evaluation..... | 2-465 |
| 2.31.4 | Conclusions | 2-477 |

| | |
|--|------------|
| 3.0 Lichen Species..... | 3-1 |
| 3.1 <i>Chaenotheca subroscida</i> | 3-1 |
| 3.1.1 Regulatory Status and Ranking | 3-1 |
| 3.1.2 Background Information | 3-1 |
| 3.1.3 Persistence Evaluation..... | 3-3 |
| 3.1.4 Conclusions | 3-15 |
| 3.2 <i>Leptogium teretiusculum</i> | 3-16 |
| 3.2.1 Regulatory Status and Ranking | 3-16 |
| 3.2.2 Background Information | 3-16 |
| 3.2.3 Persistence Evaluation..... | 3-18 |
| 3.2.4 Conclusions | 3-29 |
| 4.0 Vascular Plants | 4-1 |
| 4.1 <i>Cypripedium fasciculatum</i> | 4-1 |
| 4.1.1 Regulatory Status and Ranking | 4-1 |
| 4.1.2 Background Information | 4-1 |
| 4.1.3 Persistence Evaluation..... | 4-4 |
| 4.1.4 Conclusions | 4-15 |
| 5.0 Mollusk Species..... | 5-1 |
| 5.1 <i>Deroceras hesperium</i> | 5-1 |
| 5.1.1 Regulatory Status and Ranking | 5-1 |
| 5.1.2 Background Information | 5-1 |
| 5.1.3 Persistence Evaluation..... | 5-3 |
| 5.1.4 Conclusions | 5-15 |
| 5.2 <i>Monadenia chaceana</i> | 5-16 |
| 5.2.1 Regulatory Status and Ranking | 5-16 |
| 5.2.2 Background Information | 5-16 |
| 5.2.3 Persistence Evaluation..... | 5-18 |
| 5.2.4 Conclusions | 5-29 |
| 6.0 Vertebrate Species | 6-1 |
| 6.1 <i>Arborimus longicaudus</i> | 6-1 |
| 6.1.1 Regulatory Status and Ranking | 6-1 |
| 6.1.2 Background Information | 6-1 |
| 6.1.3 Persistence Evaluation..... | 6-3 |
| 6.1.4 Conclusions | 6-15 |
| 6.2 <i>Strix nebulosa</i> | 6-16 |
| 6.2.1 Regulatory Status and Ranking | 6-16 |
| 6.2.2 Background Information | 6-16 |
| 6.2.3 Persistence Evaluation..... | 6-19 |
| 6.2.4 Conclusions | 6-30 |
| 7.0 References | 7-1 |

List of Tables

Chapter 1 Tables

| | |
|---------------|---|
| Table INTRO-1 | Fifth Field Watersheds and Land Allocations Crossed by the Pacific Connector Gas Pipeline on National Forest System Lands |
| Table INTRO-2 | Miles of PCGP Project Corridor on National Forest System Lands by Watershed |
| Table INTRO-3 | Survey and Manage Categories |
| Table INTRO-4 | NFS Lands in Regional, Local, and Project Areas |

Descriptions of Species Tables in Following Document Sections:

| | |
|-----------------|--|
| Table SPECIES-1 | Number of SPECIES Sites (2017) |
| Table SPECIES-2 | Distribution of SPECIES across Federal, Private, and Other Lands |
| Table SPECIES-3 | Distribution of SPECIES across 1994 ROD (NFS) and 2016 RMPs (BLM) Land Allocations |
| Table SPECIES-4 | Extent of Forests that Could Provide Habitat for SPECIES on NFS and BLM Lands |
| Table SPECIES-5 | Distribution of SPECIES in Local 5th Field Watersheds |
| Table SPECIES-6 | Impacts to SPECIES Sites on NFS Lands in the Project Area |
| Table SPECIES-7 | Site-Specific Overview of Impacts to SPECIES Sites (select species only) |

Chapter 2 Species Tables

| | |
|-------------------------------------|--------------|
| Tables ALEL-1 through ALEL-6 | Section 2.1 |
| Tables ARCR-1 through ARCR-5 | Section 2.2 |
| Tables BOPU-1 through BOPU-7..... | Section 2.3 |
| Tables CHAL-1 through CHAL-5 | Section 2.4 |
| Tables CLOC-1 through CLOC-6..... | Section 2.5 |
| Tables CLSA-1 through CLSA-6 | Section 2.6 |
| Tables CLTR-1 through CLTR-6 | Section 2.7 |
| Tables COBA-1 through COBA-6..... | Section 2.8 |
| Tables CORA-1 through CORA-6..... | Section 2.9 |
| Tables COMA-1 through COMA-7 | Section 2.10 |
| Tables COOL-1 through COOL-7 | Section 2.12 |
| Tables COVE-1 through COVE-7 | Section 2.13 |
| Tables CUMO-1 through CUMO-6..... | Section 2.14 |
| Tables GAAT-1 through GAAT-6 | Section 2.15 |
| Tables GASU-1 through GASU-6 | Section 2.16 |
| Tables GOCL-1 through GOCL-6 | Section 2.17 |
| Tables GOKA-1 through GOKA-6..... | Section 2.18 |
| Tables GYAB-1 through GYAB-6 | Section 2.19 |
| Tables HYCA-1 through HYCA-7 | Section 2.20 |
| Tables MYOV-1 through MYOV-6 | Section 2.21 |
| Tables POMU-1 through POMU-6..... | Section 2.22 |
| Tables RAAR-1 through RAAR-6..... | Section 2.23 |
| Tables RACO-1 through RACO-7..... | Section 2.24 |
| Tables RARU5-1 through RARU5-6..... | Section 2.25 |
| Tables RARU6-1 through RARU6-6..... | Section 2.26 |
| Tables RHTR-1 through RHTR-6..... | Section 2.27 |
| Tables SAFU-1 through SAFU-6 | Section 2.28 |
| Tables SEPU-1 through SEPU-6 | Section 2.29 |
| Tables SPCR-1 through SPCR-6 | Section 2.30 |
| Tables SPFL-1 through SPFL-6..... | Section 2.31 |

Tables TRHE-1 through TRHE-6..... Section 2.32

Chapter 3 Species Tables

Tables CHSU-1 through CHSU-6..... Section 3.1
 Tables LETE-1 through LETE-6 Section 3.2

Chapter 4 Species Tables

Tables CYFA-1 through CYFA-6..... Section 4.1

Chapter 5 Species Tables

Tables DEHE-1 through DEHE-6..... Section 5.1
 Tables MOCH-1 through MOCH-6..... Section 5.2

Chapter 6 Species Tables

Tables ARLO-1 through ARLO-6 Section 6.1
 Tables STNE-1 through STNE-6..... Section 6.2

List of Figures

Chapter 1 Figures

Figure INTRO-1 Pacific Connector Gas Pipeline Route on National Forest System Lands
 Figure INTRO-2 Typical Pipeline Construction Corridor with Temporary Extra Work Areas

Descriptions of Species Figures in Following Document Sections:

Figure SPECIES-1 Regional Distribution of SPECIES
 Figure SPECIES-2 Extent of SPECIES Sites in Protected Areas
 Figure SPECIES-3 Forests That May Provide Habitat for SPECIES
 Figure SPECIES-4 Local Distribution of SPECIES
 Figure SPECIES-5, 6, and 7 Location of SPECIES in the Project Area (select species only)

Chapter 2 Species Figures

Figures ALEL-1 through ALEL-4 Section 2.1
 Figures ARCR-1 through ARCR-5..... Section 2.2
 Figures BOPU-1 through BOPU-7 Section 2.3
 Figures CHAL-1 through CHAL-5..... Section 2.4
 Figures CLOC-1 through CLOC-4 Section 2.5
 Figures CLSA-1 through CLSA-4 Section 2.6
 Figures CLTR-1 through CLTR-4 Section 2.7
 Figures COBA-1 through COBA-4 Section 2.8
 Figures CORA-1 through CORA-5 Section 2.9
 Figures COMA-1 through COMA-6 Section 2.10
 Figures COOL-1 through COOL-7..... Section 2.12
 Figures COVE-1 through COVE-6..... Section 2.13
 Figures CUMO-1 through CUMO-4..... Section 2.14
 Figures GAAT-1 through GAAT-4 Section 2.15
 Figures GASU-1 through GASU-5..... Section 2.16
 Figures GOCL-1 through GOCL-4..... Section 2.17
 Figures GOKA-1 through GOKA-4 Section 2.18

Figures GYAB-1 through GYAB-5 Section 2.19
Figures HYCA-1 through HYCA-7 Section 2.20
Figures MYOV-1 through MYOV-4 Section 2.21
Figures POMU-1 through POMU-4 Section 2.22
Figures RAAR-1 through RAAR-4 Section 2.23
Figures RACO-1 through RACO-6 Section 2.24
Figures RARU5-1 through RARU5-4 Section 2.25
Figures RARU6-1 through RARU6-4 Section 2.26
Figures RHTR-1 through RHTR-4 Section 2.27
Figures SAFU-1 through SAFU-5 Section 2.28
Figures SEPU-1 through SEPU-5 Section 2.29
Figures SPCR-1 through SPCR-4 Section 2.30
Figures SPFL-1 through SPFL-4 Section 2.31
Figures TRHE-1 through TRHE-4 Section 2.32

Chapter 3 Species Figures

Figures CHSU-1 through CHSU-4 Section 3.1
Figures LETE-1 through LETE-4 Section 3.2

Chapter 4 Species Figures

Figures CYFA-1 through CYFA-4 Section 4.1

Chapter 5 Species Figures

Figures DEHE-1 through DEHE-4 Section 5.1
Figures MOCH-1 through MOCH-4 Section 5.2

Chapter 6 Species Figures

Figures ARLO-1 through ARLO-4 Section 6.1
Figures STNE-1 through STNE-4 Section 6.2

List of Attachments

Attachment A 2003 S&M List

Attachment B Glossary

Attachment C Spatial Analysis Process for Persistence Evaluation

List of Acronyms/Abbreviations

| | |
|--------------------------------------|--|
| 2001 ROD | <i>Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines</i> |
| ASR | Annual Species Review |
| BLM | U.S. Bureau of Land Management |
| feet msl | feet above mean sea level |
| FME | Feature Manipulation Engine |
| Forest Service | U.S. Department of Agriculture, Forest Service |
| GeoBob | Geographic Biotic Observations, a BLM geodatabase |
| GIS | geographic information systems |
| KOAC | Known Owl Activity Center |
| LSOG | late-successional and old-growth |
| LSR | Late Successional Reserve |
| NFS | National Forest System |
| Northwest Forest Plan or NWFP | <i>Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl and Standards and Guidelines for Management for Late-Successional and Old-Growth Related Species in the Range of the Northern Spotted Owl</i> |
| NRIS | Natural Resource Information System, a Forest Service geodatabase |
| NSO | northern spotted owl |
| ORBIC | Oregon Biodiversity Information Center |
| PCGP Project | Pacific Connector Gas Pipeline Project |
| POD | Plan of Development |
| RMP | Resource Management Plan |
| ROD | Record of Decision |
| ROW | Right-of-Way |
| S&M | Survey and Manage |
| SEIS | Supplemental Environmental Impact Statement |
| TEWA | temporary extra work area |
| TMP | Transportation Management Plan |
| UCSA | uncleared storage area |
| <i>Species Abbreviations:</i> | |
| ALEL | <i>Albatrellus ellisii</i> |
| ARCR | <i>Arcangeliella crassa</i> |
| ARLO | <i>Arborimus longicaudus</i> |
| BOPU | <i>Boletus pulcherrimus</i> |

| | |
|-------|--------------------------------------|
| CHAL | <i>Choiromyces alveolatus</i> |
| CHSU | <i>Chaenotheca subroscida</i> |
| CLOC | <i>Clavariadelphus occidentalis</i> |
| CLSA | <i>Clavariadelphus sachalinensis</i> |
| CLTR | <i>Clavariadelphus truncatus</i> |
| COBA | <i>Collybia bakerensis</i> |
| CORA | <i>Collybia racemosa</i> |
| COMA | <i>Cortinarius magnivelatus</i> |
| COOL | <i>Cortinarius olympianus</i> |
| COVE | <i>Cortinarius verrucisporus</i> |
| CUMO | <i>Cudonia monticola</i> |
| CYFA | <i>Cypridium fasciculatum</i> |
| DEHE | <i>Deroceras hesperium</i> |
| GAAT | <i>Galerina atkinsoniana</i> |
| GASU | <i>Gastroboletus subalpinus</i> |
| GOCL | <i>Gomphus clavatus</i> |
| GOKA | <i>Gomphus kauffmanii</i> |
| GYAB | <i>Gymnomyces abietis</i> |
| HYCA | <i>Hygrophorus caeruleus</i> |
| LETE | <i>Leptogium teretiusculum</i> |
| MOCH | <i>Monadenia chaceana</i> |
| MYOV | <i>Mycena overholtsii</i> |
| POMU | <i>Polyozellus multiplex</i> |
| RAAR | <i>Ramaria araiospora</i> |
| RACO | <i>Ramaria coulterae</i> |
| RARU5 | <i>Ramaria rubrievanescens</i> |
| RARU6 | <i>Ramaria rubripermanens</i> |
| RHTR | <i>Rhizopogon truncatus</i> |
| SAFU | <i>Sarcodon fuscoindicus</i> |
| SEPU | <i>Sedecula pulvinata</i> |
| SPCR | <i>Sparassis crispa</i> |
| SPFL | <i>Spathularia flavida</i> |
| STNE | <i>Strix nebulosa</i> |
| TRHE | <i>Tremiscus helvelloides</i> |

1.0 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

This report analyzes the impacts of the Pacific Connector Gas Pipeline Project (PCGP Project) on Survey and Manage (S&M) species on National Forest System (NFS) lands in southern Oregon. The information presented in this document will be used by:

- U.S. Department of Agriculture, Forest Service (Forest Service) decision-makers to support findings concerning the persistence of S&M species affected by the PCGP Project,
- Forest Service decision-makers in consideration of possible amendments of land management plans related to S&M species, and
- The Federal Energy Regulatory Commission while preparing an Environmental Impact Statement in compliance with the National Environmental Policy Act for construction and operation of the PCGP Project.

The proposed Jordan Cove Liquefied Natural Gas project is not a part of the PCGP Project and would not be located on NFS lands. It is, therefore, not subject to the S&M Standards and Guidelines or Forest Service discretionary actions.

The purpose of this analysis is to determine if the PCGP Project would affect the persistence of any S&M species within the range of the northern spotted owl (NSO) or otherwise not meet the persistence objectives in the 1994 Northwest Forest Plan Record of Decision (ROD) and 2001 S&M ROD to provide reasonable assurance of species persistence. An overview of the PCGP Project, a discussion of relevant planning documents, and a description of the methodology used to conduct the analysis are presented in this chapter.

1.2 PROJECT OVERVIEW

The PCGP Project includes construction of a 230-mile-long, 36-inch diameter high pressure natural gas pipeline that would extend from interconnections with other interstate pipelines near Malin, Oregon to the Jordan Cove natural gas liquefaction and terminal at Coos Bay, Oregon. The proposed route is illustrated on Figure INTRO-1.

The standard construction corridor would be about 95 feet wide, with some locations narrower depending on the work being conducted. Figure INTRO-2 illustrates a typical pipeline construction corridor with a temporary extra work area (TEWA). These TEWAs would be needed in numerous locations to support pipeline installation and facility construction; these areas would be cleared of vegetation and may be graded, but would be restored to pre-disturbance conditions (e.g., similar contours, vegetation) upon completion of construction. Uncleared storage areas (UCSAs) would also be used during construction to store materials, such as downed logs, large boulders and rootwads. Understory vegetation and sapling sized trees may be removed in the UCSAs, but larger trees would not be cut except as needed for safety during construction operations. Upon completion of the construction phase, a 50-foot-wide permanent easement centered on the pipeline would be required for long-term access and maintenance; 30 feet of the permanent easement would be maintained in low growing herbaceous and shrub vegetation to facilitate aerial inspections.

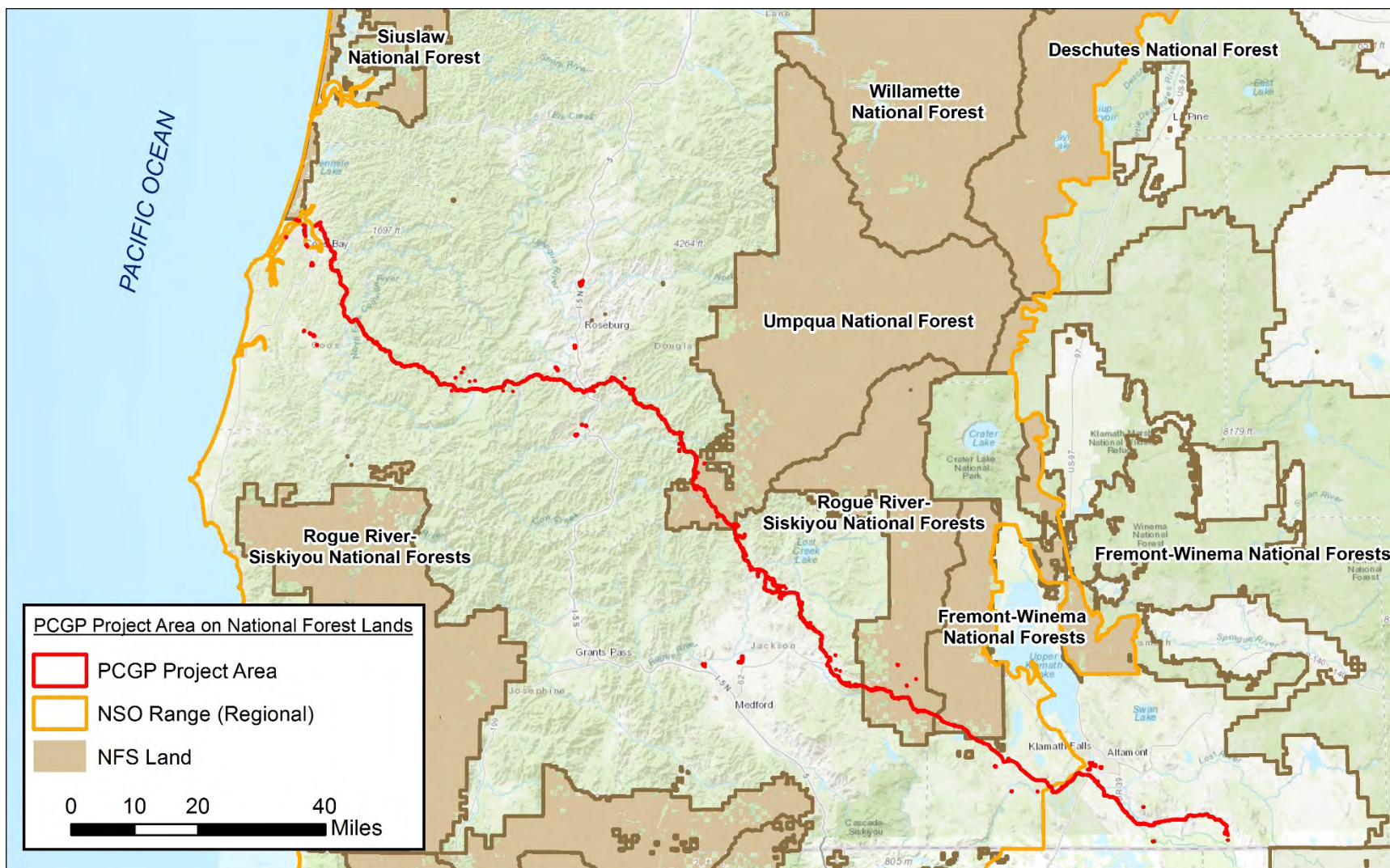


Figure 1. PCGP Project Area on National Forest Lands



Figure INTRO-2. Typical Pipeline Construction Corridor with Temporary Extra Work Areas

Table INTRO-1 displays an overview of the extent of the PCGP Project on NFS lands, and across 18 5th-field watersheds. The construction corridor and TEWAs (i.e., cleared portions) includes approximately 450 acres of NFS lands. The project area, which encompasses both cleared and modified components of the project, includes approximately 620 acres of NFS lands. Table INTRO-2 portrays the number of miles of the Project corridor on NFS lands in each watershed. The Project corridor extends approximately 30.5 miles across NFS lands, including the Umpqua, Rogue River-Siskiyou, and Fremont-Winema National Forests.

The PCGP Project Right-of-Way (ROW) Grant application includes a Plan of Development (POD) which consists of 29 specific exhibits, including the Transportation Management Plan (TMP) that identifies necessary road improvements and maintenance activities to support construction activities and defines new temporary and permanent access roads. Some road improvements and construction would be necessary on federal lands. Road maintenance and improvement/reconstruction, such as spot rocking, grading to remove ruts, resurfacing, culvert replacement, vegetation clearing, dust abatement, danger tree removal, drainage cleanout, road widening, and turnout construction, would be implemented on designated roads to accommodate pipe transportation and heavy construction equipment access to the corridor. These activities would involve a minimal amount of site disturbance and earthwork necessary to make the roads useable for construction access needs. More substantial work, such as surfacing or resurfacing of roads, may be necessary for roads used outside of the normal operating season. No maintenance or improvements will be allowed on any road not authorized for use or approved for improvements.

For purposes of this analysis, the anticipated disturbance area associated with the TMP encompasses a 30-foot-wide corridor along the existing and proposed Forest Service road alignments, some of which fall within the PCGP Project corridor.

| Watershed Unit | Federal Land Allocation | | | | | | | |
|-------------------------------------|-----------------------------|--------------|--------------------------------|-------------|---|------------|--|--------------|
| | LSR Project Area (acres) | | Matrix Project Area (acres) | | Riparian Reserves Project Area (acres) | | All Allocations ³ Project Area (acres) | |
| | Cleared | Modified | Cleared | Modified | Cleared | Modified | Cleared | Modified |
| Big Butte Creek | 0 | 0 | 0 | 4.9 | 0 | 0 | 0 | 4.9 |
| Coos Bay Frontal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| East Fork Coquille River | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Elk Creek-South Umpqua | 23.3 | 3.2 | 3.5 | 1.8 | 0 | 0 | 26.8 | 5.0 |
| Klamath R. – John C Boyle Reservoir | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lake Ewauna-Upper Klamath River | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Little Butte Creek | 205.3 | 88.7 | 0.1 | 0.1 | 0 | 0 | 205.4 | 88.8 |
| Lower Lost River | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Middle Fork Coquille River | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Middle South Umpqua River | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Myrtle Creek | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| North Fork Coquille River | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Olalla Creek-Lookingglass Creek | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rogue River-Shady Cove | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| South Umpqua River | 9.3 | 20.0 | 11.8 | 14.0 | 0 | 0 | 21.1 | 34.0 |
| Spencer Creek | 0 | 0 | 71.0 | 10.0 | 8.6 | 1.7 | 79.6 | 11.7 |
| Trail Creek | 0 | 0 | 41.1 | 20.4 | 0 | 0 | 41.1 | 20.4 |
| Upper Cow Creek | 34.4 | 0.5 | 40.3 | 4.5 | 0 | 0 | 74.7 | 5.0 |
| Total | 272.3 | 112.4 | 167.8 | 55.7 | 8.6 | 1.7 | 448.7 | 169.8 |

| Watershed | Length in Miles | | | |
|------------------------|-----------------|----------------------|----------------|--------------|
| | Umpqua | Rogue River-Siskiyou | Fremont-Winema | Total |
| Elk Creek-South Umpqua | 2.26 | 0 | 0 | 2.26 |
| Little Butte Creek | 0 | 13.72 | 0.01 | 13.73 |
| South Umpqua River | 1.53 | 0 | 0 | 1.53 |
| Spencer Creek | 0 | 0 | 6.04 | 6.04 |
| Trail Creek | 2.10 | 0 | 0 | 2.10 |
| Upper Cow Creek | 4.86 | 0 | 0 | 4.86 |
| Total Length | 10.75 | 13.72 | 6.05 | 30.52 |

A number of exhibits with the POD include design measures developed in consultation with the Forest Service to reduce impacts to lands and resources and comprehensive mitigation plans that may benefit S&M species. Design measures from the POD and additional construction measures that would benefit S&M species include:

- Approximately 2,000 acres of land will be reallocated from the Matrix land allocation to the Late Successional Reserve (LSR) land allocation. This would benefit S&M species because lands allocated as LSR are managed for late-successional and old-growth (LSOG) habitat with which S&M species are typically associated.
- Extensive large woody debris will be placed in Riparian Reserves and managed stands (e.g., plantations) where this material was removed by past management and fuel reduction treatments. Large woody debris will also be placed back on the corridor as part of the overall construction effort. This may benefit S&M species over time because large woody debris is an important habitat element for many S&M species.
- Fuels reductions and fire suppression projects will be implemented along the corridor. Stand-replacement fire has been the primary threat to LSOG habitat on federal lands in the Pacific Northwest (Moer et al. 2011). High intensity stand-replacement fire could adversely affect some S&M species. Fuels reduction and fire suppression projects reduce the probability that high-intensity stand-replacement fire will occur in areas where these activities are implemented.
- Approximately 80 miles of road decommissioning are proposed on federal lands within the 5th field watersheds affected by the PCGP Project. Road decommissioning may benefit LSOG habitat and a number of S&M species over time by re-establishing native vegetation and decreasing habitat fragmentation.
- Precommercial and commercial thinning will be implemented along the corridor. Reducing stand density in overstocked stands may benefit S&M species by accelerating the development of LSOG habitat, particularly with respect to accelerating late-successional stand characteristics, such as larger trees, snags, and a multi-layered canopy.
- Dead and downed woody debris greater than 16 inches in diameter, unmerchantable woody debris, slash (greater than 16 inches in diameter), and large rocks and boulders that are removed from the construction corridor will be stored nearby in UCSAs or TEWAs and used for restoration efforts in temporary disturbance areas to maintain or enhance upland habitat diversity.
- Prior to vegetation clearing activities, snags and large diameter trees on the edge of the removal area will be flagged and protected in place to preserve green tree recruitment and existing and potential snag habitat, where feasible.
- Known locations of populations or individuals of S&M species will be flagged and avoided in UCSAs and other temporary disturbance areas that do not require vegetation removal to avoid removal of the species.
- To minimize impacts to trees within UCSAs, the contractor will leave as much space between the stored material, spoils, or equipment/vehicle and the trees as practical. Operators will be informed about proper placement of materials and equipment in storage areas, such that placement and retrieval of these materials and equipment minimize soil compaction, bark damage, and other disturbance to protected trees.

- In upland forests, the contractor will limit stump removal to the trenchline and areas where grading is necessary to construct a safe level working plane. Minimizing stump removal in upland areas would minimize soil disturbance and erosion potential, increase soil strength by maintaining soil root structure, and provide substrate for fungi and other species.
- In isolated, rugged topographic areas with poor access, helicopter logging may be used. Cable and helicopter logging methods would minimize the potential for soil compaction. When log skidding is used, low-ground pressure vehicles will be used as much as possible, and soil duff layer removal will be avoided. Designated skid trails will be used to restrict soil compaction to a smaller area of the corridor.
- Rutting, compaction, and structural damage will be minimized by scheduling the majority of construction activities during the dry season, from May through October.
- Temporary erosion control devices will be installed immediately after initial disturbance (clearing) and will be properly maintained throughout construction. The devices will be reinstalled as necessary until replaced by permanent erosion control devices or restoration is complete.
- Equipment and vehicles will be cleaned prior to moving them onto the construction corridor to prevent the import and spread of weeds. Also, vegetation clearing and grading equipment will be cleaned if they pass through known noxious weed infestation areas. Pressure washing may be used to clean equipment, if deemed necessary.
- Temporary disturbed areas will be restored to pre-disturbance contours and conditions, to the extent practicable, including replanting of trees and replacement of woody debris, slash, and other woody materials and rocks removed from the area during construction.

1.3 REGULATORY BACKGROUND

1.3.1 Agency Land Management Plans

The 1994 *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl and Standards and Guidelines for Management for Late-Successional and Old-Growth Related Species in the Range of the Northern Spotted Owl* (Northwest Forest Plan; NWFP ROD) amended or was incorporated into BLM and Forest Service land management plans to require certain actions for rare amphibians, mammals, bryophytes, mollusks, vascular plants, fungi, lichens, and arthropods that occupy late-successional and old-growth forests (USDA and USDI 1994). These rare species were identified in Section C of Attachment A to the NWFP ROD collectively as “Survey and Manage” species. The NWFP ROD also established protection buffers on matrix lands for certain species (i.e., protection buffer species) that were not on the 1994 S&M list and required that those buffers be managed as part of the LSR network.

Four survey strategies were developed to guide management of S&M species:

- Manage known sites
- Survey prior to ground-disturbing activities
- Conduct extensive surveys

- Conduct general regional surveys

The NWFP ROD also established overall objectives for managing S&M species populations that were referred to as “persistence objectives.” These objectives were based on the Forest Service viability provision in the 1982 National Forest System Land and Resource Management Planning Regulation for the National Forest Management Act of 1976. This provision is targeted toward vertebrate species, but was also applied to non-vertebrate species, to the extent practicable, as described in the NWFP ROD. It generally states that the Forest Service shall manage habitat “to maintain viable populations of existing native and desired non-native vertebrate species in the planning area” (36 CFR 219.19¹). Although the viability standard is part of the Forest Service planning regulations, the protections for S&M species were also applied to BLM lands in the NWFP ROD with a goal of protecting long-term health and sustainability of all federal forests within the range of the NSO and the species that inhabit them. Because of the uncertainty associated with the continued persistence of species due to natural factors, the NWFP ROD noted that compliance with the planning regulations is not subject to precise numerical interpretations and cannot be fixed at any single threshold; rather, “as in any administrative field, common sense and agency expertise must be applied” (NWFP ROD, p. 44).

In 2001, the *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (2001 ROD; USDA and USDI 2001) modified the management direction provided in the NWFP ROD for S&M and protection buffer species and amended BLM and Forest Service land management plans in the range of the NSO accordingly. For the S&M Standards and Guidelines, the major elements were retained with some restructuring for clarity, and criteria and processes for changing species assignments in the future were developed. The list of S&M species was also modified to remove 72 species in all or part of their ranges because new information indicated they were secure or otherwise did not meet the basic criteria for S&M. Species remaining on the list were assigned to one of six categories (A-F) (see Table INTRO-3), which was based on their level of relative rarity, the ability to reasonably and consistently locate occupied sites during surveys prior to habitat disturbing activities, and the level of information known about the species or group of species. The 2001 ROD also removed the direction specific to protection buffer species, but some of these species were included in the S&M Standards and Guidelines. As part of the 2001 Standards and Guidelines, objectives, criteria, and management direction were defined for each category. Specific criteria were also established to add, remove, or change species categories based on new information and as part of the Annual Species Review (ASR) processes.

In 2016, the BLM approved two new Resource Management Plans RMPs, including the Northwestern and Coastal Oregon RMP and the Southwestern Oregon RMP (USDI 2016a, 2016b). All lands managed by the BLM that occur in the PCGP Project are within the revised RMPs management areas. The past RMPs were developed consistent with the 1994 Northwest Forest Plan and thereby included S&M measures. The 2016 RMPs revises the past RMPs in their entirety and removes all S&M measures, although S&M species would likely still be protected in certain management areas on lands managed by the BLM.

¹ The NWFP was developed under the 1982 planning regulations rather than the current 2012 planning rule.

Although some species covered by the S&M Standards and Guidelines also occur on private land, land managed by the BLM, and areas outside the NSO range, the requirements of the 1994 NWFP and 2001 ROD apply only to lands managed by the Forest Service within the range of the NSO.

| Relative Rarity | Pre-Disturbance Surveys Practical | Pre-Disturbance Surveys Not Practical | Status Undetermined |
|-----------------|---|--|---|
| Rare | <u>Category A</u> - Manage all known sites - Pre-disturbance surveys practical - Strategic surveys necessary | <u>Category B</u> - Manage all known sites - Strategic surveys necessary | <u>Category E</u> - Manage all known sites - Pre-disturbance surveys not applicable - Strategic surveys necessary |
| Uncommon | <u>Category C</u> - Manage high-priority sites - Pre-disturbance surveys practical - Strategic surveys necessary | <u>Category D</u> - Manage high-priority sites - Strategic surveys necessary | <u>Category F</u> - Management of known sites is not required - Pre-disturbance surveys not applicable - Strategic surveys necessary |

Source: USDA and USDI 2001

1.3.2 Litigation and Settlement Agreement Modifications

In 2004 and again in 2007, the BLM and Forest Service issued a ROD to eliminate the S&M requirements of the 2001 ROD and to provide protection for species on the S&M lists by managing them under the agencies' special-status species programs. In 2014, the Court issued a remedy order in the case of *Conservation Northwest et al. v. Bonnie et al.*, No 08-1067-JCC (W.D. Wash.)/No. 11-35729 (9th Circ.). As the latest step in the ongoing litigation challenging the 2007 ROD, this remedy order vacated the 2007 ROD to remove or modify the S&M mitigation measure standards and guidelines, which returned the agencies to the status quo in existence prior to the 2007 ROD. Thus, the 2001 ROD was reinstated, including any amendments or modifications to the 2001 ROD that were in effect as of March 21, 2004, with the exception of the 2003 ASR removal for the red tree vole, returning the species to the category assigned in the 2001 ROD.

In accordance with the 2014 Court decision, this assessment was completed using the 2001 ROD Survey and Manage Standards and Guidelines, with the 2003 ASR modifications for the species list and category assignments. The 2003 list is included as Attachment A and identifies the species considered in this report, based on their documented presence in or near the PCGP Project corridor and associated roads and work areas. Attachment A also includes 12 species that were removed or changed in 2003 ASR, but may require special consideration at this time, as directed in Instruction Memorandum No. OR-2014-037 (USDI 2014). These 12 species have the 2001 ROD category assignments for the purposes of this analysis.

1.3.3 Forest Trends and Effectiveness Monitoring of the Northwest Forest Plan

Based on an analysis of forest trends conducted by Strittholt et al. (2006), old-growth forests (a component of LSOG forests) have experienced a decline over the past couple of centuries as a result of timber harvesting and other activities that have removed old and mature trees. Old-growth forests (defined as forests greater than 150 years old by Strittholt et al. 2006; note that this definition deviates slightly from the 2001 ROD definition for old-growth) encompassed an estimated 16.1 million hectares in the Pacific Northwest during the 1800s. By 2000, the extent of

old-growth forests had declined by an estimated 70 percent, totaling approximately 4.7 million hectares. Since the inception of the Northwest Forest Plan, and based on an analysis of LSOG forest trends conducted by Davis et al. (2015), LSOG forests have declined between 2 and 3 percent on federal-managed lands and between 11 and 18 percent on other land ownerships (Davis et al. 2015). LSOG forests are defined as medium and large older forest with greater than 10 percent canopy cover and conifer trees with diameters larger than 20 inches (2001 ROD). These declines are primarily a result of wildfire on federal-managed lands and a result of timber harvest on other lands. An estimated 10.6 million acres of LSOG forests existed in the NSO range in 2012, with 69 percent of this area located on federal-managed lands (Davis et al. 2015). These analyses of forest trends generally demonstrate that older, mature forests have declined across the Pacific Northwest over the past 200 years, with a slower decline in LSOG forests since 1994.

1.3.4 Management Recommendations

The Forest Service has developed management recommendations for most S&M species or groups of species, and additional research on many species has generated useful background information on the species to aid in management decisions. In addition, conservation assessments have been prepared for many species to update information and management recommendations for the species. Management recommendations are documents developed by taxa experts and land managers that provide guidance about conserving S&M species and direction on managing known sites. The documents describe what is known about the habitat or life history requirements of the species and discuss management recommendations that correspond with the level of protection intended in the Standards and Guidelines of the respective agency's land management plans. The management recommendations identify management goals and objectives and general or specific direction or requirements for species, depending on the amount of information known about the species. For some species, specific information may be identified on sizes (e.g., width) of buffers to be applied to a known location of a species and what management activities are appropriate for maintaining one or more habitat components. Some recommendations may also allow loss of some individuals, areas, or elements not affecting continued site occupancy. In many cases, the need for more information and research is identified to further refine the management recommendations, support management of known sites, identify high-priority sites, and identify survey priorities.

1.3.5 Proposed Amendment of Land Management Plans

Management recommendations for S&M species generally require protection of known sites. Because of construction requirements and the linear nature of pipelines (see Figure INTRO-1), it is not possible for the PCGP Project to comply with the Forest Service land management plans as proposed in the draft ROW Grant application. Therefore if the PCGP Project is certificated by the Federal Energy Regulatory Commission, the Forest Service is proposing an amendment to its land management plans to waive the Management Recommendations that require protection of known S&M species sites within the PCGP Project corridor on the Umpqua, Rogue River-Siskiyou, and Fremont-Winema National Forests in order to make provision for the PCGP Project. This proposed amendment is specific to the actions that could be authorized by the Forest Service under a ROW Grant and would not remove or change species to which the S&M Standards and Guidelines apply or change species categories. The proposed amendments to the land management plans would not exempt the Forest Service from the requirements of the 2001 S&M ROD to maintain species persistence within the range of the NSO. If a reasonable assurance of species

persistence is not maintained, the agencies would require avoidance of sites where the species is found or would decline to adopt the land management plans amendments.

1.4 OTHER LISTING AND SPECIES STATUS CATEGORIES

In addition to the S&M status, the state (Oregon), federal, and global listing statuses of each species was reviewed to assist with the discussion on the rarity of each species in support of the persistence evaluation. In Oregon, the Oregon Department of Fish and Wildlife maintains a list of native fish and wildlife species that meet the state requirements for listing as threatened and endangered (OAR 635-100-0105), and the Oregon Department of Agriculture maintains a list of threatened and endangered plant species (ORS 564.105 and OAR 603-073). The U.S. Fish and Wildlife Service maintains lists of threatened and endangered plant and wildlife species that are protected under the Endangered Species Act (50 CFR 17.11 and 17.12). The BLM and Forest Service also have lists of species considered “sensitive” on their lands, which are managed in accordance with Section 2670 of the Forest Service Manual and Section 6840 of the BLM Manual. NatureServe and local natural heritage or conservation centers also identify state and global rankings for species based on their known ranges and distributions and information provided by state and federal agencies. The Oregon Biodiversity Information Center (ORBIC) evaluates the NatureServe ranks and further refines the data for state application by placing species on their Lists 1 to 4. List 1 species are threatened with extinction; List 2 species are threatened with extirpation; List 3 species require more information; and List 4 species are of conservation concern. The BLM and Forest Service use these lists to identify Sensitive and Strategic species; List 1 and 2 species are considered Sensitive, and List 3 species are considered Strategic. Definitions of the state and global ranking systems and the list categories are available on the ORBIC website (<http://inr.oregonstate.edu/orbic>). None of the species on the S&M list are listed under the Endangered Species Act, but several species are considered Strategic species by the BLM or Forest Service.

1.5 METHODOLOGY FOR PERSISTENCE EVALUATION

This section presents an overview of the species evaluations and summarizes the methodology used to evaluate the effects of the PCGP Project on S&M species and determine if the PCGP Project would threaten species persistence of each affected species in the NSO range. The S&M species considered in this report are listed in Attachment A; these species have sites documented on Forest Service lands within the analysis areas used for the persistence evaluation (additional details on the analysis areas are provided in Section 1.5.5 below). Key terms used throughout this report are defined in the Glossary in Attachment B. Additional information on the spatial analysis processes and geographic information systems (GIS) data used to conduct the analysis is provided in Attachment C.

1.5.1 Format of Species Sections

Each S&M species considered in this report has its own section that consists of the following subsections (each subsection serves a specific purpose to support the evaluation, as noted below):

- **Regulatory Status and Ranking:** presents the S&M status of the species, as well as global and state (Oregon) rankings and other agency statuses that help demonstrate how rare or common the species appears to be.

- **Background Information:** includes descriptions of the species' life history, known range, population status, habitat requirements, threats, and management recommendations; this information captures what has been published or previously documented about the species, including recent survey results specific to the PCGP Project, and presents the previously known information (or information available prior to conducting the analyses).
- **Persistence Evaluation:** discusses the distribution of the species using the most current information on sites, evaluates impacts to sites from the PCGP Project, and summarizes the information on distributions and impacts to support the determinations made for each species; the distribution information, in combination with the background information, was used to determine the need for a more focused analysis.
- **Conclusions:** presents a determination regarding whether remaining sites (i.e., those not affected by the PCGP Project and that would persist in or near the project area following project implementation) would provide a reasonable assurance of species persistence in the NSO range; when applicable, recommendations for avoiding or minimizing disturbance in sites are presented to protect sites that may be needed to provide a reasonable assurance of species persistence.

1.5.2 Data Sources

Background research was conducted on each species considered in this analysis to describe its known range, habitat requirements, life history, threats, population status, and other relevant information. The type of information collected was based on evaluation criteria presented in the 2001 ROD for assessing the level of concern or relative rarity of a species. This information was presented in the "Background Information" section for each species. The primary sources of information include agency handbooks, species factsheets, management recommendations, conservation assessments, and annual species reviews for S&M species; journal articles; ORBIC species accounts; and other species descriptions available on the Internet. Much of the information presented in the species descriptions was compiled from previous work done by Pacific Connector (the project applicant).

The 2001 ROD, BLM and Forest Service Sensitive species lists, and ORBIC website were reviewed to determine current regulatory status and rankings of each species. Each species' status and ranking were presented in the "Regulatory Status and Ranking" section and used to discuss how rare or common the species is.

GIS data were also compiled from Forest Service and BLM geodatabases (NRIS and GeoBob, respectively) to discuss the distribution of each species for the "Persistence Evaluation" section. These data are based on the results of surveys conducted over the past 20-plus years and include new information on species locations that was not available during ASRs. It should be noted, however, that the data only include observations that have been recorded and entered into the geodatabases and are not intended to provide information on the population status of the species. For example, observations of some species may have been made incidentally or outside of formal surveys (e.g., by mushroom collectors or enthusiasts) and are not necessarily included in the geodatabases. Also, surveys have not been conducted extensively across the NSO range for most species, and detectability of some species (e.g., fungi, lichens) can affect observations of the species, even with formal surveys. Specific survey limitations for fungi result from the species

not necessarily fruiting each year and the deviations in seasons when the various S&M fungi may fruit, requiring surveys throughout the year and over the course of several years to obtain the best information on their locations. Pre-disturbance surveys for many species were also not required prior to 2011 (for fungi) and 2006 (for bryophytes and lichens). The geodatabase data only reflect where observations of species have been recorded, and it is likely that many species may be found in other previously unsurveyed locations or even where surveys have been conducted, but at the wrong time.

The agency geodatabase data were converted into sites using a GIS-based tool, as discussed in Section 1.5.4 Spatial Analyses. Additional GIS data were used to map forests and evaluate the distribution of the species across different land ownerships and land use allocations on NFS and BLM lands (see Attachment C for list of key data used). This information was also presented in the “Persistence Evaluation” section.

1.5.3 Project Surveys

The project proponent retained Siskiyou BioSurvey LLC to conduct surveys for S&M species on federal lands in the PCGP Project area between 2007–2008 and 2010–2016. Surveys were conducted by qualified botanists and biologists, trained in the taxonomy and identification of the target species, and vouchers or specimens of the observed species were submitted to the agencies for verification. These surveys were based on the S&M lists and survey requirements in effect at the time of the survey, and incidental observations of species not requiring surveys were also recorded. All surveys were consistent with the 2001 S&M list and established protocol, which is the most inclusive list out of all the versions as a result of ASRs and litigation. An overview of the methodology for surveys for each group of species is presented below, and additional details on the survey areas and other details are available in the reports prepared by Edge Environmental (2011, 2013), Siskiyou BioSurvey LLC (2008, 2011a-c, 2012a-b), and Whiteman (2013, 2015, 2016). More recent observation data is available as unpublished data (Siskiyou BioSurvey 2016a). Results of the surveys are presented as part of the discussion of population status in the “Background Information” section for each species in this report, and the observations resulting from these surveys were compiled in agency geodatabases, after verification of the species observations by the agencies, and converted to sites for use in the “Persistence Evaluation” section. Agency botanists, biologists, and specialists in S&M species provided direction on the survey protocol and reviewed the results of the surveys.

Fungi

Surveys for one Category A fungus (*Bridgeoporus nobilissimus*) were conducted, along with surveys for vascular and non-vascular plants, between spring of 2007 and the fall of 2008 on approximately 1,331 acres within the Coos Bay and Roseburg BLM Districts (Siskiyou BioSurvey LLC 2008). Between 2010 and 2012, 2-year equivalent effort surveys were conducted for Category B fungi in old-growth coniferous forest to satisfy the requirements of the 2001 ROD (Siskiyou BioSurvey LLC 2012a). Additional surveys for Category B fungi were conducted between 2013 and 2016 in locations where the project was re-routed. All fungi surveys were conducted according to the protocols described in *Sporocarp Survey Protocol for Macrofungi, Version 1.0* (for 2007–2008 surveys) and *Survey & Manage Category B Fungi Equivalent-Effort Survey Protocol, Version 1.0* (for 2010–2016 surveys) (Van Norman et al. 2008, 2012). Surveys were conducted within old-growth stands in the PCGP Project area and within a 100-foot buffer

of habitat removal areas, creating a survey unit width that ranged generally from 250 to 300 feet. Old-growth stands were defined as those stands equal to or older than 180 years that have met the generally accepted definition of “old-growth” forest found in the 2001 ROD. Approximately 565 acres within about 43 survey units were surveyed: 181 acres within the Umpqua National Forest, 146 acres within the Rogue River-Siskiyou National Forest, 57 acres within the Fremont-Winema National Forest, and 181 acres within BLM lands.

Additional persistence surveys were conducted for fungus species that were determined to be rare at a watershed level or were determined to be rare within the range of the NSO. Persistence surveys included several levels, ranging from 100-meter evaluations around identified “rare” fungi to extensive surveys in LSRs to augment information about selected species. Persistence surveys were conducted in 44 areas adjacent to the project area, on LSR lands near the project area, and in the Cascade-Siskiyou National Monument.

Lichen

Surveys for Category A, B, and C lichen were conducted between spring 2007 and the end of 2008 on approximately 7,900 acres (Siskiyou BioSurvey LLC 2008a). Additional surveys were conducted in 2010, 2015, and 2016 to survey the modified areas of the PCGP Project area not previously surveyed, to verify locations of previously recorded occurrences, and to conduct persistence surveys for some species, as done for the fungi (Siskiyou BioSurvey LLC 2011a, 2016a [unpublished data]). Surveys were conducted in accordance with *Survey Protocols for Survey and Manage Category A & C Lichens in the Northwest Forest Plan Area, Version 2.1* (Derr et al. 2003). Full coverage complete surveys were conducted within the PCGP Project area, and the intuitive-controlled method was used within suitable habitat in the PCGP Project area and within 200 feet of habitat removal and within 50 feet on either side of proposed TMP access roads. The persistence surveys were conducted for certain species (i.e., those that were determined to be locally or regionally rare) in suitable habitat within 0.25-mile around the documented population or observation in the survey area.

Bryophytes

Surveys for bryophyte species were conducted on approximately 7,900 acres in the PCGP Project area, focusing on BLM and Forest Service Sensitive species, but also targeting S&M bryophyte species (Siskiyou BioSurvey LLC 2008). Additional surveys were conducted in 2010, 2015, and 2016 to survey the modified areas of the PCGP Project area not previously surveyed (Siskiyou BioSurvey LLC 2011a, 2016a [unpublished data]). Surveys were conducted within suitable habitat in the PCGP Project area and within 200 feet of habitat removal and within 50 feet on either side of proposed TMP access roads. No bryophytes on the 2001 S&M list were found in the surveyed areas.

Vascular Plants

Surveys for special-status vascular plants, including S&M plants, were conducted on approximately 7,900 acres between spring 2007 and the end of 2008 (Siskiyou BioSurvey LLC 2008). Additional surveys were conducted in 2010, 2015, and 2016 to survey the modified areas of the PCGP Project area not previously surveyed, to verify locations of previously recorded occurrences, and to conduct persistence surveys for wayside aster (*Eucephalus vialis*) within 0.25 mile of the previously documented occurrence (Siskiyou BioSurvey LLC 2011a, 2016a

[unpublished data]). Surveys were conducted according to *Survey Protocols for Survey and Manage Strategy 2 Vascular Plants (Version 2.0)* (Whitaker et al. 1998). Full coverage complete surveys were conducted within the PCGP Project area, and the intuitive-controlled method was used in suitable habitat in the PCGP Project area and within 200 feet of habitat removal, as well as within 50 feet on either side of proposed access roads.

Mollusks

Surveys for Category A and B mollusks were conducted on approximately 1,561 acres in 2007, including one spring visit and one fall visit (Siskiyou BioSurvey LLC 2008b). Additional surveys were conducted in areas modified in the PCGP Project area in 2010, 2013, and 2014 on approximately 290 acres in 17 survey units (Whiteman 2013, 2015, 2016). The surveys were conducted within suitable habitat in the PCGP Project area and within 100 feet of habitat removal in accordance with the *Survey Protocol for Survey and Manage Terrestrial Mollusk Species from the Northwest Forest Plan, Version 3.0* (Duncan et al. 2003).

Great Gray Owl

Surveys for great gray owls were conducted in suitable habitat in the PCGP Project area in accordance with the *Survey Protocol for the Great Gray Owl within the Range of the Northwest Forest Plan, Version 3.0* (Quintana-Coyer et al. 2004). Within the PCGP Project area, suitable habitat generally occurs east of the Coos County/Douglas County border. Six visits were conducted each year for two years, between March 24 and July 15, 2007 and March 21 and July 9, 2008, within 22 survey areas on approximately 4,442 acres (Siskiyou BioSurvey LLC 2008). Additional surveys were conducted in 2010 and 2011 on approximately 131 acres (two survey units) in suitable habitat associated with modified portions of the PCGP Project area that were not previously surveyed (Siskiyou BioSurvey LLC 2011c). Surveys in 2010 were initiated too late in the season (June); therefore, only three visits between May 15 and July 15 were conducted. The 2011 Settlement Agreement identified a revised survey protocol for great gray owls that only required six visits for one year, rather than two years; thus, the 2011 surveys consisted of six visits within each unit to complete the survey effort.

Red Tree Vole

Surveys for red tree voles were conducted in 2007 in the xeric biological zone in the PCGP Project area and within a 150-foot buffer of the project corridor on approximately 314 acres in the Medford BLM District and on the Umpqua National Forest (Siskiyou BioSurvey LLC 2008a). Surveys were conducted in accordance with the *Survey Protocol for the Red Tree Vole, Version 2.1* (Biswell et al. 2002). Version 2.2 of the survey protocol was completed in 2003, and it released six watersheds from pre-disturbance requirements; these watersheds are not crossed by the PCGP Project corridor. The purpose of the surveys was to identify active and inactive nests in and near the project area. Where potential nest sites were identified in trees during ground survey efforts, the trees were climbed to verify the status of the nest (i.e., active, inactive, other). Surveys for the “mesic biological zone” were initiated in the PCGP Project area and within a 150-foot buffer in 2010 after S&M litigation (December 2009) required red tree vole surveys in the mesic zone. Surveys in the mesic biological zone were conducted between September 2010 and June 2012 on approximately 825 acres within 43 survey units in the Coos Bay and Roseburg BLM Districts and on the Umpqua National Forest (Siskiyou BioSurvey LLC 2012b). Additional surveys in both the mesic and xeric zones were completed during 2015 and 2016 (Siskiyou Biosurvey LLC 2016b).

1.5.4 Spatial Analysis

The BLM and Forest Service maintain geodatabases of recorded S&M and sensitive species observations in California, Oregon, and Washington (geodatabases are referred to as GeoBob and NRIS, respectively). The BLM spatial data include point files of collections (for flora) and observations (for fauna) and polygon files of buffered observations (for flora) and nest sites or other important areas (for fauna). The Forest Service spatial data include polygon files for flora and fauna species observations, based on a buffer around a recorded observation (generally 10 meters to account for spatial accuracy). These data were standardized for use in this analysis by converting the original observation data into a polygon geodatabase feature to establish sites using a Feature Manipulation Engine (FME) tool; additional details on this process is provided in Attachment C and can be obtained from the agencies upon request. Within each site, multiple points or observations may have been recorded, and the converted polygon encompasses observations that are in close proximity to one another. The sizes of sites vary based on the proximity and size of the original observation data and the buffer distance around the original data, which is consistent with the buffers used in annual species reviews and other planning and analysis purposes over the past 12 years. These buffers include 50 meters (164 feet) around original data for fungi, lichens, bryophytes, plants, and red-tree vole; 36 meters (120 feet) for amphibians; and no buffer for mollusks. Overlapping buffers were dissolved or combined using the tool to create a single site for observations within the overlapping polygons. Using this method, the sizes and shapes of sites vary for each species and depend on the proximity of observations to one another.

The FME tool was not used to create sites for great gray owl due to the large amount of incidental observations that may not constitute true sites. Instead, guidance was followed from the great gray owl survey protocol (Huff and Godwin 2016) to select observations that would be considered a great gray owl site (e.g., documented reproduction, repeated male and female siting). When available, great gray owl polygons representing the extent of a known site were used. When only point observation data was available, the points were buffered 0.25-mile to create the site. Additional information is provided in Attachment C: Spatial Analysis Process.

The site data was modified to remove sites that were in the destructive areas of the Stouts Creek Fire. The fire occurred in Douglas County during the summer of 2015 and encompassed approximately 13.4 linear miles of the PCGP Project. Fire impacts were determined by utilizing Burned Area Reflectance Classification data. This satellite-derived layer of post-fire vegetation conditions classifies data into four categories of fire severity, including low/unburned, low, moderate, and high. These data were then used to develop an input for burn severity mapping produced by Burned Area Emergency Response (BAER) teams (Silva 2015). A combination of field surveys², discussions with BLM and Forest Service natural resource specialists, and BAER reports confirmed that the moderate and high severity classification represent a stand replacement fire event. Additionally, field surveys established which portions of LSRs crossed by the PCGP Project were impacted by the fire. Based on these data, it is presumed that S&M sites in areas of moderate or high severity classifications, as refined by field surveys within the PCGP Project area, are no longer viable and would not contribute towards each species persistence. Therefore, these sites were removed from the overall site dataset for the purposes of the persistence evaluation.

² Personnel from North State Resources, Inc. surveyed the pipeline alignment within the fire area during November 2015.

For all species except red tree vole, the resulting polygon site data (FME sites) were used for the persistence evaluation and were further queried using other available GIS data, such as land allocations, reserve boundaries, ownership, project data, and vegetation/forest cover layers. The FME sites for red tree vole were further modified according to the management recommendations for the species (Forest Service and BLM 2001). Those sites within 100 meters of the project area were modified to establish habitat areas around active and undetermined nest sites using the original observation data from NRIS and GeoBOB. Guidance from the management recommendations on how to define habitat areas was used to create new polygons, which were then used for the analysis of impacts on red tree vole sites.

Forest Service land use allocation data were obtained from the Forest Service Regional Ecosystems Office using a GIS dataset that was developed in 2009 and included land allocations consistent with the NWFP ROD for federal lands in the NSO range. Although more recent data are available for some NFS lands, the 2009 regional data provide sufficient representation of the different land allocations for purposes of this analysis and represent the best information available to the agencies that is applicable at the scales used in the analysis (i.e., regional, local, analysis, project, as defined below) and consistent with the NWFP ROD allocations.

The 2009 land use allocation data were used to identify reserve lands, which were defined as NFS lands with allocations of Congressionally Reserved (e.g., Wilderness) or Late Successional Reserve (LSR) (including occupied marbled murrelet stands [LSR3] and known owl activity centers [KOAC, LSR4]), as recognized and defined in the 1994 ROD, in combination with the National Hydrography Dataset from the U.S. Geological Survey, which was used to map Riparian Reserves across the NSO range. Regional datasets of Riparian Reserves were not available from the Forest Service for this analysis, although each Forest Service management unit has a unique GIS layer used to portray Riparian Reserves; albeit at various scales and degrees of field verification. For consistency at multiple scales, and across the various Forest Service management units, this analysis used the National Hydrography Dataset to determine locations of Riparian Reserves; this dataset was clipped to only cover those lands in the Other/Matrix allocation of the regional land allocation dataset. Using this approach, the extent of Riparian Reserves may be underestimated across the region.

BLM land use allocation data were obtained from a 2016 final EIS dataset associated with the 2016 BLM RMPs (USDI 2016a, 2016b). The 2016 BLM RMPs supersede the NWFP on all BLM lands across the project area, and sites on BLM lands are no longer protected under S&M Standards and Guidelines. However, it is likely that sites located entirely in BLM reserves receive some level of protection due to the land preservation that occurs with management of LSRs, Congressional Reserves, District Designated Reserves, and Riparian Reserves. All observational data, regardless of the management agency or land ownership, was considered when determining if a species would persist. The observations on BLM lands are particularly important in determining persistence when the species is generally uncommon on NFS lands but abundant on BLM lands. The BLM land use data was used to determine the likelihood that certain sites would remain protected and therefore contribute to the species overall population numbers, distribution, and persistence.

Original vegetation data from the Landscape Ecology, Modeling, Mapping, and Analysis team (Forest Service and Oregon State University staff) were used to map and estimate the extent of forests across the NSO range. These data had been used for the Northwest Forest Plan

Effectiveness Monitoring 15-year report to map LSOG forests (Moeur et al. 2011) and provided a consistent dataset for mapping forests across the NSO range. Because each S&M species has narrower habitat requirements, the extent and distribution of forests that could provide habitat for the species using the vegetation data is much greater than where the species' habitat is likely found. Regional data were not available to accurately map or estimate all types of potential habitat or specific microsite conditions that are preferred by S&M species, such as moist understories, closed or open canopies, or wet areas. Digital elevation models from the U.S. Geological Survey were also used to obtain elevation information about the locations of sites in the NSO range and to map and estimate the extent of forests at different elevation ranges, depending on the species' general habitat requirements. A list of key datasets used for the analysis is included in Attachment C, and a complete list of GIS data used for the analysis is part of the Project Record.

1.5.5 Evaluation of Persistence

This report is intended to present the facts, evaluate the evidence, and draw conclusions on the impacts of the PCGP Project with respect to the persistence objectives for S&M species defined in the 2001 ROD, as modified by the 2003 ASR. The Forest Service will use the information provided in this report to make a persistence finding for each species potentially affected by the PCGP Project in their decision documents. The intent of this evaluation is to determine the extent of the PCGP Project's effects on S&M species, specifically through the quantification of the number of sites and acreage of forests affected by project-related activities and the effects on the distribution of the species and potential habitat within the NSO range. The extent of impacts on sites and the species found within those sites was considered in combination with background and new information on the species to determine if remaining sites (i.e., those not affected by the PCGP Project and that would persist in or near the project area following project implementation) would provide a reasonable assurance of species persistence in the NSO range.

Evaluation Factors

The 2001 ROD outlines criteria to consider during ASRs and regional reviews of the status of species to assess the level of concern for persistence of a species and the relative rarity of a species for which a concern has been identified. Although the criteria themselves support a different purpose, they were used as guidance to present applicable information in support of the conclusions made for each species regarding the reasonable assurance of species persistence. The 2001 ROD does not provide a clearly defined process to analyze project-level impacts on species persistence, nor could a project-level analysis develop the type of information needed to address those criteria in the ROD at their intended scale. This analysis seeks to determine whether sites of S&M species affected by the PCGP Project would continue to provide a reasonable assurance of persistence in the NSO range if the PCGP Project is constructed. Accordingly, the Forest Service adapted the criteria from the ROD to address that question at the project scale. It is important to note that this persistence evaluation is not intended to lead to a change in category for any species or the removal of any species from the S&M list. Although new information available for this evaluation (e.g., survey results, sites generated by the FME tool) may demonstrate that a species appears to be more common than when it was last addressed in an ASR, additional assessment and determinations through an ASR process would be necessary to modify the species' S&M status.

The 2001 ROD criteria used to assess the concern for persistence include:

- Criteria indicating a concern for persistence³:
 - Low-to-moderate number of likely extant known sites/records in all or part of a species range.
 - Low-to-moderate number of individuals.
 - Low-to-moderate number of individuals at most sites or in most populations.
 - Very-limited to somewhat-limited range.
 - Very-limited to somewhat-limited habitat.
 - Distribution within habitat is spotty or unpredictable in at least part of its range.
- Criteria indicating little or no concern for persistence⁴:
 - Moderate-to-high number of likely extant sites/records.
 - High proportion of sites and habitat in reserve land allocations; or limited number of sites within reserves, but the proportion or amount of potential habitat within reserves is high and there is a high probability that the habitat is occupied.
 - Sites are relatively well distributed within the species range.
 - Matrix Standards and Guidelines or other elements of the NWFP (e.g., LSR and Riparian Reserves Standards and Guidelines) provide a reasonable assurance of species persistence.

The 2001 ROD criteria used to assess relative rarity include:

- A species may be “rare” if it has:
 - A limited distribution,
 - A low number of sites (or individuals per site),
 - Highly specialized habitat requirements,
 - Declining habitat or population trends,
 - Reproductive characteristics that limit population growth rates,
 - Restricted distribution pattern relative to range or potential habitat, and/or
 - Narrow ecological amplitude.
- A species may be “uncommon” if it has:
 - A more widespread distribution,
 - A higher number of sites,
 - A low-to-high number of individuals per site,
 - More stable populations or habitats,
 - Less restricted distribution pattern relative to range or potential habitat, and
 - Moderate-to-broad ecological amplitude.

³ Per the 2001 ROD, one or more of the criteria, which are to be considered in the context of the reserve system and other standards and guidelines of the Northwest Forest Plan, may indicate a concern for species persistence. The criteria must be considered aside from the Survey and Manage provisions and must apply within the Northwest Forest Plan area.

⁴ Per the 2001 ROD, usually, most of the criteria need to be met to indicate that a concern for persistence does not exist. These criteria must apply within the Northwest Forest Plan area.

To support the project-level analysis of species persistence for the PCGP Project, background and current information on each S&M species that could be affected by the project was compiled and presented to address the following factors derived from the above criteria:

- Range of the species, in terms of being locally endemic or found globally;
- Rarity status or rankings across its range within the NSO range as well as globally and across Oregon;
- Relative distribution of the species across its known range based on agency geodatabases;
- Current range or distribution compared with known information on historical range or distribution;
- Distribution patterns across the range of the NSO, locally, and in and near the project area, in terms of being well distributed or spotty and unpredictable;
- Locations of NFS sites on Matrix versus reserve lands (i.e., proportion of NFS sites in reserves) and on NFS lands versus private, BLM, or other lands at different scales (regional, local, project);
- Locations of sites on BLM lands that are entirely in BLM reserves (i.e., proportion of BLM sites in reserves);
- Stability of known populations and normal fluctuation patterns;
- Risk factors or threats to populations; and
- Extent of forests that could provide habitat across different scales (regional, local, project) and proportion of those forests in reserve land allocations⁵.

Incomplete or Unavailable Information

This analysis was conducted using the best available information and data on S&M species for the factors listed in the previous section. Council on Environmental Quality regulations 40 CFR 1502.22 require a discussion of incomplete or unavailable information. Information was unavailable for:

- **Total populations of S&M species beyond those represented in the geodatabases of the agencies used in this report.** Although a statistically reliable region-wide survey has been done for most of the S&M species, the results of those surveys have not been biologically interpreted, and the results have not yet been published. In absence of a published interpretation of the results of those regional surveys, this assessment relies on the known sites of affected species that have been inventoried and recorded in the known site geodatabases of the BLM and Forest Service. This data constitutes “best available information” for populations of S&M species.
- **Total acres of the specialized microsites and habitats used by certain S&M species.** This analysis was completed using geodatabase records of observations (i.e., “known

⁵ Data, such as microsite-level habitat conditions, were not available at the regional scale to accurately map or estimate the extent of habitat for each species. The best available regional data of forest cover were used to map general habitat or forests that could provide habitat for the species, which overestimates the extent of potential habitat.

sites”), regionally available vegetation inventory data, and evaluation criteria developed from the 2001 ROD. In many cases, S&M species rely on specialized habitats that may not be catalogued in agency geodatabase records or vegetation inventories. This is one of the reasons why pre-project surveys are required for S&M species. Habitat requirements for each of the species considered are discussed in detail in each species’ section, to the extent the information is available from previous literature. In this assessment, estimates are provided of the general forests where specialized habitats may be found, but these should not be interpreted as the actual acres of available specialized habitats; the actual acres of available specialized habitats are typically a fraction of the general forest description. For example, some mollusks rely on moist microsites found in late-successional coniferous forests. A regional inventory of late-successional coniferous forests is available, but a regional inventory of moist microsites is not; many, many more acres of late-successional forests exist than acres of moist microsites within those forests. This assessment identifies sites and broad habitat classifications such as “late-successional coniferous forests below 6,000 feet” where specialized habitats and the species in question may be found, but makes no estimates of, nor does the analysis rely on, estimates of specialized habitats that may exist within those broad vegetation categories.

- **Recovery of occupied sites after disturbance.** S&M species are by definition associated with LSOG forests. The construction corridor and TEWAs will be reforested and replanted with native vegetation similar to what occupied the project area prior to disturbance. It will be at least 80 years before those areas provide late-successional habitat. A 30-foot-wide maintenance corridor centered along the pipeline would be maintained in low growing brush and grass vegetation (no trees) for the life of the project. When the project is decommissioned, it would be an additional 80 years before this strip provides late-successional stand characteristics. Information is not generally available as to how quickly, or if the affected S&M species will, reoccupy these areas. This analysis presumes that if the “site” is within the construction clearing or TEWAs, the project would result in a long-term loss of that site. This analysis does not speculate on when or if the affected species may reoccupy the site.

Areas Used for Analysis

The regional area discussed in this report for purposes of analyzing the distribution patterns of each species and forests that could provide habitat in the range of the NSO, which encompasses approximately 58.2 million acres (23.6 million hectares), including 19.7 million acres of NFS lands, in western Washington, western Oregon, and northwestern California (see Table INTRO-4 for overview of areas). The focus of the regional distribution is on the currently known species’ range, which is generally where sites have been documented, within the NSO range. The local area includes the following 5th-field watersheds that overlap the PCGP Project area (presented alphabetically in this report): Big Butte Creek, Coos Bay Frontal, East Fork Coquille River, Elk Creek-South Umpqua, Klamath River-John C. Boyle Reservoir, Lake Ewauna-Upper Klamath River, Little Butte Creek, Lower Lost River, Middle Fork Coquille River, Middle South Umpqua River, Myrtle Creek, North Fork Coquille River, Olalla Creek-Lookingglass Creek, Rogue River-Shady Cove, South Umpqua River, Spencer Creek, Trail Creek, Upper Cow Creek. The local area encompasses approximately 2.0 million acres, of which approximately 213,780 acres are NFS lands.

An analysis area was established to identify S&M species that may be directly or indirectly affected by the PCGP Project. This area was established by creating a buffer around the PCGP Project area. The PCGP Project area includes the project corridor, associated work areas, and the access roads subject to improvements or modifications pursuant to the TMP. For analysis purposes for most S&M species (fungi, lichens, bryophytes, plants, and mollusks), a 50-meter buffer was established around the project area to identify sites that could be affected by the PCGP Project. The sites for fungi, lichens, bryophytes, and plants also include a 50-meter buffer around the recorded observation of the species using the FME tool, which ensures that any observations of these species up to 100 meters away from the project area are addressed in the analysis. This is a conservative approach to analyzing potential effects. Management recommendations for great gray owl and red tree vole provided guidance for the analysis areas for those species. A 1-mile buffer around potential blasting areas and a 0.25-mile buffer around other project activities were established as the analysis area for great gray owl. The red tree vole analysis area encompassed 100 meters around the PCGP Project area based on the site potential tree distance (approximately 60 meters in the project vicinity).

The analysis area for the non-vertebrate species encompasses approximately 1,990 acres of NFS lands, and the PCGP Project area encompasses approximately 590 acres of NFS lands (see Table INTRO-4). The great gray owl analysis area encompasses approximately 193,190 acres, including 37,150 acres of NFS lands. The red tree vole analysis area encompasses approximately 28,330 acres, including 3,380 acres of NFS lands.

| Lands | Regional Area | Local Area | Analysis Area* | Project Area |
|------------------------|-------------------|------------------|----------------|--------------|
| Other | 38,526,790 | 1,745,620 | 14,960 | 4,770 |
| NFS | 19,704,740 | 213,780 | 1,990 | 590 |
| Total All Lands | 58,231,530 | 1,959,400 | 16,950 | 5,360 |

Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
 Note: Areas are presented in acres.
 *Analysis area is the 50-meter buffer of the project area used for fungi, lichens, bryophytes, plants, and mollusks.

Analysis Process

The general assessment of each species included a literature review and Internet research to compile background information on the species; a review of the site data generated from the spatial analysis process described above; a discussion of the regional, local, and analysis/project area distributions; mapping of general habitat for each species using the data described above; and an evaluation of the PCGP Project’s impacts on the S&M sites on NFS lands within the range of the NSO. For many species, limited information is available on their ranges, life histories, and habitat requirements, and published and agency source documents were compiled and reviewed to describe this information to the level of detail available. The distribution patterns of the species at different scales were described based on the GIS data (FME sites) and required additional spatial analyses to present the number of sites in different land allocations, land ownerships, and agency boundaries across the three scales (regional, local, and analysis/project areas) and to estimate the extent of forests that could provide habitat in the regional, local, and project areas. This information was used to describe the general distribution of the species in terms of sites being isolated or clustered and scattered/spotty/sparse or well-distributed, as well as the potential for other sites to exist in the NSO range. Information on general habitat (i.e., forests that could provide

habitat) for the species across the three scales was also presented using GIS data. All of this information was used to assess the effects of the PCGP Project on persistence of the species and support the conclusions made for each species using the factors listed under “Evaluation Criteria” above.

The final level of review entailed an evaluation of impacts on the sites and forests as a result of the PCGP Project. For each species, an initial analysis was conducted to quantify the extent of project-related impacts on sites using the GIS data. The methods used for this initial analysis included:

- Identify sites on NFS lands that could be affected by the PCGP Project, either directly or indirectly, by selecting those sites that fall within, either partially or entirely, the analysis area for the species.
- Compare the number of potentially affected sites for each species to the number of sites in the NSO range and assess other factors presented in the Background Information and Species Distribution discussions for each species to determine if a more focused analysis of impacts is necessary.
- Review the number of sites on land managed BLM that occur entirely in reserves and would likely receive some degree of protection. For certain species, a large proportion of sites occur on BLM land, and preceding the 2016 BLM RMP amendments, would have been protected under the S&M Standards and Guidelines. While sites on BLM lands are no longer subject to protections under the S&M Standards and Guidelines, it is presumed that the BLM reserve system would enable a certain proportion of sites to persist and contribute towards the species overall distribution, dispersal, and ultimately, persistence. Many sites occur partially in BLM reserves and partially in non-reserve land allocations; while these sites are included in the overall population numbers, they may not be protected and are not considered when evaluating the likelihood of a species to persist after Project implementation.
- Quantify anticipated effects to the sites based on the proximity of those sites to the project area using a spatial intersect in GIS.
- Quantify and generally discuss the anticipated effects to forests that could provide habitat for the species using the GIS data and information on the species’ habitat requirements.
- If a more focused analysis was determined not to be necessary, a discussion of the types of impacts expected in the sites was provided based on the results of the spatial intersect noted above.

If this initial analysis provided sufficient evidence to support a determination that the persistence objectives of the NWFP would be met for the species in question (i.e., remaining sites would provide a reasonable assurance of species persistence in the NSO range), a more focused analysis was determined not to be needed. This level of analysis was considered adequate to assess project impacts using a conservative approach (i.e., if a site fell within the analysis area, it was generally assumed that site persistence would not be maintained following project implementation) if project-related effects on the sites would not substantially alter the distribution of the species across the NSO range (e.g., the species would still be well distributed or locally abundant in the

vicinity of the project area). The analysis used GIS data (e.g., FME sites, PCGP Project data) and is reproducible in that the same methods could be applied to any project using similar datasets to evaluate impacts. This is a conservative interpretation of potential effects on the species and likely overstates the impacts of the PCGP Project.

However, if this initial analysis identified that the extent of PCGP Project impacts on the site or sites could reduce the number of remaining sites such that they may not provide a reasonable assurance of species persistence or that insufficient evidence was available to support a determination that the persistence objectives of the NWFP would be met for the species, a closer evaluation of the effects on each site was conducted to further assess impacts of the project. The intent of the more focused analysis was to determine if site persistence would be maintained at any of the sites following project implementation or if measures were needed to protect or avoid the site(s). The analysis entailed a closer look at the effects of the PCGP Project on the sites and the original observations of the species within the sites (from the FME original data and/or the NRIS and GeoBOB databases). This evaluation employed professional judgment to determine whether the site in question was likely to persist after project implementation. The methods used for the more focused analysis included:

- Review the site and original observation data in GIS and determine the potential for direct impacts on the actual observations. If the only observation(s) of a species within a site were within the corridor or a TEWA, site persistence was not likely to be maintained following ground disturbance activities. If some observations were outside the corridor or TEWAs, the potential for indirect effects was evaluated.
- Evaluate indirect effects to the site and observations using aerial photographs, contour lines, forest cover data, land use and ownership data, and background on the species' habitat requirements. Professional judgment was used to determine the extent of impacts (i.e., how far out from the observation an impact would be anticipated) and potential for the species to survive near the project area. If the anticipated indirect effects associated with habitat or microclimate alterations are expected to be unfavorable to the species in question, the species is not likely to survive at the site. If the anticipated indirect effects are considered neutral or beneficial to the species in question, the species is likely to survive at the site after project implementation. For some species, a closer evaluation of the sites confirmed that topography, distance, or other factors reduced the potential for indirect effects (and no direct effects were anticipated), and site persistence would be maintained after project implementation.

The analysis resulted in the following general conclusions:

- Upon a closer evaluation of impacts to sites, site persistence was expected to be maintained at one or more of the sites in the analysis area. For some species, all sites were expected to persist, and the PCGP Project would, therefore, not affect the distribution of the species in the NSO range. For other species, some sites were expected to persist, while others would not likely persist, but the remaining sites in the NSO range would provide a reasonable assurance of species persistence, and the PCGP Project was not expected to affect the distribution of the species in the NSO range.

- The PCGP Project would directly affect one or more sites of a species, and those sites were determined to be important to the species for dispersal opportunities or other reasons. For these species, the PCGP Project could substantially affect the distribution of the species in the local vicinity of the project area or in the NSO range. In these cases, remaining sites may not provide a reasonable assurance of species persistence, and recommendations were developed to avoid impacts to the site(s) by re-routing the corridor away from the site(s).

1.5.6 Effects Conclusions

Based on the information compiled and analyzed for each species, a conclusion was made to state that with implementation of the PCGP Project, remaining sites (i.e., those not affected by the PCGP Project and that would persist in or near the project area following project implementation) either “would provide a reasonable assurance of species persistence” or “may not provide a reasonable assurance of species persistence.” To support this conclusion, the evaluation factors listed above were addressed for each species, considering pre- and post-project site distributions and other factors, to make one of the following three conclusions:

- For species that are not necessarily more common than previously documented despite new information available from pre-disturbance surveys for the PCGP Project and/or other sources since the species were listed in the 2001 ROD and 2003 ASR, the PCGP Project would affect site persistence of the species at one or more sites, and the remaining sites in the NSO range may not provide a reasonable assurance of species persistence. For these species, the PCGP Project could substantially alter the distribution of the species in the local vicinity of the project area or in the NSO range.
- For species that are not necessarily more common than previously documented despite new information available from pre-disturbance surveys for the PCGP Project and/or other sources since the species were listed in the 2001 ROD and 2003 ASR, the PCGP Project would affect site persistence of the species at one or more sites, but the remaining sites in the NSO range would provide a reasonable assurance of species persistence. For these species, the PCGP Project would not substantially alter the distribution of the species in the local vicinity of the project area or in the NSO range.
- For species that appear to be more common than previously documented based on new information available from surveys for the PCGP Project and/or other sources since the species were listed in the 2001 ROD and 2003 ASR, the PCGP Project would affect site persistence of the species at one or more sites, but the remaining sites in the NSO range would provide a reasonable assurance of species persistence. For these species, the PCGP Project would not substantially alter the distribution of the species in the local vicinity of the project area or in the NSO range.

1.6 AGENCY DECISIONS

The Forest Service will review the analyses contained in this report and provide a recommendation to the decision-makers regarding the finding of persistence for each S&M species evaluated in this report. The findings will ultimately be documented in the Forest Service Record of Decision for the PCGP Project.

2.0 FUNGI SPECIES

2.1 ALBATRELLUS ELLISII

Albatrellus ellisii is an ecto-polypore fungus in the Albatrellaceae family (formerly in the Scutigeraceae family) and is commonly known as greening goat's foot.

2.1.1 Regulatory Status and Ranking

The 2001 ROD, including the 2003 ASR modifications to the S&M species list, identifies *A. ellisii* as a Category B (rare) species. ORBIC evaluated *A. ellisii* in its 2004 *Survey and Manage Assessment* for BLM and the Forest Service (ORBIC 2004) and again in its most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2016). In 2016, the species was considered to be uncommon but not rare, with some cause for long-term concern due to declines or other factors within its global range (G4) and was considered to be at moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors in Oregon (S3). The species is on ORBIC List 4. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.1.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to this analysis. Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are discussed below under Persistence Evaluation. The background information in this section is used to support the persistence evaluation in the following section, which is updated with more recent information (e.g., recent survey data) specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *A. ellisii*. It is an annual polypore fungus and is most easily detected in late summer and fall (Castellano et al. 2003). The fruit bodies tend to be large and conspicuous, and the species may appear locally common during heavy fruiting of a single population (Holthausen et al. 1994). Other ecto-polypore species in the genus *Albatrellus* (e.g., *A. avellaneus* and *A. caeruleoparus*) are presumed to be dependent on wind and possibly on animals, particularly arthropods, for the dispersal of spores (Castellano and O'Dell 1997), and the same may be true of *A. ellisii*. Based on the presumed dispersal capability, extirpated populations may become re-established through natural recolonization and may recover from decreased abundance over a period of several years (ORBIC 2004).

Range

Albatrellus ellisii is endemic to North America and has been documented in 10 states from New Jersey south to Alabama, and from Colorado west to the Pacific Northwest where it has been found from British Columbia to northern California (ORBIC 2004). In the Pacific Northwest, the mushroom has been found most often in the Cascade Range. The currently known range of the species within the NSO range based on 2017 data is discussed below under Species Distribution.

Although information on the species' historical range is not known, it is likely similar to the current range, with populations widely distributed across North America. Local distributions across its

range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed below under Threats.

Population Status

ORBIC reported *A. ellisii* from less than 200 element occurrences¹ across the species' range in 2004. In the Pacific Northwest, Oregon had the highest number of occurrences at more than 20 in 2004, while California and Washington had less than five occurrences each (ORBIC 2004). According to ORBIC (2004), *A. ellisii* was considered to be uncommon with a sporadic distribution across the NSO range in 2004. *Albatrellus ellisii* populations of the species appeared to be stable in western North America, but their status in eastern North America was unknown. The species was not found during Random Multi-Species surveys across the NSO range in 2001 through 2004 (USDA and USDI 2007). Molina (2008) documented 34 new sites of *A. ellisii* in the NSO range between 1998 and 2006, and 48 total sites were documented by 2006, including 16 in reserves or protected areas. The 2007 Final SEIS reported 46 sites on NFS and BLM lands and 48 total sites on all lands in the NSO range (USDA and USDI 2007).

Pre-disturbance surveys are not practical for Category B species. Instead, equivalent-effort surveys² were conducted during the fall and spring from 2010 to 2016 in old-growth stands in the PCGP Project area and within 100 feet of habitat removal to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). The equivalent-effort surveys targeted all Category B species, including *A. ellisii*, and resulted in 18 new observations of individuals or populations of *A. ellisii*. Additional surveys for *A. ellisii* in LSRs in nearby areas resulted in five additional observations of the species. These observations have increased the number of sites documented in BLM and Forest Service records by about 40 percent. Based on the increased number of known sites since 1998 as a result of the increased number of surveys (a more than three-fold increase between 1998 and 2006 per Molina 2008 records) and considering that the species is fairly conspicuous, additional surveys would be expected to locate additional populations within the NSO range, particularly in the Cascade Range, where most observations have been reported. The current estimated number of sites and distribution of the species based on 2017 data are presented below under Species Distribution.

Habitat

Albatrellus ellisii occurs as solitary sporocarps or small clusters on the soil surface in coniferous or mixed hardwood-coniferous forests (Castellano et al. 2003, Holthausen et al. 1994). Based on data available in 1994, *A. ellisii* was primarily found in old-growth coniferous stands in Oregon and Washington, and mixed coastal coniferous and hardwood stands in California (Holthausen et al. 1994). Reported observations of *A. ellisii* in Portland, Eugene, Everett, and Berkeley have been in urban park settings, indicating the species may not be dependent on old-growth forest conditions (Trappe, pers. comm. 2013). Additionally, DNA markers have been used to confirm the mycelial presence of *A. ellisii* in several historical sites within managed forests where fruitings have not

¹ An element occurrence is different than a site, as defined in the 2001 ROD. ORBIC used element occurrences in accordance with the NatureServe definition, and one occurrence could consist of multiple sites or observations and usually contains a subpopulation, population, or metapopulation.

² Chapter 1 provides summaries of the survey methods for each group of species for the PCGP Project, and the cited survey reports provide additional details.

been observed in recent surveys (Gordon and Apple 2011). Based on data available in 2007, recorded observations were found between about 550 and 6,000 feet msl (Cushman and Huff 2007). *Albatrellus ellisii* may prefer specific microclimate conditions of LSOG forests, but it may not be restricted to these conditions.

Threats

Threats to *Albatrellus* species are presumably actions that disrupt stand conditions necessary for its survival, particularly damage to host trees and disturbance of soil occupied by host tree roots (Castellano and O'Dell 1997). Typical threats in coniferous forests include heavy logging that removes overstory trees and causes disturbance to soil, development, hot fires, and heavy thinning for fire management (ORBIC 2004). Invasive plants can also disrupt or displace the fungus by affecting its mycorrhizal association with its host plant, which could lead to mortality (Shohet et al. 2008). Like other *Albatrellus* species, the mushroom may be harvested for food, but is rarely harvested commercially (Holthausen et al. 1994).

Management Recommendations

As a Category B S&M species, the direction under the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). This statement is no longer applicable on BLM lands under the 2016 BLM RMPs, although it is still valid on NFS lands within the range of the NSO. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *A. ellisii*:

- As a mycorrhizal species, *A. ellisii* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.1.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new site information, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *A. ellisii* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and the Forest Service (Oregon/Washington regional offices) and converted into sites³ in accordance with the methodology described in Chapter 1. Table ALEL-1 shows the total number of known sites in the regional (NSO range), local (18 5th-field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 148 observations

³ The term site is used in the persistence evaluation throughout this document to represent the polygon created by buffering observation data from NRIS and GeoBOB by a specified buffer for each taxonomic group (refer to Chapter 1 for details) and combining polygons that overlap. Using this method, one or more observations may fall within a single site.

from BLM and Forest Service geodatabases were converted into 112 sites in the NSO range (region). Table ALEL-2 shows the total number of sites on NFS lands and other land ownerships across the regional, local, and analysis areas. Table ALEL-3 shows the total number of sites within each land use allocation defined in the 1994 ROD and 2016 RMPs across the regional, local, and analysis areas. Figure ALEL-1 displays the regional distribution of the species across NFS lands, Figure ALEL-2 displays the extent of known sites located in protected areas (NFS lands, NFS reserves, BLM reserves, and NPS lands), and Figure ALEL-3 displays the species' regional distribution as well as the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,000 feet msl on NFS and BLM lands.

| TABLE ALEL-1 | |
|---|-----------------|
| Number of <i>Albatrellus ellisii</i> Sites (2017) | |
| Location* | Number of Sites |
| Regional Area | 112 |
| Local Area | 45 |
| Analysis Area (Project Area) | 11 (11) |
| Data source: Processed BLM and Forest Service GIS data, August 2, 2017 | |
| *Definitions of regional, local, analysis, and project areas are provided in Chapter 1. | |

| TABLE ALEL-2 | | | |
|---|----------------|-------------|---------------------|
| Distribution of <i>Albatrellus ellisii</i> across Federal, Private, and Other Lands | | | |
| Land Ownership | Regional Sites | Local Sites | Analysis Area Sites |
| Forest Service | 72 | 22 | 10 |
| BLM | 36 | 23 | 1 |
| NPS | 1 | - | - |
| Fish and Wildlife Service | - | - | - |
| Other (Private, State, etc.) | 7 | 4 | 2 |
| Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011 | | | |
| Notes: Columns are not additive because some sites occur on lands in multiple ownerships. | | | |

| TABLE ALEL-3 | | | |
|---|----------------|-------------|---------------------|
| Distribution of <i>Albatrellus ellisii</i> across 1994 ROD and 2016 RMPs Land Allocations | | | |
| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
| Adaptive Management Area (AMA) | 1 | - | - |
| Adaptive Management Reserves (AMR) | - | - | - |
| Administratively Withdrawn (AW) | 16 | - | - |
| Congressionally Reserved (CR) | 4 | - | - |
| Late Successional Reserve (LSR) | 29 | 10 | 3 |
| Marbled Murrelet Area (LSR3) | - | - | - |
| Northern Spotted Owl Activity Center (LSR4) a/ | - | - | - |
| Managed Late Successional Area (MLSA) | 2 | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | 27 | 13 | 8 |
| Riparian Reserve | - | - | - |
| Bureau of Land Management | Regional Sites | Local Sites | Analysis Area Sites |
| Administratively Withdrawn (AW) | - | - | - |
| Congressional Reserve | - | - | - |
| District Designated Reserve | 11 | 6 | 1 |
| Harvest Land Base | 23 | 17 | 1 |
| Late Successional Reserve | 15 | 8 | 1 |
| Not Designated (ND) | - | - | - |

| TABLE ALEL-3 | | | |
|---|----------------|-------------|---------------------|
| Distribution of <i>Albatrellus ellisii</i> across 1994 ROD and 2016 RMPs Land Allocations | | | |
| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
| Other (Matrix, Other) | - | - | - |
| Riparian Reserve | 8 | 6 | 1 |

Data sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0; 2016 RMP land allocation data, August 2016.
 Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
 a/ Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center.

Regional Distribution

Albatrellus ellisii is widely distributed across 10 physiographic provinces in Washington (Western and Eastern Cascades, Olympic Peninsula), Oregon (Coast Range, Cascades East and West, and Klamath Mountain), and California (Klamath, Coast, and Cascades) (see Figure ALEL-1). Most sites are found along the eastern and western Cascade Range in Oregon, with scattered sites in other outlying areas in Washington and California. Several sites are clustered and near other known sites in the Cascade Range and Klamath Mountains, and several isolated sites occur in the rest of the species’ range. The largest cluster of sites is in the southern Cascade Range in Oregon, where the species appears to be locally abundant. *Albatrellus ellisii* does not, however, appear to be well distributed within its range in the NSO range.

Seven of 112 known sites are at least partially located on private, state, or other lands; one site is on NPS lands (Olympic National Park); 72 sites are at least partially on NFS lands; and 36 sites are at least partially on BLM lands. Sites managed by the Forest Service that encompass the project area include 40 sites on the Fremont-Winema National Forest, 11 sites on the Rogue River-Siskiyou National Forest, and five sites on the Umpqua National Forest. Sites included on other National Forests include four sites on the Willamette National Forest, five sites on the Klamath National Forest, four sites on the Shasta-Trinity National Forest, one site on the Six Rivers National Forest, one site on the Mt. Hood National Forest, one site on the Wenatchee National Forest, one site on the Gifford Pinchot National Forest, and one site on the Mt. Baker-Snoqualmie National Forest.

Across the NSO range, 33 sites are at least partially located in reserve lands⁴ managed by the Forest Service, including 29 in LSRs and four in Congressionally Reserved areas (see Figure ALEL-2). These sites represent 46 percent of the total NFS sites in the region. The remaining NFS sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. Additionally, 13 sites are entirely located in reserve lands managed by BLM, which represents 36 percent of the total number of BLM sites in the region. While the 13 sites in BLM reserves and single NPS site are not covered by the S&M Standards and Guidelines, they likely receive some degree of protection through BLM reserve management and National Park Management.

Albatrellus ellisii is primarily found in LSOG forests based on available data (94 of 112 total sites are in LSOG), but it has been found in urban park settings as well. Based on current site locations,

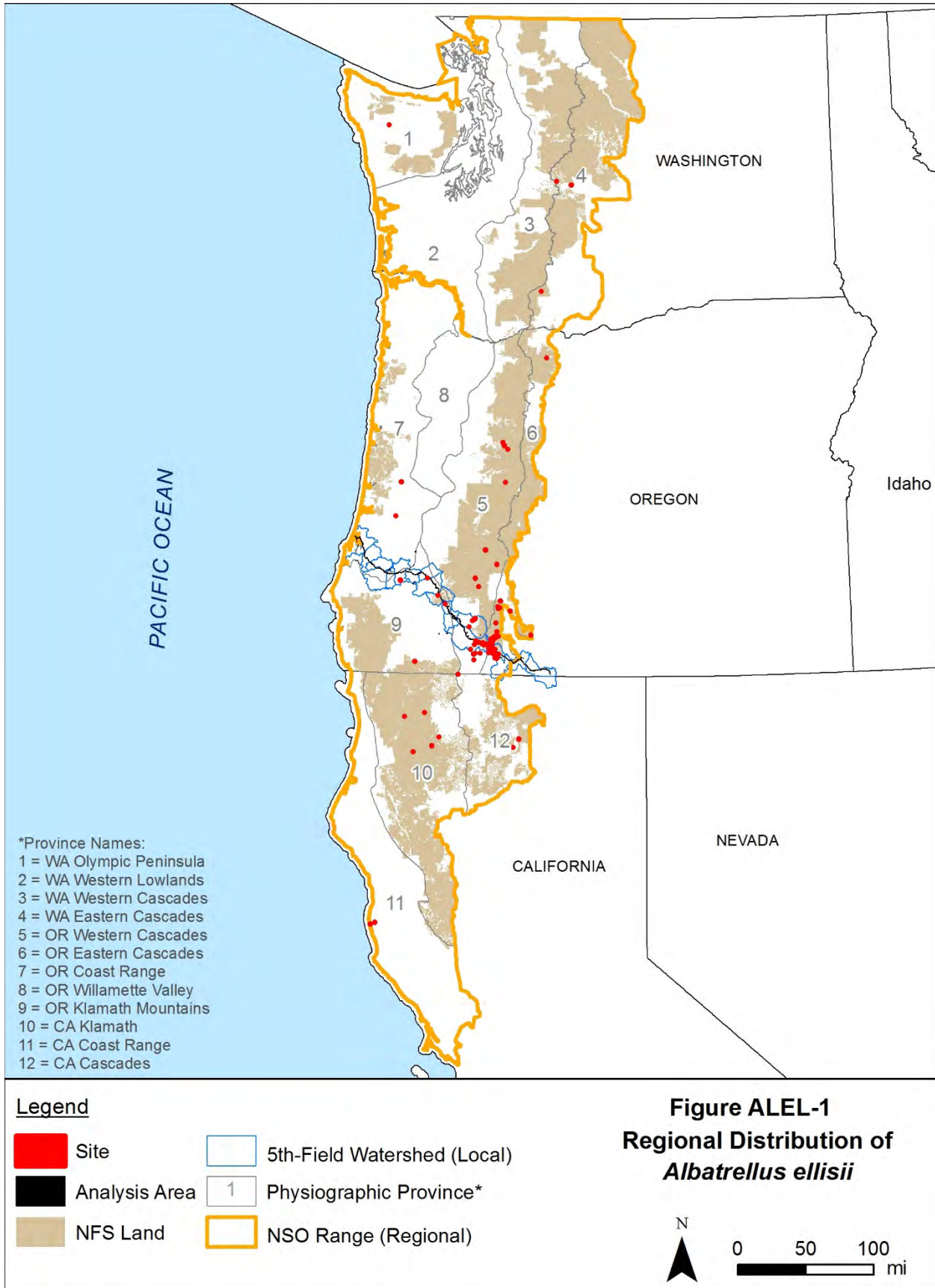
⁴ See Chapter 1 for the definition and mapping of reserves for this report. LSR and Riparian Reserves are not consistently defined or mapped for NFS and BLM lands; therefore, the extent of lands managed as reserves may be underrepresented.

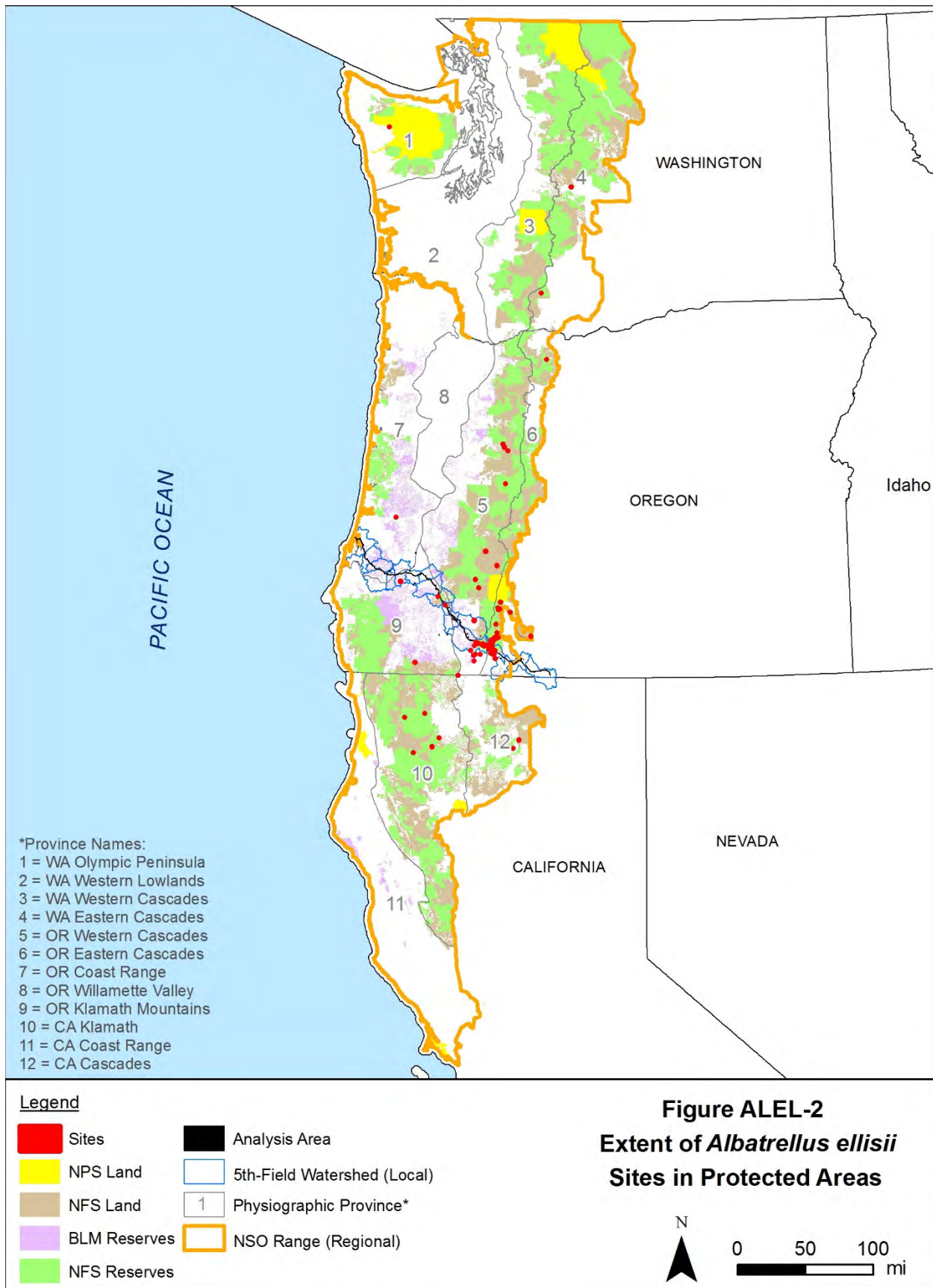
the species is found in coniferous and mixed hardwood-coniferous forests below 6,000 feet msl throughout the NSO range. Due to the extent of known sites, the amount of potential habitat on both NFS and BLM lands in the region, and the level of protection offered by NFS and BLM reserve lands, both land ownerships are included in this potential habitat discussion. Coniferous and mixed hardwood-coniferous forests, including the LSOG component of these forests, within the NSO range could provide habitat for *A. ellisii* and support additional sites. These forests encompass an estimated 18.1 million acres on BLM and NFS lands in the region, including an estimated 10.7 million acres in reserve land allocations (59 percent of the forests; Table ALEL-4).

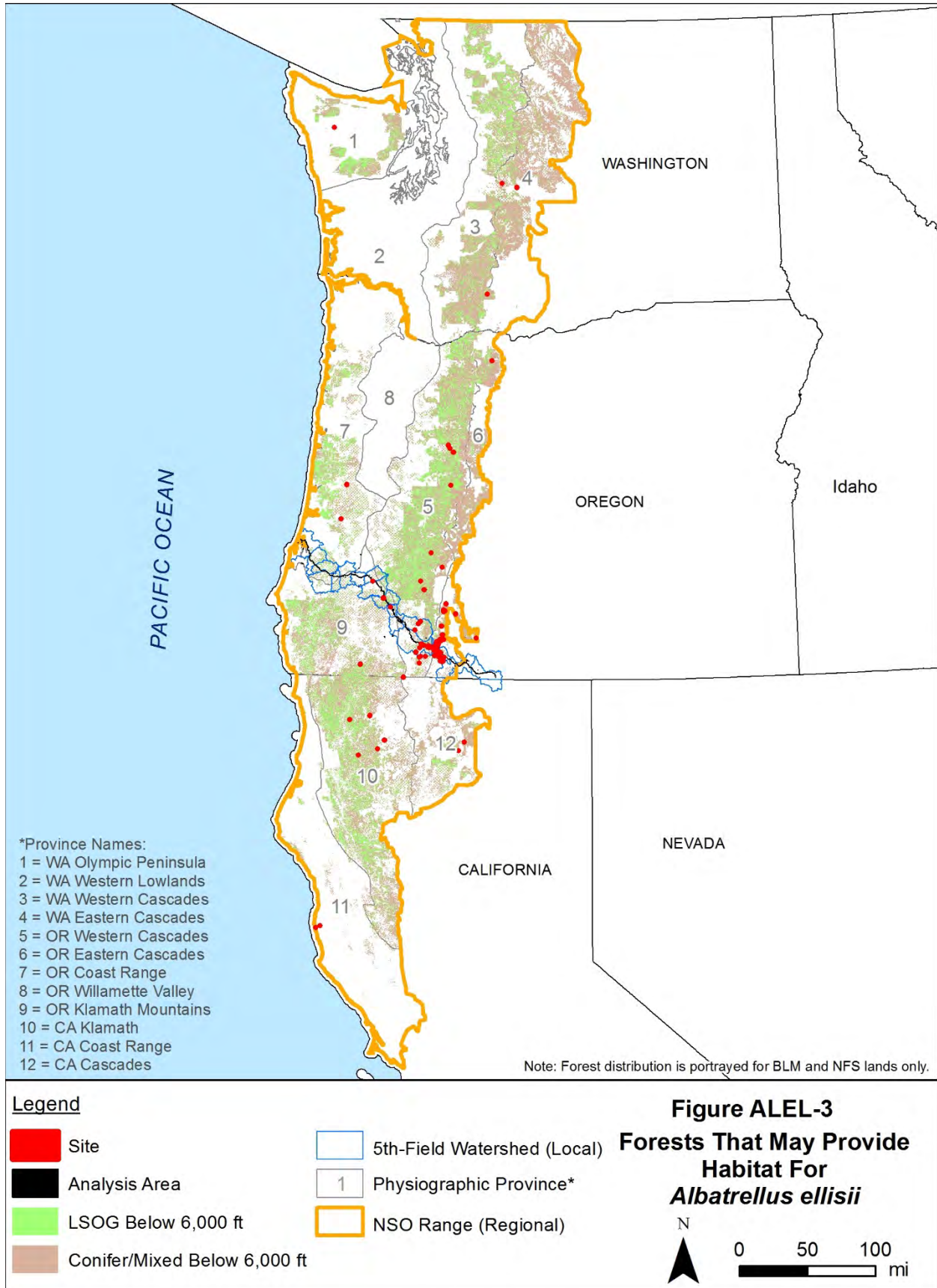
Of this acreage, an estimated 5.9 million acres are LSOG (see Figure ALEL-3), including 3.9 million acres in reserve land allocations (66 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 6,000 feet msl are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

| Location | Coniferous and Mixed Forests below 6,000 feet | | LSOG Forests below 6,000 feet | |
|---------------|---|------------|-------------------------------|-----------|
| | Total | Reserves | Total | Reserves |
| Regional Area | 18,055,593 | 10,707,574 | 5,908,944 | 3,894,277 |
| Local Area | 568,307 | 369,371 | 181,349 | 133,178 |
| Project Area | 1,419 | 982 | 323 | 230 |

Data source: Gradient nearest neighbor vegetation data from Moerur et al. 2011
 Note: Areas are presented in acres.
^{a/} The area estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.







Local Distribution

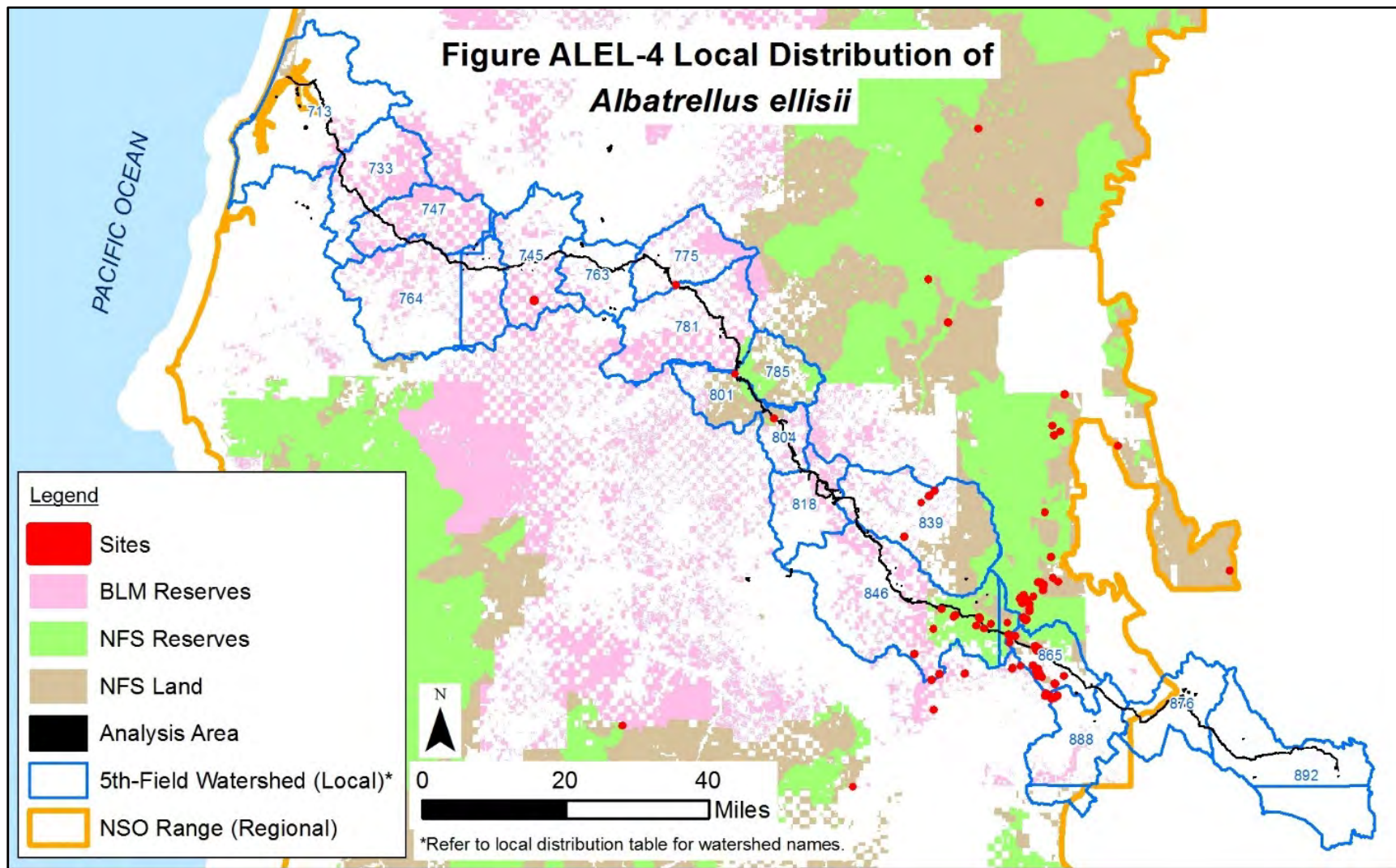
Within the local area, *A. ellisii* is distributed across 10 5th-field watersheds that overlap the project area (see Figure ALEL-4 and Table ALEL-5.) Most sites appear to be clustered and near one another in the Cascade Range, but sites in the Myrtle Creek/South Umpqua River, Olalla Creek-Lookingglass Creek, Elk Creek-South Umpqua/Upper Cow Creek, and Trail Creek watersheds appear more isolated. Across these watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed hardwood-coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas based on the proximity of other sites in the region. Several sites are located within 10 miles of the project area within the Cascade Range.

Of the 45 sites in the local area, 22 are on NFS lands and are located on lands designated as Other (Matrix) and LSR. Four sites are partially on private lands and 23 are at least partially on BLM lands. Of the sites in the local area, nine sites are entirely within NFS reserves and six sites are entirely in BLM reserve lands, representing 57 percent of the NFS and BLM sites.

Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl encompass approximately 568,307 acres on BLM and NFS lands in the local area, with 369,371 acres in reserve land allocations (65 percent of the forests). Of this acreage, an estimated 181,349 acres are LSOG, including 133,178 acres in reserves (73 percent of the forests).

| Watershed (HUC5 ID) | Number of Sites | Number of Sites in NFS Reserve Lands | Number of Sites in BLM Reserve Lands |
|--|-----------------|--------------------------------------|--------------------------------------|
| Big Butte Creek (839) | 6 | - | 5 |
| Coos Bay Frontal (713) | - | - | - |
| East Fork Coquille River (747) | - | - | - |
| Elk Creek-South Umpqua (785) | 1 <u>a/</u> | - | - |
| Klamath River-John C Boyle Reservoir (888) | 3 | - | - |
| Lake Ewauna-Upper Klamath River (876) | - | - | - |
| Little Butte Creek (846) | 12 <u>b/</u> | 10 | 2 |
| Lower Lost River (892) | - | - | - |
| Middle Fork Coquille River (764) | - | - | - |
| Middle South Umpqua River (763) | - | - | - |
| Myrtle Creek (775) | 1 <u>c/</u> | - | 1 |
| North Fork Coquille River (733) | - | - | - |
| Olalla Creek-Lookingglass Creek (745) | 1 | - | 1 |
| Rogue River-Shady Cove (818) | - | - | - |
| South Umpqua River (781) | 1 <u>c/</u> | - | 1 |
| Spencer Creek (865) | 21 <u>b/</u> | 1 | 4 |
| Trail Creek (804) | 1 | - | - |
| Upper Cow Creek (801) | 1 <u>a/</u> | - | - |

Data sources: Processed BLM and Forest Service GIS data, August 2, 2017; HUC5 Watershed layer, August 23, 2011
 Note: Number of sites in reserves may include sites that are only partially in reserves.
 Site counts are not additive because some sites occur in multiple watersheds and the counts overlap, as noted below:
a/ One site is in both Elk Creek-South Umpqua and Upper Cow Creek watersheds.
b/ One site is in both Little Butte Creek and Spencer Creek watersheds; the portion of the site in Spencer Creek is not in a reserve.
c/ One site is in both Myrtle Creek and South Umpqua watersheds.



Analysis/Project Area Distribution

The analysis and project areas contain 11 sites of *A. ellisii*, 10 of which are at least partially on NFS lands, on the Rogue River-Siskiyou, Fremont-Winema, and Umpqua National Forests. Two sites are partially on private lands and one site is completely on BLM lands. The analysis area sites are distributed across seven 5th-field watersheds in the central to eastern portion of the analysis area. Sites in the Cascade Range are more clustered than sites in the Klamath Mountains. Many sites are also located within the immediate vicinity of the analysis area in the Cascade Range (see Local Distribution discussion above), including several on NFS lands within 10 miles.

The sites on NFS lands in the analysis area are located on lands designated as Other (Matrix) and LSR. Of the 10 NFS sites in the analysis area, three sites are entirely in reserve lands. The single site on BLM lands in the analysis area is entirely in reserve lands (District Designated Reserve, LSR, and Riparian Reserve).

Surveys for the PCGP Project resulted in 29 total observations of the species in 23 locations in or near the project area (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). An estimated 24 of these recorded observations comprise the 11 sites in the analysis area; the other observations are in sites outside the analysis area. Within the project area, eight sites are between mileposts (MP) 162.5 and 173.6, and one site is located near each of the following MPs: 82.9, 102.8, and 112.8.

Analysis

The PCGP Project would affect¹ 10 out of the 72 sites on NFS lands in the region, representing approximately 14 percent of the NFS sites. Site impacts on other land ownerships include one site affected on BLM lands. The total number of sites affected is 11 sites out of the 112 total sites on all lands. Table ALEL-6 provides an overview of the features of the PCGP Project that would affect the *A. ellisii* sites on NFS lands. The construction corridor and associated work and storage areas would affect approximately 15.5 acres within the sites (about 28 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *A. ellisii* in and near the project area.

The following discussion presents an overview of the types of impacts that would be expected at the sites based on the features of the PCGP Project that could affect site persistence.

Vegetation removal and grading activities in the 95-foot wide construction corridor would disturb about 11.4 acres of vegetation and soil within 10 sites and could result in the removal of *A. ellisii* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 1.6 acres within five sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *A. ellisii* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs

¹ All impacts discussed in this document are focused on sites or portions of sites on NFS lands unless otherwise specified. Impacts on other lands are not subject to management direction from the Forest Service and are not considered in the persistence evaluation of each S&M species.

could make habitat within the sites no longer suitable for the species, although this species has been found in park-like settings and may be somewhat resilient to open canopies and edge effects. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A 30-foot wide portion of the corridor throughout the project area would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 2.5 acres of understory habitat in six sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

| Project Activity | Number of Sites Affected | Area of Disturbance within Sites |
|--------------------------------------|--------------------------|----------------------------------|
| Construction Corridor | 10 | 11.4 ac |
| Temporary Extra Work Area (TEWA) | 5 | 1.6 ac |
| Uncleared Storage Area (UCSA) | 6 | 2.5 ac |
| Roads (TMP) | - | - |
| Other Minimal Disturbance Activities | - | - |

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Across the project area, the PCGP Project would remove an estimated 1,142 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including 249 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *A. ellisii*. Within this impact area, about 567 acres (about 50 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A 30-foot wide corridor would be maintained in low-growing vegetation across the project area, resulting in a loss of about 246 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the 10 sites on NFS lands as a result of the PCGP Project, 12 *A. ellisii* sites would remain on NFS lands in the local area, including seven at least partially in reserves, and 62 sites, including 30 at least partially in reserves, would remain on NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to S&M Standards and Guidelines protections and applicable management recommendations with regard to agency-related actions. The sites in reserves or portions of sites in reserves are assumed to have additional protections provided by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 48 percent of the remaining *A. ellisii* sites on NFS lands in the NSO range would be protected in reserves.

The PCGP project may also affect one site on BLM land. Assuming persistence cannot be maintained at the single site, 22 sites would remain on BLM lands in the local area, including five entirely in reserves, and 35 sites, including 12 entirely in reserves would remain on BLM lands in

the NSO range. While sites on BLM lands are not subject to S&M Standards and Guidelines protections, sites entirely in reserves would likely receive some protection under the BLM 2016 RMPs.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states “instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision” (Standards and Guidelines, pg. 4). The Forest Service has embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *Albatrellus ellisii* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information received since the species was listed in the 2001 ROD, however, indicates that the species appears to be more common than previously documented, as described below:
 - *Albatrellus ellisii* has a wide, but somewhat scattered, distribution across 10 physiographic provinces and three states in the region and a moderate-high number of overall sites (72 on NFS lands, 112 on all lands). The species is fairly common in the Cascade Range, but less abundant in other areas. The currently known number of sites on NFS and BLM lands has increased by 66 sites since 2007, with many sites documented during the PCGP Project surveys.
 - An estimated 54 percent of the sites (58 sites) on federal lands are at least partially in reserves, which is an increase of 42 sites in reserves since 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 18.1 million acres on BLM and NFS lands, with an estimated 59 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented.
- The PCGP Project would affect 10 of 72 *A. ellisii* sites on NFS lands, representing approximately 14 percent of the sites on NFS lands in the NSO range. Assuming site persistence cannot be maintained at the 10 sites, a moderate-high number of sites (62) would remain on NFS lands in the region, with a wide distribution across Washington, Oregon, and California. Several sites (12 sites) would remain on NFS lands in the local vicinity of the analysis area; these sites would continue to be distributed across six 5th-field watersheds. An additional 12 sites would remain entirely in BLM reserves across the NSO range. The distribution of sites and extent of the species’ range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence of three sites in LSRs and the percentage of sites on NFS lands in reserves would decrease from 46 to 42 percent. Of the remaining sites on NFS lands, 29 sites are at least partially in LSRs where management actions are

restricted to those activities that benefit LSOG forests, and four sites are in Congressionally Reserved areas where management activities that may adversely affect *A. ellisii* are unlikely. The PCGP Project would also affect one site entirely in BLM reserves. A total of 12 sites would remain entirely within BLM reserves, including LSRs where management actions are restricted to those activities that benefit LSOG forests, District Designated Reserves where management activities that may adversely affect *A. ellisii* are unlikely, and Riparian Reserves where management actions are restricted to those activities that benefit the conservation of riparian areas and riparian-associated species.

- The PCGP Project would result in a permanent loss of an estimated 246 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 10.7 million acres (59 percent) of coniferous and mixed forests and 3.9 million acres (66 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *A. ellisii*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. *Albatrellus ellisii* is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.1.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *A. ellisii* at 10 sites on NFS lands and one site on BLM lands; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 62 sites would remain on NFS lands across the region, including 30 sites at least partially in reserves, and 12 sites would remain on NFS lands in the local area, including seven sites at least partially in reserves. Additionally, 35 sites would remain on BLM lands across the region, including 12 sites entirely in reserves, and 22 sites would remain on BLM lands in the local area, including five sites entirely in reserves. Although the PCGP Project would affect site persistence of *A. ellisii* at 10 sites on NFS lands, these sites are part of a large cluster of sites on federal lands in the Cascade Range in southern Oregon where the species is locally abundant. It is expected that BLM management would allow sites in BLM reserves to persist. After project implementation the species would remain locally common; 12 sites would remain on NFS lands in the local area (reserves and non-reserves) and five sites would remain in BLM reserves in the local area. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *Albatrellus ellisii* would persist in the region without considering the 10 sites as part of the population.
- The PCGP Project would remove approximately 1,142 acres of coniferous and mixed hardwood-coniferous forests and 249 acres of LSOG coniferous and mixed forests below 6,000 feet msl (a negligible amount of the forests). An estimated 50 percent of the forests would be restored to similar conditions or shrublands, but a 30-foot wide early-successional

corridor would remain across the project area. An estimated 10.7 million acres (59 percent) of coniferous and mixed forests and 3.9 million acres (66 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.

- The remaining sites on NFS lands are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Additionally, the remaining sites that are entirely in BLM reserves are expected to receive some level of protection under the 2016 BLM RMPs. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *A. ellisii* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the 10 *A. ellisii* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the NFS land management plans that apply to the affected sites would waive implementation of Management Recommendations for *A. ellisii* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term. The monitoring plan shall be approved by the Forest Service.

2.2 ARCANGELIELLA CRASSA

Arcangeliella crassa is a sequestrate mushroom and false truffle species in the Russulaceae family and does not have a common name.

2.2.1 Regulatory Status and Ranking

The 2001 ROD, including the 2003 ASR modifications to the S&M species list, identifies *A. crassa* as a Category B (rare) species. ORBIC evaluated *A. crassa* in its most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2016). In 2016, the species was considered to be between uncommon but not rare with some cause for long-term concern; and at high risk of extinction or elimination due to very restricted range, very few populations, steep declines, or other factors within its global range (G2G4). In Oregon, it was considered to be at very high risk of extinction due to extreme rarity, very steep declines, or other factors. (S1). The species is on ORBIC List 3. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.2.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to this analysis. Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are discussed below under Persistence Evaluation. The background information in this section is used to support the persistence evaluation in the following section, which is updated with more recent information (e.g., recent survey data) specifically used for the persistence evaluation.

Life History

Relatively little is known about the autecology or reproductive biology of *A. crassa*. It forms sporocarps just under the surface of the soil near true fir (*Abies* spp.) or pine (*Pinus* spp.) trees (Castellano et al. 1999). Fruiting has been documented from June through October. It is presumed to be ectomycorrhizal, forming symbiotic associations with conifer trees for translocation of minerals, water, and nutrients (Castellano and O'Dell 1997). As with other sequestrate fungi, spore dispersal is presumed to depend on mycophagy or consumption of fungi and spores by animals, particularly small mammals (Holthausen et al. 1994).

Range

Arcangeliella crassa was believed to be endemic to California (Castellano et al. 1999), but it was recently found in Oregon during surveys between 2002 and 2012, including those for the PCGP Project (Siskiyou BioSurvey LLC 2012a). In California, it has been found from the Sierra Nevada in Fresno County north to the southern Cascade Range and Siskiyou Mountains (ORBIC 2004). This species is locally abundant in Fresno County, but its abundance across the Pacific Northwest is unknown. The species may be found in more locations with more survey efforts. The currently known range of the species within the NSO range based on 2017 data is discussed below under Species Distribution.

Although information on the species' historical range is not known, it may have been similar to the current range, with populations limited to the Pacific Northwest. It may have had more abundant local distributions across its range, but habitat modifications and other environmental factors, as discussed below under Threats, have likely reduced available habitat and may have further restricted the species' distribution.

Population Status

Within California, Castellano and O'Dell (1997) reported *A. crassa* from five populations in 1997, including two populations in the NSO range (one on the Klamath National Forest and one on the Shasta-Trinity National Forest). ORBIC (2004) reported the species from more than 10 element occurrences in California, where the species was thought to be endemic. Prior to 2002, the species had not been reported in Oregon, but surveys conducted since then have documented the species in multiple locations, including two observations on the Winema National Forest that were recorded during surveys conducted for the PCGP Project in October 2011 (Siskiyou BioSurvey LLC 2012a). The species was found in one location during Random Multi-Species surveys across the NSO range between 2001 and 2004 (USDA and USDI 2007). Molina (2008) documented one new site of *A. crassa* in the NSO range between 1998 and 2006, which may have been from the Random Multi-Species surveys, and four total sites were documented by 2006, including two in reserves or protected areas. The 2007 Final SEIS reported two sites on NFS and BLM lands and two total sites on all lands in the NSO range (USDA and USDI 2007).

Pre-disturbance surveys are not practical for Category B species. Instead, equivalent-effort surveys were conducted during the fall and spring from 2010 to 2016 in old-growth stands in the PCGP Project area and within 100 feet of habitat removal to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). These equivalent-effort surveys targeted all Category B species, including *A. crassa*, and resulted in two new observations of *A. crassa* on the Winema

National Forest. *Arcangeliella crassa* has not been found in high numbers during past survey efforts, although limited fungi surveys have been conducted across the NSO range, and more survey effort may locate additional populations of the species. The current estimated number of sites and distribution of the species based on 2017 data are presented below under Species Distribution.

Habitat

Based on data available prior to 1999, *A. crassa* was found in mixed coniferous forests above 6,000 feet msl (Castellano and O'Dell 1997, Castellano et al. 1999) and in upper montane true fir forests in northern California (Holthausen et al. 1994). It has been found in association with the roots of mountain hemlock (*Tsuga mertensiana*) at mid to high elevations (Holthausen et al. 1994) and with various trees in the Pine family (Pinaceae), such as white fir (*Abies concolor*), California red fir (*A. magnifica*), ponderosa pine (*Pinus ponderosa*), Jeffrey pine (*P. jeffreyi*), and lodgepole pine (*P. contorta*) (Castellano et al. 1999). It may require abundant coarse woody debris along the forest floor (Holthausen et al. 1994).

Threats

Threats to *A. crassa* are actions that affect host trees and disturb the soil, such as road and trail construction, logging, fire management, and recreational activities (Castellano and O'Dell 1997). Fire is not considered to be a major threat because the species is commonly found in cool, wet habitats that are less susceptible to fire. The removal of coarse woody debris on the forest floor can also affect the species (Holthausen et al. 1994).

Management Recommendations

As a Category B S&M species, the direction under the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). This statement is no longer applicable on BLM lands under the 2016 BLM RMPs, although it is still valid on NFS lands within the range of the NSO. Management recommendations were developed for *A. crassa* along with several other species (Group 3 of Castellano and O'Dell 1997). The primary guidance is to maintain habitat conditions at all known sites, which will maintain viable populations of the species until additional information on the effects of various management activities can be obtained and evaluated. Populations on federal land should be managed to maintain population viability. In order to maintain habitat conditions around known locations, impacts from soil-disturbing activities should be minimized and damage to or removal of host trees should be prevented. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *A. crassa*:

- As a mycorrhizal species, *A. crassa* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.2.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new information on sites, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining

in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *A. crassa* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and the Forest Service (Oregon/Washington regional offices) and converted into sites in accordance with the methodology described in Chapter 1. Table ARCR-1 shows the total number of known sites in the regional (NSO range), local (18 5th-field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 28 observations from BLM and Forest Service geodatabases were converted into 26 sites in the NSO range (region). Table ARCR-2 shows the total number of sites on NFS lands and other land ownerships across the regional, local, and analysis areas. Table ARCR-3 shows the total number of sites within each land use allocation defined in the 1994 ROD and 2016 RMPs across the regional, local, and analysis areas. Figure ARCR-1 displays the regional distribution of the species across NFS lands, Figure ARCR-2 displays the extent of known sites located in protected areas (NFS lands, NFS reserves, BLM reserves, and NPS lands), and Figure ARCR-3 displays the species’ regional distribution as well as the extent of coniferous forests and LSOG coniferous forests between 2,000 and 7,000 feet msl on BLM and NFS lands within the currently known range of the species.

| TABLE ARCR-1 | |
|---|-----------------|
| Number of <i>Arcangeliella crassa</i> Sites (2017) | |
| Location* | Number of Sites |
| Regional Area | 26 |
| Local Area | 5 |
| Analysis Area (Project Area) | 1 (1) |
| Data source: Processed BLM and Forest Service GIS data, August 2, 2017 | |
| *Definitions of regional, local, analysis, and project areas are provided in Chapter 1. | |

| TABLE ARCR-2 | | | |
|---|----------------|-------------|---------------------|
| Distribution of <i>Arcangeliella crassa</i> across Federal, Private, and Other Lands | | | |
| Land Ownership | Regional Sites | Local Sites | Analysis Area Sites |
| Forest Service | 21 | 1 | 1 |
| BLM | 5 | 4 | - |
| NPS | - | - | - |
| Fish and Wildlife Service | - | - | - |
| Other (Private, State, etc.) | 3 | 3 | 1 |
| Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011 | | | |
| Notes: Columns are not additive because some sites occur on lands in multiple ownerships. | | | |

| TABLE ARCR-3 | | | |
|--|----------------|-------------|---------------------|
| Distribution of <i>Arcangeliella crassa</i> across 1994 ROD and 2016 RMPs Land Allocations | | | |
| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
| Adaptive Management Area (AMA) | - | - | - |
| Adaptive Management Reserves (AMR) | - | - | - |
| Administratively Withdrawn (AW) | 5 | - | - |
| Congressionally Reserved (CR) | - | - | - |
| Late Successional Reserve (LSR) | 2 | - | - |
| Marbled Murrelet Area (LSR3) | - | - | - |
| Northern Spotted Owl Activity Center (LSR4) @/ | - | - | - |

| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
|---------------------------------------|----------------|-------------|---------------------|
| Managed Late Successional Area (MLSA) | - | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | 15 | 1 | 1 |
| Riparian Reserve | - | - | - |
| Bureau of Land Management | Regional Sites | Local Sites | Analysis Area Sites |
| Administratively Withdrawn (AW) | - | - | - |
| Congressional Reserve | - | - | - |
| District Designated Reserve | 3 | 2 | - |
| Harvest Land Base | 4 | 3 | - |
| Late Successional Reserve | 2 | 2 | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | - | - | - |
| Riparian Reserve | - | - | - |

Data sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0; 2016 RMP land allocation data, August 2016.

Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.

a/ Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center.

Regional Distribution

Arcangeliella crassa has a somewhat limited distribution across six physiographic provinces in Oregon (Coast Range, Kalmath Mountains, Cascades East and West) and California (Klamath and Cascades) and a low-moderate overall number of sites (see Figure ARCR-1). Most sites are found along the Cascade Range, with scattered sites in the Coast Range and Klamath Mountains. A group of sites is found in the eastern Cascade Range in Oregon, but other sites appear isolated. *Arcangeliella crassa* does not appear to be well distributed within its range in the NSO range.

Three of the 26 known sites are at least partially located on private, state, or other lands; five sites are at least partially on BLM lands, and 21 sites are at least partially on NFS lands. Sites managed by the Forest Service that encompass the project area include one site on each of the Fremont-Winema National Forest, Umpqua National Forest, and Rogue River-Siskiyou National Forest. Sites on other National Forests include 12 sites on the Deschutes National Forest, one site on the Mt. Hood National Forest, two sites on the Klamath National Forest, and three sites on the Shasta-Trinity National Forest.

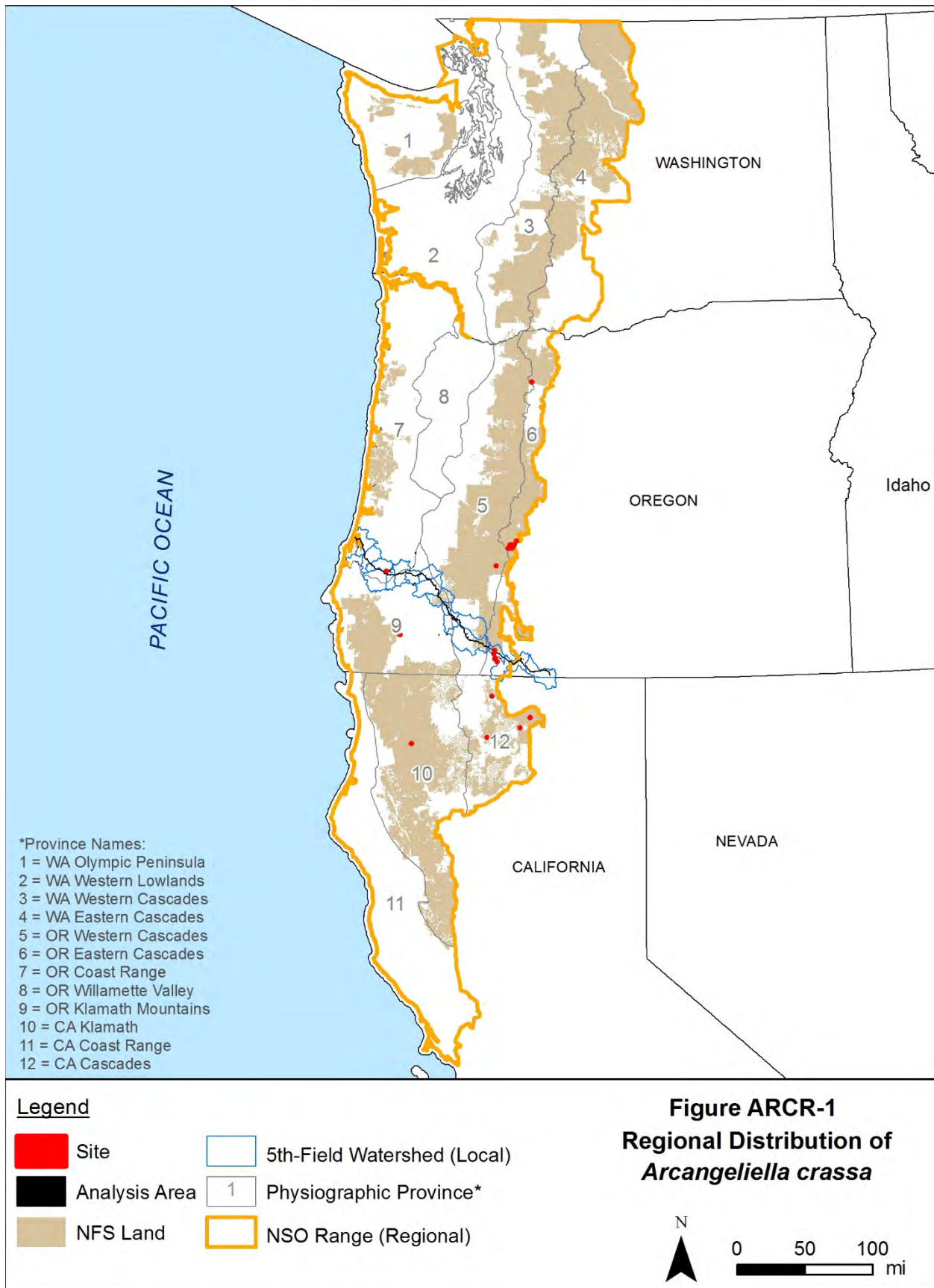
Across the NSO range, two sites are located on LSRs managed by the Forest Service (see Figure ARCR-2). This represents 10 percent of the total NFS sites in the region. The remaining NFS sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. One site is located entirely on LSRs managed by BLM, while an additional three sites are partially in BLM reserves and partially on BLM harvest lands. While the single site that is entirely in BLM reserves is not covered by the S&M Standards and Guidelines, it will likely receive some degree of protection through BLM reserve management.

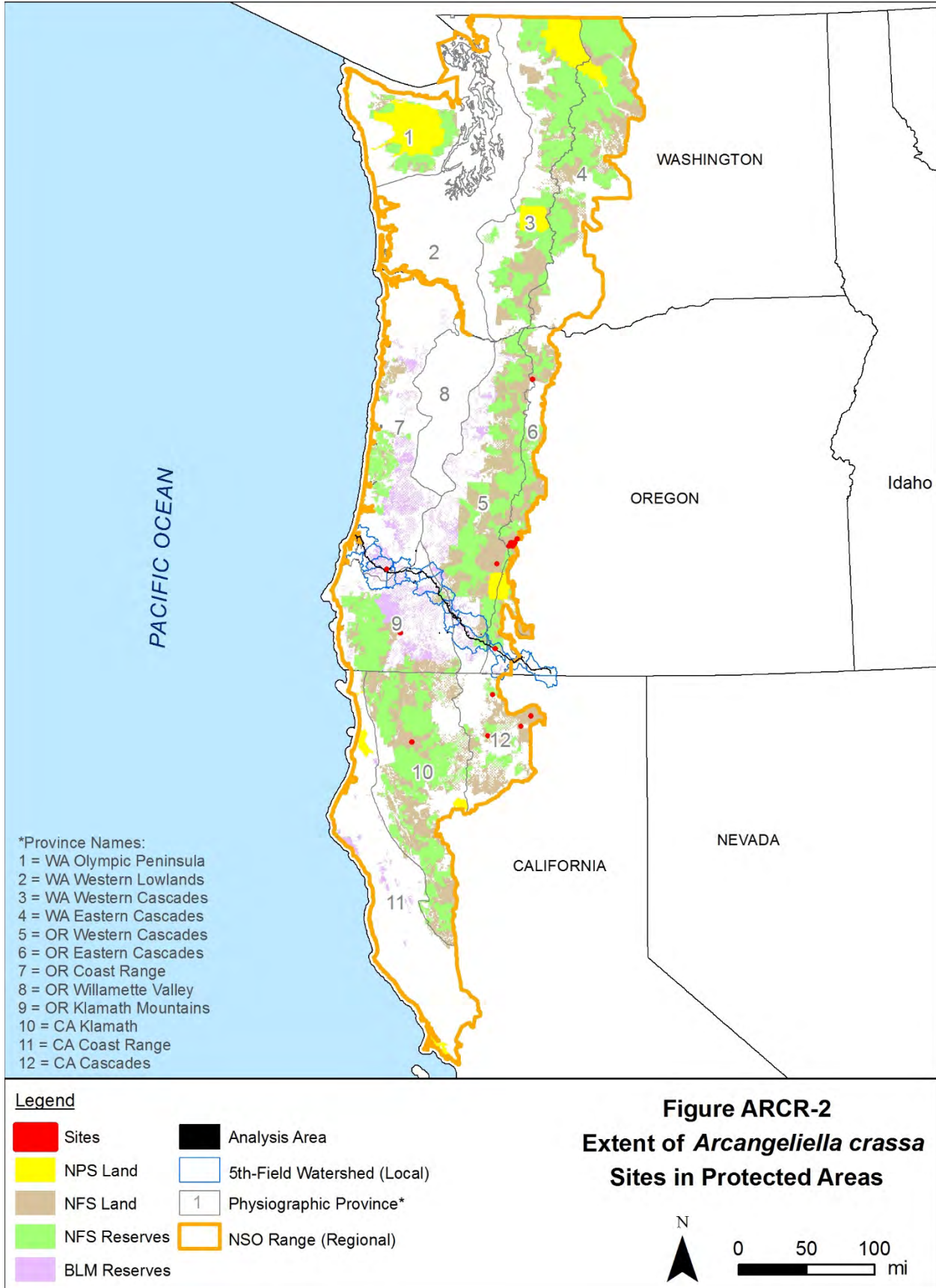
Arcangeliella crassa is primarily found in LSOG forests based on available data (22 of 26 total sites are in LSOG) and may be restricted to specific microclimate conditions of these forests. Based on current site locations, the species is found in coniferous forests between 2,000–7,000 feet msl and has only been documented in Oregon and California. Due to the extent of known sites, the amount of potential habitat on both NFS and BLM lands in the region, and the level of

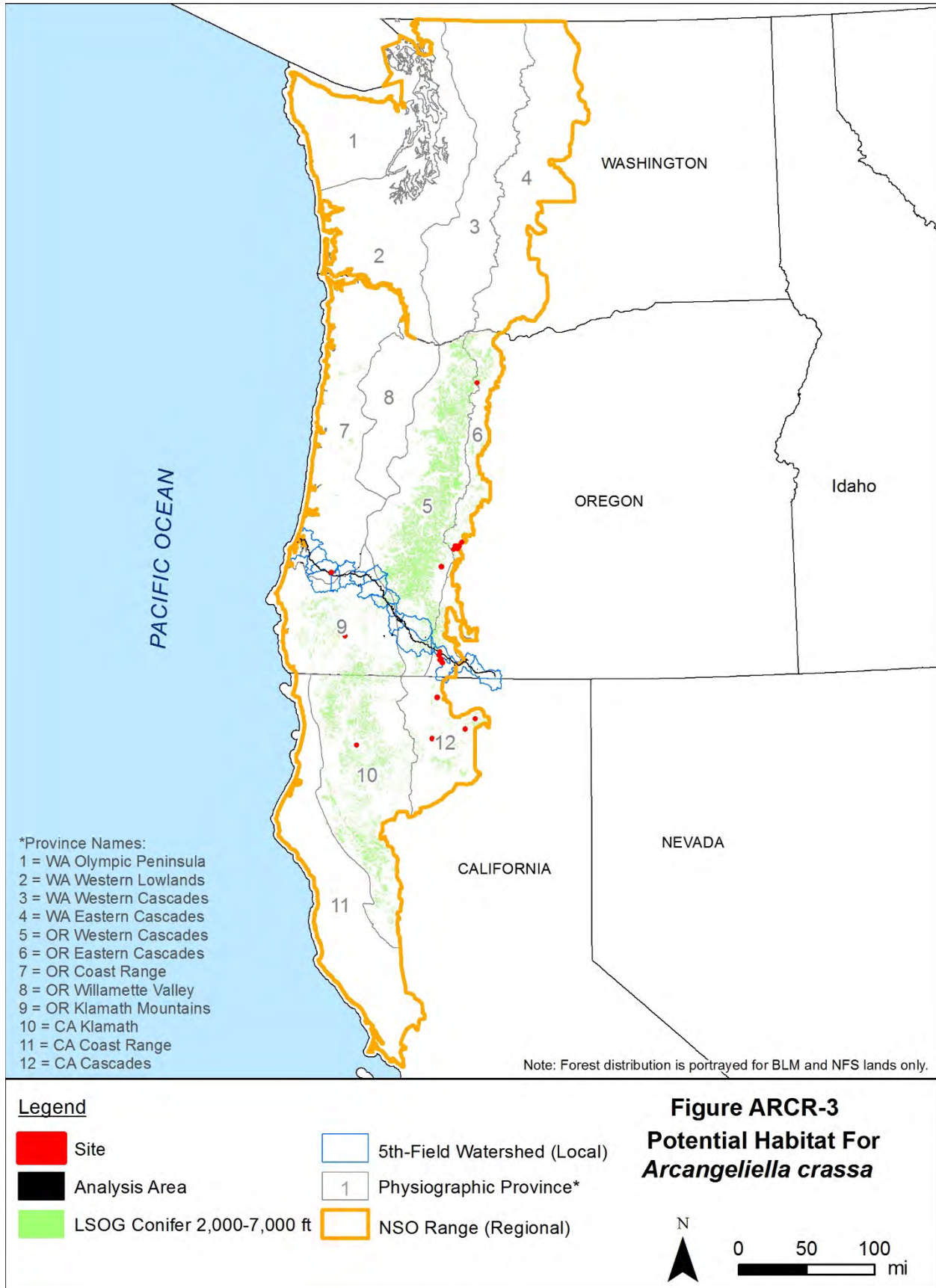
protection offered by NFS and BLM reserve lands, both land ownerships are included in this potential habitat discussion. LSOG coniferous forests within the NSO range could provide habitat for *A. crassa* and support additional sites. These forests encompass an estimated 2.9 million acres on BLM and NFS lands (see Figure ARCR-3 and Table ARCR-4), including 1.7 million acres in reserve land allocations (59 percent of the forests). LSOG coniferous forests between 2,000–7,000 feet msl are a somewhat limited habitat in Oregon and California and are primarily found along the Cascade Range and the Klamath Mountains. Younger coniferous forests may provide habitat for the species as they mature and develop suitable habitat conditions over time, and these forests are more widespread across Oregon and California (see Figure ARCR-3 and Table ARCR-4).

| Location | Coniferous Forests between 2,000–7,000 feet | | LSOG Conifer between 2,000–7,000 feet | |
|---------------|---|-----------|---------------------------------------|-----------|
| | Total | Reserves | Total | Reserves |
| Regional Area | 8,642,537 | 4,620,852 | 2,909,752 | 1,725,206 |
| Local Area | 328,613 | 178,814 | 104,916 | 65,073 |
| Project Area | 789 | 518 | 225 | 152 |

Data source: Gradient nearest neighbor vegetation data from Moerur et al. 2011
 Note: Areas are presented in acres.
^{a/} The area estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.







Local Distribution

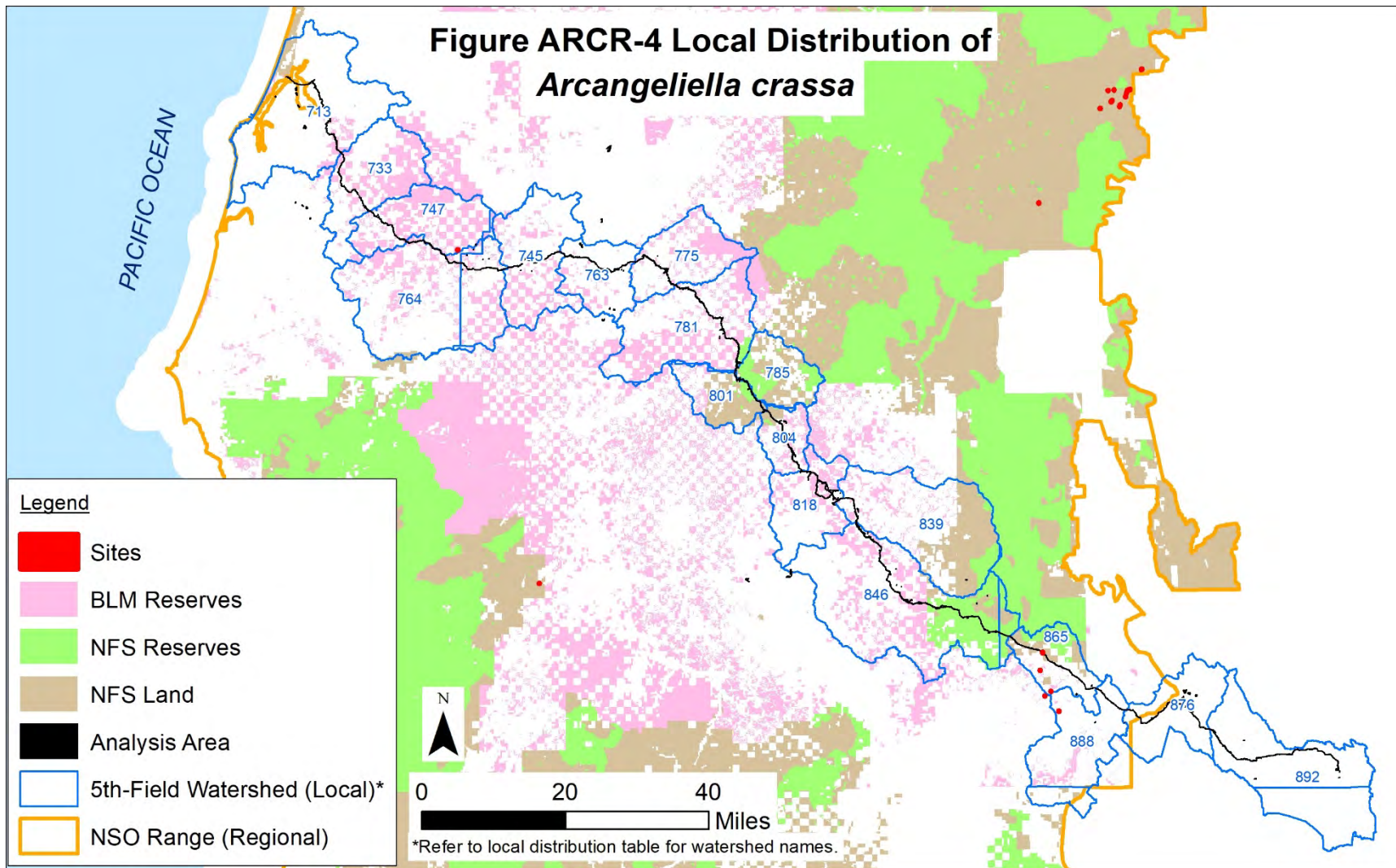
Within the local area, *A. crassa* is found in three 5th-field watersheds that overlap the project area: East Fork Coquille River, Klamath River-John C Boyle Reservoir, and Spencer Creek (see Table ARCR-5 and Figure ARCR-4). The sites appear isolated from others in the region, with the nearest site located 25 miles south of the easternmost local site in the eastern Cascade Range. The sites in the eastern Cascade Range are grouped locally, while the site in the Coast Range is isolated. Limited connectivity appears available between the local sites and other sites in the region based on the distance between the sites, although animals could transport spores across suitable habitat within the local area.

One site in the local area is located on land designated as Other (Matrix) on the Fremont-Winema National Forest and four sites are on BLM lands, one of which is entirely in reserves (LSRs). Three sites are partially on private lands.

LSOG coniferous forests between 2,000–7,000 feet msl encompass approximately 104,916 acres on BLM and NFS lands in the local area, including 65,073 acres in reserve land allocations (62 percent of the forests). Forests that may provide suitable habitat are primarily found in the Cascade Range (see Figure ARCR-2), and other sites may be located in the mountain range in areas that have not been previously surveyed.

| Watershed (HUC5 ID) | Number of Sites | Number of Sites in NFS Reserve Lands | Number of Sites in BLM Reserve Lands |
|--|-----------------|--------------------------------------|--------------------------------------|
| Big Butte Creek (839) | - | - | - |
| Coos Bay Frontal (713) | - | - | - |
| East Fork Coquille River (747) | 1 | - | 1 |
| Elk Creek-South Umpqua (785) | - | - | - |
| Klamath River-John C Boyle Reservoir (888) | 1 | - | 1 |
| Lake Ewauna-Upper Klamath River (876) | - | - | - |
| Little Butte Creek (846) | - | - | - |
| Lower Lost River (892) | - | - | - |
| Middle Fork Coquille River (764) | - | - | - |
| Middle South Umpqua River (763) | - | - | - |
| Myrtle Creek (775) | - | - | - |
| North Fork Coquille River (733) | - | - | - |
| Olalla Creek-Lookingglass Creek (745) | - | - | - |
| Rogue River-Shady Cove (818) | - | - | - |
| South Umpqua River (781) | - | - | - |
| Spencer Creek (865) | 3 | - | 1 |
| Trail Creek (804) | - | - | - |
| Upper Cow Creek (801) | - | - | - |

Data sources: Processed BLM and Forest Service GIS data, August 2, 2017; HUC5 Watershed layer, August 23, 2011
 Note: Number of sites in reserves may include sites that are only partially in reserves.



Analysis/Project Area Distribution

The analysis and project areas contain one site of *A. crassa*. This site is on the Winema National Forest in the Spencer Creek watershed, as described above in Local Distribution.

Surveys for the PCGP Project resulted in two observations of *A. crassa* in the survey area during fall 2011 (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). These recorded observations were near MP 173.2 and comprise the single site in the analysis area.

Project Impacts

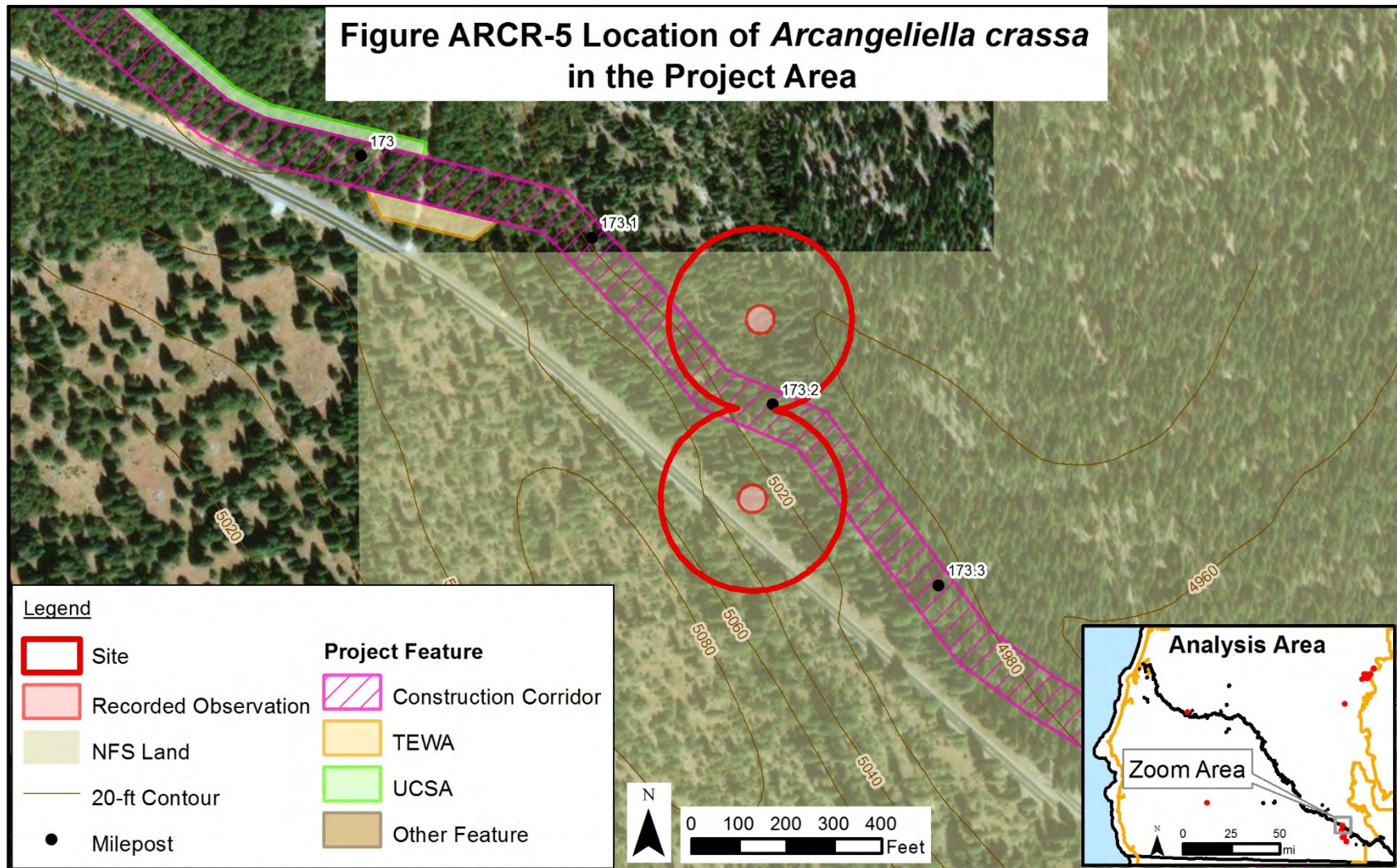
Analysis

The PCGP Project would affect one site out of the 21 sites on NFS lands in the region, representing approximately 5 percent of the NFS sites, or one out of the 26 total sites on all lands in the NSO range. The construction corridor would affect approximately 0.8 acre (15 percent) of the site (the site is approximately 5.4 acres), and the corridor would cross through the central portion of the site (see Figure ARCR-5). The site would not be affected by any other project component (e.g., TEWAs). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *A. crassa* in and near the project area. Due to the low number of overall sites of *A. crassa*, the effects on one site could potentially alter the distribution of the species in the NSO range if site persistence is affected.

This following discussion provides an overview of the types of impacts that would be expected at the site based on the features of the PCGP Project that could affect site persistence.

The PCGP Project would result in ground disturbance and vegetation removal across the central portion of the site near MP 173.2. The recorded observations of the species are just south and just north of the project area (see Figure ARCR-5). Both observations would likely be avoided by activities within the corridor. The species could be subject to indirect effects associated with the PCGP Project based on the proximity of project activities to the observations.

Establishment of the 95-foot wide construction corridor would disturb vegetation and soils about 100 feet from the observations within the site. The site is mostly forested, and a paved road crosses through the southern portion of the site, just south of the southern observation. Based on the proximity of the road to the observation, the species may be somewhat resilient to edge effects in the site. The establishment of the corridor could adversely modify microclimate conditions around the observations, but the species is expected to persist within the site in forested areas that are not disturbed by the PCGP Project. The removal of forests and host trees and disturbance to soil could negatively affect *A. crassa* by removing its habitat, disturbing the roots of host trees, and affecting its mycorrhizal association with the trees, but individuals outside the corridor would be expected to persist despite nearby changes to the species' habitat. Restored portions of the corridor would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A 30-foot wide portion of the corridor throughout the project area would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.



Based on this analysis, *A. crassa* is likely to persist at the site following project implementation. The site is one site in a small group of sites in the eastern Cascade Range in southern Oregon. While it is the only site in of the group that is on NFS lands, two of the other sites in the group are in BLM reserves, and would likely be protected under BLM management. The group of sites may be important for dispersal of the species between other sites to the north and south in the Cascade Range and sites to the southwest in the Klamath Mountains in California. Despite impacts to habitat in the site, *A. crassa* would still be found in the Cascade Range in Oregon, and opportunities for dispersal into the southern portion of the NSO range would still be possible.

Across the project area, the PCGP Project would remove an estimated 171 acres of LSOG coniferous forests between 2,000–7,000 feet msl. These impacts would result in a reduction of habitat that may be suitable for *A. crassa*. Within this impact area, about 88 acres (51 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, but the restored areas would not return to LSOG conditions for more than 80 years and would not likely provide habitat for the species during the life of the PCGP Project. A 30-foot wide corridor would be maintained in low-growing vegetation across the project area, resulting in a loss of about 43 acres of LSOG coniferous forests between 2,000–7,000 feet msl. The permanent loss of LSOG coniferous forests between 2,000–7,000 feet msl represents less than 1 percent of the total estimated area of these forests in Oregon and California.

Discussion

Given that site persistence would be maintained at the one site in the project area despite impacts to individuals and habitat within the site as a result of the PCGP Project, one site of *A. crassa* would remain on NFS lands in the local area (non-reserves) and four sites would remain on BLM lands in the local area, including one site entirely in reserves. A total of 21 sites, including two in reserves, would remain on NFS lands in the NSO range. The sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and management recommendations for the species with regard to agency-related actions. The two sites in NFS reserves is assumed to have additional protections provided by the NWFP Standards and Guidelines in place for the land allocation. Based on these site counts, approximately 9 percent of the *A. crassa* sites on NFS lands in the NSO range would continue to be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states “instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision” (Standards and Guidelines, pg. 4). The Forest Service has embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species. The preceding discussions present this evaluation, as summarized below:

- *Arcangeliella crassa* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information received since the species was listed in the 2001 ROD, however, indicates that more information on the species’ distribution is available, as described below:

- *Arcangeliella crassa* has a somewhat limited distribution across four physiographic provinces and two states in the region, and the total number of sites is low-moderate (21 on NFS lands, 26 on all lands). *Arcangeliella crassa* does not appear to be well distributed in any part of its range because sites are scattered and its distribution is spotty. However, the currently known number of sites on NFS and BLM lands has increased by 24 since 2007, and new sites have been documented in Oregon since 2002.
- An estimated 23 percent of the sites (six sites) on federal lands are in reserves, which is an increase of four sites in reserves since 2006 per Molina (2008).
- LSOG coniferous forests between 2,000 and 7,000 feet msl (general habitat for the species) have a somewhat limited distribution across Oregon and California and encompass approximately 2.9 million acres on BLM and NFS lands with an estimated 59 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. *Arcangeliella crassa* is likely restricted to a subcomponent of LSOG coniferous forests based on available information on its habitat and life history requirements.
- The PCGP Project would affect one of 21 sites of *A. crassa* on NFS lands, representing approximately 5 percent of the sites on NFS lands in the NSO range. However, the species is expected to persist at the site based on the analysis. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be the same as the currently documented distribution and range.
- The two sites in reserves on NFS lands would not be affected by the PCGP Project. One site would remain entirely in BLM reserves as well. The sites in reserves are in LSRs where management actions are restricted to those activities that benefit LSOG forests.
- The PCGP Project would result in a permanent loss of approximately 43 acres of LSOG coniferous forests between 2,000–7,000 feet msl (less than 1 percent of the total acreage in the NSO range). An estimated 1.7 million acres of LSOG coniferous forests between 2,000–7,000 feet msl would remain in reserves in Oregon and California.
- The remaining forests could support additional populations of *A. crassa*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. *Arcangeliella crassa* is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites may exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.2.4 Conclusions

If implemented as proposed, the PCGP Project would affect habitat for *A. crassa* at one site on NFS lands, but *A. crassa* is expected to persist at the site, and the PCGP Project would not modify the distribution of the species in the NSO range. The remaining sites would continue to provide a reasonable assurance of species persistence because:

- With project implementation, the number of sites across the region would not change. Although the PCGP Project may affect individuals of *A. crassa* at one site, site persistence is not expected to be affected. The species' distribution and range within the NSO range would be the same as its currently known distribution and range.
- The PCGP Project would remove approximately 171 acres of LSOG coniferous forest between 2,000–7,000 feet msl (a negligible amount of the forests). An estimated 52 percent of these forests would be restored to similar conditions or shrublands, but a 30-foot wide early-successional corridor would remain across the project area. An estimated 1.7 million acres of LSOG coniferous forests between 2,000–7,000 feet msl would remain in reserves (negligible change with project implementation). Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The sites on NFS lands are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Additionally, the single site entirely in BLM reserves is expected to receive significant protection under the 2016 BLM RMPs. Although a single natural disturbance event or combination of events could affect a significant portion of sites in the Cascade Range, some other sites are scattered across the region and are less likely to be collectively affected by a single event.

The PCGP Project would not be able to avoid impacts to the *A. crassa* site in the analysis area, but individuals within the site are expected to persist following project implementation and avoidance is not necessary. Amendments to the NFS land management plan that applies to the affected site would waive implementation of Management Recommendations for the *A. crassa* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the site and adjacent habitat over the long term. The monitoring plan shall be approved by the Forest Service.

2.3 BOLETUS PULCHERRIMUS

Boletus pulcherrimus is a bolete mushroom species in the Boletaceae family and is commonly known as red pored bolete.

2.3.1 Regulatory Status and Ranking

The 2001 ROD, including the 2003 ASR modifications to the S&M species list, identifies *B. pulcherrimus* as a Category B (rare) species. ORBIC evaluated *B. pulcherrimus* in its 2004 *Survey and Manage Assessment* for BLM and the Forest Service (ORBIC 2004) and in the 2010 *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2010). It was not included in the most recent updates of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013, ORBIC 2016). In 2010, the species was considered to be at moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors within its global range (G3) and was considered to be at high risk of extinction due to a restricted range, relatively few populations, recent and widespread declines, or other factors in Oregon (S2). It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.3.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to this analysis. Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are discussed below under Persistence Evaluation. The background information in this section is used to support the persistence evaluation in the following section, which is updated with more recent information (e.g., recent survey data) specifically used for the persistence evaluation.

Life History

Relatively little is known about the autecology or reproductive biology of *B. pulcherrimus*. As a presumed ectomycorrhizal species, *B. pulcherrimus* mycorrhiza form symbiotic associations with host plant roots, particularly roots of species in the Pine family (Castellano and O'Dell 1997). *Boletus pulcherrimus* spores possibly disperse by wind and by animal (arthropod) vectors. In California, fruiting has been documented from late fall to early winter (The Fungi of California 2010), but elsewhere in its range the species has been observed fruiting from July through December (Castellano et al. 1999).

Range

Boletus pulcherrimus is endemic to the Pacific Northwest, where it has been found from Canada south to California (Holthausen et al. 1994). Based on data available in 2004, *B. pulcherrimus* was found in Oregon in the lower eastern half of the Willamette Valley foothills and in the Ashland area (ORBIC 2004). The currently known range of the species within the NSO range based on 2017 data is discussed below under Species Distribution.

Although information on the species' historical range is not known, it may have been similar to the current range, with populations limited to the Pacific Northwest. It may have had more abundant local distributions across its range, but habitat modifications and other environmental factors, as discussed below under Threats, have likely reduced available habitat and may have further restricted the species' distribution.

Population Status

ORBIC (2004) reported *B. pulcherrimus* from an estimated 45 element occurrences in the Pacific Northwest in 2004. Most of these occurrences were in Oregon (6), with fewer in California (3) and Washington (2) (ORBIC 2004). In 2004, population trends across the species' range in the Pacific Northwest were unknown, but some populations appeared to have good viability based on the recurrence of observations at the same locations. The species was not found during Random Multi-Species surveys across the NSO range between 2001 and 2004 (USDA and USDI 2007). Molina (2008) documented 15 new sites of *B. pulcherrimus* in the NSO range between 1998 and 2006, and 44 total sites were documented by 2006, including 14 in reserves or protected areas. The 2007 Final SEIS reported 20 sites on NFS and BLM lands and 26 total sites on all lands in the NSO range (USDA and USDI 2007).

Pre-disturbance surveys are not practical for Category B species. Instead, equivalent-effort surveys were conducted during the fall and spring from 2010 to 2016 in old-growth stands in the PCGP Project area and within 100 feet of habitat removal to comply with the Standards and

Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). These equivalent-effort surveys targeted all Category B species, including *B. pulcherrimus*, and resulted in eight new observations of individuals or populations of the species between 2010 and 2011. Additional surveys for *B. pulcherrimus* in LSRs in nearby areas resulted in three additional observations of the species. These observations have increased the number of sites documented in BLM and Forest Service records by about 20 percent. Based on the increased number of known sites since 1998 as a result of the increased number of surveys (more than 50 percent increase between 1998 and 2006 per Molina 2008 records) and considering that the species is fairly conspicuous, additional surveys would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2017 data are presented below under Species Distribution.

Habitat

Boletus pulcherrimus grows in humus in association with the roots of conifers such as Douglas-fir (*Pseudotsuga menziesii*) and grand fir (*Abies grandis*), and hardwoods such as tanoak (*Notholithocarpus densiflorus*) in coastal forests (Castellano et al. 1999). Sporocarps are usually found solitary or in scattered areas, but not in groups. It has primarily been found in low- to mid-elevation old-growth coniferous forests, generally below 6,000 feet (Holthausen et al. 1994, Cushman and Huff 2007). Prior to 1994, this species had not been observed in forests that were disturbed (Holthausen et al. 1994). However, it has more recently been reported from open mixed hardwood stands with young conifers and along roadsides (Trappe, pers. comm. 2013). *Boletus pulcherrimus* may prefer specific microclimate conditions of LSOG forests, but it may not be restricted to these conditions because it is also found in open stands and disturbed settings.

Threats

Threats to *B. pulcherrimus* include disruption of stand conditions, particularly from disturbance to host trees, soil, litter, and duff (Castellano and O'Dell 1997). Logging of LSOG forests is the most serious threat. *Boletus pulcherrimus* is not collected for food because it is toxic (The Fungi of California 2010).

Management Recommendations

As a Category B S&M species, the direction under the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). This statement is no longer applicable on BLM lands under the 2016 BLM RMPs, although it is still valid on NFS lands within the range of the NSO. Management recommendations were developed for *B. pulcherrimus* along with two other species (Group 1 of Castellano and O'Dell 1997). The primary guidance is to maintain current habitat and microclimatic conditions at all known sites. In order to maintain habitat conditions around known locations, impacts from soil disturbing activities should be minimized and damage to or removal of host trees should be prevented. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *B. pulcherrimus*:

- As a mycorrhizal species, *B. pulcherrimus* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch

retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.3.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species’ currently known distribution within the NSO range based on new site information, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *B. pulcherrimus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and the Forest Service (Oregon/Washington regional offices) and converted into sites in accordance with the methodology described in Chapter 1. Table BOPU-1 shows the total number of known sites in the regional (NSO range), local (18 5th-field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 92 observations from BLM and Forest Service geodatabases were converted into 60 sites in the NSO range (region). Table BOPU-2 shows the total number of sites on NFS lands and other land ownerships across the regional, local, and analysis areas. Table BOPU-3 shows the total number of sites within each land use allocation defined in the 1994 ROD and 2016 RMP across the regional, local, and analysis areas. Figure BOPU-1 displays the regional distribution of the species across NFS lands, Figure BOPU-2 displays the extent of known sites located in protected areas (NFS lands, NFS reserves, BLM reserves, and NPS lands), and Figure BOPU-3 displays the species’ regional distribution as well as the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,000 feet msl on NFS and BLM lands.

| Location* | Number of Sites |
|------------------------------|-----------------|
| Regional Area | 60 |
| Local Area | 22 |
| Analysis Area (Project Area) | 7 (5) |

Data source: Processed BLM and Forest Service GIS data, August 2, 2017
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

| Land Ownership | Regional Sites | Local Sites | Analysis Area Sites |
|------------------------------|----------------|-------------|---------------------|
| Forest Service | 34 | 14 | 7 |
| BLM | 18 | 8 | - |
| NPS | - | - | - |
| Fish and Wildlife Service | - | - | - |
| Other (Private, State, etc.) | 12 | 2 | - |

Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

TABLE BOPU-3

Distribution of *Boletus pulcherrimus* across 1994 ROD and 2016 RMPs Land Allocations

| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
|--|----------------|-------------|---------------------|
| Adaptive Management Area (AMA) | 2 | - | - |
| Adaptive Management Reserves (AMR) | - | - | - |
| Administratively Withdrawn (AW) | 10 | - | - |
| Congressionally Reserved (CR) | 2 | - | - |
| Late Successional Reserve (LSR) | 19 | 10 | 4 |
| Marbled Murrelet Area (LSR3) | - | - | - |
| Northern Spotted Owl Activity Center (LSR4) ^{a/} | - | - | - |
| Managed Late Successional Area (MLSA) | - | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | 4 | 4 | 3 |
| Riparian Reserve | - | - | - |
| Bureau of Land Management | Regional Sites | Local Sites | Analysis Area Sites |
| Administratively Withdrawn (AW) | 1 | - | - |
| Congressional Reserve | - | - | - |
| District Designated Reserve | 6 | 5 | - |
| Harvest Land Base | 10 | 7 | - |
| Late Successional Reserve | 9 | 3 | - |
| Not Designated (ND) | 9 | - | - |
| Other (Matrix, Other) | - | - | - |
| Riparian Reserve | 8 | 4 | - |

Data sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0; 2016 RMP land allocation data, August 2016.

Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.

^{a/} Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center.

Regional Distribution

Boletus pulcherrimus has a wide, but scattered distribution across eight physiographic provinces in Washington (Western Lowlands and Western Cascades), Oregon (Willamette Valley, Cascades East and West, and Klamath Mountains), and California (Klamath and Coast). A large cluster of sites is found in the southern Cascade Range in Oregon, where the species appears to be locally abundant, while other sites scattered across the NSO range appear to be somewhat isolated. *Boletus pulcherrimus* does not appear to be well distributed within its range in the NSO range.

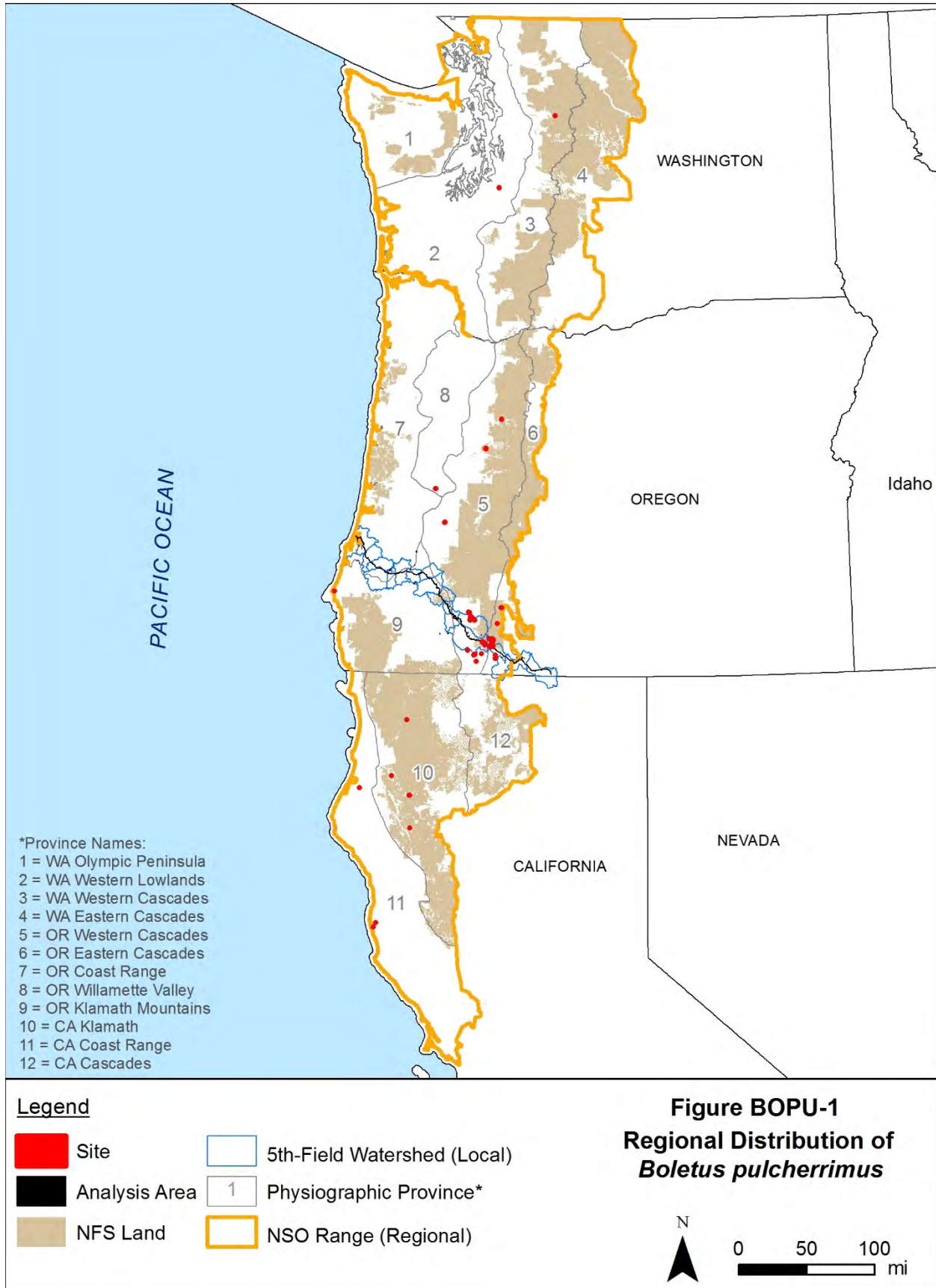
Twelve of the 60 known sites in the region are at least partially on private, state, or other lands; 34 sites are at least partially on NFS lands; and 18 are at least partially on BLM lands. Sites included on National Forests that encompass the project area include 20 sites on the Fremont-Winema National Forest and eight sites on the Rogue River-Siskiyou National Forest. Sites on other National Forests include two sites on the Shasta-Trinity National Forest, two sites on the Willamette National Forest, two sites on the Six Rivers National Forest, and one site on the Mt. Baker-Snoqualmie National Forest.

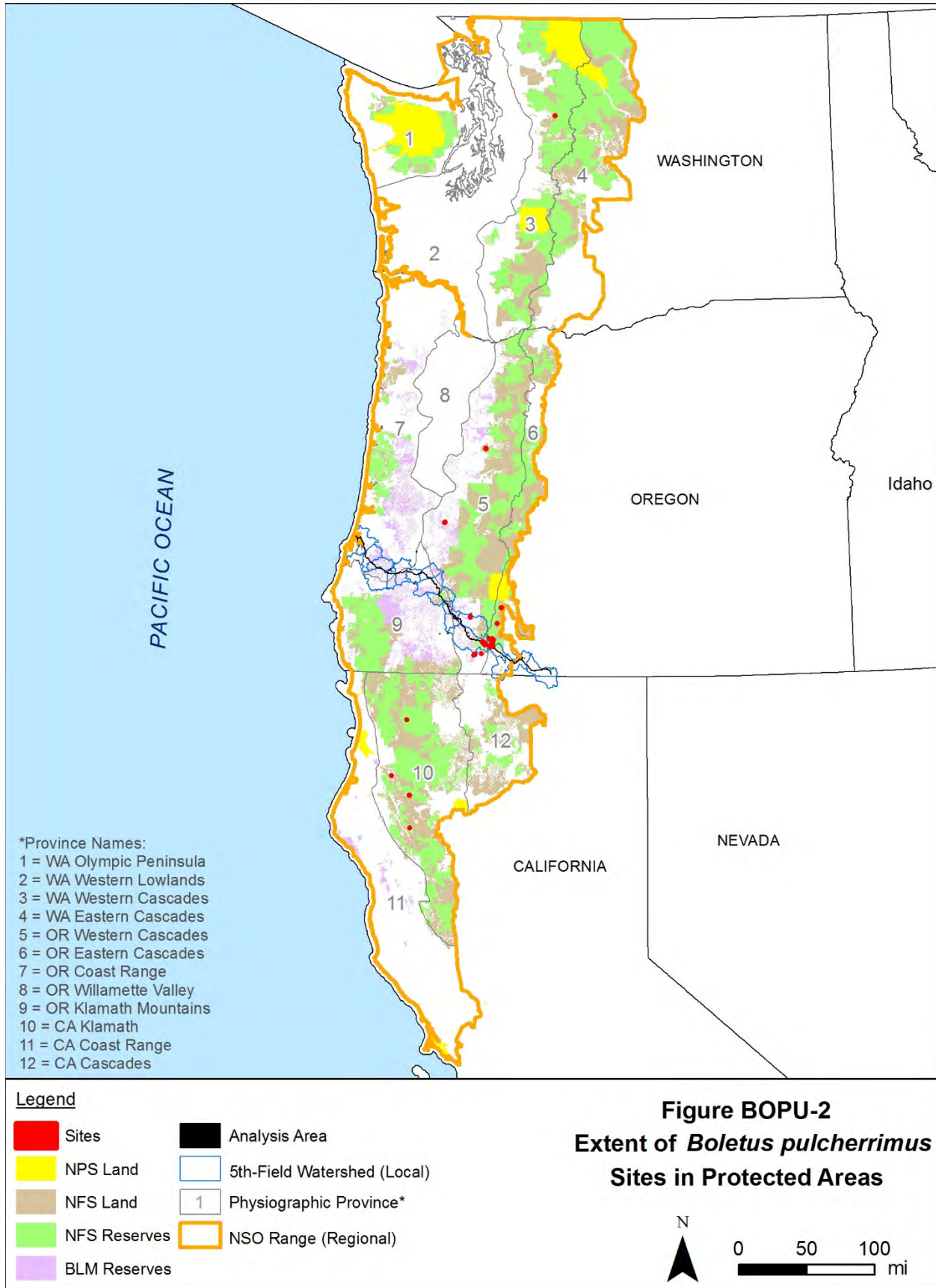
Across the NSO range, 21 sites are at least partially located in reserve lands managed the Forest Service, including 19 sites in LSRs and two sites in Congressionally Reserved areas (see Figure BOPU-2). These sites represent 62 percent of the total Forest Service-managed sites in the region. The remaining NFS sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. Additionally, eight sites are located entirely in reserve lands managed by BLM, which represents 44 percent of the total BLM-managed sites in the region. While the eight sites in BLM reserve lands are not covered by the S&M Standards and Guidelines, they likely receive some degree of protection through BLM reserve management.

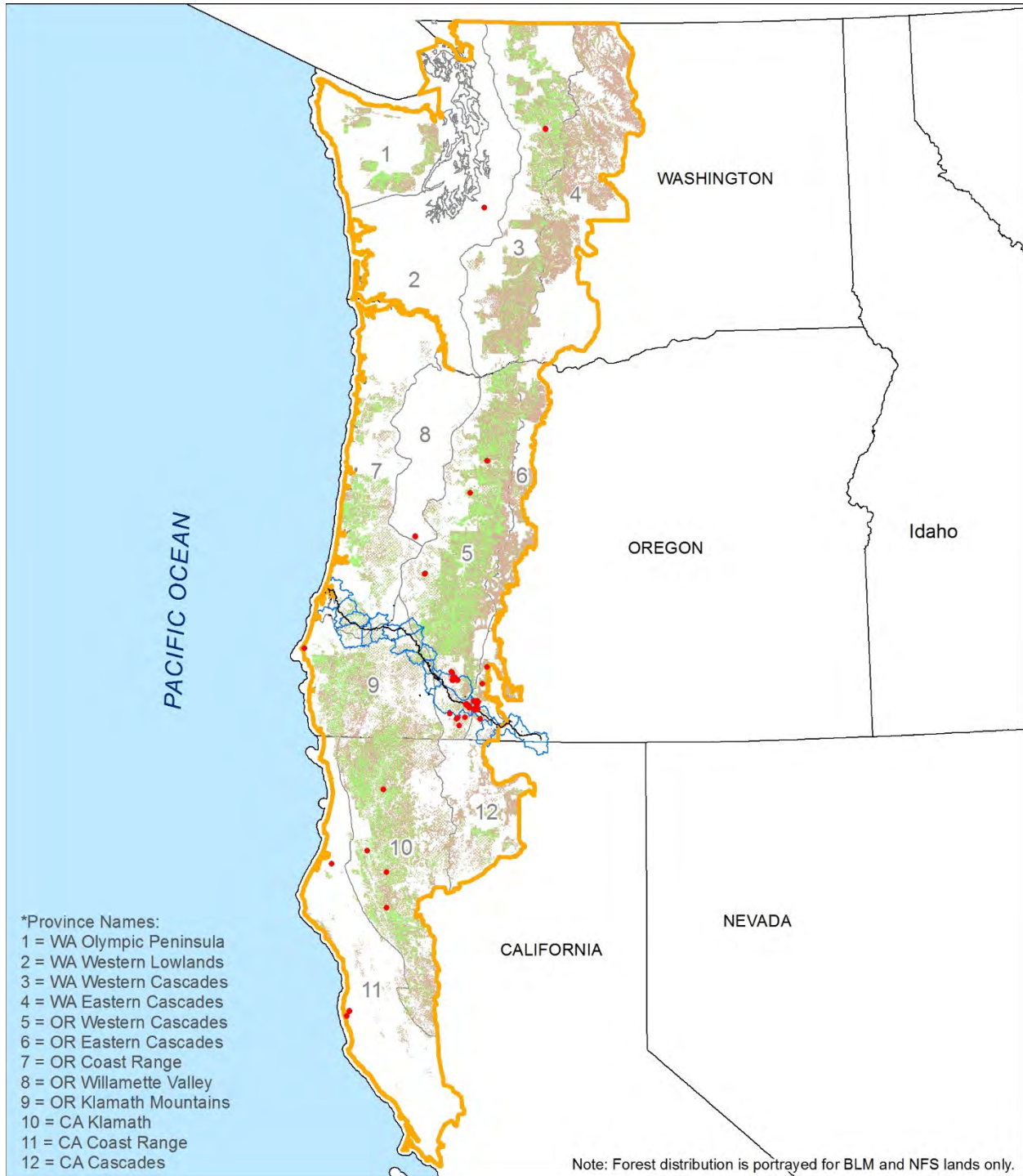
Boletus pulcherrimus is primarily found in LSOG forests based on available data (56 of 60 total sites are in LSOG) and may prefer certain microclimate conditions of these forests, but it has also been found in open stands and along roadsides. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 6,000 feet msl throughout the NSO range. Due to the extent of known sites, the amount of potential habitat on both NFS and BLM lands in the region, and the level of protection offered by NFS and BLM reserve land, both land ownerships are included in this potential habitat discussion. Coniferous and mixed hardwood-coniferous forests below about 6,000 feet msl, including the LSOG component of these forests within the NSO range could provide habitat for *B. pulcherrimus* and support additional sites. These forests encompass an estimated 18.1 million acres on BLM and NFS lands in the NSO range, including an estimated 10.7 million acres in reserve land allocations (59 percent of the forests; Table BOPU-4). Of this acreage, an estimated 5.9 million acres are LSOG (see Figure BOPU-3), including 3.9 million acres in reserve land allocations (66 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 6,000 feet msl are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

| Location | Coniferous and Mixed Forests below 6,000 feet | | LSOG Forests below 6,000 feet | |
|---------------|---|------------|-------------------------------|-----------|
| | Total | Reserves | Total | Reserves |
| Regional Area | 18,055,593 | 10,707,574 | 5,908,944 | 3,894,277 |
| Local Area | 568,307 | 369,371 | 181,349 | 133,178 |
| Project Area | 1,419 | 982 | 323 | 230 |

Data source: Gradient nearest neighbor vegetation data from Moeur et al. 2011
 Note: Areas are presented in acres.
^{a/} The area estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.







Legend

- Site
- Analysis Area
- LSOG Below 6,000 ft
- Conifer/Mixed Below 6,000 ft
- 5th-Field Watershed (Local)
- 1 Physiographic Province*
- NSO Range (Regional)

Figure BOPU-3
Potential Habitat For
Boletus pulcherrimus



Local Distribution

Within the local area, *B. pulcherrimus* is found in three 5th-field watersheds that overlap the project area: Little Butte Creek, Big Butte Creek, and Spencer Creek (see Table BOPU-5 and Figure BOPU-4). The sites are relatively close to one another in the Cascade Range. Several sites are located to the north and south in the regional vicinity, and dispersal opportunities appear to be available between the local sites and other sites in the region. The cluster of sites in the local area is part of the largest abundance of sites in the region (the southern Cascade Range in Oregon).

Fourteen out of the 22 sites are in the local area are on NFS lands in the Rogue River-Siskiyou and Fremont-Winema National Forests. Ten of these sites are entirely in LSRs, including all of the sites in the Little Butte Creek watershed and two of the sites in the Spencer Creek watershed. The remaining eight sites in the local area are located on BLM lands, one of which is entirely in BLM reserves (LSRs).

| Watershed (HUC5 ID) | Number of Sites | Number of Sites in NFS Reserve Lands | Number of Sites in BLM Reserve Lands |
|--|-----------------|--------------------------------------|--------------------------------------|
| Big Butte Creek (839) | 7 | 7 | 5 |
| Coos Bay Frontal (713) | - | - | - |
| East Fork Coquille River (747) | - | - | - |
| Elk Creek-South Umpqua (785) | - | - | - |
| Klamath River-John C Boyle Reservoir (888) | - | - | - |
| Lake Ewauna-Upper Klamath River (876) | - | - | - |
| Little Butte Creek (846) | 8 | 8 | - |
| Lower Lost River (892) | - | - | - |
| Middle Fork Coquille River (764) | - | - | - |
| Middle South Umpqua River (763) | - | - | - |
| Myrtle Creek (775) | - | - | - |
| North Fork Coquille River (733) | - | - | - |
| Olalla Creek-Lookingglass Creek (745) | - | - | - |
| Rogue River-Shady Cove (818) | - | - | - |
| South Umpqua River (781) | - | - | - |
| Spencer Creek (865) | 7 | 2 | 1 |
| Trail Creek (804) | - | - | - |
| Upper Cow Creek (801) | - | - | - |

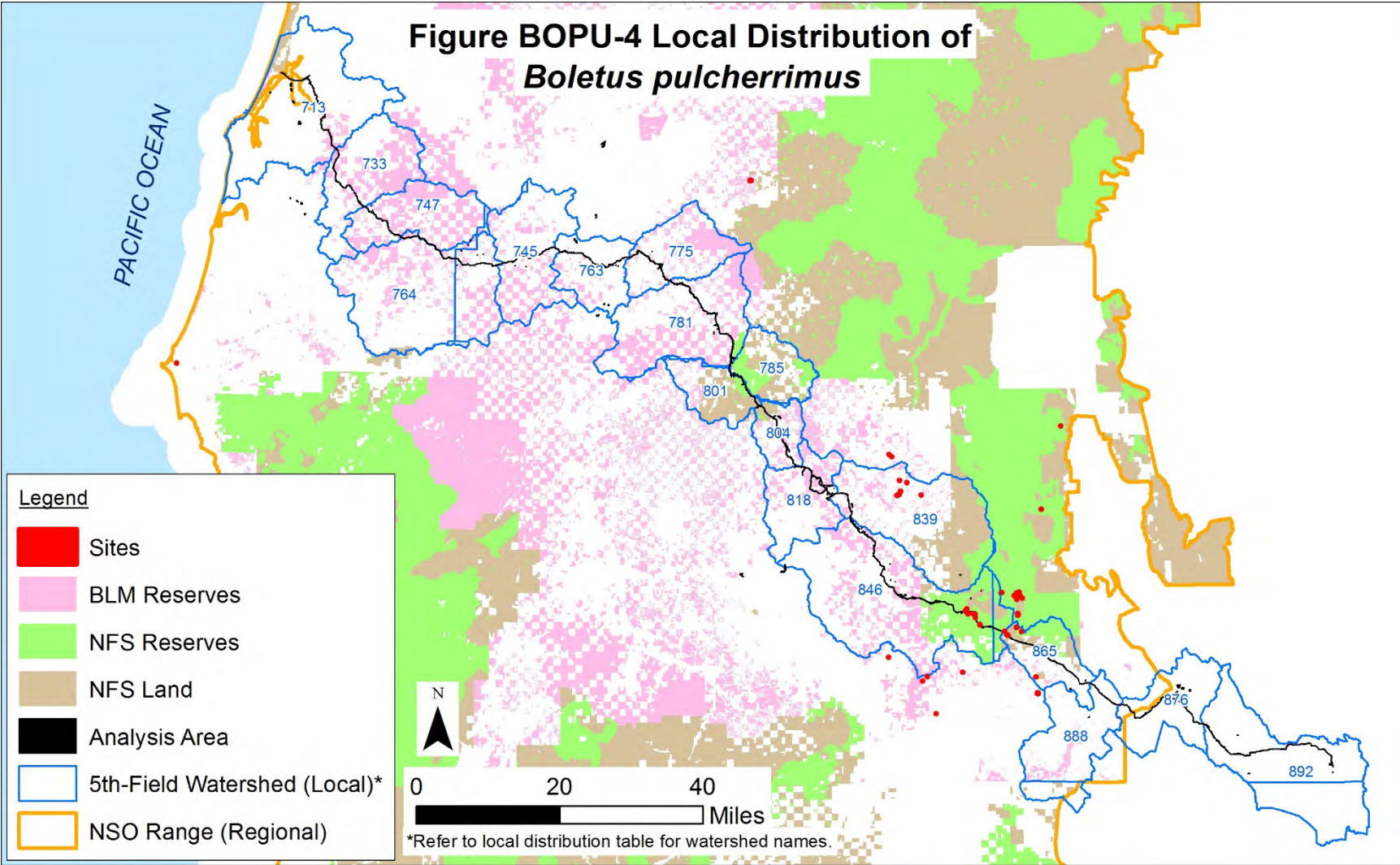
Data sources: Processed BLM and Forest Service GIS data, August 2, 2017; HUC5 Watershed layer, August 23, 2011
 Note: Number of sites in reserves may include sites that are only partially in reserves.

Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl encompass approximately 568,307 acres on BLM and NFS lands in the local area, with 369,371 acres in reserve land allocations (65 percent of the forests). Of this acreage, an estimated 181,349 acres are LSOG, including 133,178 acres in reserves (73 percent of the forests).

Analysis/Project Area Distribution

The analysis area contains seven *B. pulcherrimus* sites and the project area contains five sites. The seven analysis area sites are on NFS lands in the Little Butte Creek and Spencer Creek 5th-field watersheds. Four of the sites are entirely in LSRs, and the other three sites are on lands designated as Other (Matrix).

Surveys for the PCGP Project resulted in 18 total observations of *B. pulcherrimus* in 15 locations in or near the project area during 2010–2011 (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). An estimated 13 of these recorded observations comprise the seven sites in the analysis area; the other observations are in sites outside the analysis area. Within the project area, seven sites are between MPs 161 and 169.



Project Impacts

Analysis

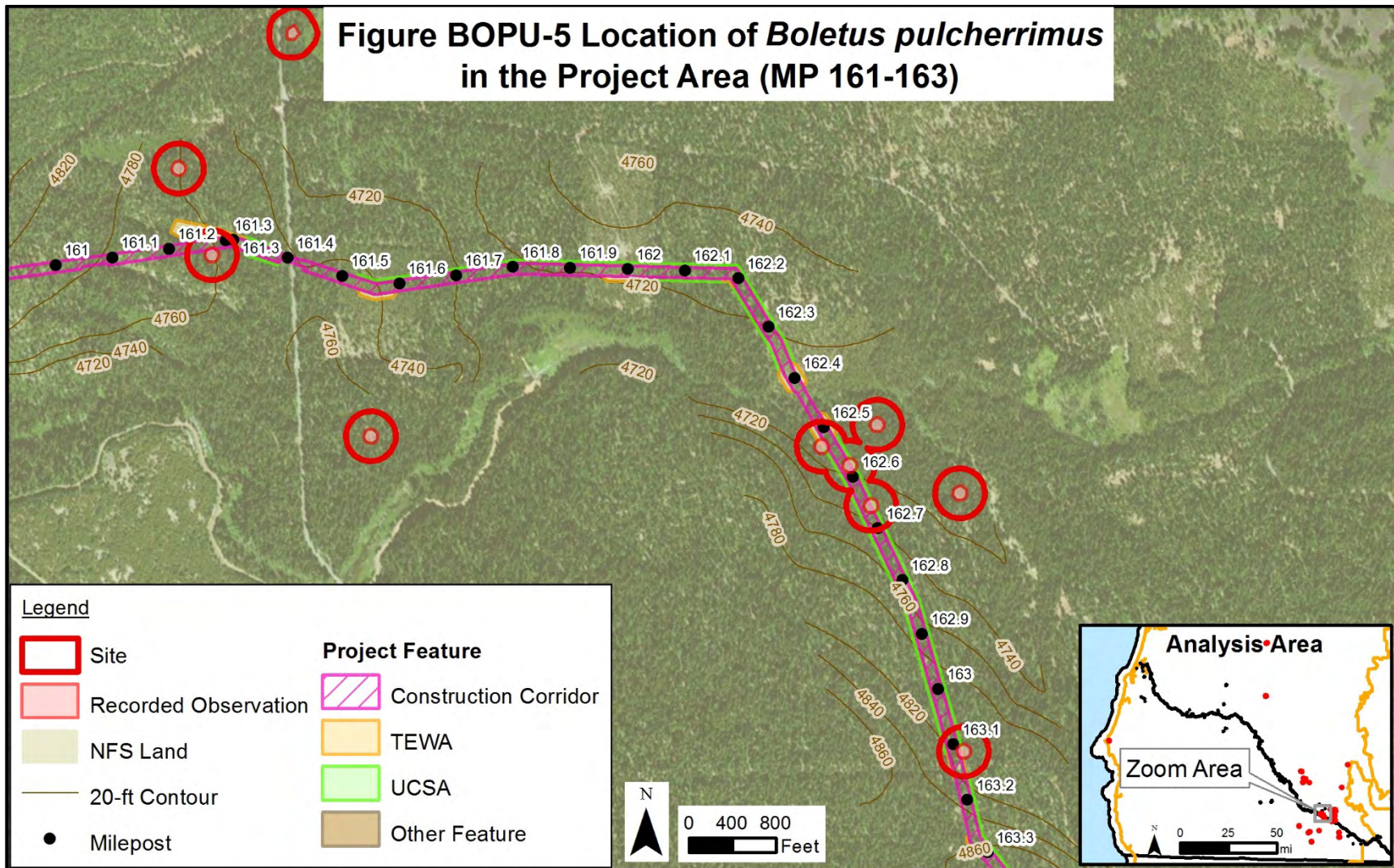
The PCGP Project would affect seven out of the 34 NFS sites in the region, representing approximately 21 percent of the NFS sites, or seven out of 60 total sites on all lands in the NSO range. Table BOPU-6 provides an overview of the features of the PCGP Project that would affect the *B. pulcherrimus* sites on NFS lands. The construction corridor and associated work and storage areas would affect approximately 10.2 acres (27 percent) of the sites (the sites encompass 38 acres), with some sites experiencing greater impacts than others (see Figures BOPU-5, BOPU-6, and BOPU-7). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *B. pulcherrimus* in and near the project area. Due to the proportion of sites affected, the effects on seven sites could potentially alter the distribution of the species in the NSO range if site persistence is affected.

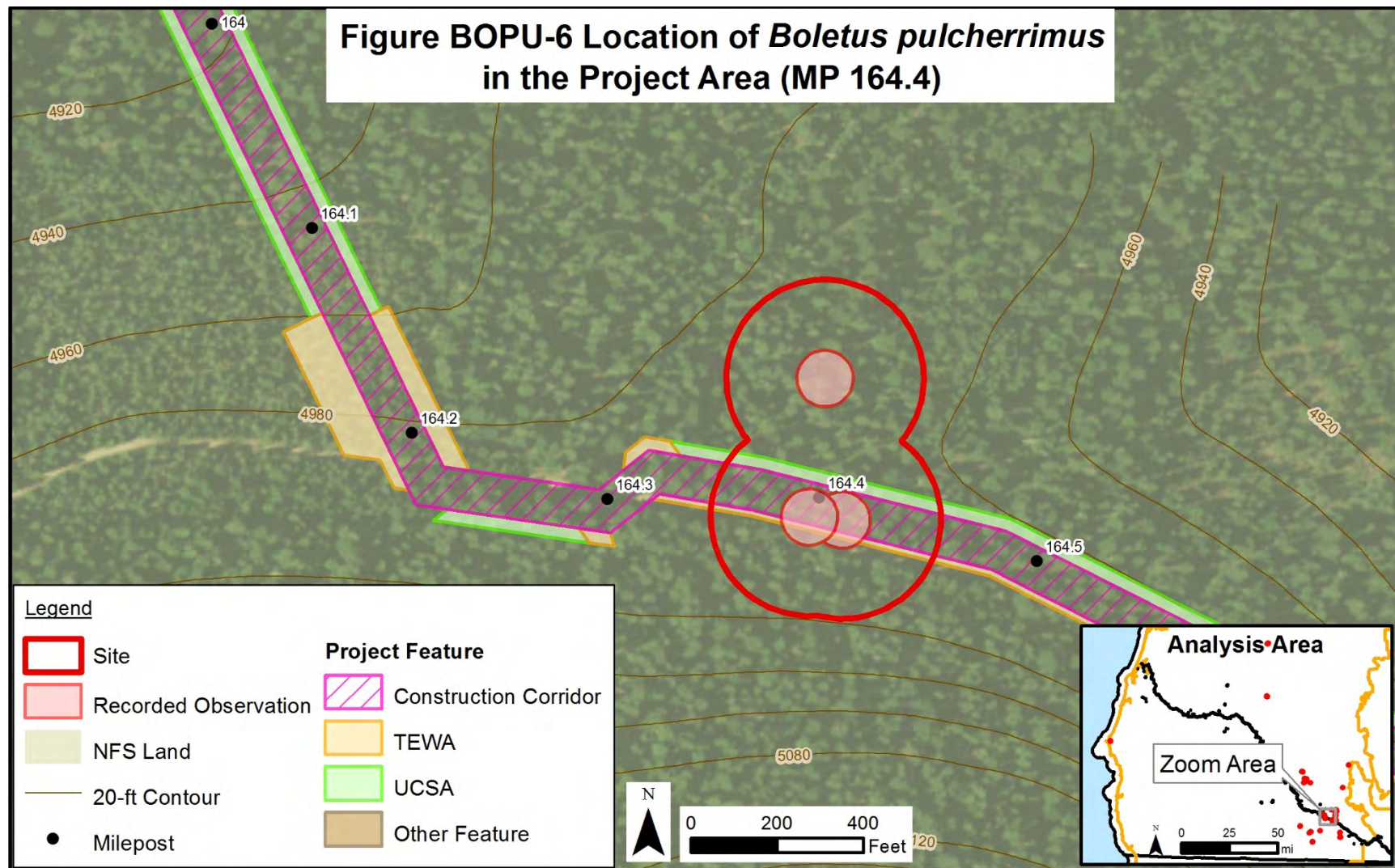
The following discussion provides an overview of the types of impacts that would be expected at the sites based on the features of the PCGP Project that could affect site persistence.

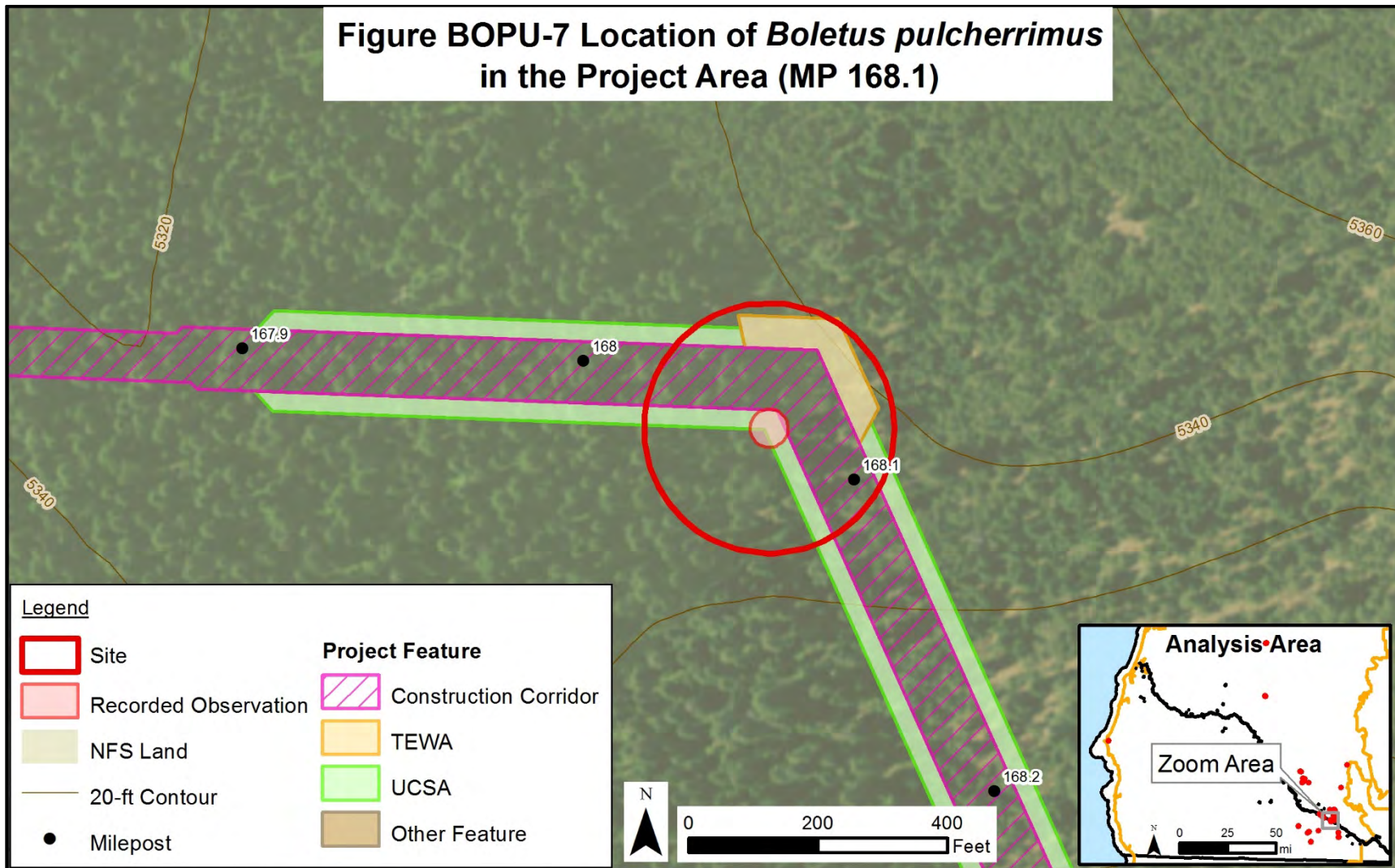
| Project Activity | Number of Sites Affected | Area of Disturbance within Sites |
|--------------------------------------|--------------------------|----------------------------------|
| Construction Corridor | 5 | 6.4 ac |
| Temporary Extra Work Area (TEWA) | 5 | 1.5 ac |
| Uncleared Storage Area (UCSA) | 4 | 2.3 ac |
| Roads (TMP) | - | - |
| Other Minimal Disturbance Activities | - | - |

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

The PCGP Project would result in ground disturbance and vegetation removal in five out of the seven sites in the analysis area (Table BOPU-7). The only recorded observations of the species in three of the sites (MP 161.2-161.3, MP 163.1, and MP 168.1) would likely be removed by construction within the corridor (see Figures BOPU-5 and BOPU-6). The site at MP 162.5-162.7 is a large site and includes five observations, three of which are within the corridor and would likely be removed. The remaining two observations are outside the project area and would not be directly affected. The site at MP 164.4 is also a large site with three observations; two of the observations are within the corridor and would likely be removed. The third observation is outside the project area and would not be directly affected. For all of the sites, individuals outside the corridor and TEWAs may also be subject to indirect effects associated with the PCGP Project based on the proximity of project activities to the sites, as discussed below.







| Site Location | Source of Impacts | Area of Disturbance | Individuals Likely to Persist? |
|----------------|-------------------|---------------------|--------------------------------|
| MP 161.2-161.3 | Corridor | 0.9 ac | No |
| | TEWA | 0.5 ac | |
| MP 162.5-162.7 | Corridor | 2.5 ac | Yes |
| | TEWA | 0.4 ac | |
| | UCSA | 1.3 ac | |
| MP 163.1 | Corridor | 0.9 ac | No |
| | TEWA | 0.2 ac | |
| | UCSA | 0.3 ac | |
| MP 164.4 | Corridor | 1.2 ac | Yes |
| | TEWA | 0.2 ac | |
| | UCSA | 0.3 ac | |
| MP 168.1 | Corridor | 1.0 ac | No |
| | TEWA | 0.3 ac | |
| | UCSA | 0.4 ac | |
| MP 168.7 | n/a | n/a | Yes |
| MP 168.8 | n/a | n/a | Yes |

Notes: MP = milepost; ac = acres

Establishment of the 95-foot wide construction corridor and TEWAs would likely remove *B. pulcherrimus* individuals in five sites and modify microclimate conditions around individuals that are not removed. The removal of forests and host trees and disturbance to soil could negatively affect *B. pulcherrimus* in adjacent areas by removing its habitat, disturbing the roots of host trees, and affecting its mycorrhizal association with the trees, although the species appears to be somewhat resilient to edge effects in some areas (e.g., it has been found along roadsides). Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A 30-foot wide portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. *Boletus pulcherrimus* is not likely to persist at three of the sites because of the extent of impacts within the sites and the proximity of the recorded observations to the corridor (see Table BOPU-7). *Boletus pulcherrimus* is likely to persist at the two larger sites (MP 162.5-162.7 and MP 164.4), despite impacts to some individuals, because some observations within those sites are more than 100 feet from the corridor, where direct effects are not anticipated and indirect effects are unlikely. The site at MP 162.5-162.7 is comprised of several observations and is located in a heavily forested area on a north-facing slope. One observation within the site is located more than 300 feet northeast and downslope of the corridor and is likely to persist. The site at MP 164.4 has similar conditions, and the observation located 180 feet north and downslope of the corridor is likely to persist. A road crosses through the southern part of this site, and the corridor would follow the north side of the road where two observations have been recorded and cannot be avoided.

The two other sites in the analysis area (about 280-300 feet west of MP 168.7 and MP 168.8) are not likely to be affected by activities within the corridor or TEWAs. These sites are in a forested area on a south-facing slope, and more open forests exist to the northeast and east where the corridor and TEWAs would be located. Vegetation removal and disturbance in the project area are not expected to affect microclimate conditions in the sites based on their distance from the activities and the existing habitat conditions.

Based on this analysis, *B. pulcherrimus* is not likely to persist at three of the seven sites in the analysis area following project implementation. The four sites that are expected to persist in the

analysis area are distributed across the Cascade Range in southern Oregon, and several additional sites are located in the vicinity. The species would continue to be locally abundant in the southern Cascade Range in Oregon. Two of the affected sites are in LSRs, and the third is on land designated as Other (Matrix).

Across the project area, the PCGP Project would remove an estimated 1,142 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including 249 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *B. pulcherrimus*. Within this impact area, about 567 acres (about 50 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A 30-foot wide corridor would be maintained in low-growing vegetation across the project area, resulting in a loss of about 246 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the three sites as a result of the PCGP Project, 11 sites of *B. pulcherrimus* would remain on NFS lands in the local area, including eight in reserves, and 31 sites, including 19 in reserves, would remain on NFS lands in the NSO range. Additionally, eight sites are entirely within BLM reserves in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but the NFS sites would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 19 sites in NFS reserves are assumed to have additional protections provided by the NWFP Standards and Guidelines in place for those land allocations, while the eight sites in BLM reserves would likely receive some level of protection through BLM management. Based on these site counts, approximately 61 percent of the remaining *B. pulcherrimus* sites on NFS lands in the NSO range would be protected in NFS reserves and 52 percent of the remaining sites on federal lands would be protected in either NFS reserves or BLM reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states “instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision” (Standards and Guidelines, pg. 4). The Forest Service has embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *Boletus pulcherrimus* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD, however, indicates that the species appears to be more common than previously documented, as described below:

- *Boletus pulcherrimus* has a wide, but scattered, distribution across eight physiographic provinces and three states in the region and a low-moderate number of overall sites (34 on NFS lands, 60 on all lands). The species is most abundant in the southern Cascade Range in Oregon, but less abundant in other areas. The currently known number of sites on NFS and BLM lands has increased by 32 sites since 2007, with many sites documented during the PCGP Project surveys.
- An estimated 67 percent of the sites (35 sites) on federal lands are in reserves, which is an increase of 21 sites in reserves since 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 18.1 million acres on BLM and NFS lands with an estimated 59 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented.
- The PCGP Project would affect three of 34 *B. pulcherrimus* sites on NFS lands, representing approximately 9 percent of the sites on NFS lands in the NSO range. Assuming site persistence cannot be maintained at three of the sites in the analysis area, a low-moderate number of sites (31) would continue to be documented on NFS lands in the region with a wide, but scattered, distribution across Washington, Oregon, and California. Several sites (11 sites) would remain in the local vicinity of the analysis area; these sites would continue to occur in two 5th-field watersheds. Additionally, eight sites would remain entirely in BLM reserves in the region, and one site would remain entirely in BLM reserves in the local area. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at two sites in LSRs, and the percentage of sites on NFS lands in reserves would remain about the same (61 percent). Of the remaining sites on NFS lands, 17 are at least partially in LSRs where management actions are restricted to activities that benefit LSOG forests, and two are in Congressionally Reserved areas where management activities that may adversely affect *B. pulcherrimus* are unlikely. Additionally, eight sites are entirely within BLM reserves in the regional area, including LSRs where management actions are restricted to activities that benefit LSOG forests, Riparian Reserves where management actions are restricted to those activities that benefit the conservation of riparian areas and riparian-associated species, and District Designated Reserves where management activities that may adversely affect *B. pulcherrimus* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 246 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 10.7 million acres (59 percent) of coniferous and mixed forests and 3.9 million acres (66 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *B. pulcherrimus*, although the potential for the habitat to be occupied varies based on the distribution of sites and the

species' specific habitat requirements. *Boletus pulcherrimus* is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO, particularly in the Cascade Range, that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.3.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *B. pulcherrimus* at seven sites on NFS lands; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 31 sites would remain on NFS lands across the region, 11 sites would remain on NFS lands in the local area, and four sites would remain in the analysis area. Although the PCGP Project would affect site persistence of *B. pulcherrimus* at three sites, these sites are part of a large cluster of sites in the Cascade Range where the species is locally abundant. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *Boletus pulcherrimus* would persist in the region without considering the three sites as part of the population.
- The PCGP Project would remove approximately 1,142 acres of coniferous and mixed hardwood-coniferous forests and 249 acres of LSOG forests below 6,000 feet msl (a negligible amount of the forests). An estimated 50 percent of the forests would be restored to similar conditions or shrublands, but a 30-foot wide early-successional corridor would remain across the project area. An estimated 10.7 million acres (59 percent) of coniferous and mixed forests and 3.9 million acres (66 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites on NFS lands are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Additionally, the sites in BLM reserves are expected to receive some level of protection under BLM reserve management. Although a single natural disturbance event or combination of events could affect a significant portion of sites in the Oregon Cascade Range, several sites are scattered across the region and are less likely to be collectively affected by a single event.

The PCGP Project would not be able to avoid impacts to all *B. pulcherrimus* sites in the analysis area, although some individuals or populations within the sites and some sites are expected to persist following project implementation. Based on the above conclusions, avoidance of the seven *B. pulcherrimus* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the NFS land management plans that apply to the affected sites would waive implementation of Management Recommendations for *B. pulcherrimus* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species

and adjacent habitat near affected sites over the long term. The monitoring plan shall be approved by the Forest Service.

2.4 CHOIROMYCES ALVEOLATUS

Choiromyces alveolatus is a truffle species in the Tuberaceae family and does not have a common name.

2.4.1 Regulatory Status and Ranking

The 2001 ROD, including the 2003 ASR modifications to the S&M species list, identifies *C. alveolatus* as a Category B (rare) species. ORBIC evaluated *C. alveolatus* in its 2004 *Survey and Manage Assessment* for BLM and the Forest Service (ORBIC 2004) and again in its most recent update of the *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2016). In 2016, the species was considered to be at moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors within its global range (G3) and was considered to be at moderate risk of extinction due to a restricted range, relatively few populations, recent and widespread declines, or other factors in Oregon (S2). The species is on ORBIC List 3. It is not considered a BLM Sensitive or Strategic species in Oregon, but it is considered a Forest Service Strategic species in Oregon.

2.4.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to this analysis. Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are discussed below under Persistence Evaluation. The background information in this section is used to support the persistence evaluation in the following section, which is updated with more recent information (e.g., recent survey data) specifically used for the persistence evaluation.

Life History

Relatively little is known about the autecology or reproductive biology of *C. alveolatus*. It is presumed to be ectomycorrhizal, forming symbiotic associations with the roots of conifer trees for translocation of minerals, water, and nutrients (Castellano and O'Dell 1997). It forms sporocarps below the soil surface (Castellano et al. 1999) and forms relatively large fruiting bodies (up to 2 inches in diameter) (ORBIC 2004). Fruiting has been documented from May through November (Castellano et al. 1999), although the species does not fruit regularly (ORBIC 2004). As with other sequestrate fungi, spore dispersal is presumed to depend on mycophagy (the consumption of fungi by small mammals) (Castellano and O'Dell 1997, Holthausen et al. 1994).

Range

Choiromyces alveolatus appears to be endemic to the western United States, where it has been found in California, Oregon, Washington, and Utah (ORBIC 2004). Based on data available in 1997, its range in the Pacific Northwest extended from the Cascade Range in Mt. Rainier National Park south to the Klamath National Forest in California (Castellano and O'Dell 1997). It also has disjunct occurrences on the Tahoe National Forest in California. The currently known range of the species within the NSO range based on 2017 data is presented below under Species Distribution.

Although information on the species' historical range is not known, it may have been similar to the current range, with populations distributed across western North America. It may have had more abundant local distributions across its range, but habitat modifications and other environmental factors may have reduced available habitat and further restricted the species' distribution, as discussed below under Threats.

Population Status

ORBIC (2004) reported *C. alveolatus* from less than 20 element occurrences with a patchy distribution across its range in 2004. An estimated nine of these occurrences were within the range of the NSO with four in protected areas. Most of the occurrences were in California (about 10), with fewer in Oregon (6) and Washington (1). The species was found in one location during Random Multi-Species surveys across the NSO range between 2001 and 2004 (USDA and USDI 2007). Molina (2008) documented two new sites of *C. alveolatus* in the NSO range between 1998 and 2006, and 10 total sites were documented by 2006, including five in reserves or protected areas. The 2007 Final SEIS reported seven sites on NFS and BLM lands and eight total sites on all lands in the NSO range (USDA and USDI 2007).

Pre-disturbance surveys are not practical for Category B species. Instead, equivalent-effort surveys were conducted during the fall and spring from 2010 to 2016 in old-growth stands in the PCGP Project area and within 100 feet of habitat removal to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). The equivalent-effort surveys targeted all Category B species, including *C. alveolatus*, and resulted in one new observation of the species in 2012 on the Fremont-Winema National Forest. *Choiromyces alveolatus* has not been found in high numbers during past survey efforts, although limited fungi surveys have been conducted across the NSO range, and more survey effort may locate additional populations of the species. The current estimated number of sites and distribution of the species based on 2017 data are presented below under Species Distribution.

Habitat

Choiromyces alveolatus is found in mixed coniferous forests associated with various species in the Pine family, particularly noble fir (*Abies procera*), lodgepole pine, ponderosa pine, Douglas-fir, western hemlock (*Tsuga heterophylla*), and mountain hemlock (Castellano et al. 1999). Due to its underground fruiting habit, the species can grow in drier habitats such as ponderosa pine forests compared to a higher diversity of fungi which require wetter forests (Barroetaveña et al. 2007). Based on data available in 1999, the species had only been documented from elevations above 4,200 feet msl. More recent records indicate the species is found between 1,600 and 7,000 feet msl (Trappe, pers. comm. 2013). Prior to 1994, it was found in old-growth forests with abundant coarse woody debris along the forest floor (Holthausen et al. 1994).

Threats

Threats to *C. alveolatus* are actions that affect host trees and disturb the soil, such as road and trail construction, logging and fire management activities, and recreational activities (Castellano and O'Dell 1997). Fire is a lower threat to this species because it is found in cool, wet habitats that are less susceptible to fire. Other specific threats to the species are not currently known.

Management Recommendations

As a Category B S&M species, the direction under the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). This statement is no longer applicable on BLM lands under the 2016 BLM RMPs, although it is still valid on NFS lands within the range of the NSO. Management recommendations were developed for *C. alveolatus* with several other species (Group 4 of Castellano and O'Dell 1997). The primary guidance is to maintain habitat and microclimatic conditions at all known sites; minimize soil disturbance at or around known sites; and prevent the removal of host trees. The known locations of the species on federal lands should be managed to include an area that is large enough to maintain the habitat and associated microclimate of the population. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *C. alveolatus*:

- As a mycorrhizal species, *C. alveolatus* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.4.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new site information, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. alveolatus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and the Forest Service (Oregon/Washington regional offices) and converted into sites in accordance with the methodology described in Chapter 1. Table CHAL-1 shows the total number of known sites in the regional (NSO range), local (18 5th-field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 23 observations from BLM and Forest Service geodatabases were converted into 21 sites in the NSO range (region). Table CHAL-2 shows the total number of sites on NFS lands and other land ownerships across the regional, local, and analysis areas. Table CHAL-3 shows the total number of sites within each land use allocation defined in the 1994 ROD and 2016 RMPs across the regional, local, and analysis areas. Figure CHAL-1 displays the regional distribution of the species across NFS lands, Figure CHAL-2 displays the extent of known sites located in protected areas (NFS lands, NFS reserves, BLM reserves, and NPS lands), and Figure CHAL-3 displays the species' regional distribution as well as the extent of coniferous and LSOG coniferous forests below 7,000 feet on BLM and NFS lands within the currently known range of the species.

| TABLE CHAL-1 | |
|--|-----------------|
| Number of <i>Choiromyces alveolatus</i> Sites (2017) | |
| Location* | Number of Sites |
| Regional Area | 21 |
| Local Area | 3 |
| Analysis Area (Project Area) | 1 (0) |

Data source: Processed BLM and Forest Service GIS data, August 2, 2017
 *Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

| TABLE CHAL-2 | | | |
|--|----------------|-------------|---------------------|
| Distribution of <i>Choiromyces alveolatus</i> across Federal, Private, and Other Lands | | | |
| Land Ownership | Regional Sites | Local Sites | Analysis Area Sites |
| Forest Service | 17 | 2 | 1 |
| BLM | 1 | 1 | - |
| NPS | 1 | - | - |
| Fish and Wildlife Service | - | - | - |
| Other (Private, State, etc.) | 2 | - | - |

Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
 Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

| TABLE CHAL-3 | | | |
|--|----------------|-------------|---------------------|
| Distribution of <i>Choiromyces alveolatus</i> across 1994 ROD and 2016 RMPs Land Allocations | | | |
| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
| Adaptive Management Area (AMA) | - | - | - |
| Adaptive Management Reserves (AMR) | - | - | - |
| Administratively Withdrawn (AW) | 1 | - | - |
| Congressionally Reserved (CR) | 1 | - | - |
| Late Successional Reserve (LSR) | 10 | 1 | - |
| Marbled Murrelet Area (LSR3) | - | - | - |
| Northern Spotted Owl Activity Center (LSR4) ^{a/} | - | - | - |
| Managed Late Successional Area (MLSA) | 2 | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | 6 | 1 | 1 |
| Riparian Reserve | - | - | - |
| Bureau of Land Management | Regional Sites | Local Sites | Analysis Area Sites |
| Administratively Withdrawn (AW) | - | - | - |
| Congressional Reserve | - | - | - |
| District Designated Reserve | - | - | - |
| Harvest Land Base | 1 | 1 | - |
| Late Successional Reserve | - | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | - | - | - |
| Riparian Reserve | - | - | - |

Data sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0; 2016 RMP land allocation data, August 2016.
 Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
^{a/} Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center.

Regional Distribution

Choiromyces alveolatus is somewhat widely distributed across six physiographic provinces in Washington (Western Cascades), Oregon (Coast Range, Cascades East and West), and California (Klamath and Cascades), despite a low overall number of sites (see Figure CHAL-1). Most sites are found along the Cascade Range, with scattered sites located in the Coast Range in Oregon and Klamath Mountains in California. A few of the sites are clustered and near other sites in the

Cascade Range, but most sites appear isolated across the region. *Choiromyces alveolatus* does not appear to be well distributed within its range in the NSO range.

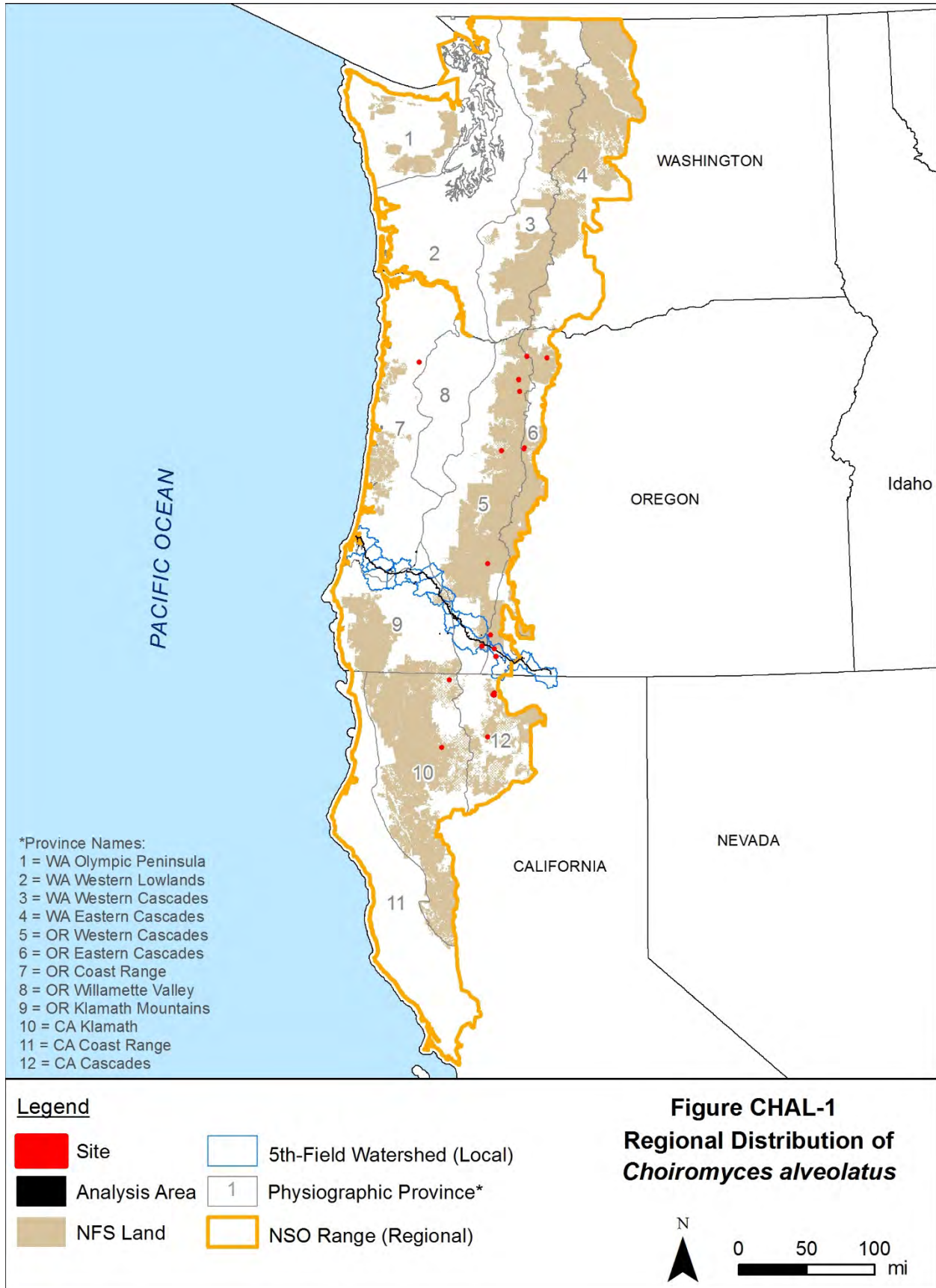
Two of the 21 sites are located on private, state, or other lands; one site is on NPS land (Mount Rainier National Park); one site is on BLM land, and the remainder (17) are on NFS lands across the region. Sites included on National Forests that encompass the project area include one site on the Rogue River-Siskiyou National Forest, one site on the Umpqua National Forest, and two sites on the Fremont-Winema National Forest. Sites included in other National Forests include six sites on the Klamath National Forest, one site on the Willamette National Forest, two sites on the Deschutes National Forest, four sites on the Mt. Hood National Forest, and one on the Shasta-Trinity National Forest.

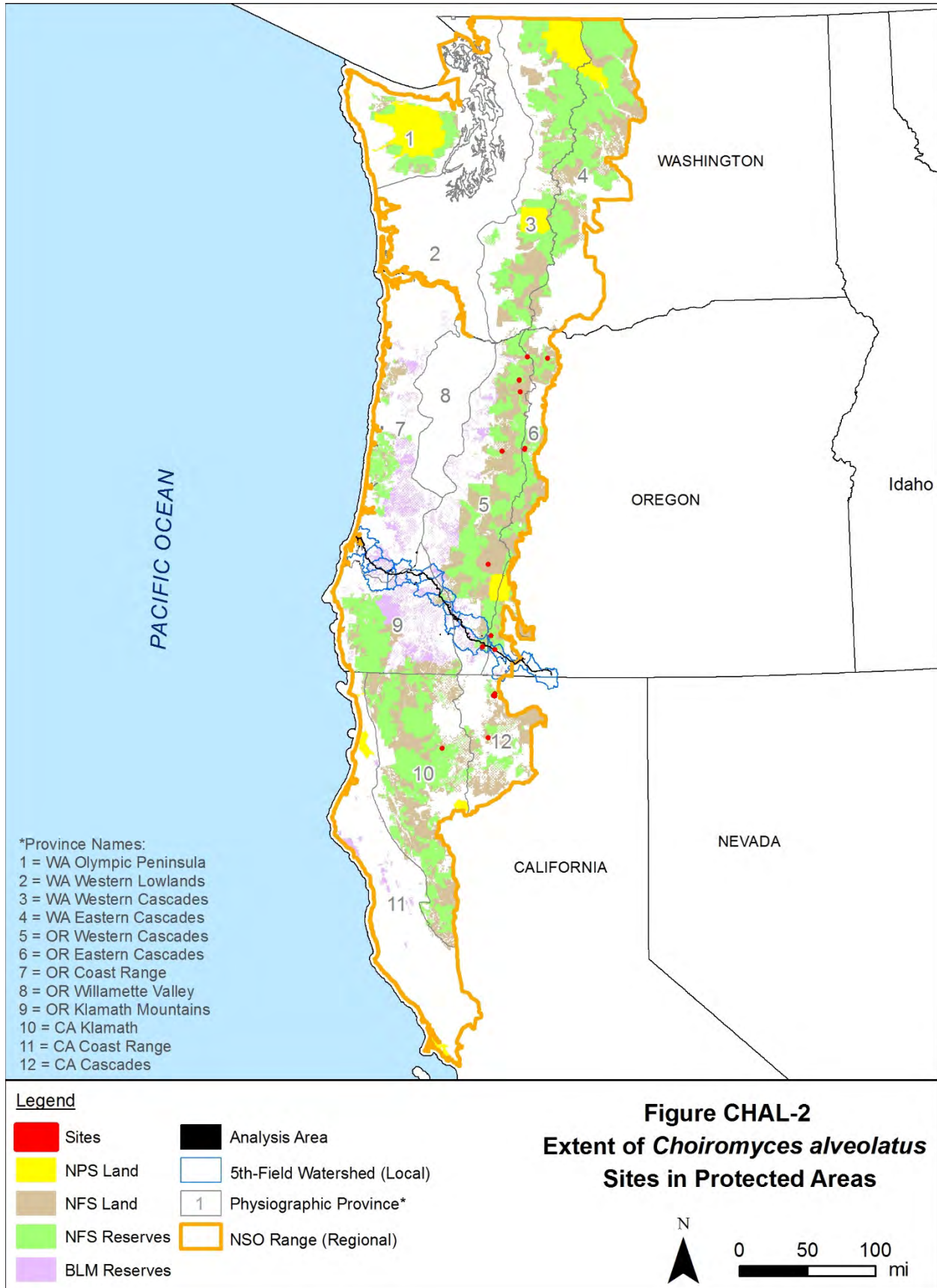
Across the NSO range, 11 sites are at least partially located in reserve lands managed by the Forest Service, including 10 sites in LSRs and one site in a Congressionally Reserved area (see Figure CHAL-2). These sites represent 65 percent of the total NFS sites in the region. The remaining NFS sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The NPS site, while not covered by the S&M Standards and Guidelines, likely receives some degree of protection based on National Park management. The site on BLM land does not occur in reserves and is likely not protected under the 2016 RMPs.

Choiromyces alveolatus is primarily found in LSOG forests based on available data (16 of 21 total sites are in LSOG), and may be restricted to specific microclimate conditions of these forests. Based on current site locations, the species is found in coniferous forests between about 2,000 and 6,200 feet msl and has only been found in part of the NSO range. Due to the extent of known sites, the amount of potential habitat on both NFS and BLM lands in the region, and the level of protection offered by NFS and BLM reserve lands, both land ownerships are included in this potential habitat discussion. LSOG coniferous forests in the NSO range could provide habitat for *C. alveolatus* and support additional sites. These forests encompass an estimated 5 million acres on BLM and NFS lands (see Figure CHAL-2 and Table CHAL-4), including 3.3 million acres in reserve land allocations (66 percent of the forests). LSOG coniferous forests below 7,000 feet msl are somewhat widespread across the region, particularly along the Cascade Range and Klamath Mountains. Younger coniferous forests may provide habitat for the species as they mature and develop suitable habitat conditions over time, and these forests are more widespread across the species' range (see Figure CHAL-3 and Table CHAL-4).

| Location | Coniferous Forests below 7,000 feet | | LSOG Coniferous Forests below 7,000 feet | |
|---------------|-------------------------------------|-----------|--|-----------|
| | Total | Reserves | Total | Reserves |
| Regional Area | 16,159,634 | 9,809,594 | 5,014,903 | 3,331,280 |
| Local Area | 452,942 | 284,057 | 161,625 | 116,952 |
| Project Area | 1,023 | 691 | 298 | 211 |

Data source: Gradient nearest neighbor vegetation data from Moerur et al. 2011
 Note: Areas are presented in acres.
^{a/} The area estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.



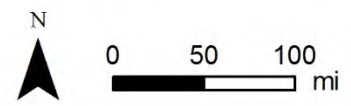




Legend

- Site
- Analysis Area
- LSOG Conifer Below 7,000 ft
- 5th-Field Watershed (Local)
- 1 Physiographic Province*
- NSO Range (Regional)

Figure CHAL-3
Potential Habitat For
Choiromyces alveolatus



Local Distribution

Within the local area, *C. alveolatus* is found in two 5th-field watersheds (Little Butte Creek and Spencer Creek) that overlap the project area (see Table CHAL-5 and Figure CHAL-4). Two of the sites are on NFS lands (Little Butte Creek and Spencer Creek) and the third is on BLM land (Spencer Creek). The Spencer Creek site on NFS land is designated as Other (Matrix) and the Little Butte Creek site is entirely in an LSR. These sites are in the western and eastern Cascade Range and are within 10 miles of one another and other sites to the north in the Cascade Range. Another group of sites are located approximately 25 miles to the south of the local sites, also in the Cascade Range. Connectivity may be available between the local sites and the other sites in the Cascade Range based on the extent of forests that may provide suitable habitat, and the ability of animals to transport spores across suitable habitat.

| Watershed (HUC5 ID) | Number of Sites | Number of Sites in NFS Reserve Lands | Number of Sites in BLM Reserve Lands |
|--|-----------------|--------------------------------------|--------------------------------------|
| Big Butte Creek (839) | - | - | - |
| Coos Bay Frontal (713) | - | - | - |
| East Fork Coquille River (747) | - | - | - |
| Elk Creek-South Umpqua (785) | - | - | - |
| Klamath River-John C Boyle Reservoir (888) | - | - | - |
| Lake Ewauna-Upper Klamath River (876) | - | - | - |
| Little Butte Creek (846) | 1 | 1 | - |
| Lower Lost River (892) | - | - | - |
| Middle Fork Coquille River (764) | - | - | - |
| Middle South Umpqua River (763) | - | - | - |
| Myrtle Creek (775) | - | - | - |
| North Fork Coquille River (733) | - | - | - |
| Olalla Creek-Lookingglass Creek (745) | - | - | - |
| Rogue River-Shady Cove (818) | - | - | - |
| South Umpqua River (781) | - | - | - |
| Spencer Creek (865) | 2 | - | - |
| Trail Creek (804) | - | - | - |
| Upper Cow Creek (801) | - | - | - |

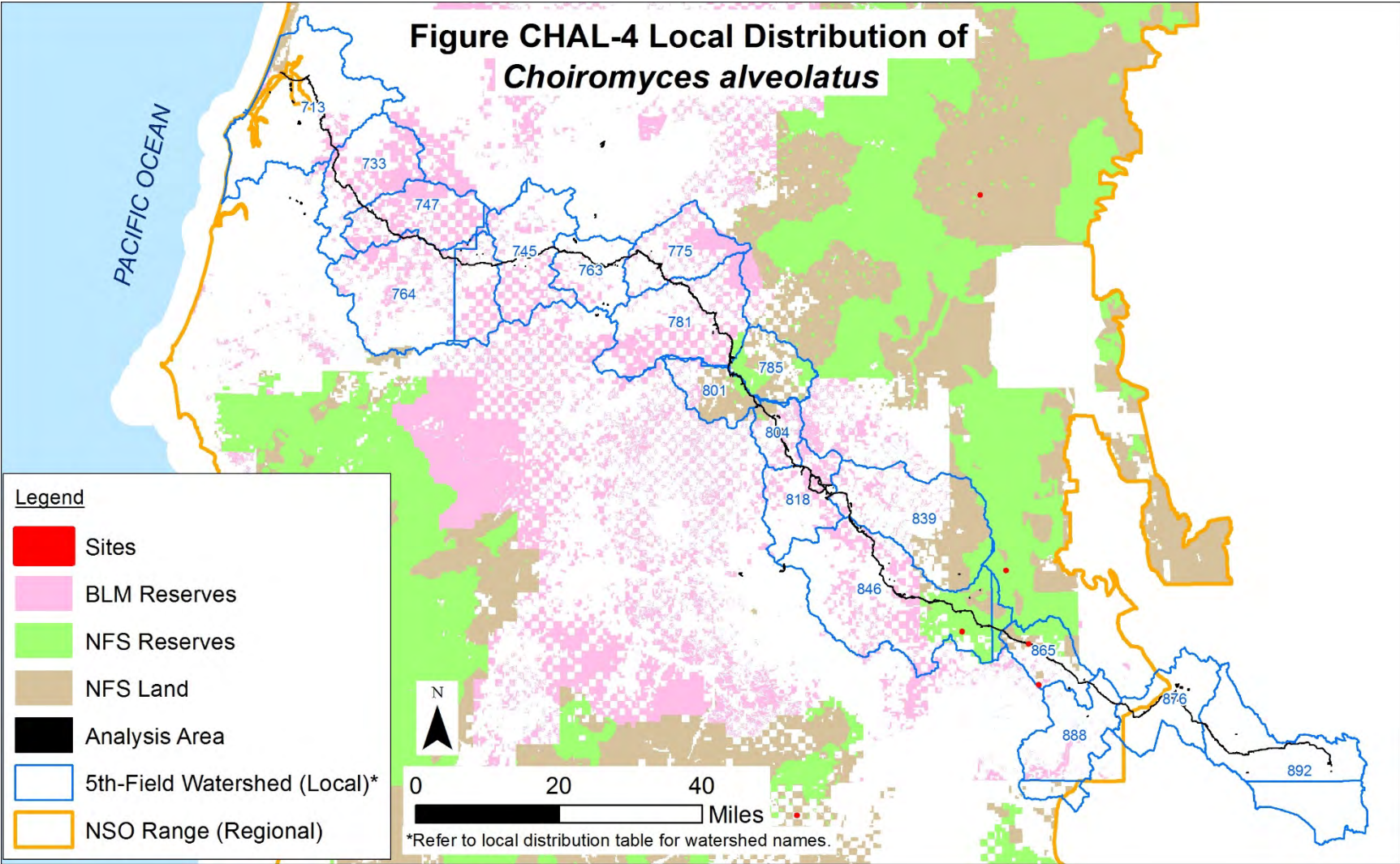
Data sources: Processed BLM and Forest Service GIS data, August 2, 2017; HUC5 Watershed layer, August 23, 2011

LSOG coniferous forests below 7,000 feet msl encompass approximately 161,625 acres on BLM and NFS lands in the local area, including 116,952 acres in reserve land allocations (72 percent of the forests). Forests that may provide suitable habitat are primarily found in the Cascade and Coast Ranges (see Figure CHAL-2), and other sites may be located in these mountain ranges in areas that have not been previously surveyed.

Analysis/Project Area Distribution

The analysis area contains one site of *C. alveolatus*, and the site is entirely outside the project area. This site is on NFS land designated as Other (Matrix) in the Spencer Creek watershed, as described in the Local Distribution discussion above.

Surveys for the PCGP Project resulted in one observation of *C. alveolatus* in the survey area during summer 2012 (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). This recorded observation was between MP 172.1 and 172.2 and comprises the single site in the analysis area.



Project Impacts

Analysis

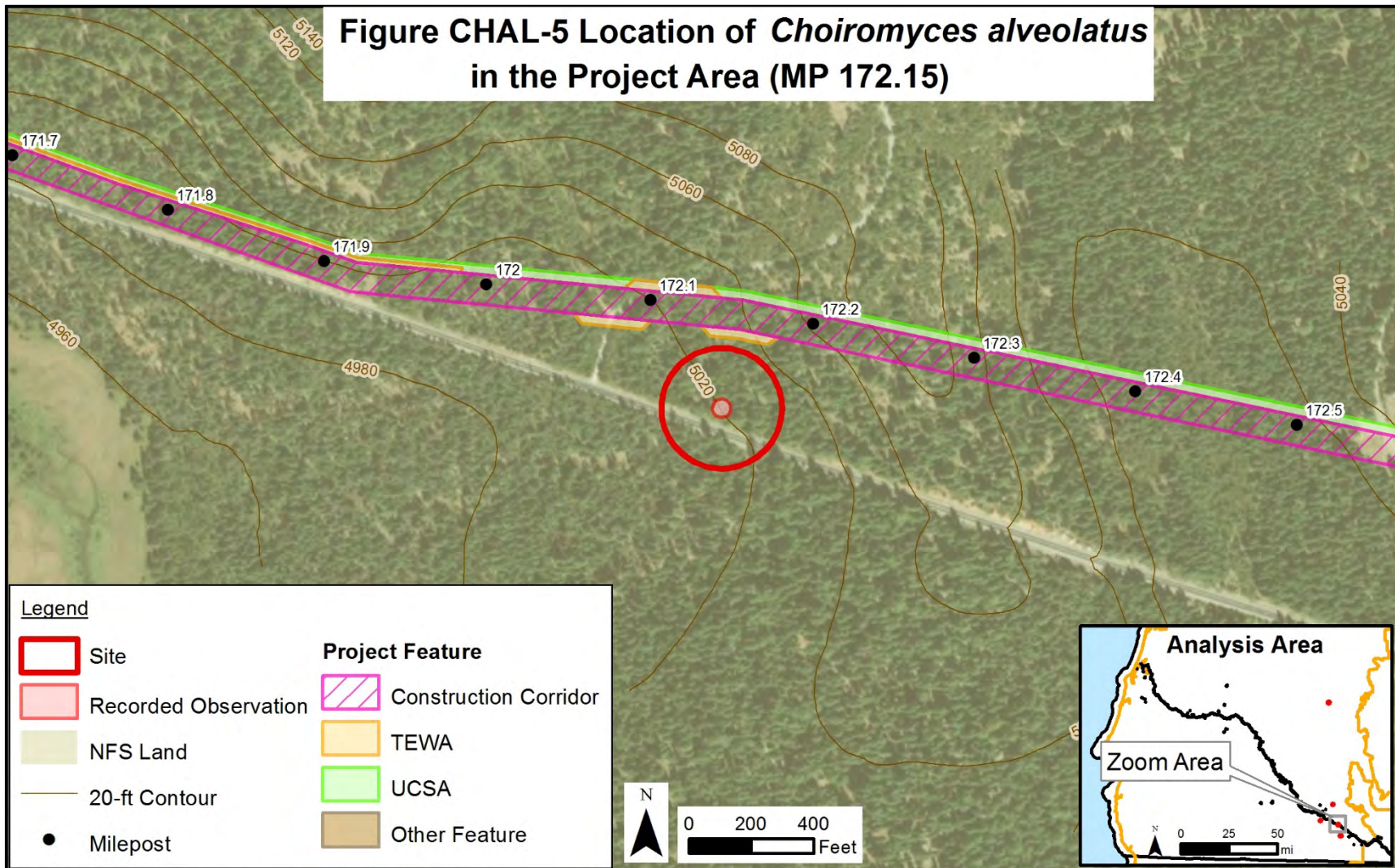
The PCGP Project would affect one out of the 17 NFS sites in the region, representing approximately 6 percent of the NFS sites (or one out of 21 total sites on all lands in the NSO range). Due to the low number of overall sites of *C. alveolatus*, the effects on one site could potentially alter the distribution of the species in the NSO range if site persistence is affected.

This following discussion provides an overview of the types of impacts that would be expected at the site based on the features of the PCGP Project that could affect site persistence.

Across the project area, the PCGP Project would remove an estimated 229 acres of LSOG coniferous forests below 7,000 feet msl. These impacts would result in a reduction of habitat that may be suitable for *C. alveolatus*. Within this impact area, about 116 acres (51 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, but the restored areas would not return to LSOG conditions for more than 80 years and would not likely provide habitat for the species during the life of the PCGP Project. A 30-foot wide corridor would be maintained in low-growing vegetation across the project area, resulting in a loss of about 60 acres of coniferous forests below 7,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests below 7,000 feet msl across the species range.

Due to conclusions made in previous persistence analyses (North State Resources 2014), the PCGP Project alignment was moved approximately 150 feet north to avoid direct impacts to the single site in the analysis area. Establishment of the currently proposed 95-foot wide construction corridor and associated storage areas would disturb vegetation and soils about 200 feet from the observation within the site. The *C. alveolatus* original observation is downslope of the edge of the project area in a heavily wooded area (Figure CHAL-5), where direct effects would not occur and indirect effects are unlikely. The establishment of the corridor could adversely modify microclimate conditions adjacent to the site. The removal of forests and host trees and disturbance to soil could negatively affect *C. alveolatus* by removing its habitat, disturbing the roots of host trees, and affecting its mycorrhizal association with the tree; however, due to the distance away from the project area, individuals within the site are expected to persist despite nearby changes to the species' habitat. Restored portions of the corridor would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A 30-foot wide portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Measures outlined in Chapter 1 would be implemented to minimize vegetation disturbance in and near the project area and restore areas following construction, which would minimize adverse impacts on *C. alveolatus* near the project area.

Based on this analysis, *C. alveolatus* is likely to persist at the site following project implementation. Due to the low number of overall sites and its scattered distribution, all sites are likely required for the species to persist. The sites in southern Oregon may be important for dispersal of the species between other sites to the north and south in the Cascade Range and sites to the southwest in the Klamath Mountains in California. Despite impacts to habitat near the site, *C. alveolatus* would still be found in the Cascade Range in Oregon, and dispersal into the southern portion of the NSO range would still be possible.



Discussion

Given site persistence would be maintained at the single site in the analysis area, two sites of *C. alveolatus* would remain on NFS lands in the local area, including one entirely in reserves, and 17 sites, including 11 at least partially in reserves, would remain on NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and management recommendations for the species with regard to agency-related actions. The 11 sites in reserves are assumed to have additional protections provided by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 65 percent of the *C. alveolatus* sites on NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states “instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision” (Standards and Guidelines, pg. 4). The Forest Service has embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *Choiromyces alveolatus* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD, however, indicates that the species appears to be more common than previously documented, as described below:
 - Although *C. alveolatus* is somewhat widely distributed across six physiographic provinces and three states in the region, the total number of sites is low (17 on NFS lands, 21 sites on all lands). *Choiromyces alveolatus* does not appear to be well distributed in any part of its range because sites are scattered and its distribution is spotty. However, the currently known number of sites on NFS and BLM lands has increased by five sites since 2007, with one site documented during the PCGP Project surveys.
 - An estimated 57 percent of the sites (11 sites) on federal lands are in reserves, which is an increase of six site in reserves since 2006 per Molina (2008).
- LSOG coniferous forests below 7,000 feet msl (general habitat for the species) have a somewhat wide distribution across the species’ range and encompass approximately 5 million acres on BLM and NFS lands with an estimated 66 percent in reserves. Most of the forests are found in the Cascade Range, where most sites are documented, and in the Klamath Mountains, where two sites are documented.
- The PCGP Project would affect one of 17 sites of *C. alveolatus* on NFS land, representing approximately 6 percent of the sites on NFS lands in the NSO range. However, the species is expected to persist at the site based on the analysis. Previous to this analysis, the proposed project alignment was moved 150 feet north to avoid direct impacts to the site. The distribution of sites and extent of the species’ range within the NSO range following

implementation of the PCGP Project would be the same as the currently documented distribution and range.

- The PCGP Project would not affect any sites in reserves. Of the remaining sites, 10 sites are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and one is in Congressionally Reserved areas where management activities that may adversely affect *C. alveolatus* are unlikely.
- The PCGP Project would result in the permanent loss of approximately 60 acres of LSOG coniferous forests below 7,000 feet msl (less than 1 percent of the total acreage in the NSO range). An estimated 3.3 million acres (66 percent) of LSOG coniferous forests below 7,000 feet would remain in reserves in the portion of the NSO range where the species may occur. Suitable habitat for *C. alveolatus* includes a subcomponent of these forests, which may be limited based on the low number of currently known sites.
- The remaining forests could support additional populations of *C. alveolatus*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. *Choiromyces alveolatus* is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites may exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.4.4 Conclusions

If implemented as proposed, the PCGP Project would affect habitat for *C. alveolatus* at one site on NFS lands, but *C. alveolatus* is expected to persist at the site, and the PCGP Project would not modify the distribution of the species in the NSO range. The remaining sites would continue to provide a reasonable assurance of species persistence because:

- With project implementation, the number of sites across the region would not change. Although the PCGP Project may affect microhabitat conditions near one *C. alveolatus* site, site persistence is not expected to be affected. The species' distribution and range within the NSO range would be the same as its currently known distribution and range.
- The PCGP Project would remove approximately 229 acres of LSOG coniferous forests below 7,000 feet msl (a negligible amount of the forests). An estimated 51 percent of the forests would be restored to similar conditions or shrublands, but a 30-foot wide early-successional corridor would remain across the project area. An estimated 3.3 million acres (66 percent) of LSOG coniferous forests below 7,000 feet msl would remain in reserves (negligible change with project implementation). Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The sites on NFS lands are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Although a single natural disturbance event or combination of events could affect a significant portion of sites in the Cascade Range, several other sites are scattered across the region and are less likely to be collectively affected by a single event.

The single site of *C. alveolatus* in the analysis area may incur indirect impacts as a result of habitat modification near the site; however, the site is expected to persist following project implementation. Previous to this analysis, the proposed project alignment was moved 150 feet north to avoid direct impacts to the site. Based on the above conclusions, *C. alveolatus* is sufficiently avoided by the PCGP project. Amendments to the NFS land management plan that applies to the affected site would waive implementation of Management Recommendations for the *C. alveolatus* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the site and adjacent habitat over the long term. The monitoring plan shall be approved by the Forest Service.

2.5 CLAVARIADELPHUS OCCIDENTALIS

Clavariadelphus occidentalis is a club mushroom species in the Clavariadelphaceae family and is commonly known as club coral.

2.5.1 Regulatory Status and Ranking

The 2001 ROD, including the 2003 ASR modifications to the S&M species list, identifies *C. occidentalis* as a Category B (rare) species. ORBIC evaluated *C. occidentalis* in its 2004 *Survey and Manage Assessment* for BLM and the Forest Service (ORBIC 2004), but it was not included in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2016). In 2004, the species was considered to be demonstrably common, widespread and abundant within its global range (G5) and was considered to be uncommon but not rare with some cause for long-term concern due to declines or other factors in Oregon (S4). The species is not currently on any ORBIC lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.5.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to this analysis. Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are discussed below under Persistence Evaluation. The background information in this section is used to support the persistence evaluation in the following section, which is updated with more recent information (e.g., recent survey data) specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *C. occidentalis*. It is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) (ORBIC 2004). Fruiting has been documented mostly from September through February but also occurs in May (Castellano et al. 2003). During fruiting, *C. occidentalis* produces clusters of two or three sporocarps.

Range

Clavariadelphus occidentalis is found across western North America, from Alaska to Mexico and east to Idaho and Arizona (ORBIC 2004). It is considered fairly common across its range, although its distribution within the NSO range was scattered to gregarious in 2004. The currently known range of the species within the NSO range based on 2017 data is discussed below under Species Distribution.

Although information on the species' historical range is not known, it was likely similar to the current range, with populations widely distributed across western North America. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed below under Threats.

Population Status

ORBIC (2004) reported *C. occidentalis* from more than 200 element occurrences across its range in 2004. In the Pacific Northwest, Oregon had the highest number of occurrences with more than 60 (ORBIC 2004). California had more than 30 occurrences in 2004, and Washington had less than 10 occurrences. ORBIC estimated that 31 of the total occurrences were in protected areas in the NSO range in 2004. In 2004, *C. occidentalis* was considered to be fairly common, but population trends across its range were unknown (ORBIC 2004). The species was found in nine locations during Random Multi-Species surveys across the NSO range between 2001 and 2004 (USDA and USDI 2007). Molina (2008) documented 50 new sites of *C. occidentalis* between 1998 and 2006, and 90 total sites were documented by 2006, including 28 in reserves or protected areas. The 2007 Final SEIS reported 66 sites on NFS and BLM lands and 80 total sites on all lands in the NSO range (USDA and USDI 2007).

Pre-disturbance surveys are not practical for Category B species. Instead, equivalent-effort surveys were conducted during the fall and spring from 2010 to 2016 in old-growth stands in the PCGP Project area and within 100 feet of habitat removal to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). The equivalent-effort surveys targeted all Category B species, including *C. occidentalis*, and resulted in 15 new observations of individuals or populations of *C. occidentalis*. Additional surveys for *C. occidentalis* in LSRs in nearby areas resulted in 10 additional observations of the species. These observations have increased the number of sites documented in BLM and Forest Service records by about 20 percent. Based on the increased number of sites since 1998 as a result of the increased number of surveys (a two-fold increase between 1998 and 2006 per Molina 2008 records), additional surveys would be expected to locate additional populations within the NSO range. The currently estimated number of sites and distribution of the species based on 2017 data are provided below under Species Distribution.

Habitat

Clavariadelphus occidentalis is found in coniferous and hardwood forests (ORBIC 2004). Based on data available in 1994, *C. occidentalis* was presumed to be similar to other club coral fungi, which require cool moist coniferous forests and are primarily found in LSOG forests (Holthausen et al. 1994). It may also require a well-developed humus layer and tends to be more common with increasing elevation and latitude. It grows solitary to gregarious in caespitose clusters on soil or duff in mixed hardwood-coniferous forests or hardwood forests (Castellano et al. 2003). Based on data available in 2007, all recorded observations were found below about 4,500 feet msl (Cushman and Huff 2007). *Clavariadelphus occidentalis* is considered to be fairly common (ORBIC 2004) and may prefer specific microclimate conditions of LSOG forests, but may not be restricted to these conditions.

Threats

The primary threat to *C. occidentalis* is from logging activities, which results in host tree removal and soil disturbance (ORBIC 2004). Like other club coral fungi, *C. occidentalis* is not subject to commercial harvest, but may be occasionally gathered by recreational pickers (Holthausen et al. 1994). Other specific threats to the species are not known.

Management Recommendations

As a Category B S&M species, the direction under the 2001 ROD was to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). This statement is no longer applicable on BLM lands under the 2016 BLM RMPs, although it is still valid on NFS lands within the range of the NSO. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *C. occidentalis*:

- As a mycorrhizal species, *C. occidentalis* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.5.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new site information, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. occidentalis* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and the Forest Service (Oregon/Washington regional offices) and converted into sites in accordance with the methodology described in Chapter 1. Table CLOC-1 shows the total number of known sites in the regional (NSO range), local (18 5th field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 214 observations from BLM and Forest Service geodatabases were converted into 177 sites in the NSO range (region). Table CLOC-2 shows the total number of sites on NFS lands and other land ownerships across the regional, local, and analysis areas. Table CLOC-3 shows the total number of sites within each land use allocation defined in the 1994 ROD and 2016 RMPs across the regional, local, and analysis areas. Figure CLOC-1 displays the regional distribution of the species across NFS lands, Figure CLOC-2 displays the extent of known sites located in protected areas (NFS lands, NFS reserves, BLM reserves, and NPS lands), and Figure CLOC-3 displays the species' regional distribution as well as the extent of coniferous, mixed hardwood-coniferous, and hardwood forests, and LSOG forests below 6,000 feet msl on BLM and NFS lands.

| TABLE CLOC-1 | |
|---|-----------------|
| Number of <i>Clavariadelphus occidentalis</i> Sites (2017) | |
| Location* | Number of Sites |
| Regional Area | 177 |
| Local Area | 32 |
| Analysis Area (Project Area) | 6 (6) |
| Data source: Processed BLM and Forest Service GIS data, August 2, 2017 | |
| *Definitions of regional, local, analysis, and project areas are provided in Chapter 1. | |

| TABLE CLOC-2 | | | |
|--|----------------|-------------|---------------------|
| Distribution of <i>Clavariadelphus occidentalis</i> across Federal, Private, and Other Lands | | | |
| Land Ownership | Regional Sites | Local Sites | Analysis Area Sites |
| Forest Service | 63 | 2 | 1 |
| BLM | 97 | 32 | 5 |
| NPS | 2 | - | - |
| Fish and Wildlife Service | - | - | - |
| Other (Private, State, etc.) | 30 | 4 | - |
| Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011 | | | |
| Notes: Columns are not additive because some sites occur on lands in multiple ownerships. | | | |

| TABLE CLOC-3 | | | |
|---|----------------|-------------|---------------------|
| Distribution of <i>Clavariadelphus occidentalis</i> across 1994 ROD and 2016 RMPs Land Allocations | | | |
| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
| Adaptive Management Area (AMA) | 22 | - | - |
| Adaptive Management Reserves (AMR) | - | - | - |
| Administratively Withdrawn (AW) | 5 | - | - |
| Congressionally Reserved (CR) | 4 | - | - |
| Late Successional Reserve (LSR) | 17 | - | - |
| Marbled Murrelet Area (LSR3) | - | - | - |
| Northern Spotted Owl Activity Center (LSR4) ^{a/} | - | - | - |
| Managed Late Successional Area (MLSA) | 1 | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | 16 | 2 | 1 |
| Riparian Reserve | - | - | - |
| Bureau of Land Management | Regional Sites | Local Sites | Analysis Area Sites |
| Administratively Withdrawn (AW) | - | - | - |
| Congressional Reserve | 7 | - | - |
| District Designated Reserve | 16 | 9 | - |
| Harvest Land Base | 30 | 14 | 4 |
| Late Successional Reserve | 65 | 22 | 5 |
| Not Designated (ND) | 1 | - | - |
| Other (Matrix, Other) | - | - | - |
| Riparian Reserve | 37 | 10 | 2 |
| Data sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0; 2016 RMP land allocation data, August 2016. | | | |
| Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. Bolded allocations are designated reserve areas. | | | |
| ^{a/} Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center. | | | |

Regional Distribution

Clavariadelphus occidentalis is widely distributed across 10 physiographic provinces in Washington (Western and Eastern Cascades, Olympic Peninsula), Oregon (Coast Range, Cascades East and West, Willamette Valley, and Klamath Mountain), and California (Klamath and Coast) (see Figure CLOC-1). Most sites are found along the western Cascade Range, Coast Range, and Klamath Mountains in Oregon, where the sites tend to be clustered or relatively close to one

another in groups. Scattered sites are located in Washington, California, and other areas of Oregon. *Clavariadelphus occidentalis* appears to be well distributed in its range in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of the species across forests that may provide suitable habitat.

Thirty of 177 known sites are at least partially located on private, state, or other lands; two sites are on NPS lands (in Olympic and Mount Rainier National Parks); 63 sites are at least partially located on NFS lands, and 97 sites are at least partially located on BLM lands. Sites included on National Forests that encompass the project area include four sites on the Rogue River-Siskiyou National Forest and 15 sites on the Umpqua National Forest. The remaining sites on NFS lands are on the Klamath, Mt. Baker-Snoqualmie, Mt. Hood, Okanogan-Wenatchee, Shasta-Trinity, Suislaw, Six Rivers, and Willamette National Forests.

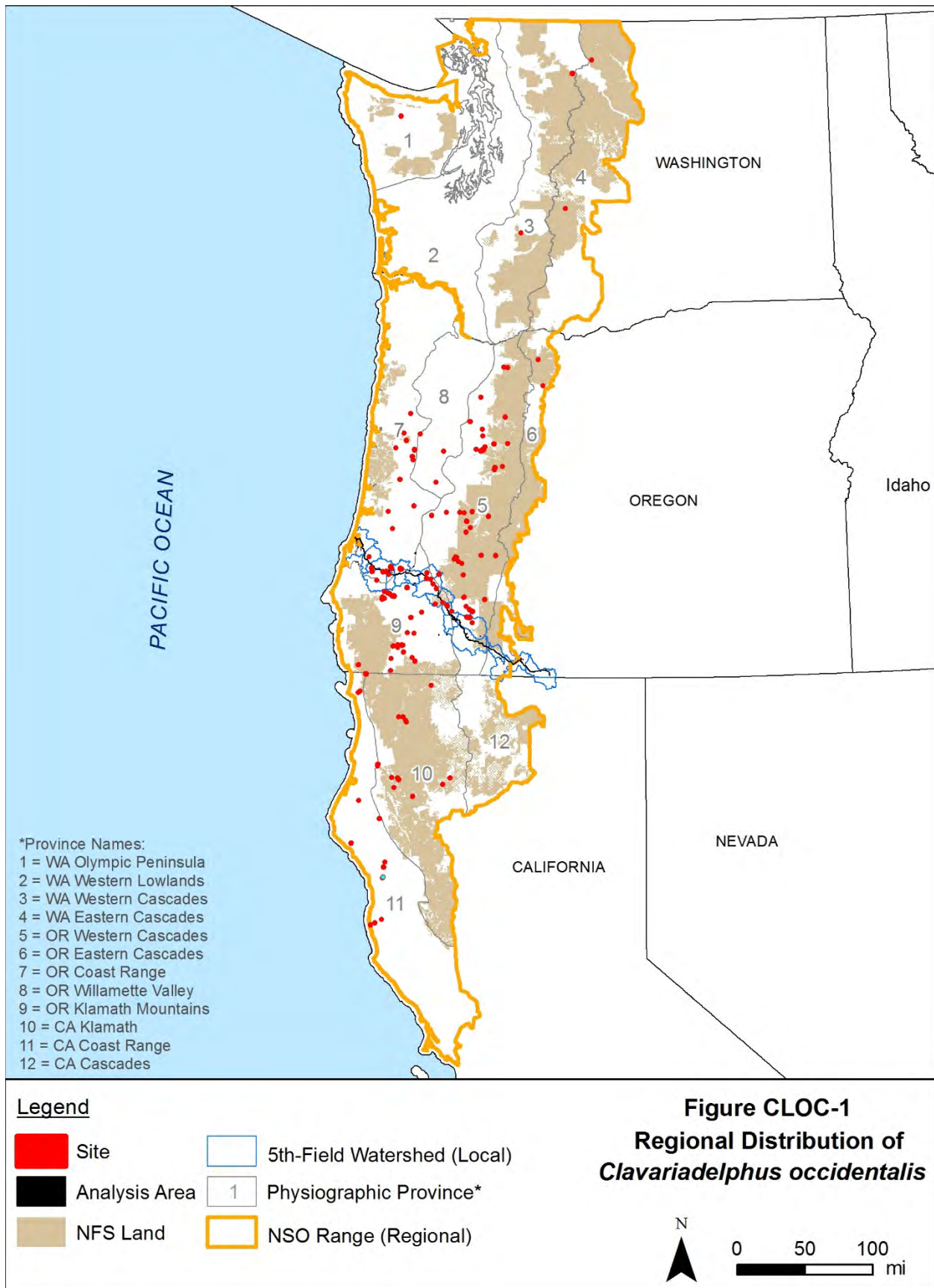
Across the NSO range, 21 sites are located entirely in reserve lands managed by the NFS, including 17 in LSRs and four in Congressionally Reserved areas (see Figure CLOC-2). These sites represent 33 percent of the total NFS-managed sites in the region. The remaining NFS sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. Additionally, 66 sites are entirely in reserve lands managed by BLM, which represents 68 percent of the total BLM-managed sites in the region. While the 66 sites in BLM reserves and the two NPS sites are not covered by the S&M Standards and Guidelines, they likely receive some level of protection through BLM reserve management and National Park management.

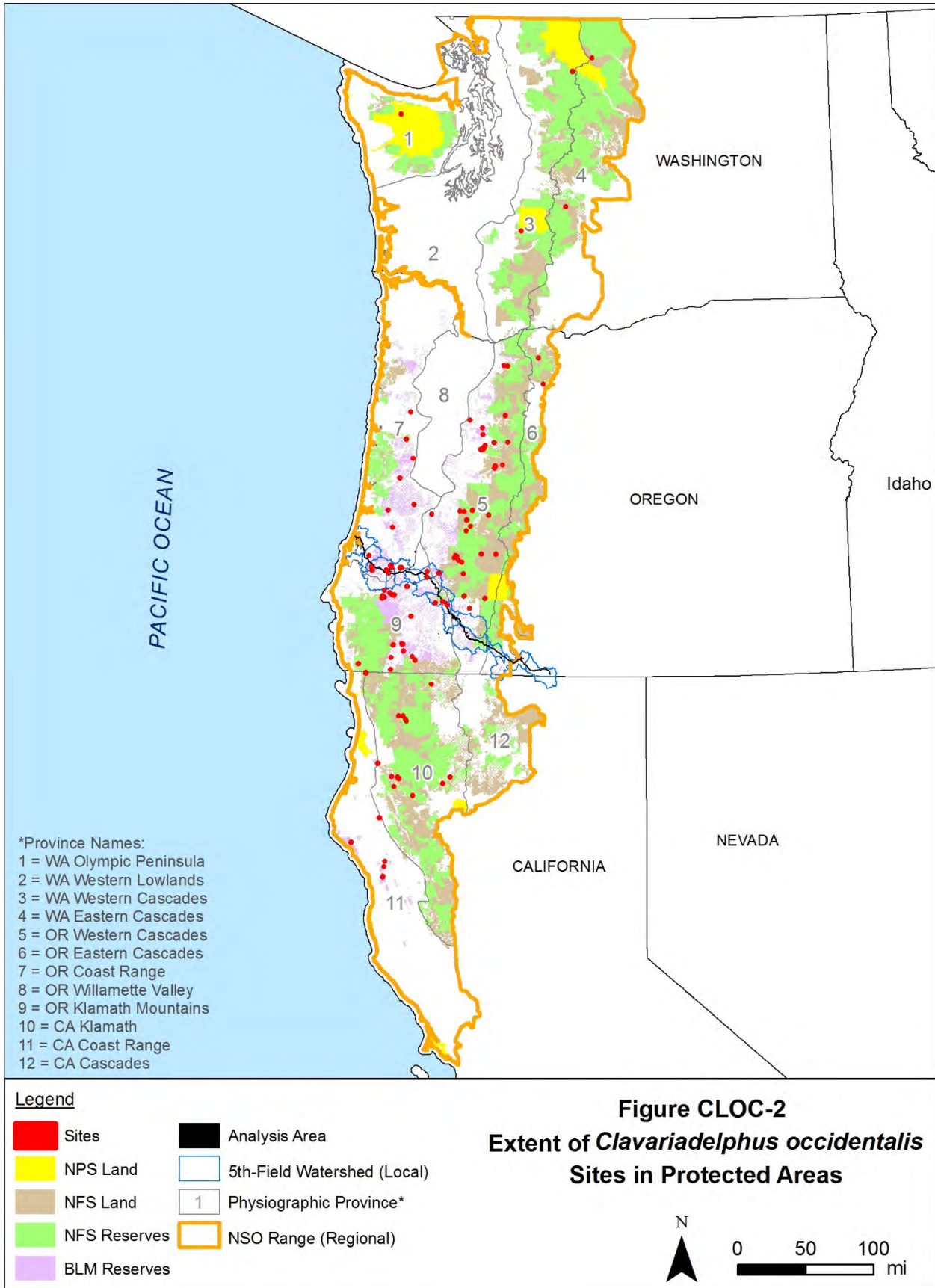
Clavariadelphus occidentalis is more common in LSOG forests based on available data (145 of 177 total sites are in LSOG), but it is also relatively common in non-LSOG forests and may not be as restricted to LSOG conditions. Based on current site locations, the species is found in all forest types below about 5,300 feet msl throughout most of the NSO range. Due to the extent of known sites, the amount of potential habitat on both NFS and BLM lands in the region, and the level of protection offered by NFS and BLM reserve lands, both land ownerships are included in this potential habitat discussion. Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *C. occidentalis* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 11.3 million acres in reserve land allocations (59 percent of the forests; Table CLOC-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure CLOC-3), including 4 million acres in reserve land allocations (66 percent of the forests). Although all forests below 6,000 feet msl are widespread across the NSO range, LSOG forests are less common and primarily found in the Cascade and Coast Ranges and Klamath Mountains.

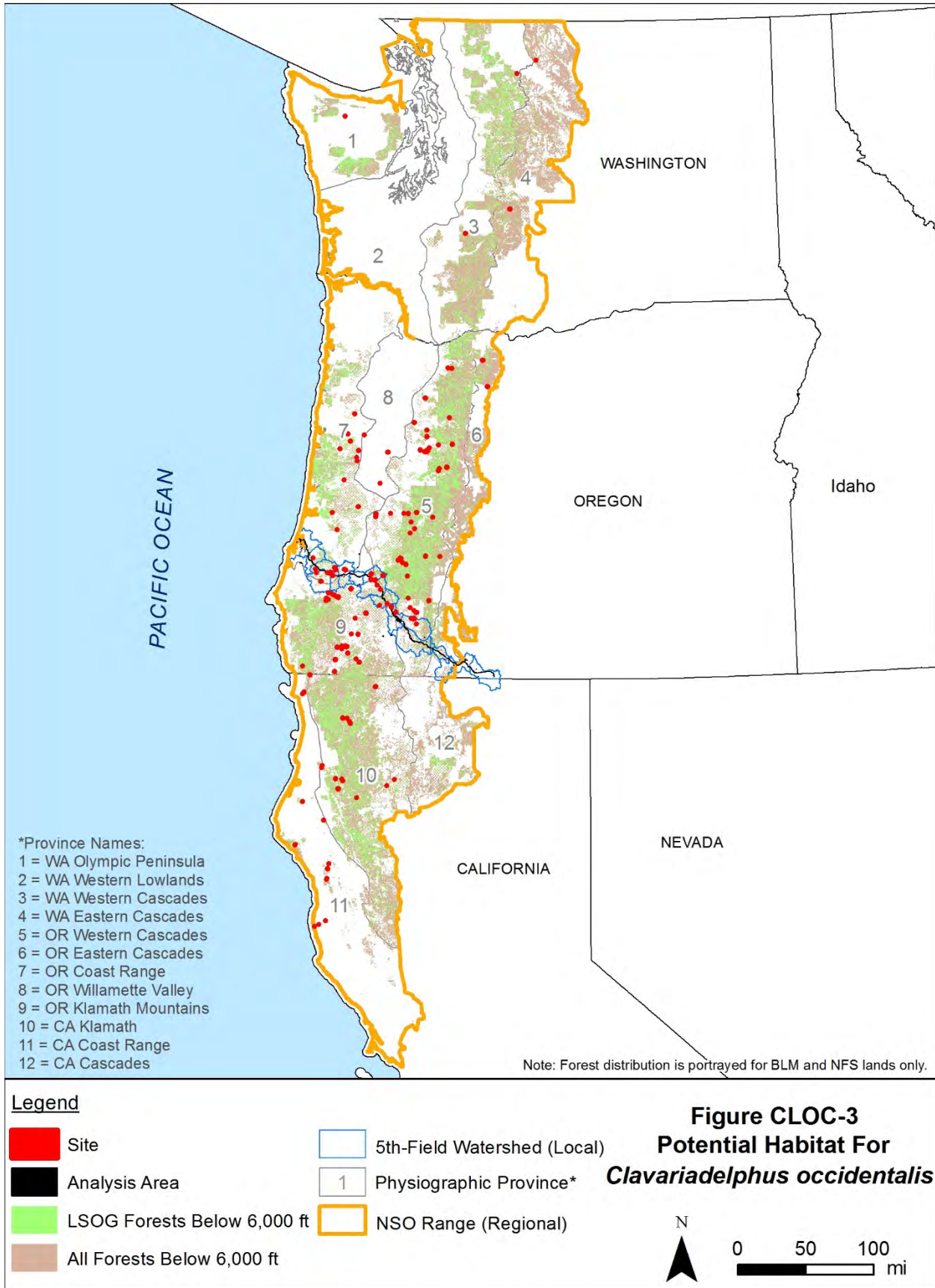
TABLE CLOC-4

| Extent of Forests That Could Provide Habitat for <i>Clavariadelphus occidentalis</i> on NFS and BLM Lands ^{a/} | | | | |
|--|-------------------------------------|-----------------|--------------------------------------|-----------------|
| Location | All Forests below 6,000 feet | | LSOG Forests below 6,000 feet | |
| | Total | Reserves | Total | Reserves |
| Regional Area | 19,183,086 | 11,264,423 | 6,088,524 | 3,998,501 |
| Local Area | 608,824 | 403,947 | 184,099 | 135,653 |
| Project Area | 1,536 | 1,069 | 326 | 233 |

Data source: Gradient nearest neighbor vegetation data from Moeur et al. 2011
 Note: Areas are presented in acres.
^{a/} The area estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.







Local Distribution

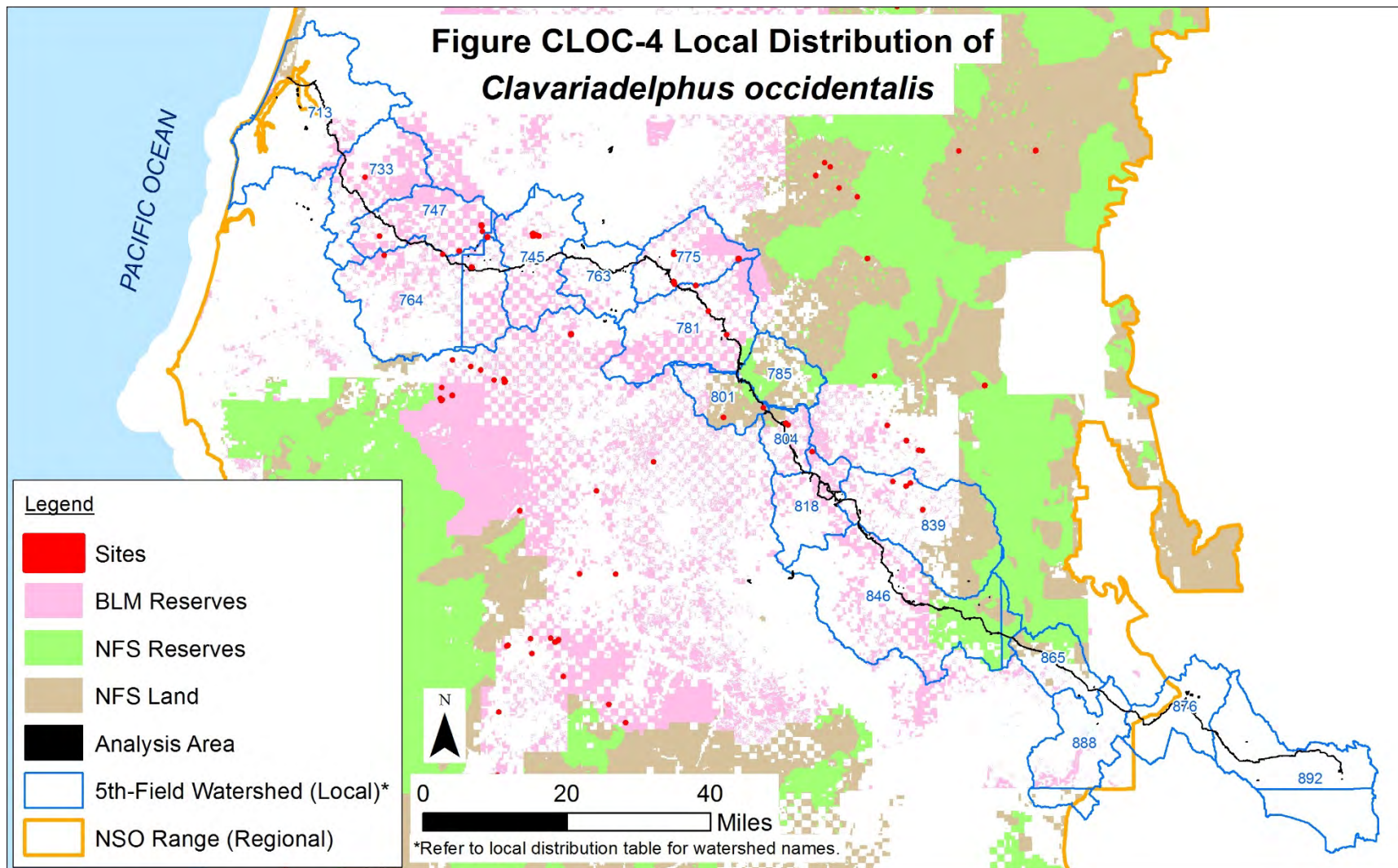
Within the local area, *C. occidentalis* is distributed across 10 5th-field watersheds that overlap the project area (see Table CLOC-5 and Figure CLOC-4). The sites tend to be clustered and near other sites within the watersheds throughout the majority of the local area. Across the watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located within 20 miles to the northeast in the Cascade Range on NFS lands and within 15 miles to the south in the Klamath Mountains entirely in BLM reserves.

Of the 34 sites in the local area, two are on NFS lands designated as Other (Matrix). Four sites are partially on private lands, and 32 sites are at least partially on BLM lands. Of the 34 sites in the local area, 18 are entirely in BLM reserve lands, representing 53 percent of the local sites.

| Watershed (HUC5 ID) | Number of Sites | Number of Sites in NFS Reserve Lands | Number of Sites in BLM Reserve Lands |
|--|-----------------|--------------------------------------|--------------------------------------|
| Big Butte Creek (839) | 4 | | 2 |
| Coos Bay Frontal (713) | - | | - |
| East Fork Coquille River (747) | 6 <u>a/</u> | | 6 |
| Elk Creek-South Umpqua (785) | - | | - |
| Klamath River-John C Boyle Reservoir (888) | - | | - |
| Lake Ewauna-Upper Klamath River (876) | - | | - |
| Little Butte Creek (846) | - | | - |
| Lower Lost River (892) | - | | - |
| Middle Fork Coquille River (764) | 5 <u>a/</u> | | 5 |
| Middle South Umpqua River (763) | - | | - |
| Myrtle Creek (775) | 7 <u>b/</u> | | 7 |
| North Fork Coquille River (733) | 1 | | 1 |
| Olalla Creek-Lookingglass Creek (745) | 4 | | 4 |
| Rogue River-Shady Cove (818) | 1 | | 1 |
| South Umpqua River (781) | 3 <u>b/</u> | - | 3 |
| Spencer Creek (865) | - | | - |
| Trail Creek (804) | 3 | | 3 |
| Upper Cow Creek (801) | 2 | | - |

Data sources: Processed BLM and Forest Service GIS data, August 2, 2017; HUC5 Watershed layer, August 23, 2011
 Note: Number of sites in reserves may include sites that are only partially in reserves.
 Site counts are not additive because some sites occur in multiple watersheds and the counts overlap, as noted below:
a/ One site in both East Fork and Middle Fork Coquille River watersheds.
b/ One site is in both Myrtle Creek and South Umpqua River watersheds.

Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl encompass approximately 608,824 acres on BLM and NFS lands in the local area, including 403,947 acres in reserve land allocations (66 percent of the forests). Of this acreage, an estimated 184,099 acres are LSOG, including 135,653 acres in reserve land allocations (74 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures CLOC-2 and CLOC-3).



Analysis/Project Area Distribution

The analysis and project areas contain 6 sites of *C. occidentalis*. These sites are distributed across five 5th-field watersheds in the central and western portions of the analysis area in three general areas (East Fork/Middle Fork Coquille River watersheds, Myrtle Creek/South Umpqua River watersheds, and Trail Creek watershed). The sites appear to be clustered and near one another within each area. Many sites are also located within the immediate vicinity of the analysis area (see Local Distribution), including several within 10 miles.

One site is located on NFS lands in the analysis area on lands designated as Other (Matrix). One of the five sites on BLM lands in the analysis area is located entirely in BLM reserves (LSR and Riparian Reserves).

Surveys for the PCGP Project resulted in 44 total observations of the species in 40 locations in or near the project area (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). An estimated six of these recorded observations comprise six sites in the analysis area; the other observations are in sites outside the analysis area or were affected by the Stout's fire. Within the project area, the sites are at MP 41.9, MP 90.0, MP 95.4, and MP 109.7. The remaining two sites are near road improvement areas outside the project corridor in the vicinity of MP 114.1.

Project Impacts

Analysis

The PCGP Project would affect one out of the 63 sites on NFS lands in the region, representing approximately 2 percent of the NFS sites. The PCGP Project may also affect another five sites on BLM lands. The total number of sites affected is six sites out of the 177 total sites on all lands. Table CLOC-6 provides an overview of the features of the PCGP Project that would affect the *C. occidentalis* sites on NFS lands. The construction corridor and associated work and storage areas would affect approximately 0.8 acre within the site (about 29 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. occidentalis* in and near the project area.

The following discussion provides an overview of the types of impacts that would be expected at the site based on the features of the PCGP Project that could affect site persistence.

Vegetation removal and grading activities in the 95-foot wide construction corridor would disturb about 0.7 acre of vegetation and soil within the site and could result in the removal of *C. occidentalis* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.1 acre within the site. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *C. occidentalis* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A 30-foot

portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

| TABLE CLOC-6 | | |
|---|--------------------------|----------------------------------|
| Impacts to <i>Clavariadelphus occidentalis</i> Sites on NFS Lands in the Project Area | | |
| Project Activity | Number of Sites Affected | Area of Disturbance within Sites |
| Construction Corridor | 1 | 0.1 ac |
| Temporary Extra Work Area (TEWA) | 1 | 0.1 ac |
| Uncleared Storage Area (UCSA) | - | - |
| Roads (TMP) | - | - |
| Other Minimal Disturbance Activities | - | - |
| ac = acres | | |
| Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities. | | |

Across the project area, the PCGP Project would remove an estimated 1,236 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including 251 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *C. occidentalis*. Within this impact area, about 609 acres (about 49 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A 30-foot wide corridor would be maintained in low-growing vegetation across the project area, resulting in a loss of about 261 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of all forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the site on NFS lands as a result of the PCGP Project, one *C. occidentalis* site would remain on NFS lands in the local area, and 62 sites, including 21 at least partially in reserves, would remain on NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The PCGP project may also affect five sites on BLM lands. Assuming site persistence cannot be maintained, 27 sites, including 17 entirely in reserves, would remain on BLM lands in the local area and 92 sites, including 65 entirely in reserves would remain on BLM lands in the NSO range. While the sites on BLM lands are not subject to S&M Standards and Guideline protections, sites entirely in reserves would likely receive some level of protection under BLM reserve management.

Based on these site counts, approximately 33 percent of the remaining *C. occidentalis* sites on NFS lands in the NSO range would be protected in reserves and 54 percent of sites on federal lands in the NSO range would be protected in either NFS or BLM reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states “instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision” (Standards and Guidelines, pg. 4). The Forest Service has embraced this

approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *Clavariadelphus occidentalis* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD, however, indicates that the species appears to be more common than previously documented, as described below:
 - *Clavariadelphus occidentalis* has a wide distribution across 10 physiographic provinces and three states in the region and a moderate-high number of overall sites (63 on NFS lands and 177 on all lands). The species appears to be well distributed in the western Cascade Range in Oregon and is locally abundant in parts of the Klamath Mountains and Coast Range. The currently known number of sites on NFS and BLM lands has increased by 94 sites since 2007, with many sites documented during the PCGP Project surveys.
 - An estimated 33 percent of the NFS sites (21 sites) are in NFS reserves, while an estimated 554 percent of the sites on federal land (87 sites) are in reserves designated by NFS or BLM.
- Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 59 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented.
- The PCGP Project would affect one of 63 *C. occidentalis* sites on NFS lands, representing approximately 2 percent of the sites on NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (62) would remain on NFS lands in the region with a wide distribution across Washington, Oregon, and California. One site would remain on NFS lands in the local vicinity of the analysis area and 17 sites would remain entirely in BLM reserves in the local area. The distribution of sites and extent of the species' range within the NSO range would be similar to the currently documented distribution and range.
- The PCGP Project would affect five sites that are at least partially on BLM lands. Assuming site persistence cannot be maintained at the five sites, 27 sites would remain on BLM lands in the local area, including 17 entirely in reserves. These sites would continue to be distributed across 10 5th-field watersheds. The BLM reserve allocations that contain sites in the local area includes Riparian Reserves where management actions are restricted to those activities that benefit the conservation of riparian areas and riparian-associated species; LSRs where management actions are restricted to those that benefit LSOG forests; and Designated Reserves where management activities that may adversely affect *C. occidentalis* are unlikely.
- The PCGP Project would not affect site persistence at sites in NFS LSRs, and the percentage of sites in NFS reserves in the NSO range would remain at 33 percent.

Seventeen sites are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and four are at least partially in Congressionally Reserved areas where management activities that may adversely affect *C. occidentalis* are unlikely.

- The PCGP Project would result in the permanent loss of an estimated 261 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 11.3 million acres (59 percent) of coniferous, mixed, and hardwood forests and 4 acres (66 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. occidentalis*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. *Clavariadelphus occidentalis* is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.5.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. occidentalis* at one site on NFS land and five sites on BLM lands. The remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 62 sites would remain on NFS lands across the region, and one site would remain on NFS lands in the local area. Additionally, 29 sites would remain on BLM lands in the local area, including 17 sites in reserves. The PCGP Project would affect site persistence of *C. occidentalis* at one site on NFS lands. Except for the single site remaining on NFS lands in the Klamath Mountains in the local area, the nearest NFS sites are located 15 miles to the northeast in the Cascade Range in Oregon and 60 miles to the south in the Klamath in California. Sites on BLM lands are much more abundant in the vicinity of the analysis area, and many sites are distributed across the Coast Range, Klamath Mountains, and Western Cascade Range in southern Oregon. It is expected that BLM management would enable the majority of the sites in reserves to persist. Due to the significant number of sites remaining on BLM lands in the local area (27) with a large proportion of sites entirely in BLM reserves (63 percent), it is presumed that many sites would be protected and the species would remain locally abundant. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *Clavariadelphus occidentalis* would persist in the region without considering the three sites as part of the population.
- The PCGP Project would remove approximately 1,236 acres of coniferous, mixed hardwood-coniferous, and hardwood forests and 251 acres of LSOG forests below 6,000 feet msl (a negligible amount of the forests). An estimated 49 percent of the forests would be restored to similar conditions or shrublands, but a 30-foot wide early-successional corridor would remain across the project area.

- An estimated 11.3 million acres (59 percent) of coniferous, mixed, and hardwood forests and 4 million acres (66 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining sites on NFS land are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Additionally, the sites in BLM reserves would likely receive some level of protection under the BLM 2016 RMPs. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *C. occidentalis* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the single *C. occidentalis* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the NFS land management plans that apply to the affected sites would waive implementation of Management Recommendations for *C. occidentalis* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term. The monitoring plan shall be approved by the Forest Service.

2.6 CLAVARIADELPHUS SACHALINENSIS

Clavariadelphus sachalinensis is a club coral mushroom species in the Clavariadelphaceae family and does not currently have a common name.

2.6.1 Regulatory Status and Ranking

The 2001 ROD, including the 2003 NSR modifications to the S&M species list, identifies *C. sachalinensis* as a Category B (rare) species. ORBIC evaluated *C. sachalinensis* in its 2004 *Survey and Manage Assessment* for BLM and the Forest Service (ORBIC 2004) and again in the 2013 update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2013, the species was considered to be demonstrably common, widespread and abundant within its global range (G5) and was considered to be at moderate risk of extinction due to a restricted range, relatively few populations, recent and widespread declines, or other factors in Oregon (S3). The species was not included in the most recent ORBIC list (ORBIC 2016). It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.6.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to this analysis. Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are discussed below under Persistence Evaluation. The background information in this section is used to support the persistence evaluation in the following section, which is updated with more recent information (e.g., recent survey data) specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *C. sachalinensis*. It is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) (ORBIC 2004). The mushroom has been documented fruiting from June through October (Castellano et al. 2003) and has a conspicuous and relatively large, brightly colored, and unusually shaped fruiting body (Holthausen et al. 1994). Fruiting may consist of a single basidiocarp, but more often contains between three and six basidiocarps.

Range

Clavariadelphus sachalinensis is widespread across Europe, Asia, and North America (ORBIC 2004). It is found in most Canadian provinces, Japan, Sweden, and several states in the United States. In the Pacific Northwest, it occurs from Mendocino County in California to the North Cascades in Washington and into Canada. This species has been considered common across its global range. The currently known range of the species within the NSO range based on 2017 data is discussed below under Species Distribution.

Although information on the species' historical range is not known, it was likely similar to the current range, with populations widely distributed in Europe, Asia, and North America. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed below under Threats.

Population Status

ORBIC (2004) reported *C. sachalinensis* from approximately 183 element occurrences worldwide in 2004. An estimated 35 of these occurrences were in California, Oregon, and Washington, with the majority (29) found west of the Cascade Range in Oregon (ORBIC 2004). In 2004, the species was considered to be fairly common, but population trends were unknown (ORBIC 2004). The species was not found during Random Multi-Species surveys across the NSO range between 2001 and 2004 (USDA and USDI 2007). Molina (2008) documented 30 new sites of *C. sachalinensis* between 1998 and 2006, and 35 total sites were documented by 2006, including four in reserves or protected areas. The 2007 Final SEIS reported 30 sites on NFS and BLM lands and 35 total sites on all lands in the NSO range (USDA and USDI 2007).

Pre-disturbance surveys are not practical for Category B species. Instead, equivalent-effort surveys were conducted during the fall and spring from 2010 to 2016 in old-growth stands in the PCGP Project area and within 100 feet of habitat removal to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). The equivalent-effort surveys targeted all Category B species, including *C. sachalinensis*, and resulted in 47 new observations of individuals or populations of *C. sachalinensis*. Additional surveys for *C. sachalinensis* in LSRs in nearby areas resulted in 92 additional observations of the species. Based on the increased number of sites since 1998 as a result of increased surveys (a seven-fold increase between 1998 and 2006 per Molina 2008 records), it is likely that this species is more abundant than previously known, and more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2017 data are provided below under Species Distribution.

Habitat

Clavariadelphus sachalinensis is found in coniferous forests (ORBIC 2004). Based on data available in 1994, *C. sachalinensis* was presumed to be similar to other club coral fungi, which require cool, moist coniferous forests and are primarily found in LSOG forests (Holthausen et al. 1994). It may also require a well-developed humus layer and tends to be more common with increasing elevation and latitude. The species grows scattered or gregarious on soil or duff under mixed conifers (Castellano et al. 2003). Based on data available in 2007, all recorded observations were found below about 5,500 feet msl (Cushman and Huff 2007). *Clavariadelphus sachalinensis* is considered to be fairly common (ORBIC 2004) and may prefer specific microclimate conditions of LSOG forests, but may not be restricted to these conditions.

Threats

The primary threat to *C. sachalinensis* is from logging activities which result in host tree removal and soil disturbance (ORBIC 2004). Like other club coral fungi, *C. sachalinensis* is not subject to commercial harvest, but may be occasionally gathered by recreational pickers (Holthausen et al. 1994). Other specific threats to the species are not known.

Management Recommendations

As a Category B S&M species, the direction under the 2001 ROD was to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). This statement is no longer applicable on BLM lands under the 2016 BLM RMPs, although it is still valid on NFS lands within the range of the NSO. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *C. sachalinensis*:

- As a mycorrhizal species, *C. sachalinensis* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.6.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new site information, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. sachalinensis* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and the Forest Service (Oregon/Washington regional offices) and converted into sites in accordance with the methodology described in Chapter 1. Table CLSA-1 shows the total number of known sites in the regional (NSO range), local (18 5th-field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 563 observations from BLM and Forest Service geodatabases were converted into 273 sites in the NSO range (region). Table CLSA-2 shows the total number of sites on NFS land and other land

ownerships across the regional, local, and analysis areas. Table CLSA-3 shows the total number of sites within each land use allocation defined in the 1994 ROD and 2016 RMPs across the regional, local, and analysis areas. Figure CLSA-1 displays the regional distribution of the species across NFS lands, Figure CLSA-2 displays the extent of known sites located in protected areas (NFS lands, NFS reserves, BLM reserves, and NPS lands), and Figure CLSA-3 displays the species' regional distribution as well as the extent of coniferous forests and LSOG coniferous forests below 6,000 feet msl on BLM and NFS lands.

| TABLE CLSA-1 | |
|---|-----------------|
| Number of <i>Clavariadelphus sachalinensis</i> Sites (2017) | |
| Location* | Number of Sites |
| Regional Area | 273 |
| Local Area | 165 |
| Analysis Area (Project Area) | 15 (15) |
| Data source: Processed BLM and Forest Service GIS data, August 2, 2017 | |
| *Definitions of regional, local, analysis, and project areas are provided in Chapter 1. | |

| TABLE CLSA-2 | | | |
|---|----------------|-------------|---------------------|
| Distribution of <i>Clavariadelphus sachalinensis</i> across Federal, Private, and Other Lands | | | |
| Land Ownership | Regional Sites | Local Sites | Analysis Area Sites |
| Forest Service | 35 | 18 | 7 |
| BLM | 239 | 151 | 8 |
| NPS | - | - | - |
| Fish and Wildlife Service | - | - | - |
| Other (Private, State, etc.) | 60 | 43 | 2 |
| Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011 | | | |
| Notes: Columns are not additive because some sites occur on lands in multiple ownerships. | | | |

| TABLE CLSA-3 | | | |
|---|----------------|-------------|---------------------|
| Distribution of <i>Clavariadelphus sachalinensis</i> across 1994 ROD and 2016 RMPs Land Allocations | | | |
| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
| Adaptive Management Area (AMA) | 1 | - | - |
| Adaptive Management Reserves (AMR) | - | - | - |
| Administratively Withdrawn (AW) | 1 | - | - |
| Congressionally Reserved (CR) | 3 | - | - |
| Late Successional Reserve (LSR) | 18 | 9 | 2 |
| Marbled Murrelet Area (LSR3) | - | - | - |
| Northern Spotted Owl Activity Center (LSR4) a/ | - | - | - |
| Managed Late Successional Area (MLSA) | - | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | 13 | 9 | 5 |
| Riparian Reserve | - | - | - |

TABLE CLSA-3

| Distribution of <i>Clavariadelphus sachalinensis</i> across 1994 ROD and 2016 RMPs Land Allocations | | | |
|---|----------------|-------------|---------------------|
| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
| Bureau of Land Management | Regional Sites | Local Sites | Analysis Area Sites |
| Administratively Withdrawn (AW) | 8 | - | - |
| Congressional Reserve | - | - | - |
| District Designated Reserve | 102 | 62 | 4 |
| Harvest Land Base | 160 | 99 | 7 |
| Late Successional Reserve | 107 | 69 | 5 |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | - | - | - |
| Riparian Reserve | 79 | 55 | 5 |

Data sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0; 2016 RMP land allocation data, August 2016.

Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.

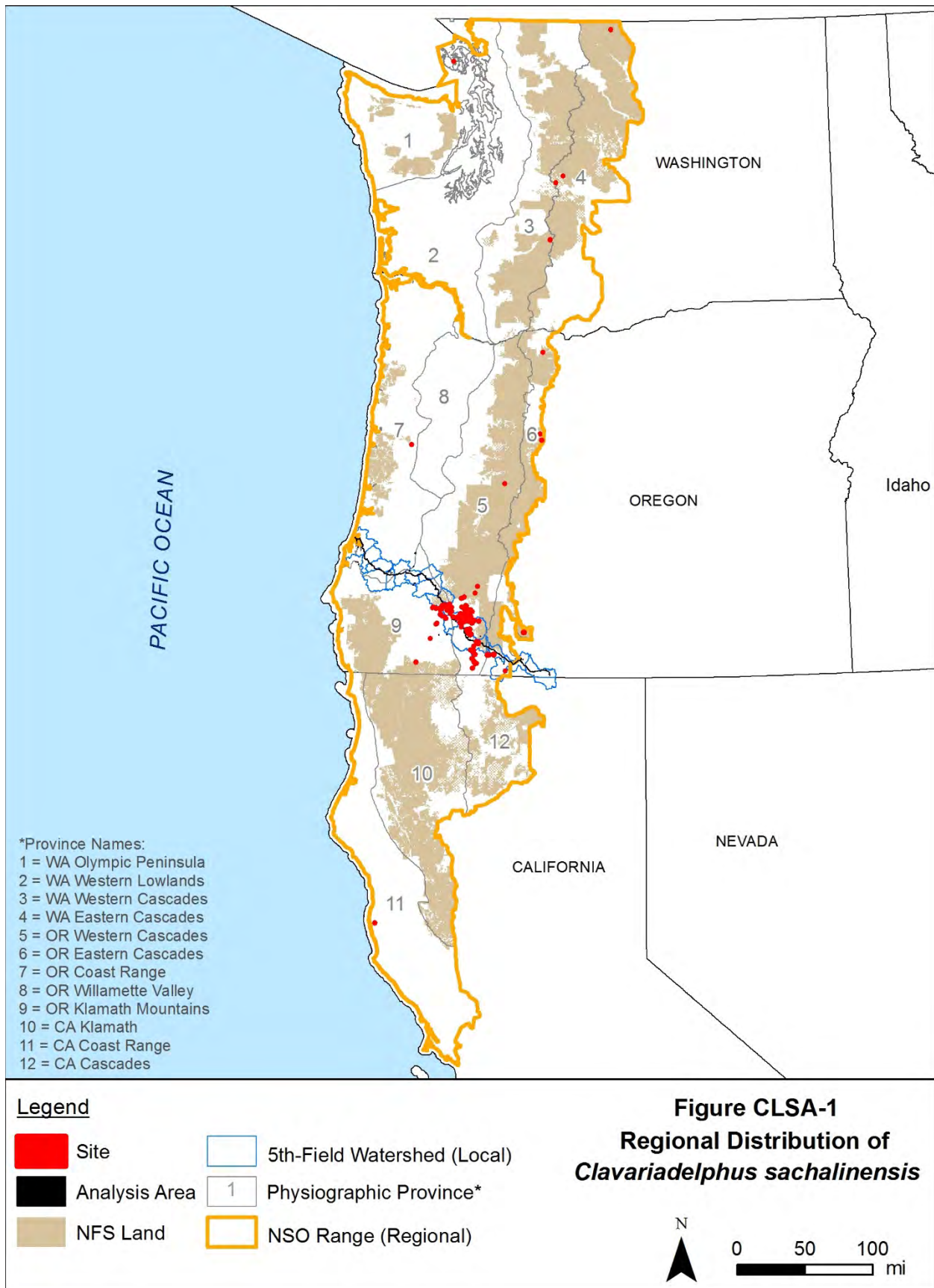
a/ Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center.

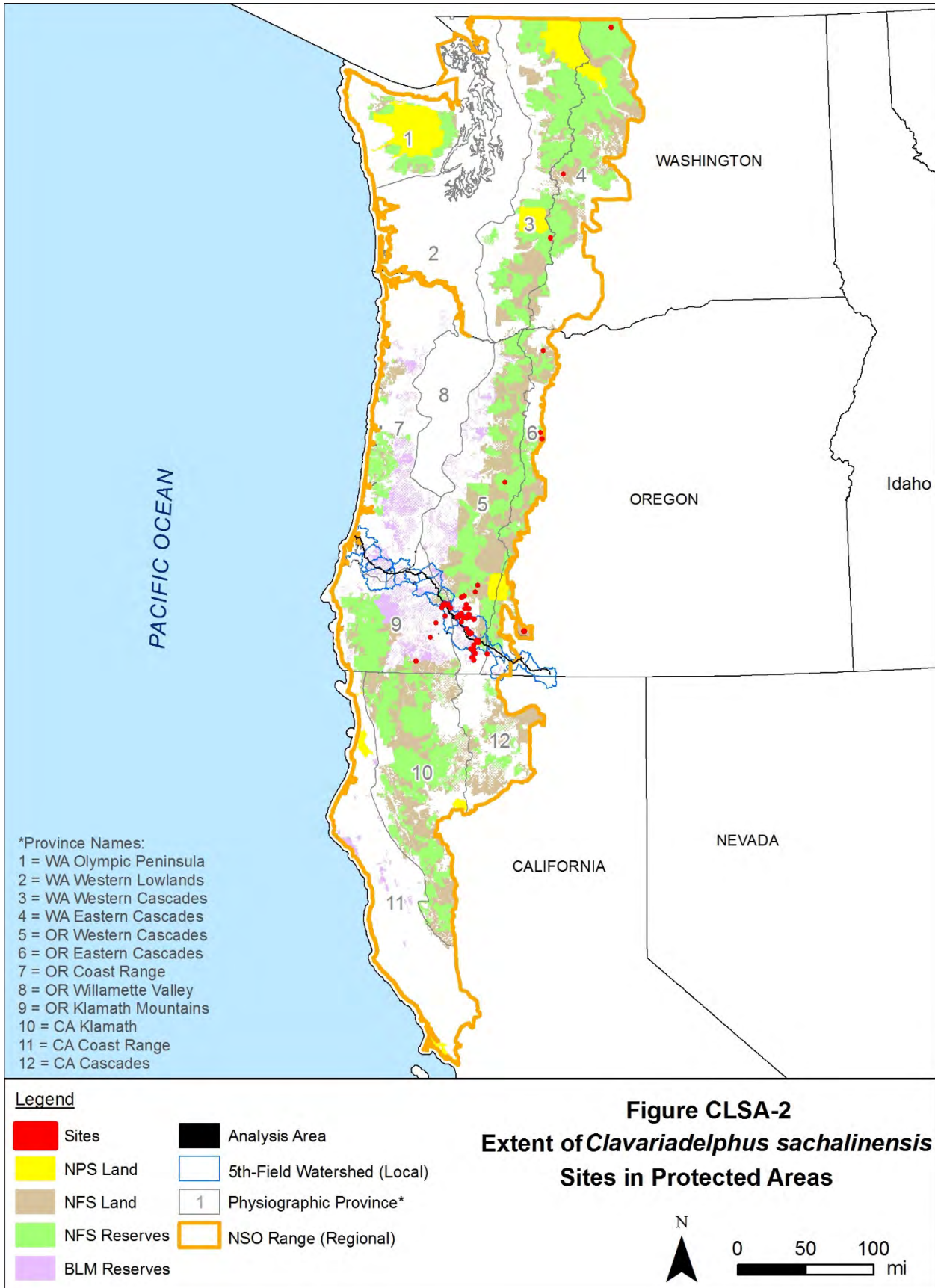
Regional Distribution

Clavariadelphus sachalinensis is widely distributed across eight physiographic provinces in Washington (Western and Eastern Cascades and Western Lowlands), Oregon (Coast Range, Cascades East and West, and Klamath Mountain), and California (Coast). Most sites are found along the western Cascade Range and eastern Klamath Mountains in southern Oregon, where the sites tend to be clustered or relatively close to one another in a large group. *Clavariadelphus sachalinensis* appears to be locally abundant in that area, but scattered sites are located in the Coast Range, Cascade Range in Washington and northern Oregon, and other outlying areas. *Clavariadelphus sachalinensis* is primarily found in southern Oregon and has a scattered distribution in other portions of the region despite the widespread distribution of forests that may provide suitable habitat, and the species does not appear to be well distributed within its range in the NSO range.

Sixty of 273 known sites are at least partially located on private or state lands, 239 sites are at least partially on BLM lands, and 35 are at least partially on NFS lands. Sites included on National Forests that encompass the project area include two sites on the Fremont-Winema National Forest, 16 sites on the Rogue River-Siskiyou National Forest and 10 sites on the Umpqua National Forest. Sites located on other National Forests include three sites on the Deschutes National Forest, one site on the Willamette National Forest, one site on the Mt. Hood National Forest, three sites on the Okanogan-Wenatchee National Forest, one site on the Mt. Baker-Snoqualmie National Forest, and one site on the Gifford Pinchot National Forest.

Across the NSO range, 20 sites are at least partially located in reserve lands managed by the Forest Service, including 18 at least partially in LSRs and three at least partially in Congressionally Reserved areas (see Figure CLSA-2). These sites represent 57 percent of the total NFS sites in the region. The remaining NFS sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. Additionally, 71 sites are entirely in reserve lands managed by BLM, which represents 30 percent of the total number of BLM sites in the region. While the sites on BLM lands are not covered by the S&M Standards and Guidelines, the sites in BLM reserves likely receive some level of protection through BLM reserve management.







Clavariadelphus sachalinensis is more common in LSOG forests based on available data (216 of 273 total sites are in LSOG), but it is also fairly common in non-LSOG forests and may not be as restricted to LSOG conditions. Based on current site locations, the species is found in coniferous forests below about 5,600 feet msl throughout most of the NSO range. Due to the extent of known sites, the amount of potential habitat on both NFS and BLM lands in the region, and the level of protection offered by NFS and BLM reserve lands, both land ownerships are included in this potential habitat discussion. Coniferous forests below 6,000 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *C. sachalinensis* and support additional sites. These forests encompass an estimated 15.1 million acres on BLM and NFS lands in the region, including an estimated 9.1 million acres in reserve land allocations (60 percent of the forests; Table CLSA-4). Of this acreage, an estimated 4.9 million acres are LSOG (see Figure CLSA-3), including 3.2 million acres in reserve land allocations (66 percent of the forests). Although coniferous forests are widespread in the NSO range, LSOG coniferous forests below 6,000 feet msl are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

| Location | Coniferous Forests below 6,000 feet | | LSOG Coniferous Forests below 6,000 feet | |
|---------------|-------------------------------------|-----------|--|-----------|
| | Total | Reserves | Total | Reserves |
| Regional Area | 15,108,825 | 9,057,899 | 4,869,845 | 3,235,553 |
| Local Area | 442,108 | 276,754 | 159,211 | 114,927 |
| Project Area | 10,23 | 691 | 298 | 211 |

Data source: Gradient nearest neighbor vegetation data from Moeur et al. 2011
 Note: Areas are presented in acres.
 a/ The area estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.

Local Distribution

Within the local area, *C. sachalinensis* is distributed across six 5th-field watersheds that overlap the project area (see Table CLSA-5 and Figure CLSA-4). The sites are located within the central and eastern portions of the local area, and most sites tend to be clustered and close to one another in groups. Across the watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located within 20 miles to the northeast in the Cascade Range and to the southwest in the Klamath Mountains.

| Watershed (HUC5 ID) | Number of Sites | Number of Sites in NFS Reserve Lands | Number of Sites in BLM Reserve Lands |
|--|-----------------|--------------------------------------|--------------------------------------|
| Big Butte Creek (839) | 72 | - | 50 |
| Coos Bay Frontal (713) | - | - | - |
| East Fork Coquille River (747) | - | - | - |
| Elk Creek-South Umpqua (785) | - | - | - |
| Klamath River-John C Boyle Reservoir (888) | 1 | - | - |
| Lake Ewauna-Upper Klamath River (876) | - | - | - |
| Little Butte Creek (846) | 42 | 9 | 33 |
| Lower Lost River (892) | - | - | - |
| Middle Fork Coquille River (764) | - | - | - |
| Middle South Umpqua River (763) | - | - | - |

| Watershed (HUC5 ID) | Number of Sites | Number of Sites in NFS Reserve Lands | Number of Sites in BLM Reserve Lands |
|---------------------------------------|-----------------|--------------------------------------|--------------------------------------|
| Myrtle Creek (775) | - | - | - |
| North Fork Coquille River (733) | - | - | - |
| Olalla Creek-Lookingglass Creek (745) | - | - | - |
| Rogue River-Shady Cove (818) | 7 <u>a/</u> | - | 7 |
| South Umpqua River (781) | - | - | - |
| Spencer Creek (865) | 3 | - | - |
| Trail Creek (804) | 41 <u>a/</u> | - | 34 |
| Upper Cow Creek (801) | - | - | - |

Data sources: Processed BLM and Forest Service GIS data, August 2, 2017; HUC5 Watershed layer, August 23, 2011
 Note: Nu Number of sites in reserves may include sites that are only partially in reserves.
 Site counts are not additive because some sites occur in multiple watersheds and the counts overlap, as noted below:
a/ One site is partially in the Rogue-River Shady Cove and Trail Creek watersheds..

Of the 165 sites in the local area, 18 are at least partially on NFS lands and are on lands designated as Other (Matrix) and LSR. A total of 43 sites are at least partially on private lands and 151 sites are at least partially on BLM lands. Within the local area, nine sites are entirely in NFS reserve lands and 52 sites are entirely in BLM reserve lands, representing 37 percent of the local sites.

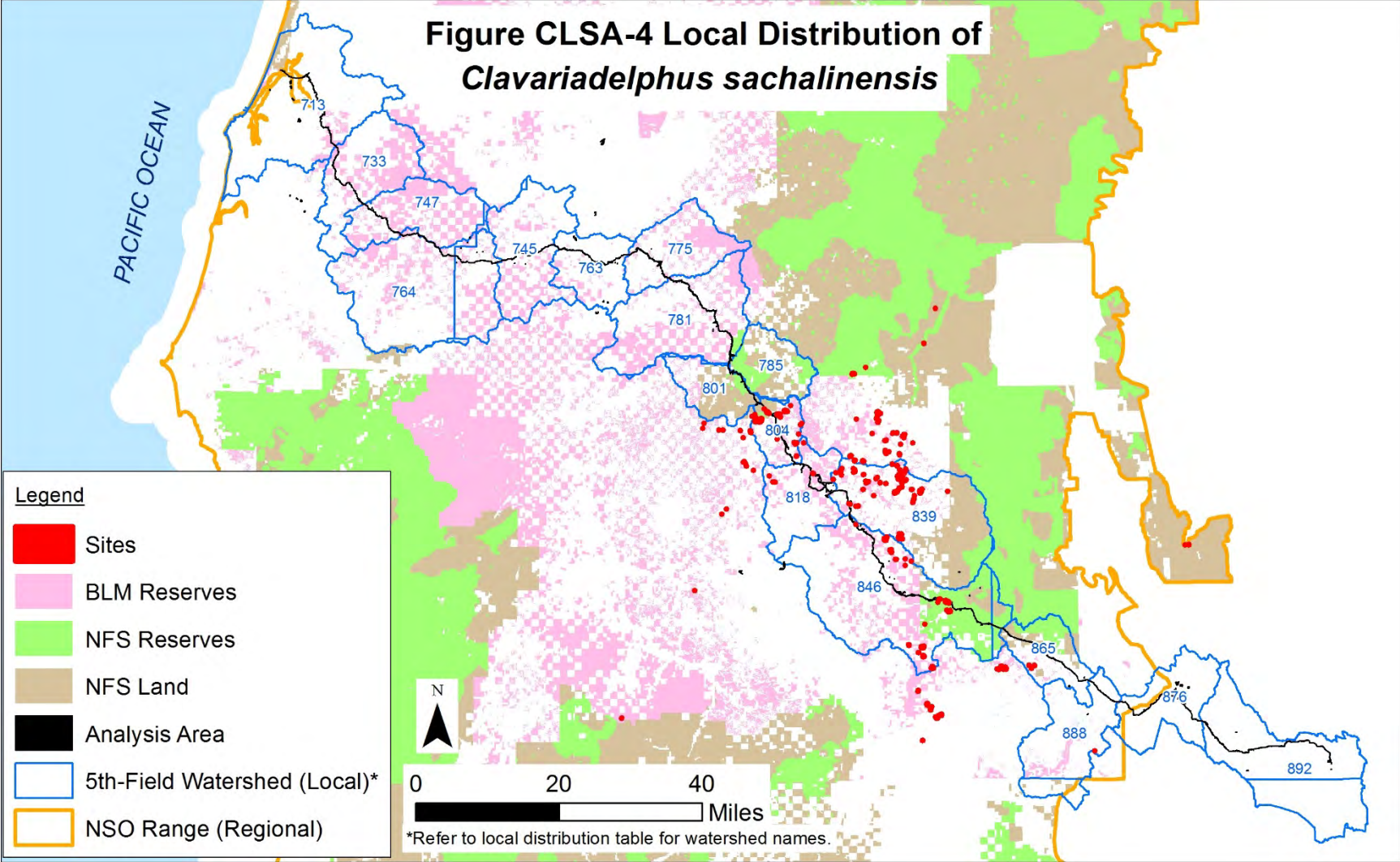
Coniferous forests below 6,000 feet msl encompass approximately 442,108 acres on BLM and NFS lands in the local area, with 276,754 acres in reserve land allocations (63 percent of the forests). Of this acreage, an estimated 159,211 acres are LSOG, including 114,927 acres in reserves (72 percent of the forests).

Analysis/Project Area Distribution

The analysis area contains 15 sites of *C. sachalinensis* and the project area contains 15 sites. The analysis area and project area contains seven sites on NFS lands, and the remaining sites are at least partially on BLM lands (two sites are partially on private land). The NFS sites are found in the central and eastern portion of the analysis area, and most of the sites are clustered in two groups. Many sites are also located within the immediate vicinity of the analysis area (see Local Distribution discussion above), including several within 5 miles.

The seven sites on NFS lands in the analysis area are designated as Other (Matrix) and LSR. Of the seven NFS sites in the analysis area, two sites are in reserve lands. Of the eight sites on BLM lands in the analysis area, one is located entirely in a BLM reserve..

Surveys for the PCGP Project resulted in an estimated 184 observations of the species in 137 locations in or near the project area (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). An estimated 86 of these recorded observations combined with other data in the agency databases comprise 12 of the sites in the analysis area; the other observations are in sites outside the analysis area. Within the project area, two sites are between MPs 100.28 and 100.53, five sites are between MPs 112.6 and 113.2, two sites are between MPs 125.1 and 125.34, one site is near MP 136.85, and two sites are between MPs 156.8 and 158.28.



Project Impacts

Analysis

The PCGP Project would affect seven sites out of the 35 sites on NFS lands in the region, representing approximately 20 percent of the NFS sites. Site impacts on other land ownerships include eight sites affected on BLM lands, two of which are at least partially on private lands as well. The total number of sites affected is 15 sites out of the 273 total sites on all lands. Table CLSA-6 provides an overview of the features of the PCGP Project that would affect the *C. sachalinensis* sites on NFS lands. The construction corridor and associated work and storage areas would affect approximately 20 acres within seven sites (about 13 percent of the NFS sites in the analysis area). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. sachalinensis* in and near the project area.

The following discussion provides an overview of the types of impacts that would be expected at the sites based on the features of the PCGP Project that could affect site persistence.

Vegetation removal and grading activities in the 95-foot wide construction corridor would disturb about 12.8 acres of vegetation and soil within seven sites and could result in the removal of *C. sachalinensis* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 2 acres within six sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *C. sachalinensis* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A 30-foot wide portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 4.7 acres of understory habitat in seven sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

| TABLE CLSA-6 | | |
|---|--------------------------|----------------------------------|
| Impacts to <i>Clavariadelphus sachalinensis</i> Sites on NFS Lands in the Project Area | | |
| Project Activity | Number of Sites Affected | Area of Disturbance within Sites |
| Construction Corridor | 7 | 12.8ac |
| Temporary Extra Work Area (TEWA) | 6 | 2.0 ac |
| Uncleared Storage Area (UCSA) | 7 | 4.7 ac |
| Roads (TMP) | - | - |
| Other Minimal Disturbance Activities | - | - |
| ac = acres | | |
| Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities. | | |

Across the project area, the PCGP Project would remove an estimated 819 acres of coniferous forests below 6,000 feet msl, including 229 acres of LSOG coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *C. sachalinensis*. Within this impact

area, about 428 acres (about 52 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A 30-foot wide corridor would be maintained in low-growing vegetation across the project area, resulting in a loss of about 190 acres of coniferous forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the seven sites on NFS lands as a result of the PCGP Project, 11 sites of *C. sachalinensis* would remain on NFS lands in the local area, including seven entirely in reserves, and 28 sites, including 18 entirely in reserves, would remain on NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 18 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. The PCGP project may also affect eight sites on BLM lands. Assuming site persistence cannot be maintained, 143 sites, including 51 entirely in reserves would remain on BLM lands in the local area and 231 sites, including 70 entirely in reserves would remain on BLM lands in the NSO range. While sites on BLM lands are not subject to S&M Standards and Guidelines protections, sites entirely in reserves would likely receive some level of protection under BLM management

Based on these site counts, approximately 64 percent of the remaining *C. sachalinensis* sites on NFS lands in the NSO range would be protected in reserves and approximately 33 percent of sites on federal lands in the NSO range would be protected in either NFS or BLM reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states “instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision” (Standards and Guidelines, pg. 4). The Forest Service has embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *Clavariadelphus sachalinensis* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information, since the species was listed in the 2001 ROD, however, indicates that the species appears to be more common than previously documented, as described below:
 - *Clavariadelphus sachalinensis* has a wide distribution across eight physiographic provinces and three states in the region and a low-moderate number of sites on NFS lands (35 sites) and a moderate-high number of sites on all lands (273 sites). The species is locally abundant in the southern Cascade Range and eastern Klamath Mountains in Oregon. The currently known number of sites on NFS and BLM lands has increased by 242 sites since 2007, with many sites documented during the PCGP

- Project surveys and during unrelated surveys in recent years in the vicinity of the project.
- An estimated 57 percent of the NFS sites (20 sites) are in NFS reserves, while an estimated 34 percent of the sites on federal land (91 sites) are in reserves designated by the NFS or BLM.
 - Coniferous forests below 6,000 feet msl (general habitat for the species) are widespread across the region and encompass approximately 15.1 million acres on BLM and NFS lands with an estimated 60 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *C. sachalinensis*.
 - The PCGP Project would affect seven of 35 NFS sites of *C. sachalinensis*, representing approximately 20 percent of the sites on NFS lands in the NSO range. Assuming site persistence cannot be maintained at the eight sites, a low-moderate number of sites (28) would remain on NFS lands in the region with a wide distribution across Washington and Oregon. Several sites (11) would remain in the local vicinity of the analysis area; these sites would be clustered in two groups in the Trail Creek and Little Butte Creek watersheds.
 - The PCGP Project would also affect eight sites that are least partially on BLM lands. Assuming site persistence cannot be maintained at the eight sites, 143 sites would remain on BLM lands in the local area, including 51 entirely in reserves. These sites would continue to be distributed across seven 5th-field watersheds. The types of reserves that contain these local sites includes Riparian Reserves where management actions are restricted to those activities that benefit the conservation of riparian areas and riparian-associated species; LSRs where management actions are restricted to those that benefit LSOG forests; and District Designated Reserves, where management activities that may adversely affect *C. sachalinensis* are unlikely.
 - The PCGP Project would affect site persistence at two sites in NFS reserves (LSRs), and the percentage of sites in reserves would increase by 6 percent. Of the remaining sites, 16 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and three are in Congressionally Reserved areas where management activities that may adversely affect *C. sachalinensis* are unlikely.
 - The PCGP Project would result in a permanent loss of an estimated 190 acres of coniferous forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 9.1 million acres (60 percent) of coniferous forests and 3.2 million acres (66 percent) of LSOG coniferous forests below 6,000 feet msl would remain in reserves in the NSO range.
 - The remaining forests could support additional populations of *C. sachalinensis*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. *Clavariadelphus sachalinensis* is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of

the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.6.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. sachalinensis* at seven sites on NFS lands and eight sites on BLM lands. The remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 28 sites would remain on NFS lands across the region, and 11 sites would remain on NFS lands in the local area. Additionally, 143 sites would remain on BLM lands in the local area, including 51 sites entirely in reserves. The PCGP Project would affect site persistence of *C. sachalinensis* at eight sites on NFS lands; these sites are part of three small groups of NFS sites in the Klamath Mountains and western Cascades. Several scattered sites on NFS lands are located within 15 miles to the north in the western Cascades. Sites on BLM lands are much more abundant than sites on NFS lands, and many sites entirely in reserves are distributed across the Klamath Mountains and western Cascades in southern Oregon. It is expected that BLM management would enable the majority of the sites in reserves to persist. Due to the significant number of sites remaining on BLM lands in the local area (143) with a moderate proportion of sites in BLM reserves (35 percent), it can be assumed that many sites would be protected and the species would remain locally abundant. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *Clavariadelphus sachalinensis* would persist in the region without considering the eight NFS sites as part of the population.
- The PCGP Project would remove approximately 819 acres of coniferous forests and 229 acres of LSOG coniferous forests below 6,000 feet msl (a negligible amount of the forests). An estimated 52 percent of the forests would be restored to similar conditions or shrublands, but a 30-foot wide early-successional corridor would remain across the project area. An estimated 9.1 million acres (60 percent) of coniferous forests and 3.2 million acres (66 percent) of LSOG coniferous forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining sites on NFS lands are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Additionally, the remaining sites in BLM reserves are expected to receive significant protection under the 2016 BLM RMPs. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *C. sachalinensis* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the eight *C. sachalinensis* sites on NFS lands is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the NFS land management plans that apply to the affected sites would waive implementation of Management Recommendations for *C. sachalinensis* sites affected by the PCGP Project. The applicant shall prepare and implement

a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term. The monitoring plan shall be approved by the Forest Service.

2.7 CLAVARIADELPHUS TRUNCATUS

Clavariadelphus truncatus (synonym *C. borealis*) is a club mushroom species in the Gomphaceae family (formerly in the Clavariadelphaceae family) and is commonly known as flat-topped, truncate, or club coral or the orange club.

2.7.1 Regulatory Status and Ranking

The 2001 ROD, including the 2003 ASR modifications to the S&M species list, identifies *C. truncatus* as a Category D (uncommon) species. ORBIC evaluated *C. truncatus* in its 2004 *Survey and Manage Assessment* for BLM and the Forest Service (ORBIC 2004), but it was not included in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2016). In 2004, the species was considered to be demonstrably common, widespread and abundant within its global range (G5) and was considered to be uncommon but not rare with some cause for long-term concern due to declines or other factors in Oregon (S4). The species is not currently on any ORBIC lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.7.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to this analysis. Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are discussed below under Persistence Evaluation. The background information in this section is used to support the persistence evaluation in the following section, which is updated with more recent information (e.g., recent survey data) specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *C. truncatus*. It is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) (ORBIC 2004). The mushroom has been documented fruiting from July through November in the NSO range (Castellano et al. 2003). In California, fruiting has been documented from late fall to mid-winter (The Fungi of California 2010).

Range

Clavariadelphus truncatus is widespread in Asia, Europe, and North America, including most Canadian provinces; 22 states from Alaska to California, Idaho, Utah, and east to Maine and Virginia; and Mexico (ORBIC 2004). Within the NSO range, populations are widely distributed from northern California, throughout Oregon, and north to the North Cascades and Olympic Mountains of Washington. The species is considered to be very common across its global range. The currently known range of the species within the NSO range based on 2017 data is discussed below under Species Distribution.

Although information on the species' historical range is not known, it was likely similar to the current range, with populations widely distributed in Asia, Europe, and North America. Local and regional distributions across its range may have varied based on specific habitat conditions and

have likely been affected by habitat modifications and other environmental factors, as discussed below under Threats.

Population Status

ORBIC (2004) reported *C. truncatus* from more than 300 element occurrences worldwide in 2004. An estimated 120 of these occurrences were in California, Oregon, and Washington, with the majority (more than 100) found in Oregon (ORBIC 2004). ORBIC estimated that 53 of the element occurrences were in protected areas in the NSO range in 2004. In 2004, *C. truncatus* was considered to be very common and likely to be secure across its range and was considered widespread in western Oregon (ORBIC 2004). The species was found in two locations during Random Multi-Species surveys across the NSO range between 2001 and 2004 (USDA and USDI 2007). Molina (2008) documented 89 new sites of *C. truncatus* in the NSO range between 1998 and 2006, and 133 total sites were documented by 2006, including 54 in reserves or protected areas. The 2007 Final SEIS reported 118 sites on NFS and BLM lands and 130 total sites on all lands in the NSO range (USDA and USDI 2007).

Equivalent-effort surveys were conducted during the fall and spring from 2010 to 2016 in old-growth stands in the PCGP Project area and within 100 feet of habitat removal to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). Incidental sightings of Category D species were recorded during these surveys and resulted in 57 new observations of individuals or populations of *C. truncatus*. The majority of the surveys (2010 to 2014) used the 2001 ROD as the target list, in which *C. truncatus* was a Category B species. During these surveys, *C. truncatus* was targeted along with all other Category B species. Additional persistence surveys for *C. truncatus* in LSRs in nearby areas resulted in 30 additional observations of the species. These observations have increased the number of sites documented in BLM and Forest Service records by about 20 percent. Based on the relatively high number of sites and the increased number of sites since 1998 with increased surveys (a three-fold increase between 1998 and 2006 per Molina 2008 records), it is likely that this species is more abundant than previously known, and more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2017 data are provided below under Species Distribution.

Habitat

Clavariadelphus truncatus is found in coniferous forests (ORBIC 2004). Based on data available in 1994, *C. truncatus* was presumed to be similar to other club coral fungi, which require cool or cold, moist coniferous forests, and are primarily found in LSOG forests (Holthausen et al. 1994). It may also require a well-developed humus layer and tends to be more common with increasing elevation and latitude. The species grows scattered or gregarious on soil or duff under mixed conifers (Castellano et al. 2003). *Clavariadelphus truncatus* is more widespread and abundant than many other S&M fungi species. It may prefer specific microclimate conditions of LSOG forests, but may not be restricted to these conditions.

Threats

The primary threat to *C. truncatus* is from logging activities, which result in removal of host trees and disturbance to soil (ORBIC 2004). Like other club coral fungi, *C. truncatus* is not subject to

commercial harvest, but may be occasionally gathered by recreational pickers (Holthausen et al. 1994). Other specific threats to the species are not known.

Management Recommendations

As a Category D species, the direction under the 2001 ROD is to manage high priority sites to provide a reasonable assurance of species persistence (USDA and USDI 2001). This statement is no longer applicable on BLM lands under the 2016 BLM RMPs, although it is still valid on NFS lands within the range of the NSO. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *C. truncatus*:

- As a mycorrhizal species, *C. truncatus* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.7.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new site information, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. truncatus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and the Forest Service (Oregon/Washington regional offices) and converted into sites in accordance with the methodology described in Chapter 1. Table CLTR-1 shows the total number of known sites in the regional (NSO range), local (18 5th-field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 492 observations from BLM and Forest Service geodatabases were converted into 332 sites in the NSO range (region). Table CLTR-2 shows the total number of sites on NFS land and other land ownerships across the regional, local, and analysis areas. Table CLTR-3 shows the total number of sites within each land use allocation defined in the 1994 ROD and 2016 RMPs across the regional, local, and analysis areas. Figure CLTR-1 displays the regional distribution of the species across NFS lands, Figure CLTR-2 displays the extent of known sites located in protected areas (NFS lands, NFS reserves, BLM reserves, and NPS lands), and Figure CLTR-3 displays the species' regional distribution as well as the extent of coniferous forests and LSOG coniferous forests on BLM and NFS lands.

| TABLE CLTR-1 | |
|---|-----------------|
| Number of <i>Clavariadelphus truncatus</i> Sites (2017) | |
| Location* | Number of Sites |
| Regional Area | 332 |
| Local Area | 147 |
| Analysis Area (Project Area) | 21 (21) |

Data source: Processed BLM and Forest Service GIS data, August 2, 2017
 *Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

| TABLE CLTR-2 | | | |
|---|----------------|-------------|---------------------|
| Distribution of <i>Clavariadelphus truncatus</i> across Federal, Private, and Other Lands | | | |
| Land Ownership | Regional Sites | Local Sites | Analysis Area Sites |
| Forest Service | 127 | 16 | 10 |
| BLM | 193 | 132 | 11 |
| NPS | 3 | - | - |
| Fish and Wildlife Service | - | - | - |
| Other (Private, State, etc.) | 59 | 35 | 3 |

Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
 Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

| TABLE CLTR-3 | | | |
|---|----------------|-------------|---------------------|
| Distribution of <i>Clavariadelphus truncatus</i> across 1994 ROD and 2016 RMPs Land Allocations | | | |
| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
| Adaptive Management Area (AMA) | 4 | - | - |
| Adaptive Management Reserves (AMR) | - | - | - |
| Administratively Withdrawn (AW) | 19 | - | - |
| Congressionally Reserved (CR) | 15 | - | - |
| Late Successional Reserve (LSR) | 39 | 4 | 4 |
| Marbled Murrelet Area (LSR3) | - | - | - |
| Northern Spotted Owl Activity Center (LSR4) a/ | 2 | - | - |
| Managed Late Successional Area (MLSA) | - | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | 59 | 13 | 6 |
| Riparian Reserve | 1 | - | - |
| Bureau of Land Management | Regional Sites | Local Sites | Analysis Area Sites |
| Administratively Withdrawn (AW) | - | - | - |
| Congressional Reserve | 1 | - | - |
| District Designated Reserve | 79 | 53 | 6 |
| Harvest Land Base | 139 | 94 | 9 |
| Late Successional Reserve | 97 | 68 | 10 |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | - | - | - |
| Riparian Reserve | 77 | 49 | 6 |

Data sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0; 2016 RMP land allocation data, August 2016.
 Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
 a/ Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center.

Regional Distribution

Clavariadelphus truncatus is widely distributed across 11 physiographic provinces in Washington (Western and Eastern Cascades and Western Lowlands), Oregon (Coast Range, Cascades West and East, Willamette Valley, and Klamath Mountains), and California (Klamath, Cascades, and Coast) (see Figure CLTR-1). Most sites are found along the Cascade Range and Klamath Mountains, where the sites tend to be clustered or relatively close to one another in groups.

Scattered sites are located in the Coast Range, and other outlying areas with some clusters of sites in western Oregon and northwestern California. *Clavariadelphus truncatus* appears to be well distributed in the Cascade Range in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.

Fifty-nine of 332 sites are at least partially located on private, state, or other lands; three sites are on NPS lands (two are in Mount Rainier National Park and one is partially in Crater Lake National Park); 193 sites are at least partially on BLM lands; and 127 sites are at least partially on NFS lands across the region. Sites included on National Forests that encompass the project area include 17 sites on the Fremont-Winema National Forest, 21 sites on the Rogue River-Siskiyou National Forest, and 38 sites on the Umpqua National Forest. The remaining sites on NFS lands are on the Deschutes, Gifford Pinchot, Klamath, Lassen, Mendocino, Mt. Baker-Snoqualmie, Mt. Hood, Okanogan-Wenatchee, Shasta-Trinity, Siuslaw, Six Rivers, and Willamette National Forests.

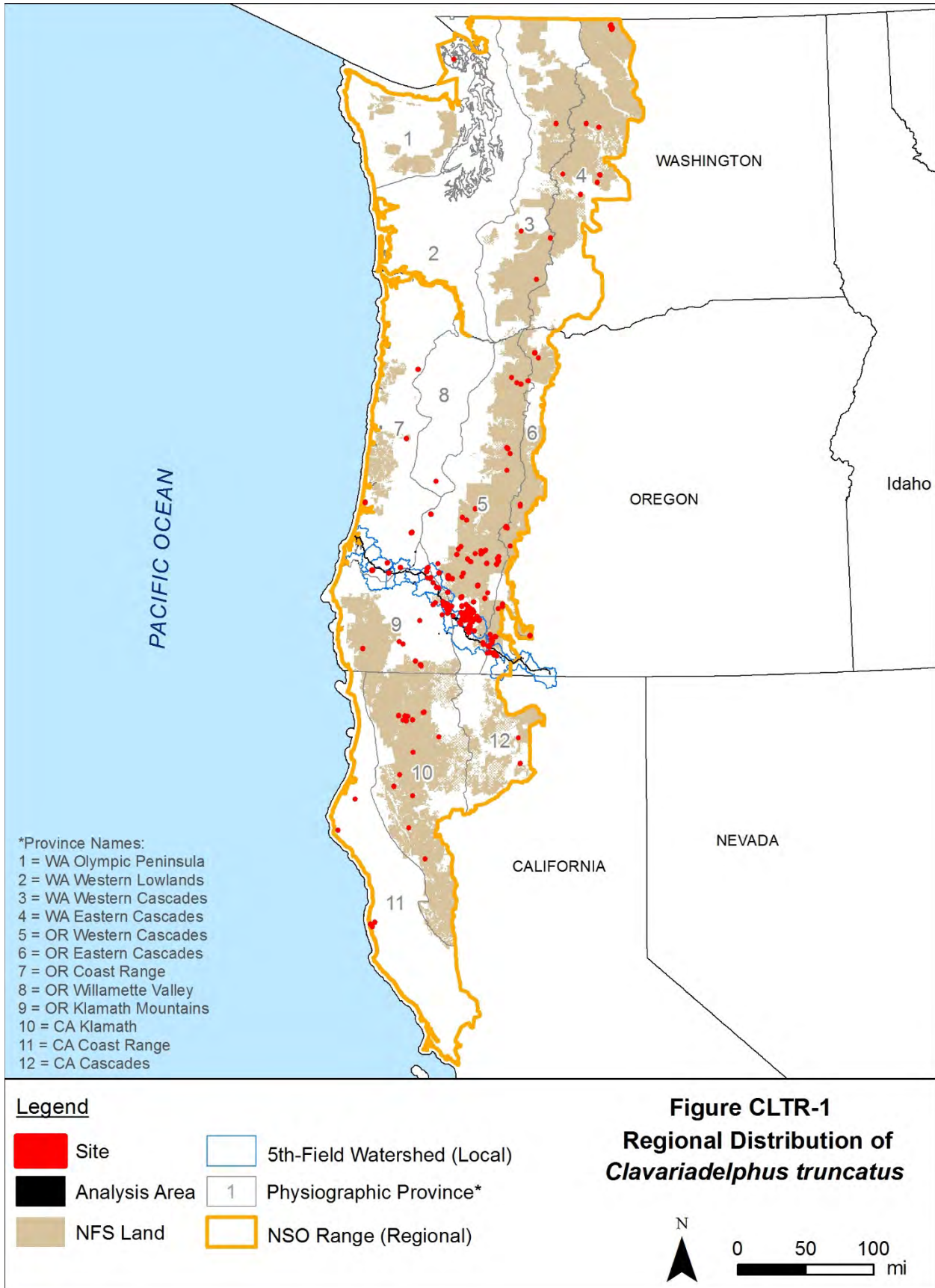
Across the NSO range, 56 sites are at least partially located in reserve lands managed by the Forest Service, including 39 at least partially in LSRs, two at least partially in Known Owl Activity Centers, 15 at least partially in Congressionally Reserved areas, and one at least partially in Riparian Reserves (see Figure CLTR-2). This represents 44 percent of the total sites on NFS lands in the region. The remaining NFS sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. Across the region, 54 sites are entirely in BLM reserves. While the sites in BLM reserves and the three NPS sites are not covered by the S&M Standards and Guidelines, they likely receive some level of protection through BLM reserve management and National Park Management.

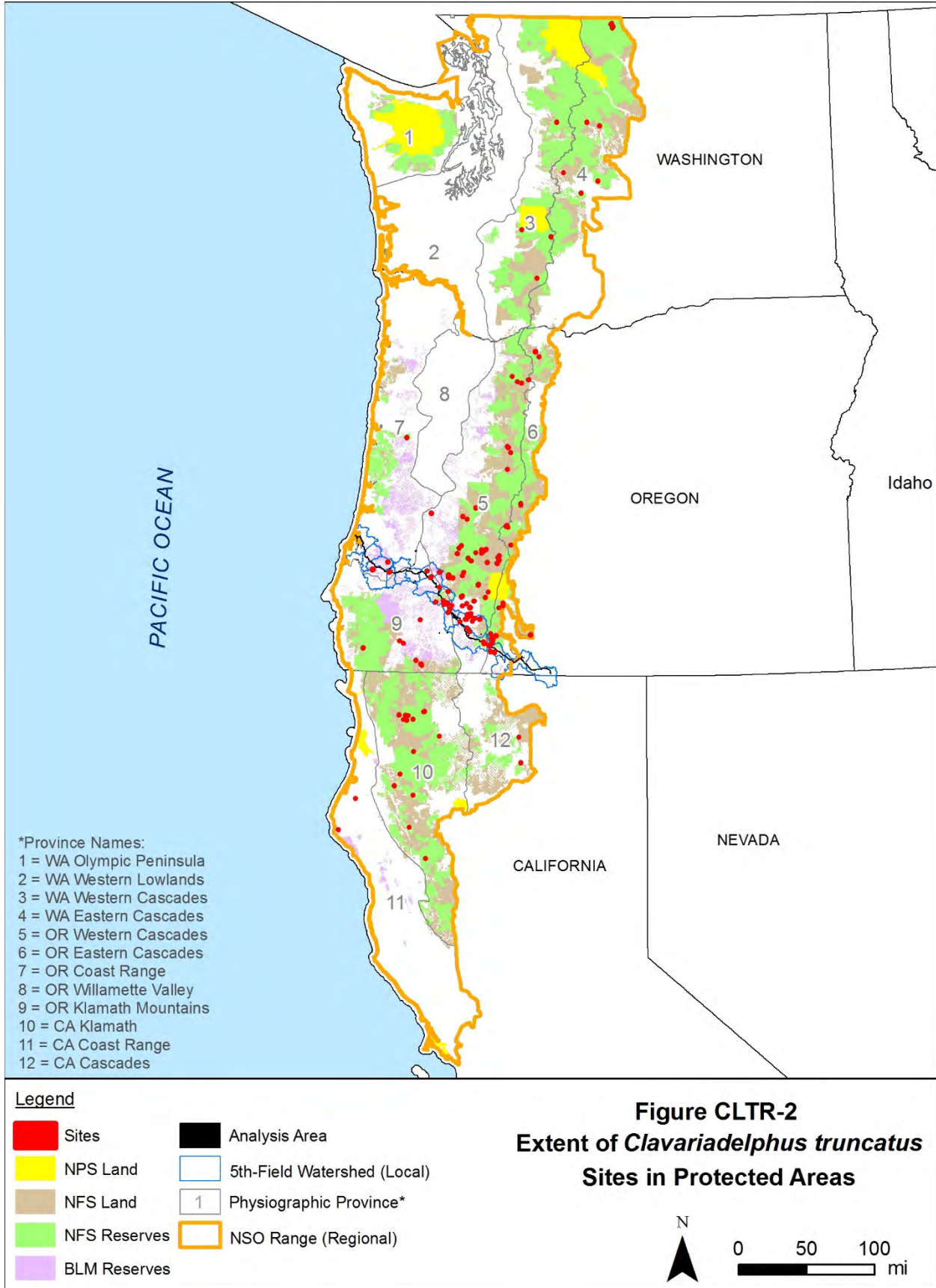
Clavariadelphus truncatus is more common in LSOG forests based on available data (274 of 332 total sites are in LSOG), but it is also relatively common in non-LSOG forests and may not be restricted to LSOG conditions. Based on current site locations, the species is found in coniferous forests across a wide elevation range and has been documented in most of the NSO range. Due to the extent of known sites, the amount of potential habitat on both NFS and BLM lands in the region, and the level of protection offered by NFS and BLM reserve land, both land ownerships are included in this potential habitat discussion. Coniferous forests, including the LSOG component of these forests, across the NSO range could provide habitat for *C. truncatus* and support additional sites. These forests encompass an estimated 16.3 million acres on BLM and NFS lands in the region, including an estimated 9.9 million acres in reserve land allocations (61 percent of the forests; Table CLTR-4). Of this acreage, an estimated 5 million acres are LSOG (see Figure CLTR-3), including 3.3 million acres in reserve land allocations (66 percent of the forests). Although coniferous forests are widespread across the region, LSOG coniferous forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

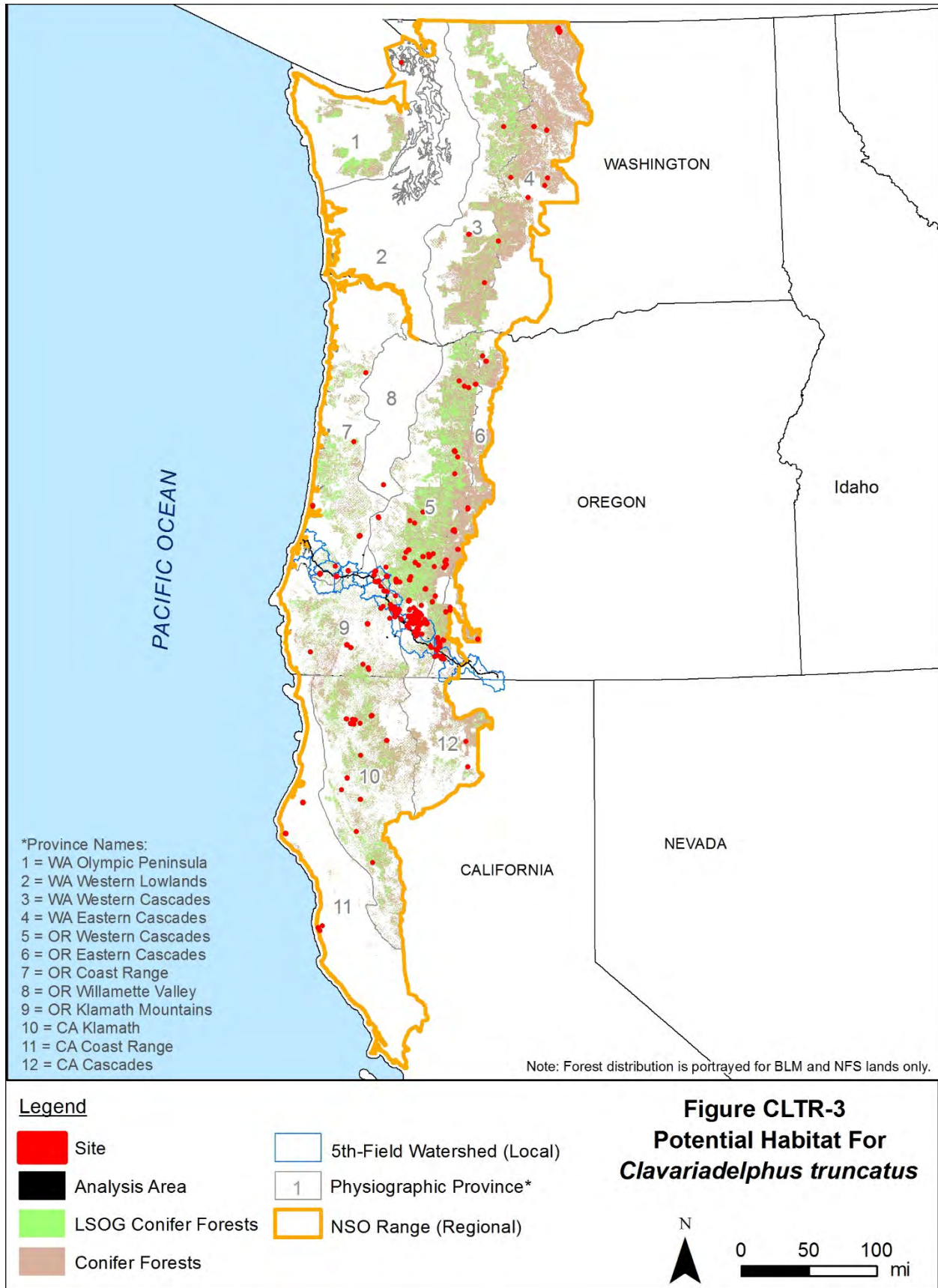
TABLE CLTR-4

| Extent of Forests That Could Provide Habitat for <i>Clavariadelphus truncatus</i> on NFS and BLM Lands ^{a/} | | | | |
|--|--------------------|-----------|-------------------------|-----------|
| Location | Coniferous Forests | | LSOG Coniferous Forests | |
| | Total | Reserves | Total | Reserves |
| Regional Area | 16,275,479 | 9,902,802 | 5,025,899 | 3,337,509 |
| Local Area | 454,206 | 285,292 | 161,143 | 116,561 |
| Project Area | 1,018 | 686 | 294 | 207 |

Data source: Gradient nearest neighbor vegetation data from Moeur et al. 2011
 Note: Areas are presented in acres.
^{a/} The area estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.







Local Distribution

Within the local area, *C. truncatus* is distributed across 12 5th-field watersheds that overlap the project area (see Figure CLTR-4 and Table CLTR-5.) Some sites are more scattered than others, while multiple clusters of sites are found in the Myrtle, South Umpqua River, Trail Creek, and Big Butte Creek watersheds. Across the watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located within 10 miles to the northeast in the Cascade Range.

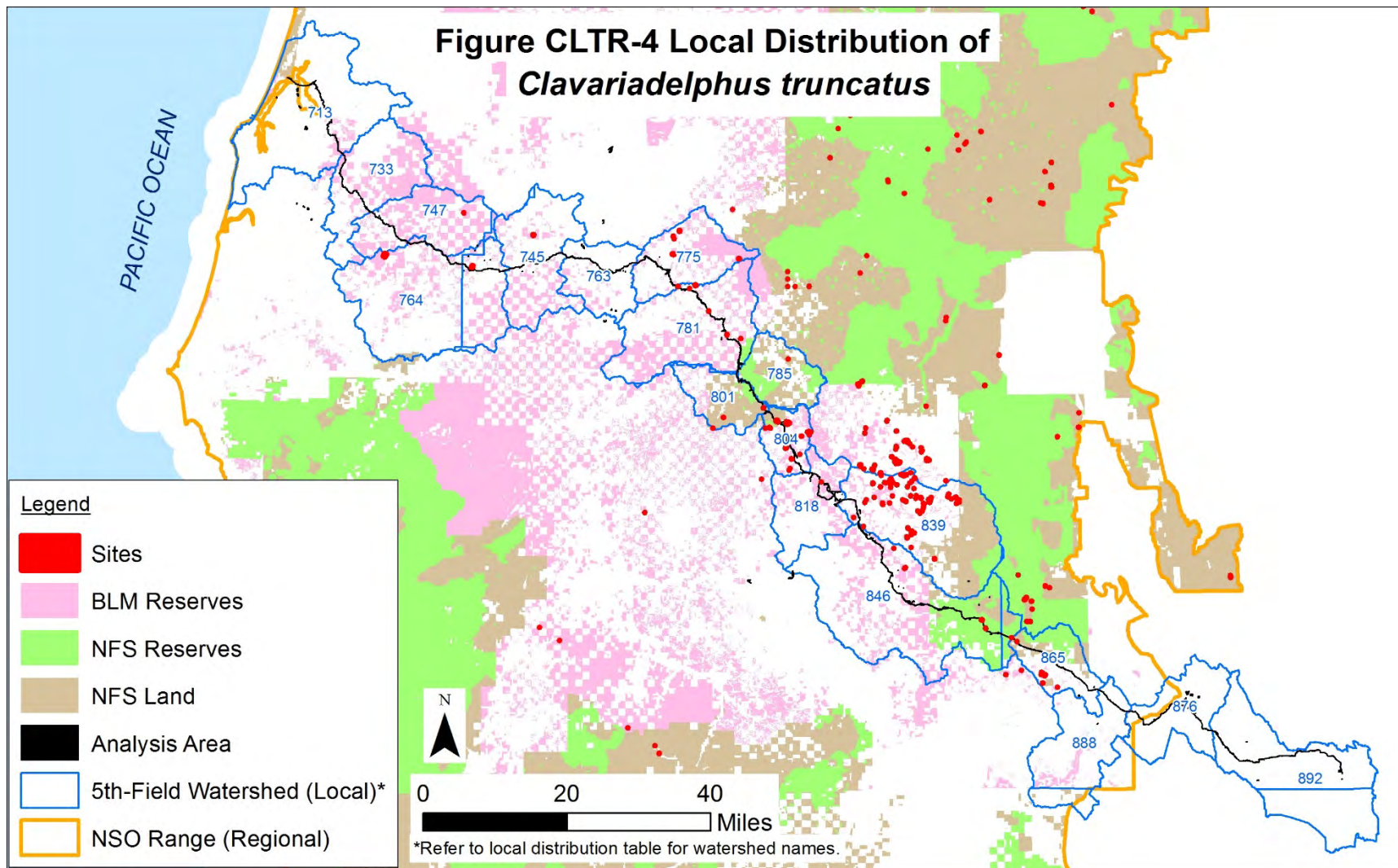
Of the 147 sites in the local area, 16 sites are at least partially on NFS lands. These sites are primarily located on lands designated as Other (Matrix) and LSR. Thirty-five sites are at least partially on private lands and 132 sites are at least partially on BLM lands. Of the 16 sites on NFS lands in the local area, four sites are at least partially in reserve lands, representing 25 percent of the local area sites on NFS lands. Of the 132 sites on BLM lands, 38 sites are entirely in BLM reserves, representing 29 percent of the local area sites on BLM lands.

Coniferous forests encompass approximately 454,206 acres on BLM and NFS lands in the local area, with 285,292 acres in reserve land allocations (63 percent of the forests). Of this acreage, an estimated 161,143 acres are LSOG, including 116,561 acres in reserves (72 percent of the forests).

Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures CLTR-3 and CLTR-4).

| TABLE CLTR-5 | | | |
|---|-----------------|--------------------------------------|--------------------------------------|
| Distribution of <i>Clavariadelphus truncatus</i> in Local 5 th -Field Watersheds | | | |
| Watershed (HUC5 ID) | Number of Sites | Number of Sites in NFS Reserve Lands | Number of Sites in BLM Reserve Lands |
| Big Butte Creek (839) | 76 | - | 48 |
| Coos Bay Frontal (713) | - | - | - |
| East Fork Coquille River (747) | 1 | - | 1 |
| Elk Creek-South Umpqua (785) | 1 | - | - |
| Klamath River-John C Boyle Reservoir (888) | - | - | - |
| Lake Ewauna-Upper Klamath River (876) | - | - | - |
| Little Butte Creek (846) | 7 | 4 | 3 |
| Lower Lost River (892) | - | - | - |
| Middle Fork Coquille River (764) | 4 | - | 4 |
| Middle South Umpqua River (763) | - | - | - |
| Myrtle Creek (775) | 8 a/ | - | 8 |
| North Fork Coquille River (733) | - | - | - |
| Olalla Creek-Lookingglass Creek (745) | 1 | - | 1 |
| Rogue River-Shady Cove (818) | 1 | - | 1 |
| South Umpqua River (781) | 7 a/ | - | 7 |
| Spencer Creek (865) | 10 | - | 8 |
| Trail Creek (804) | 30 | - | 25 |
| Upper Cow Creek (801) | 2 | - | - |

Data sources: Processed BLM and Forest Service GIS data, August 2, 2017; HUC5 Watershed layer, August 23, 2011
 Note: Number of sites in reserves may include sites that are only partially in reserves.
 Site counts are not additive because some sites occur in multiple watersheds and the counts overlap, as noted below:
 a/ One site is on both Myrtle Creek and South Umpqua River watersheds.



Analysis/Project Area Distribution

The analysis and project areas contain 21 sites of *C. truncatus*. A total of 10 sites in both the analysis area and project area are at least partially on NFS lands. Four of the sites on NFS lands in the analysis area are at least partially located in NFS reserve lands (LSRs). Three sites are partially on private lands and 11 sites are at least partially on BLM lands. The analysis area sites are distributed across six 5th-field watersheds (South Umpqua River, Elk Creek-South Umpqua, Upper Cow Creek, Trail Creek, Little Butte Creek, and Spencer Creek). The sites are widely distributed across much of the analysis area and tend to be found in several clusters, with a few scattered sites. Many sites are also located within the immediate vicinity of the analysis area (see Local Distribution discussion above), including several within 1 mile.

Surveys for the PCGP Project resulted in 121 total observations of the species in 84 locations in or near the project area (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). An estimated 69 of these recorded observations comprise 16 of the sites in the analysis area; the other observations are in sites outside the analysis area. Within the project area, 11 sites are between MPs 83 and 113.3, and five sites are between MPs 162 and 169.

Project Impacts

Analysis

The PCGP Project would affect 10 out of the 127 sites on NFS lands in the region, representing approximately 8 percent of the sites. Site impacts on other land ownerships include 11 sites at least partially on BLM lands, including three sites partially on private lands. The total number of sites affected is 12 sites out of the 332 total sites on all lands. Table CLTR-6 provides an overview of the features of the PCGP Project that would affect the *C. truncatus* sites on NFS lands. The construction corridor and associated work and storage areas would affect approximately 15 acres within 10 sites (about 28 percent of NFS sites in the analysis area). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. truncatus* in and near the project area.

| Project Activity | Number of Sites Affected | Area of Disturbance within Sites |
|--------------------------------------|--------------------------|----------------------------------|
| Construction Corridor | 10 | 10.3 ac |
| Temporary Extra Work Area (TEWA) | 7 | 2.1 ac |
| Uncleared Storage Area (UCSA) | 6 | 2.6 ac |
| Roads (TMP) | - | - |
| Other Minimal Disturbance Activities | - | - |

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

The following discussion provides an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project that could affect site persistence.

Vegetation removal and grading activities in the 95-foot wide construction corridor would disturb about 10.3 acres of vegetation and soil within 10 sites and could result in the removal of *C. truncatus* populations or individuals. Disturbance in the TEWAs would result in similar impacts

on about 2.2 acres within seven sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *C. truncatus* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A 30-foot wide portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 2.6 acres of understory habitat in six sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

Across the project area, the PCGP Project would remove an estimated 816 acres of coniferous forests, including 227 acres of LSOG coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *C. truncatus*. Within this impact area, about 427 acres (about 52 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A 30-foot wide corridor would be maintained in low-growing vegetation across the project area, resulting in a loss of about 190 acres of coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the 10 sites on NFS lands as a result of the PCGP Project, six sites of *C. truncatus* would remain on NFS lands in the local area, and 117 sites, including 52 at least partially in reserves, would remain on NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but the sites on NFS lands would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 52 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 44 percent of the remaining *C. truncatus* sites on NFS lands in the NSO range would be protected in reserves.

The PCGP project may also affect 11 additional sites that are at least partially on BLM lands. Assuming persistence cannot be maintained at the 11 sites, 121 sites, including 36 sites entirely in reserves, would remain on BLM lands in the local area, and 182 sites, including 52 sites entirely in reserves would remain on BLM lands in the NSO range. While sites on BLM lands are not subject to S&M Standards and Guidelines protections, sites entirely in reserves would likely receive some level of protection under BLM management.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states “instead, common sense and agency expertise must be used in making determinations of compliance with

the viability provision” (Standards and Guidelines, pg. 4). The Forest Service has embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *Clavariadelphus truncatus* is a Category D (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category D species are not likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information received since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as described below:
 - *Clavariadelphus truncatus* has a wide distribution across 11 physiographic provinces and three states in the region and a moderate-high number of overall sites (127 on NFS lands, 332 on all lands). The species appears to be well distributed in the Cascade Range in Oregon and is fairly common and widespread outside the mountain range. The currently known number of sites on NFS and BLM lands has increased by 220 sites since 2007, with many sites documented during the PCGP Project surveys.
 - An estimated 40 percent of the sites (85 sites) are at least partially in reserves, which is an increase of about 31 sites in reserves since 2006 per Molina (2008).
- Coniferous forests (general habitat for the species) are widespread across the region and encompass approximately 16.3 million acres on BLM and NFS lands with an estimated 61 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous forests, but sites are more scattered in these areas.
- The PCGP Project would affect 10 of 127 NFS-managed sites of *C. truncatus*, representing approximately 8 percent of the sites on NFS lands in the NSO range. Assuming site persistence cannot be maintained at the 10 sites, a moderate-high number of sites (117) would continue to be documented on NFS lands in the region with a wide distribution across Washington, Oregon, and California. Several sites (six) would remain on NFS lands in the local vicinity of the analysis area; these sites would be distributed across five 5th-field watersheds. An additional 36 sites would remain in BLM reserves in the local area; these sites would be distributed across eight 5th-field watersheds. The distribution of sites and extent of the species’ range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence of six sites in LSRs, but the percentage of sites in reserves would be about the same (45 percent). Of the remaining sites on NFS lands, 35 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 15 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *C. truncatus* are unlikely. One site is at least partially in a Riparian Reserve where management actions are restricted to those activities that benefit the conservation of aquatic and riparian-dependent terrestrial resources. A total of 52 sites would remain entirely within BLM reserves, including District Designated and Congressional Reserved areas where management activities that may adversely affect *C. truncatus* are unlikely; Riparian Reserves where management actions are restricted to those activities that benefit the conservation of

riparian areas and riparian-associated species; and LSRs where management actions are restricted to those activities that benefit LSOG forests.

- The PCGP Project would result in a permanent loss of an estimated 190 acres of coniferous forests (less than 1 percent of the total regional acreage). An estimated 9.9 million acres (61 percent) of coniferous forests and 3.3 million acres (66 percent) of LSOG coniferous forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. truncatus*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category D species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.7.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. truncatus* at 10 sites on NFS lands and 11 sites on BLM lands; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 117 sites would remain on NFS lands across the region, including 52 sites in reserves, and six sites would remain on NFS lands in the local area. Additionally, 192 sites would remain on BLM lands across the region, including 52 entirely in reserves, and 121 sites would remain on BLM lands in the local area, including 36 entirely in reserves. Although the PCGP Project would affect site persistence of *C. truncatus* at 10 sites on NFS lands, these sites are part of the many sites in southern Oregon where the species is fairly common. It is expected that BLM management would allow the majority of sites in BLM reserves to persist. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *Clavariadelphus truncatus* would persist in the region without considering the 10 sites as part of the population.
- The PCGP Project would remove approximately 816 acres of coniferous forests and 227 acres of LSOG coniferous forests (a negligible amount of the forests). An estimated 52 percent of the forests would be restored to similar conditions or shrublands, but a 30-foot wide early-successional corridor would remain across the project area. An estimated 9.9 million acres (61 percent) of coniferous forests and 3.3 million acres (66 percent) of LSOG coniferous forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites on NFS lands are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Additionally, the remaining sites in BLM reserves would likely receive some level of protection under BLM reserve management. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *C. truncatus* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the 10 *C. truncatus* sites on NFS lands is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the NFS land management plans that apply to the affected sites would waive implementation of Management Recommendations for *C. truncatus* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term. The monitoring plan shall be approved by the Forest Service.

2.8 COLLYBIA BAKERENSIS

Collybia bakerensis is a gilled wood-decaying mushroom species in the Tricholomataceae family and is commonly known as common snow agaric.

2.8.1 Regulatory Status and Ranking

The 2001 ROD, including the 2003 ASR modifications to the S&M species list, identifies *C. bakerensis* as a Category F (uncommon) species. ORBIC evaluated *C. bakerensis* in its 2004 *Survey and Manage Assessment* for BLM and the Forest Service (ORBIC 2004), but it was not included in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2016). In 2004, the species was considered to be uncommon but not rare with some cause for long-term concern due to declines or other factors within its global range and in Oregon (G4, S4, respectively). The species is not currently on any ORBIC lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.8.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to this analysis. Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are discussed below under Persistence Evaluation. The background information in this section is used to support the persistence evaluation in the following section, which is updated with more recent information (e.g., recent survey data) specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *C. bakerensis*. It is a saprophytic mushroom found on standing or dead conifer trees (ORBIC 2004). It is most commonly found on true firs, spruces (*Picea* spp.), and hemlocks and is scattered to gregarious (Castellano et al. 1999). In the Sierra Nevada and Cascade Range of California, *C. bakerensis* fruits shortly after snowmelt; in Washington, Colorado, and Idaho, it fruits in late summer and fall (Castellano and O'Dell 1997, ORBIC 2004). In the NSO range, *C. bakerensis* has been documented fruiting between May and October (Castellano et al. 1999).

Range

Collybia bakerensis is endemic to western North America (ORBIC 2004). The species' range extends from British Columbia south to California, and it has also been documented in Colorado and Idaho. Based on data available in 2004, the species was found in the NSO range from northern

California to the central Cascade Range in Oregon and in the northern Cascade Range and Olympic Mountains in Washington. *Collybia bakerensis* exhibits irregular distributions that are directly proportional to the presence of suitable substrate. The currently known range of the species within the NSO range based on 2017 data is discussed below under Species Distribution.

Although information on the species' historical range is not known, it was likely similar to the current range, with populations distributed across western North America. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed below under Threats.

Population Status

ORBIC (2004) reported *C. bakerensis* from 155 element occurrences in California, Oregon, and Washington in 2004. An estimated 120 occurrences were in California and Washington, with an unknown number in Oregon (ORBIC 2004). ORBIC estimated that 128 of these occurrences were in protected areas in the NSO range. In 2004, *C. bakerensis* was considered resilient, stable, and common across its global range and was considered stable in Oregon (ORBIC 2004). The species was found in two locations during Random Multi-Species surveys across the NSO range between 2001 and 2004 (USDA and USDI 2007). Molina (2008) documented 120 new sites of *C. bakerensis* in the NSO range between 1998 and 2006, and 134 total sites were documented by 2006, including 83 in reserves or protected areas. The 2007 Final SEIS reported 124 sites on NFS and BLM lands and 129 total sites on all lands in the NSO range (USDA and USDI 2007).

Equivalent-effort surveys were conducted during the fall and spring from 2010 to 2016 in old-growth stands in the PCGP Project area and within 100 feet of habitat removal (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). These equivalent-effort surveys targeted all Category B species and also included incidental observations of S&M fungi under other categories, and no new observations of *C. bakerensis* were recorded. Despite the lack of observations during PCGP surveys, the increased number of sites since 1998 with increased surveys (a nine-fold increase between 1998 and 2006 per Molina 2008 records) demonstrates that this species is likely more abundant than previously known, and more survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2017 data are provided below under Species Distribution.

Habitat

C. bakerensis grows on the trunks of conifer trees or on fallen trees, usually directly after snowmelt (Castellano and O'Dell 1997, ORBIC 2004). In the Sierra Nevada and Cascade Range of California, it has been documented primarily on fir trees above about 8,200 feet msl. In Washington, the species is primarily found on hemlock trees and rarely on spruce trees. *C. bakerensis* may require forest litter, duff, or debris as a habitat component (Cushman and Huff 2007). *C. bakerensis* may prefer specific microclimate conditions of LSOG forests, but it may not be restricted to these conditions.

Threats

The primary threat to *C. bakerensis* is hot fires that can damage trees and modify the general habitat, microclimate, and growth substrate inhabited by the mushroom (ORBIC 2004). Anthropogenic activities also threaten localized occurrences of *C. bakerensis* through disturbance of microclimates, coarse woody debris, or damage to conifer trees. These activities include

building of roads, campgrounds, and trails; stream diversions; and timber harvests (Holthausen et al. 1994). Populations not located in reserves or protected areas are at particular risk from habitat loss. *Collybia bakerensis* is not collected for human consumption and is therefore not subject to commercial harvest. Other specific threats to the species are not currently known.

Management Recommendations

For Category F S&M species, known sites are not required to be managed per the 2001 ROD; these species are expected to be assigned to another category or be removed from the list (USDA and USDI 2001).

2.8.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species’ currently known distribution within the NSO range based on new site information, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. bakerensis* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and the Forest Service (Oregon/Washington regional offices) and converted into sites in accordance with the methodology described in Chapter 1. Table COBA-1 shows the total number of known sites in the regional (NSO range), local (18 5th-field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 196 observations from BLM and Forest Service geodatabases were converted into 149 sites in the NSO range (region). Table COBA-2 shows the total number of sites on NFS land and other land ownerships across the regional, local, and analysis areas. Table COBA-3 shows the total number of sites within each land use allocation defined in the 1994 ROD and 2016 RMPs across the regional, local, and analysis areas. Figure COBA-1 displays the regional distribution of the species across NFS lands, Figure COBA-2 displays the extent of known sites located in protected areas (NFS lands, NFS reserves, BLM reserves, and NPS lands), and Figure COBA-3 displays the species’ regional distribution as well as the extent of coniferous forests and LSOG coniferous forests on BLM and NFS lands.

| TABLE COBA-1 | |
|---|-----------------|
| Number of <i>Collybia bakerensis</i> Sites (2017) | |
| Location* | Number of Sites |
| Regional Area | 149 |
| Local Area | 21 |
| Analysis Area (Project Area) | 2 (2) |
| Data source: Processed BLM and Forest Service GIS data, August 2, 2017 | |
| *Definitions of regional, local, analysis, and project areas are provided in Chapter 1. | |

| Land Ownership | Regional Sites | Local Sites | Analysis Area Sites |
|------------------------------|----------------|-------------|---------------------|
| Forest Service | 145 | 21 | 2 |
| BLM | - | - | - |
| NPS | 3 | - | - |
| Fish and Wildlife Service | - | - | - |
| Other (Private, State, etc.) | 1 | - | - |

Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
 Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
|---|----------------|-------------|---------------------|
| Adaptive Management Area (AMA) | - | - | - |
| Adaptive Management Reserves (AMR) | - | - | - |
| Administratively Withdrawn (AW) | 36 | - | - |
| Congressionally Reserved (CR) | 3 | - | - |
| Late Successional Reserve (LSR) | 62 | 2 | - |
| Marbled Murrelet Area (LSR3) | - | - | - |
| Northern Spotted Owl Activity Center (LSR4) a/ | - | - | - |
| Managed Late Successional Area (MLSA) | - | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | 54 | 19 | 2 |
| Riparian Reserve | - | - | - |
| Bureau of Land Management | Regional Sites | Local Sites | Analysis Area Sites |
| Administratively Withdrawn (AW) | - | - | - |
| Congressional Reserve | - | - | - |
| District Designated Reserve | - | - | - |
| Harvest Land Base | - | - | - |
| Late Successional Reserve | - | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | - | - | - |
| Riparian Reserve | - | - | - |

Data sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0; 2016 RMP land allocation data, August 2016.
 Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
 a/ Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center.

Regional Distribution

Collybia bakerensis is somewhat widely distributed across seven physiographic provinces in Washington (Western and Eastern Cascades and Olympic Peninsula), Oregon (Cascades West and East), and California (Klamath and Cascades) (see Figure COBA-1). The highest density of sites is found in the eastern Cascade Range in southern Oregon, where several sites are clustered near one another and the species appears to be locally abundant. Other sites are scattered across the Cascade Range throughout the NSO range, while one isolated site is located in the Olympic Peninsula of Washington and another is located in the Klamath Mountains of California. Although *C. bakerensis* is fairly common based on the overall number of sites, its distribution is scattered across the NSO range with a grouping of sites in the Cascade Range, and the species does not appear to be well distributed in its range within the region.

One of 149 known sites is located on private land; three sites are on NPS lands (Mount Rainier, North Cascades, and Olympic National Parks); and 145 sites are on NFS lands across the region.

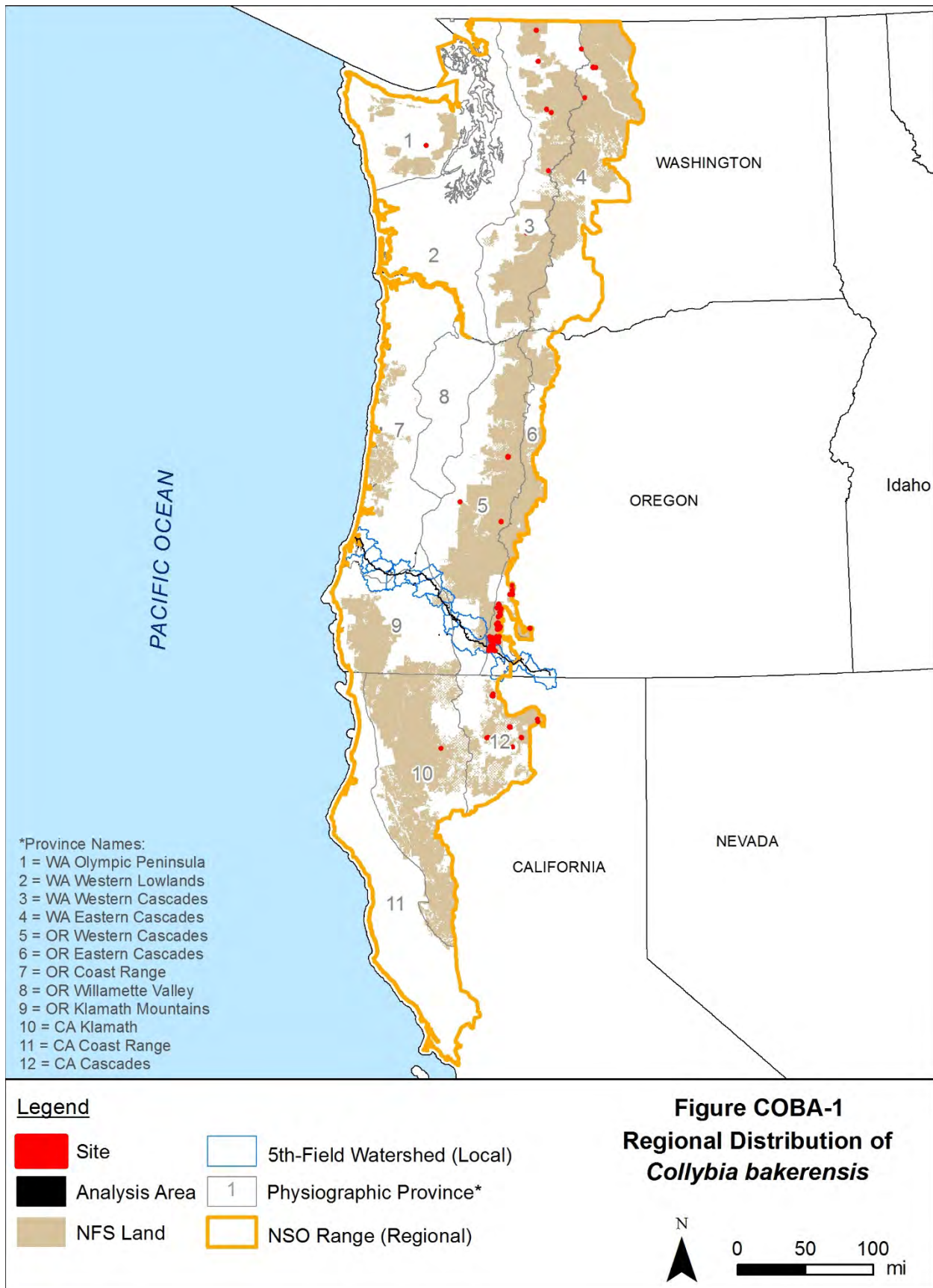
Sites included on National Forests that encompass the project area include one site on the Rogue River-Siskiyou National Forest and 119 sites on the Fremont-Winema National Forest. Sites managed by other National Forests include four sites on the Klamath National Forest, six sites on the Shasta-Trinity National Forest, two sites on the Modoc National Forest, five sites on the Willamette National Forest, four sites on the Mt. Baker-Snoqualmie National Forest, three sites on the Okanogan National Forest, and one site on the Wenatchee National Forest.

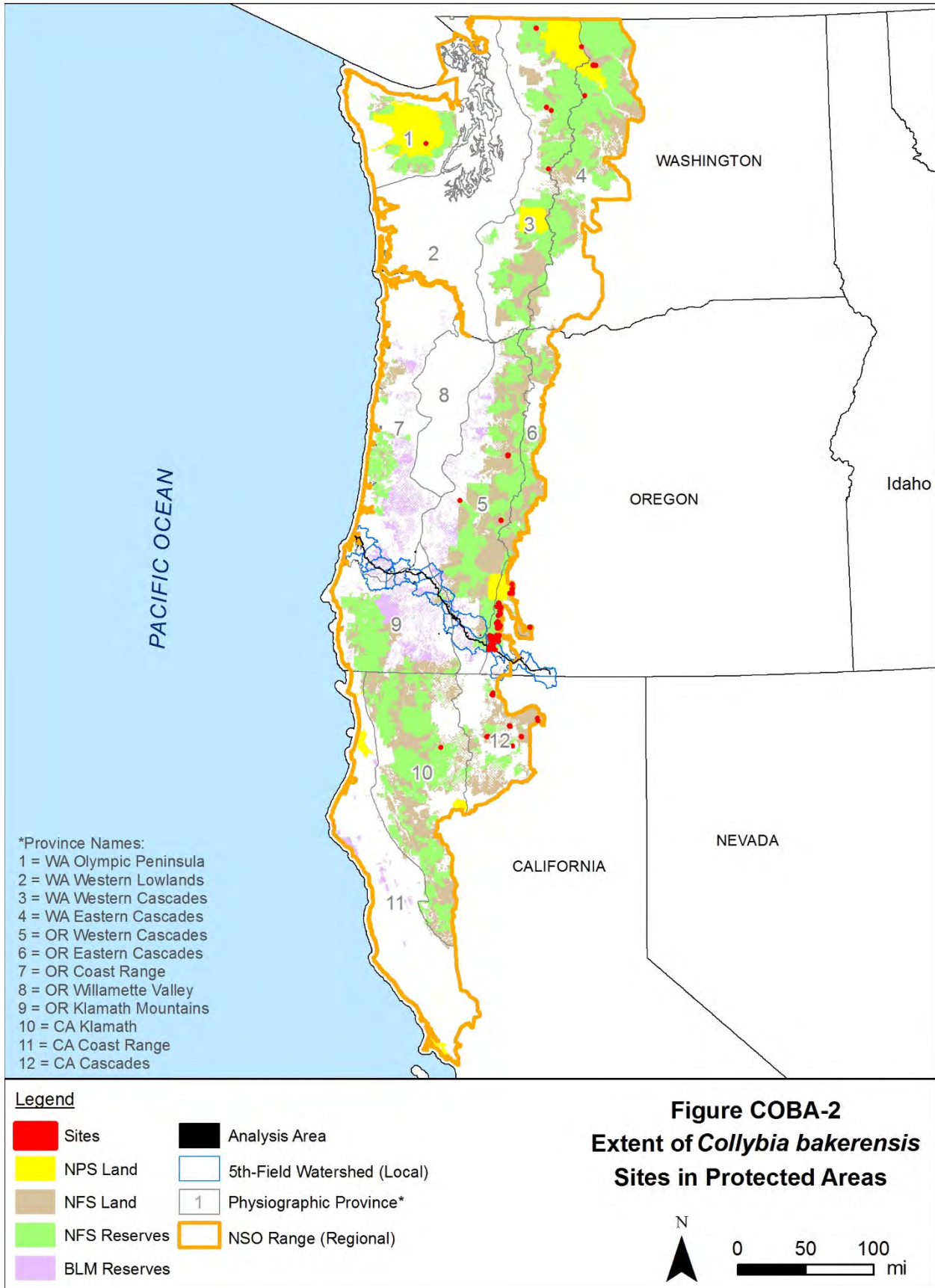
Across the NSO range, 64 sites are at least partially in reserve lands managed by the Forest Service, including 62 at least partially in LSRs and three at least partially in Congressionally Reserved areas (see Figure COBA-2). This represents 44 percent of the total NFS sites in the region. The remaining NFS sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The three NPS sites, while not covered by the S&M Standards and Guidelines, also likely receive some degree of protection through National Park management.

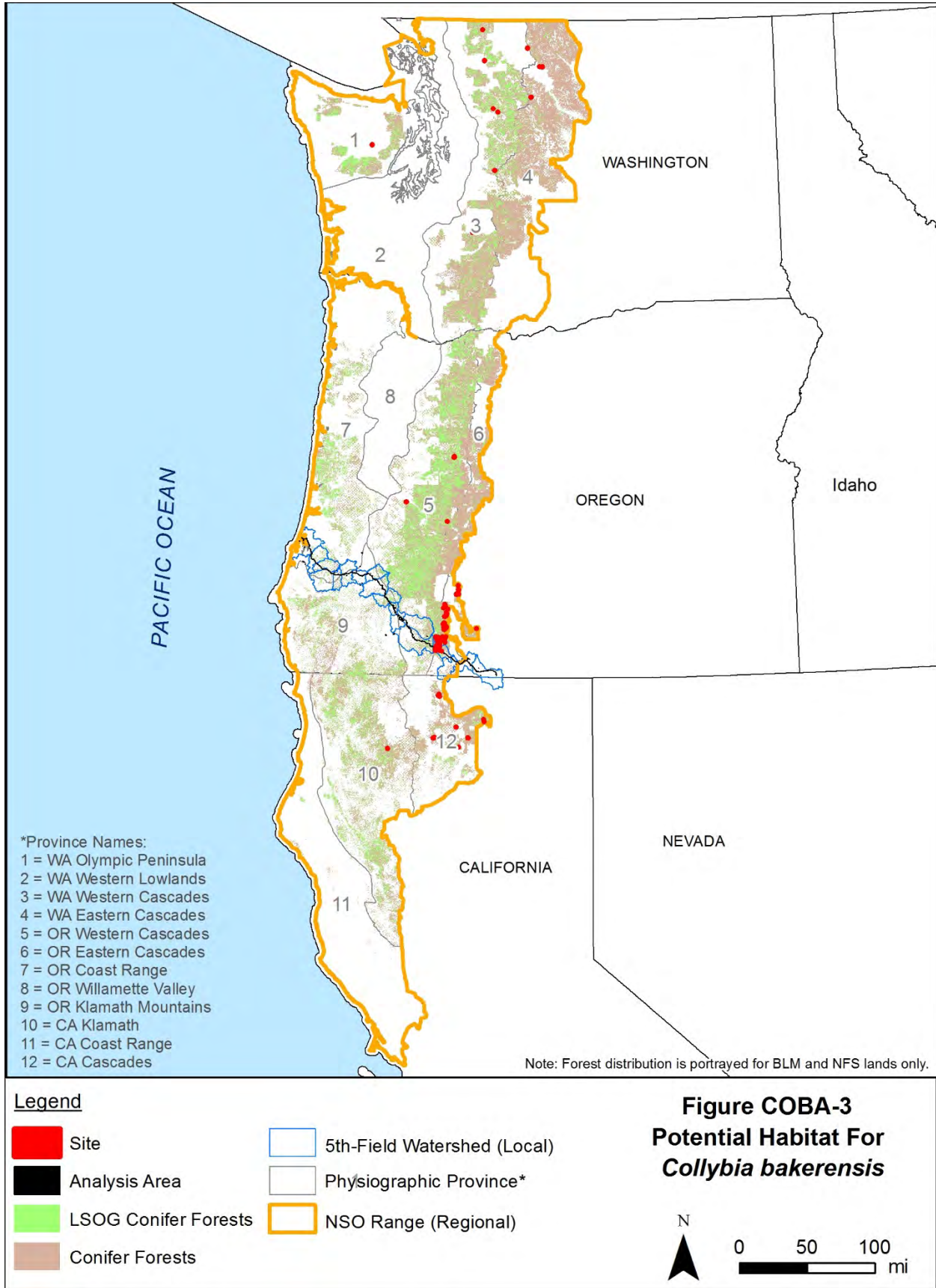
Collybia bakerensis is more common in LSOG forests based on available data (125 of 149 total sites are in LSOG), but it is also somewhat common in non-LSOG forests and may not be restricted to LSOG conditions. Based on current site locations, the species is found in coniferous forests across a wide elevation range and has been documented in most of the NSO range. Due to the extent of known sites, the amount of potential habitat on both NFS and BLM lands in the region, and the level of protection offered by NFS and BLM reserve land, both land ownerships are included in this potential habitat discussion. Coniferous forests, including the LSOG component of these forests, across the NSO range could provide habitat for *C. bakerensis* and support additional sites. These forests encompass an estimated 16.3 million acres on BLM and NFS lands in the region, including an estimated 9.9 million acres in reserve land allocations (61 percent of the forests; Table COBA-4). Of this acreage, an estimated 5 million acres are LSOG (see Figure COBA-3), including 3.3 million acres in reserve land allocations (66 percent of the forests). Although coniferous forests are widespread across the region, LSOG coniferous forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

| Location | Coniferous Forests | | LSOG Forests | |
|---------------|--------------------|-----------|--------------|-----------|
| | Total | Reserves | Total | Reserves |
| Regional Area | 16,275,479 | 9,902,802 | 5,025,899 | 3,337,509 |
| Local Area | 454,206 | 285,292 | 161,143 | 116,561 |
| Project Area | 1,018 | 686 | 294 | 207 |

Data source: Gradient nearest neighbor vegetation data from Moeur et al. 2011
 Note: Areas are presented in acres.
 a/ The area estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.







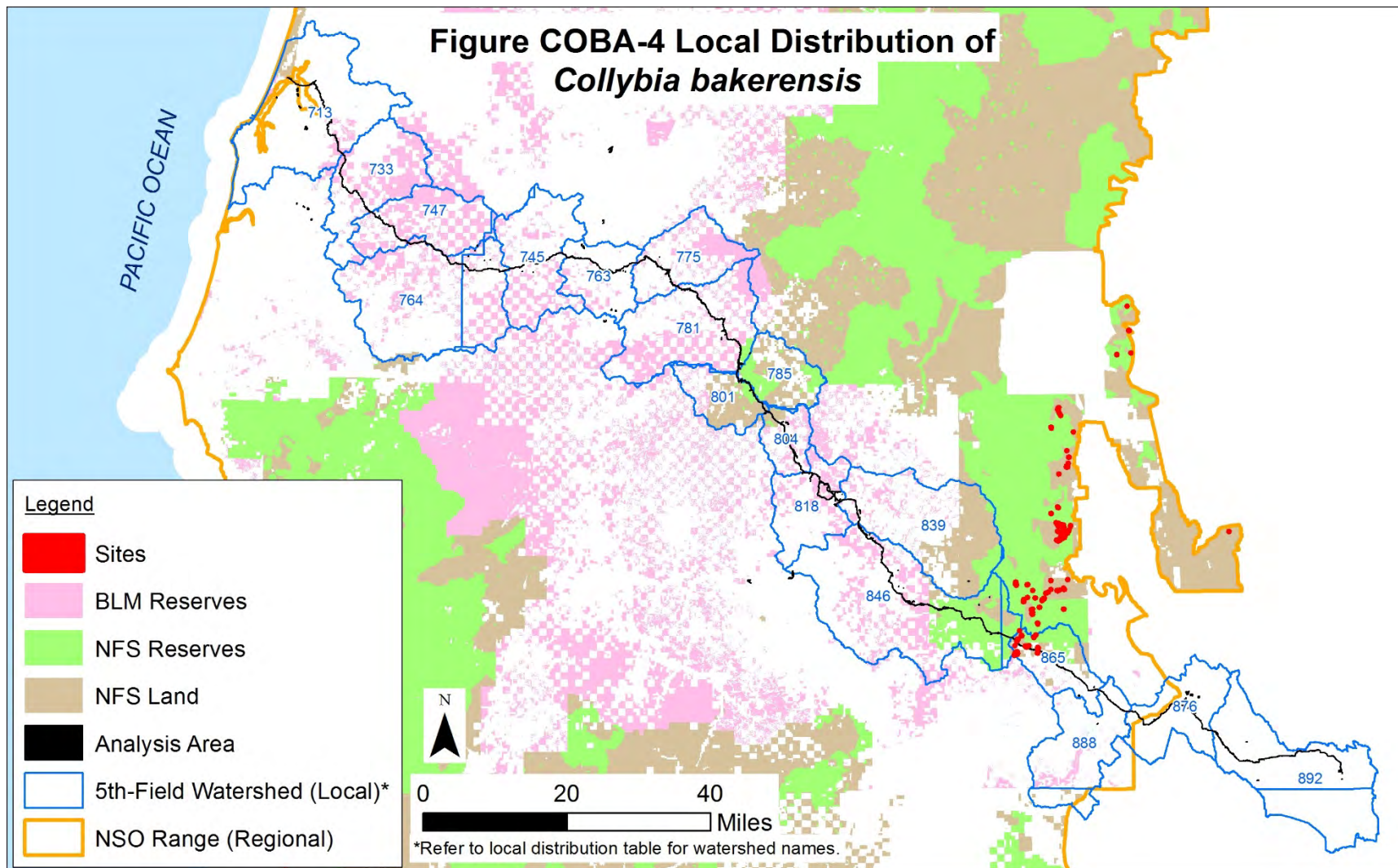
Local Distribution

Within the local area, *C. bakerensis* is found in two 5th-field watersheds that overlap the project area (see Fogire COBA-4 and Table COBA-5.) The sites in the local area are part of the large cluster of sites in the eastern Cascade Range in southern Oregon. Many regional sites are located within 20 miles of the local area to the north in the Cascade Range. All of the 21 sites in the local area are on NFS lands. These sites are primarily located on lands designated as Other (Matrix). Of the 21 sites in the local area, two sites are in reserve lands, representing 10 percent of the sites.

Coniferous forests encompass approximately 454,206 acres on BLM and NFS lands in the local area, with 285,292 acres in reserve land allocations (63 percent of the forests). Of this acreage, an estimated 161,143 acres are LSOG, including 116,561 acres in reserves (72 percent of the forests).

| Watershed (HUC5 ID) | Number of Sites | Number of Sites in NFS Reserve Lands | Number of Sites in BLM Reserve Lands |
|--|-----------------|--------------------------------------|--------------------------------------|
| Big Butte Creek (839) | - | - | - |
| Coos Bay Frontal (713) | - | - | - |
| East Fork Coquille River (747) | - | - | - |
| Elk Creek-South Umpqua (785) | - | - | - |
| Klamath River-John C Boyle Reservoir (888) | - | - | - |
| Lake Ewauna-Upper Klamath River (876) | - | - | - |
| Little Butte Creek (846) | 3 | 1 | - |
| Lower Lost River (892) | - | - | - |
| Middle Fork Coquille River (764) | - | - | - |
| Middle South Umpqua River (763) | - | - | - |
| Myrtle Creek (775) | - | - | - |
| North Fork Coquille River (733) | - | - | - |
| Olalla Creek-Lookingglass Creek (745) | - | - | - |
| Rogue River-Shady Cove (818) | - | - | - |
| South Umpqua River (781) | - | - | - |
| Spencer Creek (865) | 18 | 1 | - |
| Trail Creek (804) | - | - | - |
| Upper Cow Creek (801) | - | - | - |

Data sources: Processed BLM and Forest Service GIS data, August 2, 2017; HUC5 Watershed layer, August 23, 2011



Analysis/Project Area Distribution

The analysis and project areas contain two sites of *C. bakerensis*. These sites are two of the many in the Spencer Creek watershed, as described in the Local Distribution discussion above. Both are on NFS land designated as Other (Matrix).

Surveys for the PCGP Project resulted in no observations of *C. bakerensis* in the survey area (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). The recorded observations of the species in the analysis area are from agency databases and were recorded in 2000. Within the project area, one site is at MP 168.8, and one site is between MPs 173.7 and 173.8.

Project Impacts

Analysis

The PCGP Project would affect two out of the 145 sites on NFS lands in the region (no sites are on BLM lands), representing approximately 1 percent of the sites (or two out of 149 total sites on all lands in the NSO range). Table COBA-6 presents an overview of the features of the PCGP Project that would affect the *C. bakerensis* site. The construction corridor would affect approximately 1.4 acres within the sites (about 26 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. bakerensis* in and near the project area.

The following discussion provides an overview of the types of impacts that would be expected at the sites based on the features of the PCGP Project that could affect site persistence.

| TABLE COBA-6 | | |
|---|--------------------------|----------------------------------|
| Impacts to <i>Collybia bakerensis</i> Sites on NFS Lands in the Project Area | | |
| Project Activity | Number of Sites Affected | Area of Disturbance within Sites |
| Construction Corridor | 2 | 1.1 ac |
| Temporary Extra Work Area (TEWA) | 1 | 0.2 ac |
| Uncleared Storage Area (UCSA) | 1 | 0.2 ac |
| Roads (TMP) | - | - |
| Other Minimal Disturbance Activities | - | - |
| ac = acres | | |
| Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities. | | |

Vegetation removal and grading activities in the 95-foot wide construction corridor would disturb about 1.1 acres of vegetation and soils within the sites and could remove individuals of *C. bakerensis*. Disturbance in the TEWAs would result in similar impacts on about 0.2 acre within one site. The establishment of the corridor could modify microclimate conditions in the sites after the corridor is established. The removal of trees and woody debris and disturbance to soil could negatively affect site persistence by removing habitat and disturbing trees and understory components. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A 30-foot wide portion of the corridor would be maintained in low-growing vegetation for pipeline

maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.2 acre of understory habitat in one site, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

Across the project area, the PCGP Project would remove an estimated 816 acres of coniferous forests, including 227 acres of LSOG coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *C. bakerensis*. Within this impact area, about 427 acres (about 52 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A 30-foot wide corridor would be maintained in low-growing vegetation across the project area, resulting in a loss of about 190 acres of coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the two sites as a result of the PCGP Project, 19 sites of *C. bakerensis* would remain on NFS lands in the local area, including two in reserves, and 143 sites, including 64 at least partially in reserves, would remain on NFS lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 64 sites in reserves are assumed to have additional protections provided by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 45 percent of the remaining *C. bakerensis* sites on NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states “instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision” (Standards and Guidelines, pg. 4). The Forest Service has embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *Collybia bakerensis* is a Category F (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, information on Category F species is insufficient to determine what level of management is needed for reasonable assurance of species persistence, and known sites are not required to be managed. New information received since the species was listed in the 2001 ROD, however, indicates that the species appears to be more common than previously documented, as described below:
 - *Collybia bakerensis* changed from a Category B (rare) to Category F (uncommon) via the 2003 ASR.
 - *Collybia bakerensis* has a somewhat wide distribution across seven physiographic provinces and three states in the region and a moderate-high number of overall sites (145 on NFS lands, 149 on all lands). This species is locally abundant in the southern

Cascade Range in Oregon, but is less abundant in other parts of its range within the NSO range. The currently known number of sites on NFS and BLM lands has increased by 21 sites since 2007.

- Coniferous forests (general habitat for the species) are widespread across the region and encompass approximately 16.3 million acres on BLM and NFS lands with an estimated 61 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented.
- The PCGP Project would affect two of 145 sites of *C. bakerensis* on NFS lands, representing about 1 percent of the sites on NFS lands in the NSO range. Assuming site persistence cannot be maintained at the sites, a moderate-high number of sites (143) would continue to be documented on NFS lands in the region with a somewhat wide distribution across Washington, Oregon, and California. Several sites (19 sites) would remain in the local vicinity of the analysis area; these sites would continue to be distributed across two 5th-field watersheds. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves, and the percentage of sites in reserves would be the same. Of the remaining sites on NFS lands, 62 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and three are at least partially in Congressionally Reserved areas where management activities that may adversely affect *C. bakerensis* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 190 acres of coniferous forests (less than 1 percent of the total regional acreage). An estimated 9.9 million acres (61 percent) of coniferous forests and 3.3 million acres (66 percent) of LSOG coniferous forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. bakerensis*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. *Collybia bakerensis* is a Category F species for which its status is undetermined; therefore, pre-disturbance surveys are not applicable. It is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys.

2.8.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. bakerensis* at two sites on NFS lands; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 143 sites would remain on NFS lands across the region, and 19 sites would remain on NFS lands in the local area. Although the PCGP Project would affect site persistence of *C. bakerensis* at two sites, these sites are part of a group of sites in the Cascade Range in southern Oregon where the species is locally abundant. The species' distribution and range within the NSO range following project implementation

would be similar to its currently known distribution and range. *Collybia bakerensis* would persist in the region without considering the sites as part of the population.

- The PCGP Project would remove approximately 816 acres of coniferous forests and 227 acres of LSOG coniferous forests (a negligible amount of the forests). An estimated 52 percent of the forests would be restored to similar conditions or shrublands, but a 30-foot wide early-successional corridor would remain across the project area. An estimated 9.9 million acres (61 percent) of coniferous forests and 3.3 million acres (66 percent) of LSOG coniferous forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites are expected to continue to receive the protections of the S&M Standards and Guidelines under the NFS land management plan for the foreseeable future. Although a single natural disturbance event or combination of events could affect a significant portion of sites in the Oregon Cascade Range, many sites are scattered across the region and are less likely to be collectively affected by a single event.

As a Category F species, the Forest Service does not require management of *C. bakerensis*. This analysis is provided to assess potential impacts and to fulfill National Environmental Policy Act disclosure. The PCGP Project would not be able to avoid impacts to the *C. bakerensis* sites in the analysis area, although some individuals within the sites may persist following project implementation. Based on the above conclusions, avoidance of the two *C. bakerensis* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence.

2.9 COLLYBIA RACEMOSA

Collybia racemosa is a gilled mushroom species in the Tricholomataceae family and is commonly known as branched collybia or branched shanklet. *Collybia racemosa* is also known as *Dendrocollybia racemosa*.

2.9.1 Regulatory Status and Ranking

The 2001 ROD, including the 2003 ASR modifications to the S&M species list, identifies *C. racemosa* as a Category B (rare) species. ORBIC evaluated *C. racemosa* in its 2004 *Survey and Manage Assessment* for BLM and the Forest Service (ORBIC 2004) and again in the update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013). In 2013, the species was considered to be at high to moderate risk of extinction due to very restricted range, very few populations, steep declines, or other factors, within its global range (G2G3). In Oregon, it was considered to be at high risk of extinction due to rarity and at high risk of extinction due to very restricted range, very few populations, steep declines, or other factors (S1S2). In 2016, the species was considered too common and was dropped from the ORBIC lists (ORBIC 2016). In Oregon, it is not considered a BLM Sensitive or Strategic species, however, it is considered a Forest Service Strategic species

2.9.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to this analysis. Site counts, for

example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are discussed below under Persistence Evaluation. The background information in this section is used to support the persistence evaluation in the following section, which is updated with more recent information (e.g., recent survey data) specifically used for the persistence evaluation.

Life History

Collybia racemosa is mycoparasitic and fruits after rapidly digesting its host (fleshy mushrooms) (ORBIC 2004). It appears to prefer the Nigricans group of *Russula* species (Trappe, pers. comm. 2013), although it has also been found on rotting or mummified remnants of Agarics (gilled mushrooms) and occasionally in nutrient-rich leaf mulch (Castellano et al. 2003). It has been documented fruiting in autumn in the range of the NSO (Castellano et al. 2003). *Collybia racemosa* forms protective sclerotia which likely enable it to lie dormant for long periods of time. After dormancy, the species utilize the sclerotia to grow vegetatively or produce new fruit bodies (ORBIC 2004). The mushroom produces both sexual and asexual spores.

Range

Collybia racemosa is widespread but locally uncommon in the northern hemisphere (ORBIC 2004). Its range in the Pacific Northwest extends from California north to coastal British Columbia, and most recorded observations are from the California coast (Trappe, pers. comm. 2013). In Oregon, *C. racemosa* is widely distributed from Mount Hood south along the western slope of the Cascade Range to the California border and west to the Siuslaw National Forest near the Pacific Ocean. Based on data available in 2004, it had a spotty distribution throughout its range. The currently known range of the species within the NSO range based on 2017 data is discussed below under Species Distribution.

Although information on the species' historical range is not known, it was likely similar to the current range, with populations widely distributed across the northern hemisphere. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed below under Threats.

Population Status

ORBIC reported *C. racemosa* from 33 element occurrences in the Pacific Northwest in 2004. Most of these occurrences were in California (16), with fewer in Oregon (9) and Washington (8) (ORBIC 2004). In 2004, *C. racemosa* was considered to be widespread, but locally rare (ORBIC 2004). The species was found in four locations during Random Multi-Species surveys across the NSO range from 2001 to 2004 (USDA and USDI 2007). Molina (2008) documented 12 new sites of *C. racemosa* in the NSO range between 1998 and 2006, and 43 total sites were documented by 2006, including 14 in reserves or protected areas. The 2007 Final SEIS reported 19 sites on NFS and BLM lands and 36 total sites on all lands in the NSO range (USDA and USDI 2007).

Pre-disturbance surveys are not practical for Category B species. Instead, equivalent-effort surveys were conducted during the fall and spring between 2010 and 2016 in old-growth stands in the PCGP Project area and within 100 feet of habitat removal to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). These equivalent-effort surveys targeted all Category B

species and also included incidental observations of S&M fungi under other categories, and no new observations of *C. racemosa* were recorded. Based on the increased number of known sites since 1998 as a result of the increased number of surveys (a 40 percent increase between 1998 and 2006 per Molina 2008 records), additional surveys would be expected to locate additional populations within the NSO range, particularly in the Cascade Range, where most observations have been reported. The current estimated number of sites and distribution of the species based on 2017 data are provided below under Species Distribution.

Habitat

Prior to 1994, *C. racemosa* was primarily found in LSOG coastal forests (Holthausen et al. 1994). It has been documented in mixed hardwood-coniferous forests in California (The Fungi of California 2010) and may be associated with forest litter, duff, or debris (Cushman and Huff 2007). Based on available information, *C. racemosa* may prefer specific microclimate conditions of LSOG forests, but it may also be found in other forests with host mushrooms and favorable conditions. The mushroom grows gregarious or solitary on the fruit bodies or the remains of fruit bodies of other mushroom species (Castellano et al. 2003, The Fungi of California 2010, Holthausen et al. 1994). Hughes et al. (2001) and Aurora (1986) have suggested that hosts include members of the *Lactarius* and *Russula* genera. Additionally, one study has documented thick-shirted brittle gills (*Russula crassotunicata*) as a *C. racemosa* host (Machnicki et al. 2006).

Threats

Threats to *C. racemosa* are those that affect its host mushroom, general habitat, microclimates, and the substrate or symbiotic partner of the host (ORBIC 2004). *Collybia racemosa* is particularly vulnerable to removal of the host mushroom and substrate prior to fruiting or sclerotia formation. The removal or destruction of the sclerotia and destruction of the habitat that fosters growth of the intended host could affect populations of the species. It is also presumably vulnerable to alteration of microhabitats and microclimate regimes (e.g., stream diversion, road construction, development). Other threats include incidental catastrophic events (wildfires), road construction, development, heavy logging activities, and other activities that displace the protective sclerotia or host mushroom populations.

Management Recommendations

As a Category B S&M species, the direction under the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). This statement is no longer applicable on BLM lands under the 2016 BLM RMPs, although it is still valid on NFS lands within the range of the NSO. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *C. racemosa*:

- As a parasitic fungus, *C. racemosa* use other living fungi as hosts. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.9.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new site information, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining

in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. racemosa* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and the Forest Service (Oregon/Washington regional offices) and converted into sites in accordance with the methodology described in Chapter 1. Table CORA-1 shows the total number of known sites in the regional (NSO range), local (18 5th-field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 83 observations from BLM and Forest Service geodatabases were converted into 71 sites in the NSO range (region). Table CORA-2 shows the total number of sites on NFS land and other land ownerships across the regional, local, and analysis areas. Table CORA-3 shows the total number of sites within each land use allocation defined in the 1994 ROD and 2016 RMPs across the regional, local, and analysis areas. Figure CORA-1 displays the regional distribution of the species across NFS lands, Figure CORA-2 displays the extent of known sites located in protected areas (NFS lands, NFS reserves, BLM reserves, and NPS lands), and Figure CORA-2 displays the species’ regional distribution as well as the extent of all forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

| TABLE CORA-1 | |
|---|-----------------|
| Number of <i>Collybia racemosa</i> Sites (2017) | |
| Location* | Number of Sites |
| Regional Area | 71 |
| Local Area | 7 |
| Analysis Area (Project Area) | 1 (1) |
| Data source: Processed BLM and Forest Service GIS data, August 2, 2017 | |
| *Definitions of regional, local, analysis, and project areas are provided in Chapter 1. | |

| TABLE CORA-2 | | | |
|---|----------------|-------------|---------------------|
| Distribution of <i>Collybia racemosa</i> across Federal, Private, and Other Lands | | | |
| Land Ownership | Regional Sites | Local Sites | Analysis Area Sites |
| Forest Service | 24 | 1 | 1 |
| BLM | 24 | 6 | - |
| NPS | 4 | - | - |
| Fish and Wildlife Service | - | - | - |
| Other (Private, State, etc.) | 26 | 1 | - |
| Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011 | | | |
| Notes: Columns are not additive because some sites occur on lands in multiple ownerships. | | | |

| TABLE CORA-3 | | | |
|---|----------------|-------------|---------------------|
| Distribution of <i>Collybia racemosa</i> across 1994 ROD and 2016 RMPs Land Allocations | | | |
| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
| Adaptive Management Area (AMA) | 8 | - | - |
| Adaptive Management Reserves (AMR) | - | - | - |
| Administratively Withdrawn (AW) | 2 | - | - |
| Congressionally Reserved (CR) | 3 | - | - |
| Late Successional Reserve (LSR) | 8 | - | - |
| Marbled Murrelet Area (LSR3) | 1 | - | - |
| Northern Spotted Owl Activity Center (LSR4) @/ | 1 | - | - |

| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
|---------------------------------------|----------------|-------------|---------------------|
| Managed Late Successional Area (MLSA) | - | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | 3 | 1 | 1 |
| Riparian Reserve | 1 | - | - |
| Bureau of Land Management | Regional Sites | Local Sites | Analysis Area Sites |
| Administratively Withdrawn (AW) | - | - | - |
| Congressional Reserve | - | - | - |
| District Designated Reserve | 8 | 3 | - |
| Harvest Land Base | 9 | 4 | - |
| Late Successional Reserve | 13 | 1 | - |
| Not Designated (ND) | 9 | - | - |
| Other (Matrix, Other) | - | - | - |
| Riparian Reserve | 10 | 3 | - |

Data sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0; 2016 RMP land allocation data, August 2016.

Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.

a/ Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center.

Regional Distribution

Collybia racemosa has a wide, but scattered, distribution across nine physiographic provinces in Washington (Western and Eastern Cascades, Western Lowlands, and Olympic Peninsula), Oregon (Coast Range, Cascades West, and Klamath Mountain), and California (Klamath and Coast) (see Figure CORA-1). The sites are scattered primarily along the Cascade and Coast Ranges and Klamath Mountains. A few groups of clustered sites are located in the Coast Range in California. Although *C. racemosa* is widely distributed across the NSO range, its distribution is scattered with few clusters of sites, despite the extent of forests that may provide suitable habitat. Based on the species' currently known distribution, *C. racemosa* does not appear to be well distributed within its range in the NSO range.

Twenty-six of the 71 known sites are at least partially located on private, state, or other lands; four sites are on NPS lands (Mount Rainier, Olympic, and Redwood National Parks); 24 sites are at least partially on NFS lands; and 24 sites are at least partially on BLM lands. Sites managed by the Forest Service that encompass the project area include three sites on the Rogue River-Siskiyou National Forest and one site on the Umpqua National Forest. The remaining sites on NFS lands occur on the Mt. Baker-Snoqualmie, Okanogan-Wenatchee, Mt. Hood, Siuslaw, Willamette, and Six Rivers National Forests.

Across the NSO range, 13 sites are located in reserve lands managed by the Forest Service, including eight in LSRs; one each in a Marbled Murrelet Area, Known Owl Activity Center, and Riparian Reserve; and three in Congressionally Reserved areas. One of these sites partially occurs in both LSRs and Riparian Reserves (see Figure CORA-2). These sites represent 54 percent of the total NFS sites in the region. The remaining NFS sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. Additionally, 12 sites are located entirely in reserve lands managed by BLM, which represent 50 percent of the total number of BLM-managed sites in the region. While the 12 BLM sites in reserve lands and the four NPS sites are not covered by the S&M Standards and Guidelines,

they likely receive some degree of protection through the BLM reserve system and National Park management.

Collybia racemosa is more common in LSOG forests based on available data (60 of 71 total sites are in LSOG), but it is somewhat common in non-LSOG forests and may not be restricted to LSOG conditions. Based on current site locations, the species is found in all forest types below about 6,000 feet msl and has been documented in most of the NSO range. Due to the extent of known sites, the amount of potential habitat on both NFS and BLM lands in the region, and the level of protection offered by NFS and BLM reserve land, both land ownerships are included in this potential habitat discussion. Coniferous, mixed hardwood-coniferous, and hardwood forests, including the LSOG component of these forests, across the NSO range could provide habitat for *C. racemosa* and support additional sites. These forests encompass an estimated 19.2 million acres on BLM and NFS lands in the region, including an estimated 11.3 million acres in reserve land allocations (59 percent of the forests; Table CORA-4). Of this acreage, an estimated 6.1 million acres are LSOG (see Figure CORA-3), including 4 million acres in reserve land allocations (66 percent of the forests). Although coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

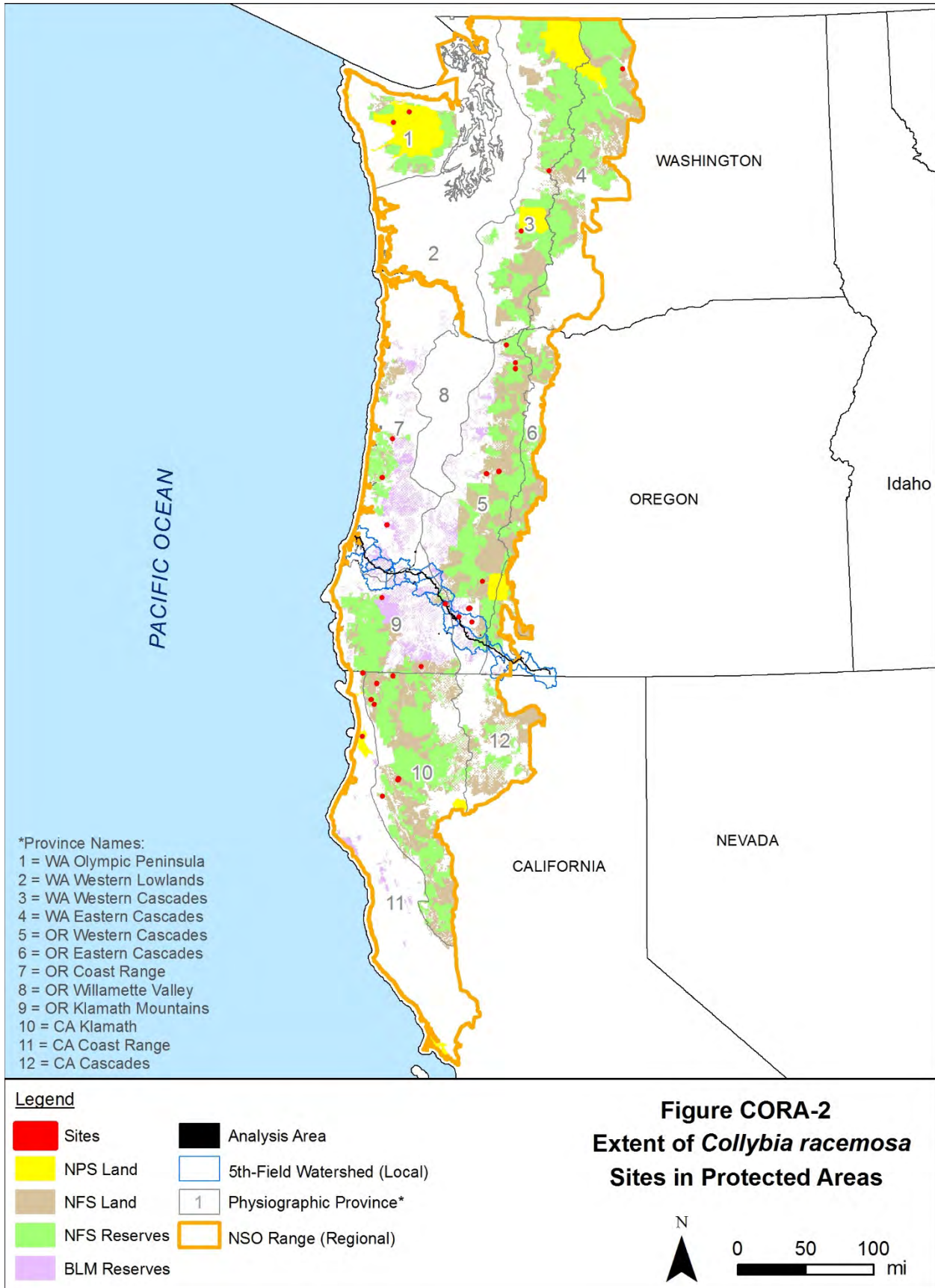
TABLE CORA-4

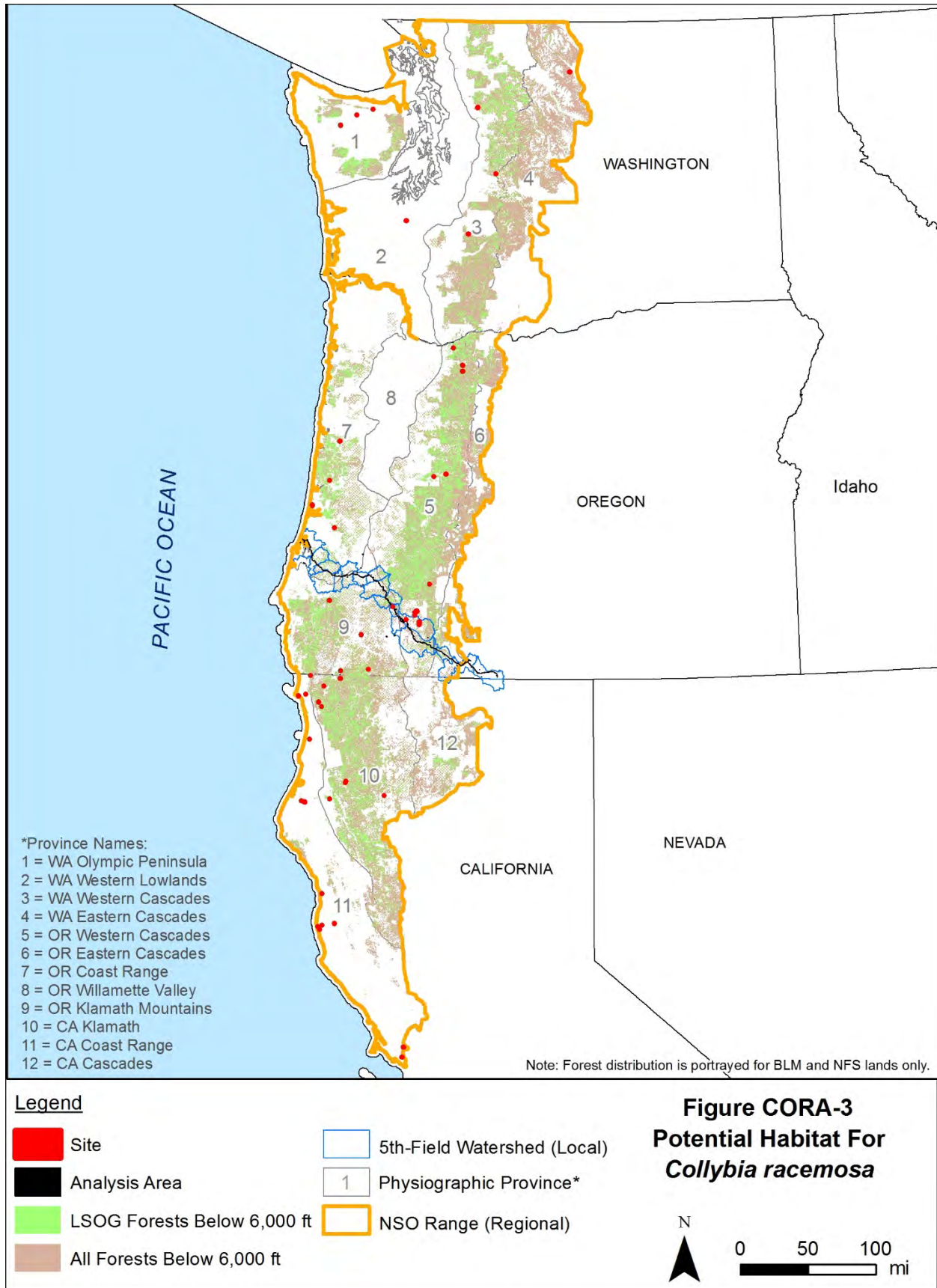
Extent of Forests That Could Provide Habitat for *Collybia racemosa* on BLM and NFS Lands ^{a/}

| Location | All Forests below 6,000 feet | | LSOG Forests below 6,000 feet | |
|---------------|------------------------------|------------|-------------------------------|-----------|
| | Total | Reserves | Total | Reserves |
| Regional Area | 19,183,086 | 11,264,423 | 6,088,524 | 3,998,501 |
| Local Area | 608,824 | 403,947 | 184,099 | 135,653 |
| Project Area | 1,536 | 1,069 | 326 | 233 |

Data source: Gradient nearest neighbor vegetation data from Moeur et al. 2011
 Note: Areas are presented in acres.
^{a/} The area estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.







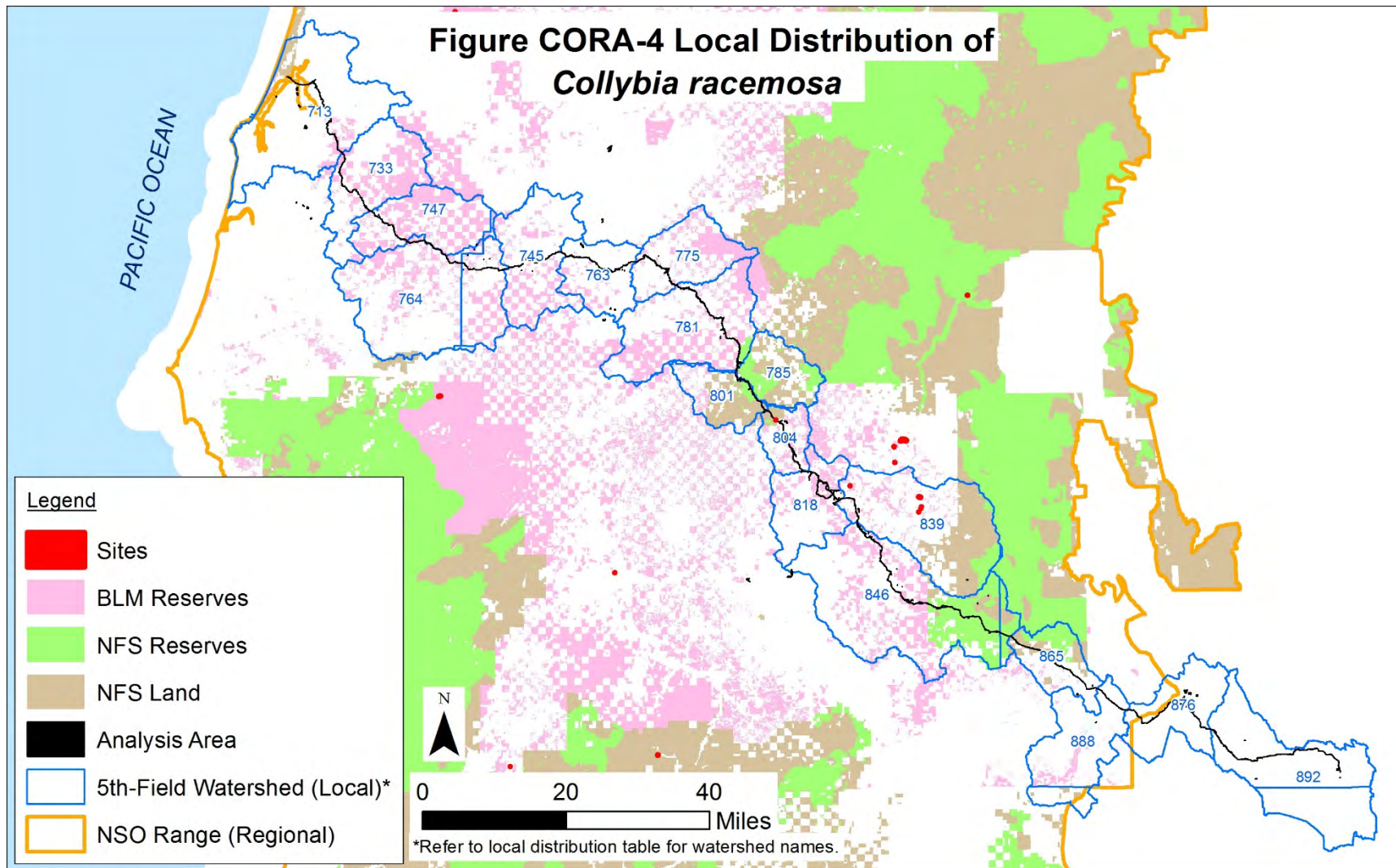
Local Distribution

Within the local area, *C. racemosa* is found in two 5th-field watersheds (Big Butte Creek and Trail Creek) that overlap the project area (see Figure CORA-4 and Table CORA-5.) One local site is located on NFS lands in the Trail Creek watershed, on lands designated as Other (Matrix). The remaining six sites are located on BLM lands in the Big Butte Creek watershed, two of which are entirely in reserves. The NFS site in the Trail Creek watershed appears to be isolated from other sites in the region, with the nearest site located on BLM land in the local area, approximately 13 miles to the southeast. The six sites on BLM lands in the Big Butte Creek watershed are part of a larger group of sites, with several clustered sites located about 8 miles north in the Cascade Range. Some connectivity appears to be available between the local sites and the nearby group of sites in the Cascade Range in Oregon (see Figure CORA-4). The distribution patterns of the regional sites indicate that dispersal opportunities likely exist between sites in the Cascade Range and Klamath Mountains.

Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl encompass approximately 608,824 acres on BLM and NFS lands in the local area, including 403,947 acres in reserve land allocations (66 percent of the forests). Of this acreage, an estimated 184,099 acres are LSOG, including 135,653 acres in reserve land allocations (73 percent of the forests).

| Watershed (HUC5 ID) | Number of Sites | Number of Sites in NFS Reserve Lands | Number of Sites in BLM Reserve Lands |
|--|-----------------|--------------------------------------|--------------------------------------|
| Big Butte Creek (839) | 6 | - | 6 |
| Coos Bay Frontal (713) | - | - | - |
| East Fork Coquille River (747) | - | - | - |
| Elk Creek-South Umpqua (785) | - | - | - |
| Klamath River-John C Boyle Reservoir (888) | - | - | - |
| Lake Ewauna-Upper Klamath River (876) | - | - | - |
| Little Butte Creek (846) | - | - | - |
| Lower Lost River (892) | - | - | - |
| Middle Fork Coquille River (764) | - | - | - |
| Middle South Umpqua River (763) | - | - | - |
| Myrtle Creek (775) | - | - | - |
| North Fork Coquille River (733) | - | - | - |
| Olalla Creek-Lookingglass Creek (745) | - | - | - |
| Rogue River-Shady Cove (818) | - | - | - |
| South Umpqua River (781) | - | - | - |
| Spencer Creek (865) | - | - | - |
| Trail Creek (804) | 1 | - | - |
| Upper Cow Creek (801) | - | - | - |

Data sources: Processed BLM and Forest Service GIS data, August 2, 2017; HUC5 Watershed layer, August 23, 2011
 Note: Number of sites in reserves may include sites that are only partially in reserves.



Analysis/Project Area Distribution

The analysis and project areas contain one site of *C. racemosa*. This site is on NFS land designated as Other (Matrix) on the Umpqua National Forest. The site is fairly isolated, with the nearest sites located approximately 13 miles east and south east in the Cascade Range and 30 miles south in the Klamath Mountains in southern Oregon.

Surveys for the PCGP Project resulted in one observation of *C. racemosa* in the survey area (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]).

Project Impacts

Analysis

The PCGP Project would affect one site out of the 24 sites on NFS lands in the region, representing approximately 4 percent of the sites (or one out of 71 total sites on all lands in the NSO range). Table CORA-6 presents an overview of the features of the PCGP Project that would affect the *C. racemosa* site. The construction corridor and associated storage areas would affect approximately 0.9 acre (39 percent) of the site (the site is approximately 2.3 acres), and the corridor would cross through the central portion of the site (see Figure CORA-5). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. racemosa* in and near the project area. Due to the scattered distribution of the species and relatively few sites near the project area, the effects on one site could potentially alter the distribution of the species in the NSO range.

The following discussion provides an overview of the types of impacts that would be expected at the sites based on the features of the PCGP Project that could affect site persistence.

The PCGP Project would result in ground disturbance and vegetation removal across the central portion of the site near MP 113. The recorded observation of the species is in the center of the project area and would be directly affected by activities within the corridor (see Figure CORA-5).

| Project Activity | Number of Sites Affected | Area of Disturbance within Sites |
|--------------------------------------|--------------------------|----------------------------------|
| Construction Corridor | 1 | 0.7 ac |
| Temporary Extra Work Area (TEWA) | - | - |
| Uncleared Storage Area (UCSA) | 1 | 0.2 ac |
| Roads (TMP) | - | - |
| Other Minimal Disturbance Activities | - | - |

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

Establishment of the 95-foot wide construction corridor would disturb vegetation and soils around the recorded observation within the site and would result in removal of individuals. The area within the site is forested and appears to be on a ridgetop, and a dirt road is located just outside the site to the north and east. The establishment of the corridor could modify microclimate conditions around the recorded observation. The removal of forests and host mushrooms and disturbance to soil would negatively affect *C. racemosa* by removing its habitat and affecting its association with other mushrooms, affecting site persistence. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A 30-foot wide portion of the corridor would be maintained

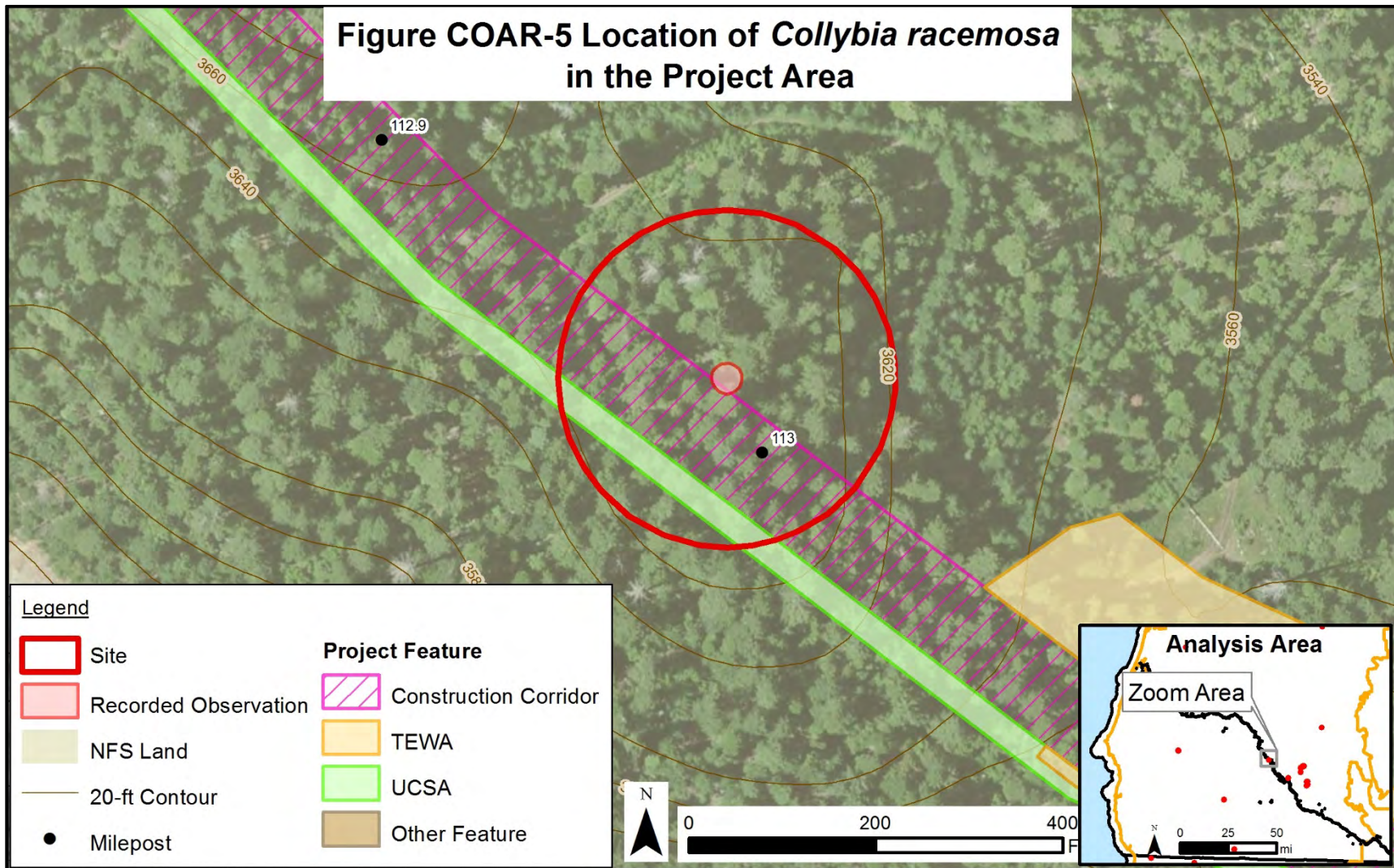
in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within a UCSA could remove host mushrooms and would disturb understory habitat within the site, which could also modify microhabitats, potentially making the habitat no longer suitable for the species.

Based on this analysis, *C. racemosa* is not likely to persist at the site following project implementation. This site is one of only seven sites in the local area and is one of several scattered sites across the Klamath Mountains and Cascade Range. It may contribute to dispersal of the species between other sites to the north in the Cascade Range and sites to the southwest in the Klamath Mountains in Oregon and California. However, if the species does not persist at this site, *C. racemosa* would still be found in the Klamath Mountains in California and Oregon and the Cascade Range in Oregon, and opportunities for dispersal across the mountain ranges would still exist based on the distribution of other sites in the region.

Across the project area, the PCGP Project would remove an estimated 1,236 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl, including 251 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *C. racemosa*. Within this impact area, about 609 acres (about 49 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A 30-foot wide corridor would be maintained in low-growing vegetation across the project area, resulting in a loss of about 261 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of all forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the site as a result of the PCGP Project, six *C. racemosa* sites would remain on BLM lands in the local area, two of which are entirely in reserves. A total of 23 sites would remain on NFS lands in the regional area, including 13 in reserves, and 24 sites would remain on BLM lands in the regional area, including 12 entirely in reserves. The remaining sites could be affected by natural hazards (e.g., fire, drought), but the sites on NFS lands would be subject to the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 13 sites in NFS reserves are assumed to have additional protections provided by the NWFP Standards and Guidelines in place for those land allocations. While sites on BLM lands are not subject to S&M Standards and Guidelines protections, the 12 sites in reserves would likely receive some level of protection under BLM management. Based on these site counts, approximately 56 percent of the remaining *C. racemosa* sites on NFS lands in the NSO range would be protected in NFS reserves.



Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states “instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision” (Standards and Guidelines, pg. 4). The Forest Service has embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *Collybia racemosa* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information received since the species was listed in the 2001 ROD, however, indicates that the species appears to be more common than previously documented, as described below:
 - *Collybia racemosa* has a wide, but scattered, distribution across nine physiographic provinces and three states in the region and a low-moderate number of overall sites (24 on NFS lands, 71 on all lands). *Collybia racemosa* does not appear to be well distributed in any part of its range because sites are fairly scattered. The currently known number of sites on NFS and BLM lands has increased by 33 sites since 2007, with one site documented during the PCGP Project surveys.
 - An estimated 69 percent of the sites (33 sites) are in reserves, which is an increase of about 19 sites in reserves since 2006 per Molina (2008).
- Coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 19.2 million acres on BLM and NFS lands with an estimated 59 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented.
- The PCGP Project would affect one of 24 NFS-managed sites of *C. racemosa*, representing approximately 4 percent of the sites on NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a low-moderate number of sites (23) would remain on NFS lands in the region. Twenty sites would remain in BLM reserves in the regional area, including six sites in the local area. The distribution of sites and extent of the species’ range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves. Of the remaining NFS sites, 10 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and three are in Congressionally Reserved areas where management activities that may adversely affect *C. racemosa* are unlikely. Twelve BLM sites are entirely in reserves, including LSRs where management actions are restricted to those activities that benefit LSOG forests, Riparian Reserves where management actions are restricted to those activities that benefit the conservation of riparian areas and riparian-associated species, and District Designated Reserves where management activities that may adversely affect *C. racemosa* are unlikely.

- The PCGP Project would result in a permanent loss of an estimated 261 acres of coniferous, mixed hardwood-coniferous, and hardwood forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 11.3 million acres (59 percent) of coniferous, mixed, and hardwood forests below 6,000 feet msl and 4 million acres (66 percent) of LSOG forests would remain in reserves in the NSO range.
- The remaining forests may support additional populations of *C. racemosa*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. *Collybia racemosa* is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.9.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. racemosa* at one site on NFS lands; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, while no sites would remain on NFS lands in the local area, 23 sites would remain on NFS lands across the region. Additionally, six sites would remain on BLM lands in the local area (all in reserves), and 24 sites would remain on BLM lands in the regional area, including 20 in reserves. Although the PCGP Project would affect site persistence of *C. racemosa* at one site, the site is part of several scattered sites in the Klamath Mountains and Cascade Range in Oregon and California. It is expected that BLM management would enable the majority of the sites in reserves to persist. Due to the presence of several sites in BLM reserves in the local area and several more sites located on both NFS lands and BLM reserves in the vicinity of the local area, it can be assumed that *C. racemosa* would be protected and remain scattered across the Klamath Mountains and Cascade Range in southern Oregon. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *Collybia racemosa* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 1,236 acres of coniferous, mixed hardwood-coniferous, and hardwood forests and 251 acres of LSOG forests below 6,000 feet msl (a negligible amount of the forests). An estimated 49 percent of the forests would be restored to similar conditions or shrublands, but a 30-foot wide early-successional corridor would be maintained across the project area. An estimated 11.3 million acres (59 percent) of coniferous, mixed, and hardwood forests below 6,000 feet msl and 4 million acres (66 percent) of LSOG forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites on NFS land are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Additionally, the sites in BLM reserves are expected to receive some level of

protection under the BLM 2016 RMPs. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to the *C. racemosa* site in the analysis area. Based on the above conclusions, avoidance of the *C. racemosa* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the NFS land management plan that applies to the affected site would waive implementation of Management Recommendations for the *C. racemosa* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term. The monitoring plan shall be approved by the Forest Service.

2.10 CORTINARIUS MAGNIVELATUS

Cortinarius magnivelatus is a gilled mushroom species in the Cortinariaceae family and has no common name.

2.10.1 Regulatory Status and Ranking

The 2001 ROD, including the 2003 ASR modifications to the S&M species list, identifies *C. magnivelatus* as a Category B (rare) species. ORBIC evaluated *C. magnivelatus* in its 2004 *Survey and Manage Assessment* for BLM and the Forest Service (ORBIC 2004) and again in its most recent publication of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2016). In 2016, the species was considered to be at moderate risk of extinction due to a restricted range, relatively few populations, recent and widespread declines within its global range and in Oregon (G3, S3, respectively). The species is on ORBIC List 3. It is not considered a BLM Sensitive or Strategic species in Oregon but it is considered a Forest Service Strategic species in Oregon.

2.10.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to this analysis. Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are discussed below under Persistence Evaluation. The background information in this section is used to support the persistence evaluation in the following section, which is updated with more recent information (e.g., recent survey data) specifically used for the persistence evaluation.

Life History

Cortinarius magnivelatus is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) and forms sporocarps beneath the soil surface (Castellano and O'Dell 1997). Fruiting occurs from May through August (Castellano et al. 1999). Its persistent membranous veil makes it a likely candidate for dispersal via mycophagy (consumption by animals) (Castellano and O'Dell 1997); however, spore prints confirm that the species can also forcibly discharge its spores (Arora 1986, Trappe et al 2009). The species has moderate dispersal capability such that extirpated populations generally become reestablished through natural recolonization (unaided by humans) (ORBIC 2004). It was originally described in 1941 as *Pholiota magnivelatus* from Sequoia

National Park in California and in 1969 it was transferred to *Cortinarius* (Castellano and O'Dell 1997).

Range

Cortinarius magnivelatus is restricted to western North America, including Nevada, Utah, Oregon, and California. It is also known from the Great Basin in eastern Nevada. It is recorded in several locations within Oregon: along Interstate 5 near Mount Ashland, in the Blue Mountains of the Umatilla National Forest and in the southern and eastern portion of the Cascades (ORBIC 2004). In California it is known from Bear Springs near Mt. Shasta, Lassen Volcanic National Park, and from high country in the northern to southern Sierra Nevada (Castellano et al 1999, ORBIC 2004). The currently known range of the species within the NSO range based on 2017 data is presented below under Species Distribution.

Although information on the species' historical range is not known, it was likely similar to the current range, with populations distributed across western North America. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed below under Threats.

Population Status

ORBIC (2004) reported six to 20 occurrences of *C. magnivelatus* distributed across the species' range. An estimated one to five of these occurrences were in Oregon and six to 20 occurrences were in California (ORBIC 2004). The number of occurrences in Nevada and Utah are unknown. Long term trends for the species show moderate decline to relatively stable in both its global range and in Oregon (ORBIC 2004). The species was not found in any locations during Random Multi-Species surveys across the NSO range between 2001 and 2004 (USDA and USDI 2007). Molina (2008) documented seven new sites of *C. magnivelatus* in the NSO range between 1998 and 2006, and 11 total sites were documented by 2006, including four in reserves or protected areas. The 2007 Final SEIS reported 10 sites on NFS and BLM lands and 10 total sites on all lands in the NSO range (USDA and USDI 2007).

Pre-disturbance surveys are not practical for Category B species. Instead, equivalent-effort surveys were conducted during the fall and spring from 2010 to 2016 in old-growth stands in the PCGP Project area and within 100 feet of habitat removal to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). The equivalent-effort surveys targeted all Category B species, including *C. magnivelatus*, and resulted in five new observations of individuals or populations of *C. magnivelatus*. Based on the increased number of known sites since 1998 as a result of the increased number of surveys (an approximately 3-fold increase between 1998 and 2006 per Molina 2008 records), additional surveys would be expected to locate additional populations within the NSO range, particularly in the Cascade Range where most observations have been reported. The current estimated number of sites and distribution of the species based on 2017 data are provided below under Species Distribution.

Habitat

Cortinarius magnivelatus occurs in old growth, montane coniferous forests (ORBIC 2004) at elevations above 4,500 feet (Castellano and O'Dell 1997). It is associated with the roots of various true fir species, Engelmann spruce (*Picea engelmannii*), sugar pine (*Pinus lambertiana*), and

ponderosa pine at elevations above 4,500 feet (Castellano and O'Dell 1997). It is solitary to gregarious under conifers and usually buried in the duff (Arora 1986). *Cortinarius magnivelatus*' environmental specificity is very narrow and it is considered a specialist species; because of this, its preferred habitat is limited (ORBIC 2004).

Threats

This taxon is believed to be at high risk under the Northwest Forest Plan because of its rarity and dependent mycorrhizal association with old-growth legacy, high-elevation conifers (Castellano and O'Dell 1997). Actions that disrupt stand conditions necessary for *C. magnivelatus* survival, particularly damage to host trees and soil disturbance, are major threats to this species. This includes logging that removes its presumed mycorrhizal host and other actions that cause disturbance to the soil, particularly road, trail, and campground construction (Castellano and O'Dell 1997). Other possible threats include hot fires, drought, climate change and insect infestations.

Management Requirements

As a Category B S&M species, the direction under the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). This statement is no longer applicable on BLM lands under the 2016 BLM RMPs, although it is still valid on NFS lands within the range of the NSO. Management recommendations were developed for *C. magnivelatus* along with several other species (a subset of Group 10 of Castellano and O'Dell 1997). The primary guidance is to identify likely habitats on federal lands that may support populations, survey these sites to reveal populations, and manage them to retain forest structure and soil conditions. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *C. magnivelatus*:

- As a mycorrhizal species, *C. magnivelatus* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.10.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new site information, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. magnivelatus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and the Forest Service (Oregon/Washington regional offices) and converted into sites in accordance with the methodology described in Chapter 1. Table COMA-1 shows the total number of known sites in the regional (NSO range), local (18 5th-field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated

55 observations from BLM and Forest Service geodatabases were converted into 47 sites in the NSO range (region). Table COMA-2 shows the total number of sites on NFS land and other land ownerships across the regional, local, and analysis areas. Table COMA-3 shows the total number of sites within each land use allocation defined in the 1994 ROD and 2016 RMPs across the regional, local, and analysis areas. Figure COMA-1 displays the regional distribution of the species across NFS lands, Figure COMA-2 displays the extent of known sites located in protected areas (NFS lands, NFS reserves, BLM reserves, and NPS lands), and Figure COMA-3 displays the species' regional distribution as well as the extent of coniferous forests and LSOG coniferous forests above 4,000 feet on BLM and NFS lands.

| TABLE COMA-1 | |
|---|-----------------|
| Number of <i>Cortinarius magnivelatus</i> Sites (2017) | |
| Location* | Number of Sites |
| Regional Area | 47 |
| Local Area | 16 |
| Analysis Area (Project Area) | 5 (5) |
| Data source: Processed BLM and Forest Service GIS data, August 2, 2017 | |
| *Definitions of regional, local, analysis, and project areas are provided in Chapter 1. | |

| TABLE COMA-2 | | | |
|---|----------------|-------------|---------------------|
| Distribution of <i>Cortinarius magnivelatus</i> across Federal, Private, and Other Lands | | | |
| Land Ownership | Regional Sites | Local Sites | Analysis Area Sites |
| Forest Service | 28 | 7 | 5 |
| BLM | 20 | 10 | - |
| NPS | - | - | - |
| Fish and Wildlife Service | - | - | - |
| Other (Private, State, etc.) | 2 | 2 | 1 |
| Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011 | | | |
| Notes: Columns are not additive because some sites occur on lands in multiple ownerships. | | | |

| TABLE COMA-3 | | | |
|--|----------------|-------------|---------------------|
| Distribution of <i>Cortinarius magnivelatus</i> across 1994 ROD and 2016 RMPs Land Allocations | | | |
| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
| Adaptive Management Area (AMA) | 1 | - | - |
| Adaptive Management Reserves (AMR) | - | - | - |
| Administratively Withdrawn (AW) | 8 | - | - |
| Congressionally Reserved (CR) | - | - | - |
| Late Successional Reserve (LSR) | 8 | 1 | - |
| Marbled Murrelet Area (LSR3) | - | - | - |
| Northern Spotted Owl Activity Center (LSR4) a/ | - | - | - |
| Managed Late Successional Area (MLSA) | 2 | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | 15 | 6 | 5 |
| Riparian Reserve | - | - | - |
| Bureau of Land Management | Regional Sites | Local Sites | Analysis Area Sites |
| Administratively Withdrawn (AW) | - | - | - |
| Congressional Reserve | - | - | - |
| District Designated Reserve | 5 | 1 | - |
| Harvest Land Base | 12 | 3 | - |
| Late Successional Reserve | 11 | 8 | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | - | - | - |
| Riparian Reserve | 1 | 1 | - |

| TABLE COMA-3 | | | |
|---|----------------|-------------|---------------------|
| Distribution of <i>Cortinarius magnivelatus</i> across 1994 ROD and 2016 RMPs Land Allocations | | | |
| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
| Data sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0; 2016 RMP land allocation data, August 2016. Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. Bolded allocations are designated reserve areas. a/ Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center. | | | |

Regional Distribution

Cortinarius magnivelatus has a somewhat limited distribution across four physiographic provinces in Oregon (Klamath Mountains and Cascades East and West) and California (Cascades) (see Figure COMA-1). Most sites are found along the Cascade Range, with one group of sites located in the Klamath Mountains in Oregon. The species appears to only occur in southern Oregon and northern California in the NSO range and has a low-moderate number of sites. *Cortinarius magnivelatus* does not appear to be well distributed within its range in the NSO range.

Two of 47 sites are at least partially located on private or other lands; 20 sites are at least partially on BLM lands; and 28 sites are at least partially on NFS lands across the region. Sites included on National Forests that encompass the project area include 19 sites on the Fremont-Winema National Forest and three sites on the Rogue River-Siskiyou National Forest. The remaining sites on NFS lands include three sites on the Klamath National Forest and six sites on the Shasta-Trinity National Forest.

Across the NSO range, eight sites are at least partially located in reserve lands managed by the Forest Service (LSRs) (see Figure COMA-2). This represents 29 percent of the total Forest Service-managed sites in the region. The remaining Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. Additionally, eight sites are entirely in reserve lands managed by BLM, which represents 40 percent of the total number of BLM-managed sites in the region. While sites on BLM lands are not covered by the S&M Standards and Guidelines, the sites entirely in reserves will likely receive some degree of protection under BLM reserve management.

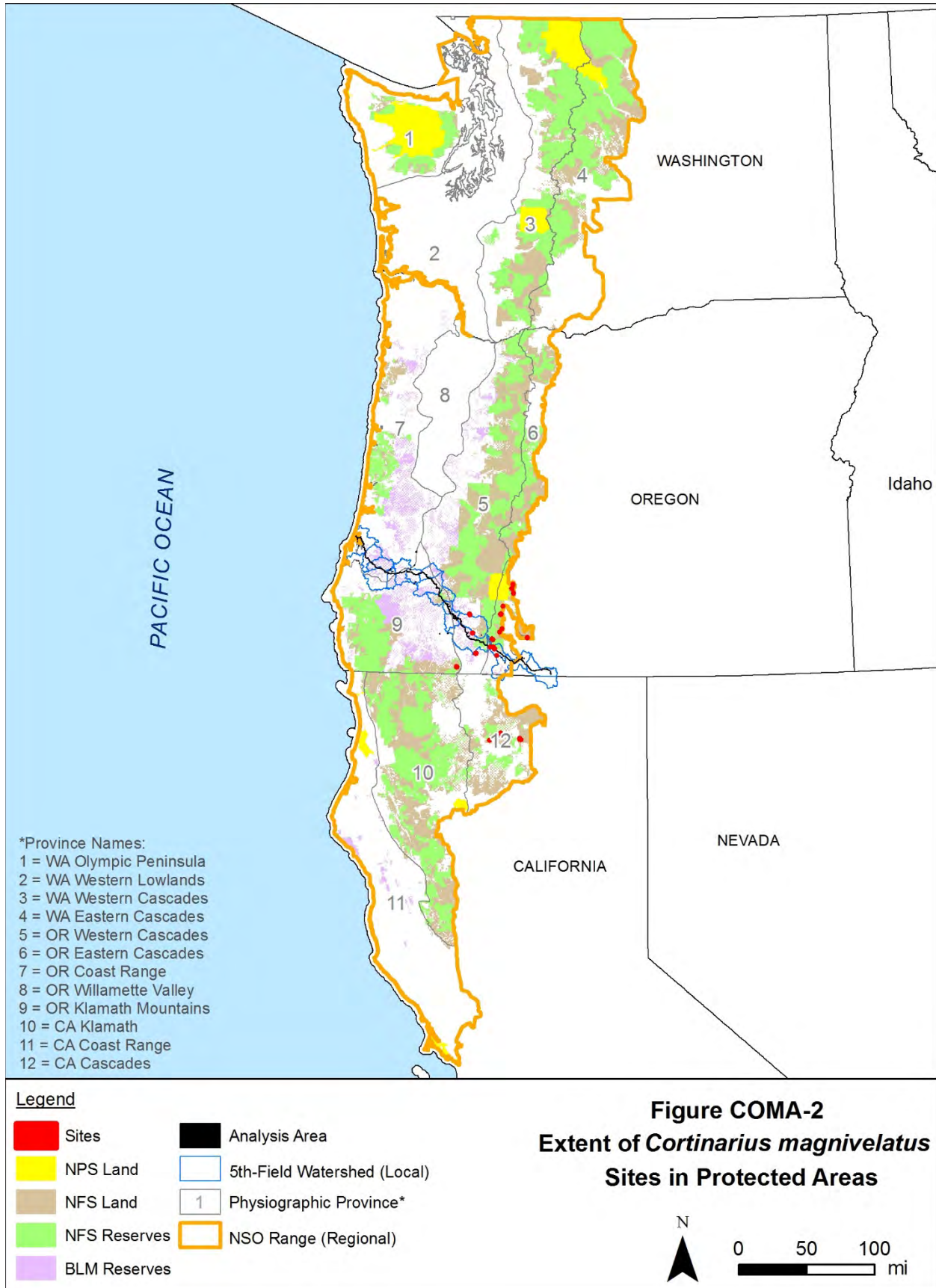
Cortinarius magnivelatus is primarily found in LSOG forests based on available data (31 of 47 total sites are in LSOG), but it is also found in non-LSOG forests and may not be restricted to LSOG conditions based on available information on its life history and habitat requirements. Based on current site locations, the species is found in coniferous forests above 4,000 feet msl and has only been documented in Oregon and California. Due to the extent of known sites, the amount of potential habitat on both NFS and BLM lands in the region, and the level of protection offered by NFS and BLM reserve land, both land ownerships are included in this potential habitat discussion. Coniferous forests, including the LSOG component of these forests, across the NSO range could provide habitat for *C. magnivelatus* and support additional sites. These forests encompass an estimated 7.5 million acres on BLM and NFS lands in the region, including an estimated 4.7 million acres in reserve land allocations (63 percent of the forests; Table COMA-4). Of this acreage, an estimated 1.7 million acres are LSOG (see Figure COMA-3), including 1.1 million acres in reserve land allocations (67 percent of the forests). Although coniferous forests

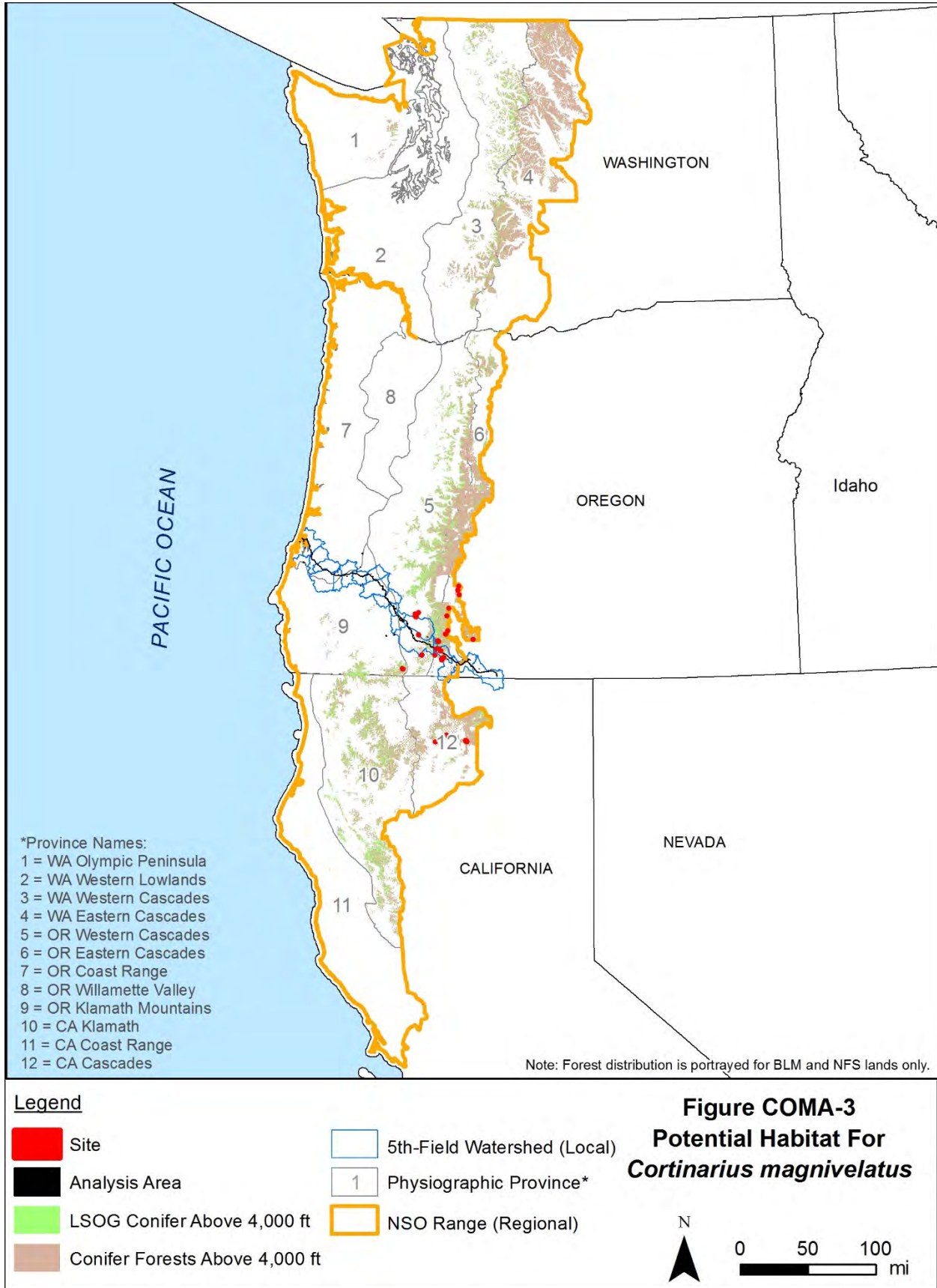
are widespread across the region, LSOG coniferous forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

| Location | Coniferous Forests above 4,000 feet | | LSOG Coniferous Forests above 4,000 feet | |
|---------------|-------------------------------------|-----------|--|-----------|
| | Total | Reserves | Total | Reserves |
| Regional Area | 7,471,720 | 4,733,729 | 1,688,359 | 1,127,276 |
| Local Area | 149,778 | 76,805 | 40,914 | 24,405 |
| Project Area | 422 | 277 | 122 | 76 |

Data source: Gradient nearest neighbor vegetation data from Moeur et al. 2011
 Note: Areas are presented in acres.
^{a/} The area estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.







Local Distribution

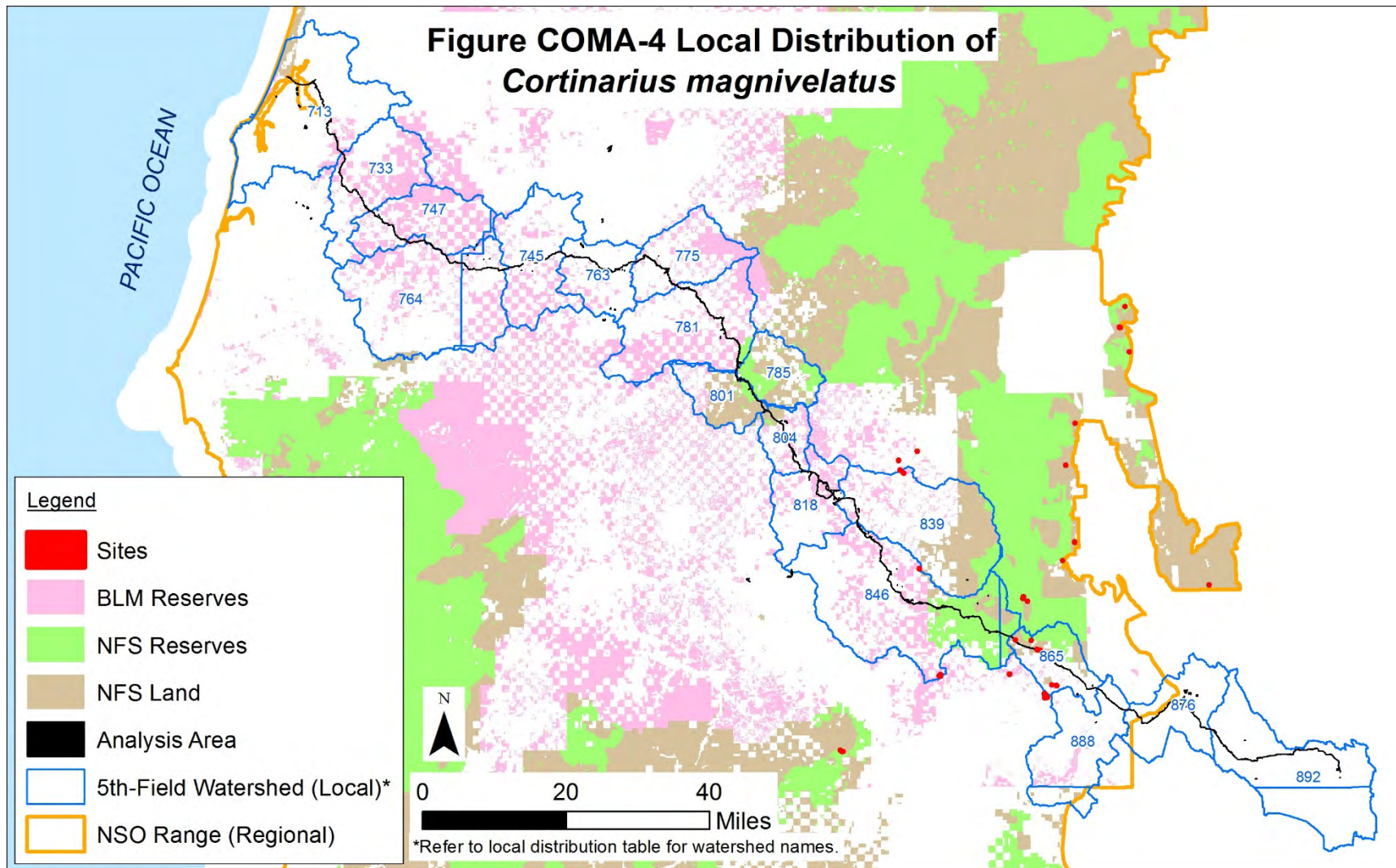
Within the local area, *C. magnivelatus* is distributed across three 5th-field watersheds that overlap the project area (see Figure COMA-4 and Table COMA-5.) The 16 sites in the local area are mainly clustered with some scattered sites located in the Cascade Range. Across these watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas based on the proximity of other sites in the region. Within the Cascade Range, several sites are located on NFS lands or entirely in BLM reserves within 10 miles north and south of the local area.

Of the 16 sites in the local area, seven are at least partially on NFS lands. Most of these sites are located on lands designated as Other (Matrix), with one site located on a LSR. Two sites are partially on private lands and 10 sites are at least partially on BLM lands. Of the local area sites, one site is in NFS reserve lands, representing 14 percent of the NFS sites and seven sites are entirely in BLM reserve lands, representing 70 percent of the BLM sites. All of the sites in the Big Butte Creek and Little Butte Creek watersheds are at least partially in reserves.

Coniferous forests encompass approximately 149,778 acres on BLM and NFS lands in the local area, with 76,805 acres in reserve land allocations (51 percent of the forests). Of this acreage, an estimated 40,914 acres are LSOG, including 24,405 acres in reserves (60 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures COMA-3 and COMA-4).

| Watershed (HUC5 ID) | Number of Sites | Number of Sites in NFS Reserve Lands | Number of Sites in BLM Reserve Lands |
|--|-----------------|--------------------------------------|--------------------------------------|
| Big Butte Creek (839) | 2 | - | 2 |
| Coos Bay Frontal (713) | - | - | - |
| East Fork Coquille River (747) | - | - | - |
| Elk Creek-South Umpqua (785) | - | - | - |
| Klamath River-John C Boyle Reservoir (888) | - | - | - |
| Lake Ewauna-Upper Klamath River (876) | - | - | - |
| Little Butte Creek (846) | 5 | - | 5 |
| Lower Lost River (892) | - | - | - |
| Middle Fork Coquille River (764) | - | - | - |
| Middle South Umpqua River (763) | - | - | - |
| Myrtle Creek (775) | - | - | - |
| North Fork Coquille River (733) | - | - | - |
| Olalla Creek-Lookingglass Creek (745) | - | - | - |
| Rogue River-Shady Cove (818) | - | - | - |
| South Umpqua River (781) | - | - | - |
| Spencer Creek (865) | 9 | 1 | 1 |
| Trail Creek (804) | - | - | - |
| Upper Cow Creek (801) | - | - | - |

Data sources: Processed BLM and Forest Service GIS data, August 2, 2017; HUC5 Watershed layer, August 23, 2011
 Note: Number of sites in reserves includes those that are partially in reserves.



Analysis/Project Area Distribution

The analysis and project areas contain five sites of *C. magnivelatus*, all of which are on NFS lands on the Fremont-Winema National Forest, and one site is partially on private lands as well. The analysis area sites are located in the Spencer Creek watershed on lands designated as Other (Matrix). Four sites are clustered and near one another, while the fifth site is more isolated. Many sites are also located within the immediate vicinity of the analysis area in the Cascade Range (see Local Distribution discussion above), including several sites on NFS lands within 10 miles north of the analysis area. While several sites are located on BLM lands approximately 7 miles south of the analysis area, these sites are at least partially on Harvest Land Base and would not likely be protected under BLM management. Several sites that are entirely in BLM reserves are located 13 miles southwest of the analysis area; these sites would likely receive some level of protection under BLM reserve management.

Surveys for the PCGP Project resulted in six total observations of the species in five locations in or near the project area (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). An estimated six of these recorded observations comprise the five sites in the analysis area; the other observations are in sites outside the analysis area. Within the project area, one site is located at approximately MP 168.8 and four sites are located between MPs 172.1 and 172.7.

Project Impacts

Analysis

The PCGP Project would affect five sites out of the 28 sites on NFS lands in the region, representing approximately 18 percent of the sites (or five out of 47 total sites on all lands in the NSO range). Table COMA-6 presents an overview of the features of the PCGP Project that would affect the *C. magnivelatus* sites. The construction corridor and associated work and storage areas would affect approximately 5.4 acres within the sites (about 31 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. magnivelatus* in and near the project area. Due to the proportion of sites affected, the effects on five sites could potentially alter the distribution of the species in the NSO range if site persistence is affected.

The following discussion provides an overview of the types of impacts that would be expected at the sites based on the features of the PCGP Project that could affect site persistence.

| Project Activity | Number of Sites Affected | Area of Disturbance within Sites |
|---|--------------------------|----------------------------------|
| Construction Corridor | 5 | 3.9 ac |
| Temporary Extra Work Area (TEWA) | 3 | 0.6 ac |
| Uncleared Storage Area (UCSA) | 5 | 1.0 ac |
| Roads (TMP) | - | - |
| Other Minimal Disturbance Activities | - | - |
| ac = acres | | |
| Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities. | | |

The PCGP Project would result in ground disturbance and vegetation removal in all five sites in the analysis area (Table COMA-7). The only recorded observations of the species in two of the sites (MP 168.8 and MP 172.4) would likely be removed during activities within the corridor (see Figures COMA-5 and COMA-6). The sites at MP 172.5 and MP 172.7 include observations that are 60 feet and 90 feet away from the project area, respectively. These observations outside the project area would not be directly affected, but may be subject to indirect effects. The site at MP 172.2 is a large site and includes three observations, two of which are within the corridor and would likely be removed. The remaining observation is 180 feet south of the project area and would not be directly affected. For all of the sites, individuals outside the corridor and TEWAs may also be subject to indirect effects associated with the PCGP Project based on the proximity of project activities to the sites, as discussed below.

| Site Location | Source of Impacts | Area of Disturbance | Individuals Likely to Persist? |
|---------------|-------------------|---------------------|--------------------------------|
| MP 168.8 | Corridor | 0.8 ac | No |
| | TEWA | 0.3 ac | |
| | UCSA | 0.2 ac | |
| MP 172.2 | Corridor | 1.2 ac | Yes |
| | TEWA | 0.1 ac | |
| | UCSA | 0.4 ac | |
| MP 172.4 | Corridor | 0.8 ac | No |
| | UCSA | 0.2 ac | |
| MP 172.5 | Corridor | 0.7 ac | No |
| | UCSA | 0.1 ac | |
| MP 172.7 | Corridor | 0.3 ac | No |
| | TEWA | 0.2 ac | |
| | UCSA | 0.1 ac | |

Notes: MP = milepost; ac = acres

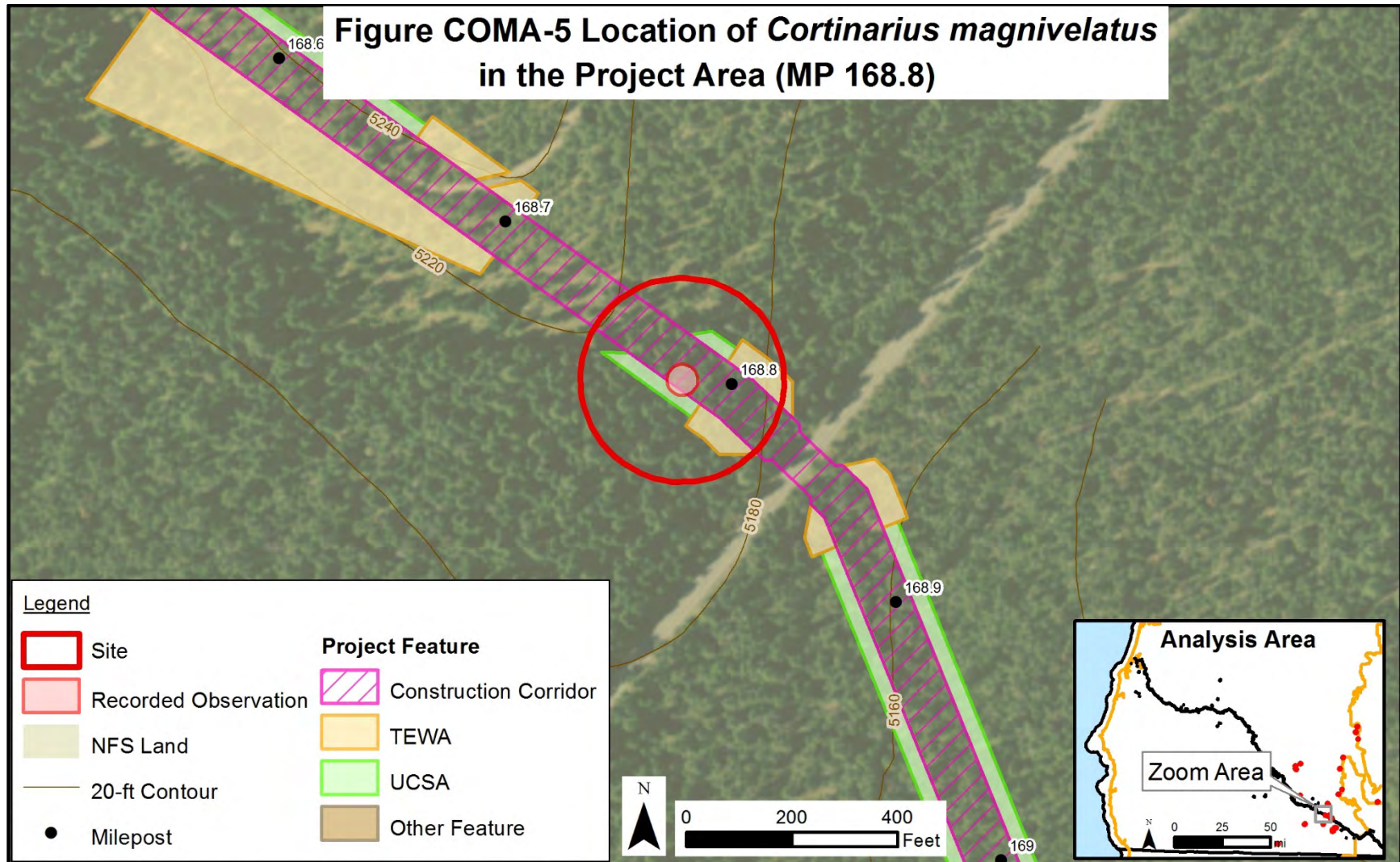
Establishment of the 95-foot wide construction corridor and TEWAs would likely remove individuals of *C. magnivelatus* in five sites and modify microclimate conditions around individuals that are not removed. The removal of forests and host trees and disturbance to soil could negatively affect *C. magnivelatus* in adjacent areas by removing its habitat, disturbing the roots of host trees, and affecting its mycorrhizal association with the trees, although the species appears to be somewhat resilient to edge effects in some areas (e.g., it has been found along roadsides). Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A 30-foot wide portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. *Cortinarius magnivelatus* is not likely to persist at four of the sites because of the extent of impacts within the sites and the proximity of the recorded observations to the corridor (see Table COMA-7). *Cortinarius magnivelatus* is likely to persist at the larger site at MP 172.2, despite impacts to some individuals, because one observation within the site is 180 feet from the corridor, where direct effects are not anticipated and indirect effects are unlikely. A road crosses through the southern end of this site, and the corridor would follow the north side of the road where two observations have been recorded and cannot be avoided.

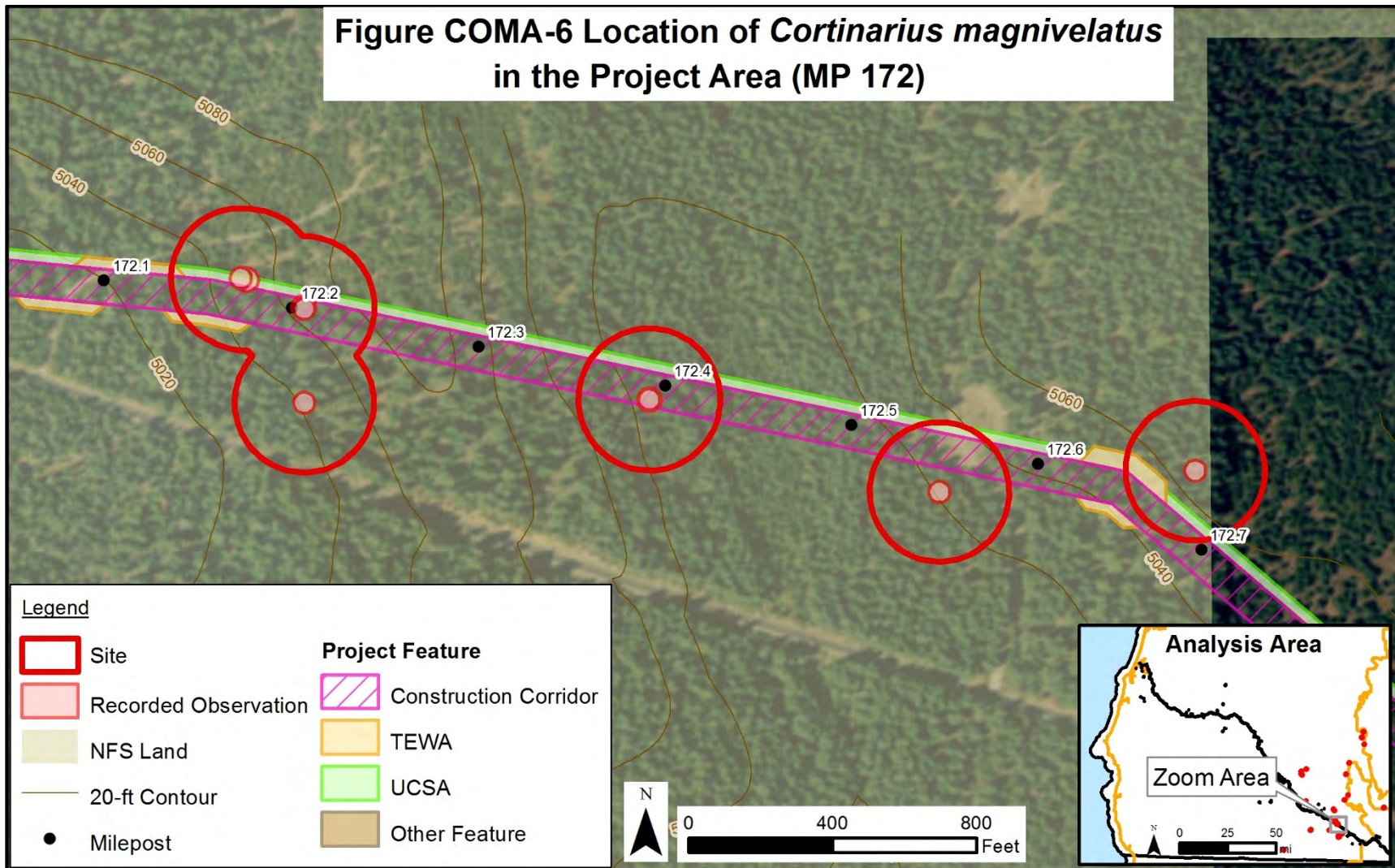
Based on this analysis, *C. magnivelatus* is not likely to persist at four of the five sites in the analysis area following project implementation. In addition to the single site remaining in the analysis area, several sites are located in its vicinity in the Cascade Range.

Across the project area, the PCGP Project would remove an estimated 338 acres of coniferous forests above 4,000 feet msl, including 94 acres of LSOG coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *C. magnivelatus*. Within this impact area, about 188 acres (about 56 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A 30-foot wide corridor would be maintained in low-growing vegetation across the project area, resulting in a loss of about 85 acres of coniferous forests above 4,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests above 4,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at four sites as a result of the PCGP Project, three sites of *C. magnivelatus* would remain on NFS lands in the local area, including one in reserves (LSRs) and 24 sites, including eight in reserves, would remain on NFS lands in the NSO range. A total of 10 sites, including seven entirely in reserves would remain on BLM lands in the local area and a total of 20 sites, including eight entirely in reserves would remain on BLM lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but the NFS sites would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The sites in NFS reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. While sites on BLM lands are not subject to S&M Standards and Guidelines protections, the eight sites entirely in reserves would likely receive some level of protection under BLM management.





Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states “instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision” (Standards and Guidelines, pg. 4). The Forest Service has embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *Cortinarius magnivelatus* is a Category B (rare) S&M species across the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information received since the species was listed in the 2001 ROD, however, indicates that more information about the species’ distribution is available, as described below:
 - *Cortinarius magnivelatus* has a somewhat limited distribution across four physiographic provinces and two states the region and a low-moderate number of overall sites (28 on NFS lands, 47 on all lands). The species is most abundant in the Cascade Range in southern Oregon, but it does not appear to be well distributed due to its limited distribution. The currently known number of sites on NFS and BLM lands has increased by 37 sites since 2007.
 - An estimated 34 percent of the sites (16 sites) on NFS and BLM lands are in at least partially in reserves, which is an increase of about 18 sites in reserves since 2006 per Molina (2008).
- Coniferous forests above 4,000 feet msl (general habitat for the species) are widespread across the region and encompass approximately 7.5 million acres on BLM and NFS lands with an estimated 63 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented.
- The PCGP Project would affect four of 28 Forest Service-managed sites of *C. magnivelatus*, representing approximately 14 percent of the sites on NFS lands in the NSO range. Assuming site persistence cannot be maintained at the four sites, a low-moderate number of sites (24) would remain on NFS lands in the region with a somewhat limited distribution across Oregon and California. Three sites would remain on NFS lands in the local vicinity of the analysis area, including one in reserves (LSRs). Seven sites would remain entirely in BLM reserves in the local area and eight sites would remain entirely in BLM reserves in the region. The distribution of sites and extent of the species’ range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect site persistence of any sites in reserves, and the percentage of sites in NFS reserves would increase (from 29 to 33 percent). All eight sites in reserves are in LSRs where management actions are restricted to those activities that benefit LSOG forests. A total of eight sites would remain entirely in BLM reserves, including LSRs where management actions are restricted to those activities that benefit LSOG forests, District Designated Reserves where management activities that may adversely affect *C. magnivelatus* are unlikely, and Riparian Reserves where management

actions are restricted to those activities that benefit the conservation of riparian areas and riparian-associated species.

- The PCGP Project would result in a permanent loss of an estimated 85 acres of coniferous forests above 4,000 feet msl (less than 1 percent of the total regional acreage). An estimated 4.7 million acres (63 percent) of coniferous forests above 4,000 feet msl and 1.1 million acres (67 percent) of LSOG coniferous forests above 4,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. magnivelatus*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. *Cortinarius magnivelatus* is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys.

2.10.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. magnivelatus* at five sites on NFS lands; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 24 sites would remain on NFS lands across the region and three sites would remain on NFS lands in the local area. Additionally, eight sites would remain in BLM reserves in the region and seven sites would remain in BLM reserves in the local area. Several sites on NFS lands are within 10 miles north of the analysis area in the Cascade Range. Several more sites are located entirely in BLM reserves approximately 13 miles southwest of the analysis area. The remaining *C. magnivelatus* sites would allow for dispersal between the Cascade Range and the Klamath Mountains. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *Cortinarius magnivelatus* would persist in the region without considering the four sites as part of the population.
- The PCGP Project would remove approximately 338 acres of coniferous forests above 4,000 feet msl and 94 acres of LSOG coniferous forests above 4,000 feet msl (a negligible amount of the forests). An estimated 56 percent of the forests would be restored to similar conditions or shrublands, but a 30-foot wide early-successional corridor would remain across the project area. An estimated 4.7 million acres (63 percent) of coniferous forests above 4,000 feet msl and 1.1 million acres (67 percent) of LSOG coniferous forests above 4,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites on NFS lands are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Additionally, the remaining sites in BLM reserves are expected to receive some level of protection under BLM management. Although a single natural disturbance event or combination of events could affect a significant portion of sites in the Cascade Range,

other sites are scattered across four provinces and are less likely to be affected by a single event.

The PCGP Project would not be able to avoid impacts to all *C. magnivelatus* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the four *C. magnivelatus* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the NFS land management plan that applies to the affected sites would waive implementation of Management Recommendations for *C. magnivelatus* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term. The monitoring plan shall be approved by the Forest Service.

2.11 CORTINARIUS OLYMPIANUS

Cortinarius olympianus is a gilled mushroom species in the Cortinariaceae family and has no common name.

2.11.1 Regulatory Status and Ranking

The 2001 ROD, including the 2003 ASR modifications to the S&M species list, identifies *C. olympianus* as a Category B (rare) species. ORBIC evaluated *C. olympianus* in its 2004 *Survey and Manage Assessment* for BLM and the Forest Service (ORBIC 2004), but it was not included in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2016). In 2004, the species was considered to be uncommon but not rare with some cause for long-term concern due to declines or other factors within its global range and in Oregon (G4, S4, respectively). The species is not currently on the ORBIC lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.11.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to this analysis. Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are discussed below under Persistence Evaluation. The background information in this section is used to support the persistence evaluation in the following section, which is updated with more recent information (e.g., recent survey data) specifically used for the persistence evaluation.

Life History

Cortinarius olympianus is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) (Castellano and O'Dell 1997). It fruits on the humus layer and in association with roots of various conifer trees between September and November (Castellano and O'Dell 1997, Castellano et al. 1999). According to ORBIC (2004), individuals are dispersed through mycelial interactions with other individuals and their mycorrhizal partners, rather than through spore dispersal. However, spores may also be dispersed by animals (Holthausen et al. 1994). Populations of the mushroom are believed to be long-lived (ORBIC 2004).

Range

Cortinarius olympianus is endemic to the Pacific Northwest (Castellano et al. 1999). It is known from the Bainbridge Island and the Olympic Peninsula east to Easy Pass in Okanogan County, Washington, and south to Shasta County, California (ORBIC 2004). It is found in the Washington Olympic Range and Cascade Range, the Oregon Cascade Range and Siskiyou Mountains, and northern California (Castellano and O'Dell 1997). Based on data available in 1997, the species' distribution was considered spotty across its range. The currently known range of the species within the NSO range based on 2017 data is discussed below under Species Distribution.

Although information on the species' historical range is not known, Holthausen et al. (1994) indicated that the species' current range may be more restricted than it was historically. This restriction may be a result of habitat modifications and other environmental factors, as discussed below under Threats.

Population Status

ORBIC (2004) reported *C. olympianus* from an estimated 51 element occurrences across the Pacific Northwest in 2004. An estimated 28 of these occurrences were in Oregon and 27 were in reserves or protected areas (ORBIC 2004). In 2004, *C. olympianus* was considered uncommon, but had stable populations with more than half in protected areas (ORBIC 2004). The species was found in five locations during Random Multi-Species surveys across the NSO range between 2001 and 2004 (USDA and USDI 2007). Molina (2008) documented 26 new sites of *C. olympianus* in the NSO range between 1998 and 2006, and 50 total sites were documented by 2006, including 33 in reserves or protected areas. The 2007 Final SEIS reported 44 sites on NFS and BLM lands and 45 total sites on all lands in the NSO range (USDA and USDI 2007).

Pre-disturbance surveys are not practical for Category B species. Instead, equivalent-effort surveys were conducted during fall and spring from 2010 to 2016 in old-growth stands in the PCGP Project area and within 100 feet of habitat removal to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). The equivalent-effort surveys targeted all Category B species, including *C. olympianus*, and resulted in eight new observations of individuals or populations of *C. olympianus*. Additional persistence surveys for *C. olympianus* in LSRs in nearby areas resulted in one additional observation of the species. Based on the increased number of known sites since 1998 as a result of the increased number of surveys (a two-fold increase between 1998 and 2006 per Molina 2008 records), additional surveys would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2017 data are provided below under Species Distribution.

Habitat

Cortinarius olympianus is found in complex coniferous forests and is generally restricted to the western hemlock zone of the NSO range (ORBIC 2004). Sporocarps of *C. olympianus* usually occur in association with the roots of various species in family Pine family (Castellano et al. 1999). It is symbiotic with true fir, spruce, and hemlock species and is reported to prefer drier, rather than wetter, gradients of western hemlock-Douglas fir stands in the Olympic National Forest in Washington (O'Dell et al. 1999). It is historically reported from LSOG forests (ORBIC 2004)

which suggest that it may prefer specific microclimate conditions of that habitat type, but it may not be restricted to these conditions.

Threats

Primary threats to *C. olympianus* are actions that affect its host trees, such as hot fires, road construction, other development, and clear-cutting (ORBIC 2004). Other threats to forest habitat, such as drought or insect infestations, and degraded air quality can also threaten the species. Other specific threats to the species are not known.

Management Recommendations

As a Category B S&M species, the direction under the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). This statement is no longer applicable on BLM lands under the 2016 BLM RMPs, although it is still valid on NFS lands within the range of the NSO. Management recommendations were developed for *C. olympianus* with several other species (Group 9 of Castellano and O'Dell 1997). The primary guidance is to maintain habitat conditions at all known sites by retaining old-growth forest structure and soil conditions, including coarse woody debris, and avoid disturbance at or around known sites, such as from removal of host trees or modification of canopy. The known locations of the species on federal land should be managed to include an area that is large enough to maintain the habitat and associated microclimate of the population. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *C. olympianus*:

- As a mycorrhizal species, *C. olympianus* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.11.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new site information, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. olympianus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and the Forest Service (Oregon/Washington regional offices) and converted into sites in accordance with the methodology described in Chapter 1. Table COOL-1 shows the total number of known sites in the regional (NSO range), local (18 5th-field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 101 observations from BLM and Forest Service geodatabases were converted into 73 sites in the NSO range (region). Table COOL-2 shows the total number of sites on NFS land and other land

ownerships across the regional, local, and analysis areas. Table COOL-3 shows the total number of sites within each land use allocation defined in the 1994 ROD and 2016 RMPs across the regional, local, and analysis areas. Figure COOL-1 displays the regional distribution of the species across NFS lands, Figure COOL-2 displays the extent of known sites located in protected areas (NFS lands, NFS reserves, BLM reserves, and NPS lands), and Figure COOL-3 displays the species' regional distribution as well as the extent of coniferous forests and LSOG coniferous forests on BLM and NFS lands.

| TABLE COOL-1 | |
|---|-----------------|
| Number of <i>Cortinarius olympianus</i> Sites (2017) | |
| Location* | Number of Sites |
| Regional Area | 73 |
| Local Area | 17 |
| Analysis Area (Project Area) | 5 (5) |
| Data source: Processed BLM and Forest Service GIS data, August 2, 2017 | |
| *Definitions of regional, local, analysis, and project areas are provided in Chapter 1. | |

| TABLE COOL-2 | | | |
|---|----------------|-------------|---------------------|
| Distribution of <i>Cortinarius olympianus</i> across Federal, Private, and Other Lands | | | |
| Land Ownership | Regional Sites | Local Sites | Analysis Area Sites |
| Forest Service | 44 | 6 | 5 |
| BLM | 26 | 11 | - |
| NPS | 1 | - | - |
| Fish and Wildlife Service | - | - | - |
| Other (Private, State, etc.) | 6 | 3 | - |
| Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011 | | | |
| Notes: Columns are not additive because some sites occur on lands in multiple ownerships. | | | |

| TABLE COOL-3 | | | |
|---|----------------|-------------|---------------------|
| Distribution of <i>Cortinarius olympianus</i> across 1994 ROD and 2016 RMPs Land Allocations | | | |
| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
| Adaptive Management Area (AMA) | 1 | - | - |
| Adaptive Management Reserves (AMR) | - | - | - |
| Administratively Withdrawn (AW) | 8 | - | - |
| Congressionally Reserved (CR) | 11 | - | - |
| Late Successional Reserve (LSR) | 16 | 5 | 4 |
| Marbled Murrelet Area (LSR3) | - | - | - |
| Northern Spotted Owl Activity Center (LSR4) ^{a/} | - | - | - |
| Managed Late Successional Area (MLSA) | 6 | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | 10 | 1 | 1 |
| Riparian Reserve | - | - | - |
| Bureau of Land Management | Regional Sites | Local Sites | Analysis Area Sites |
| Administratively Withdrawn (AW) | - | - | - |
| Congressional Reserve | - | - | - |
| District Designated Reserve | 9 | 3 | - |
| Harvest Land Base | 17 | 11 | - |
| Late Successional Reserve | 11 | 4 | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | - | - | - |
| Riparian Reserve | 9 | 3 | - |
| Data sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0; 2016 RMP land allocation data, August 2016. | | | |
| Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. Bolded allocations are designated reserve areas. | | | |
| ^{a/} Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center. | | | |

Regional Distribution

Cortinarius olympianus has a wide, but scattered, distribution across nine physiographic provinces in Washington (Western and Eastern Cascades and Olympic Peninsula), Oregon (Coast Range, Cascades East and West, and Klamath Mountain), and California (Klamath and Cascades) (see Figure COOL-1). Most sites are found along the Cascade Range, with scattered sites or groups of sites in the Klamath Mountains and other outlying areas. Some clusters of sites are located in the Cascade Range and Klamath Mountains; however, most sites appear scattered and somewhat isolated across the NSO range. Although *C. olympianus* is widely distributed across the NSO range, its distribution is scattered with few clusters of sites, despite the extent of forests that may provide suitable habitat, and the species does not appear to be well distributed within its range in the NSO range.

Six of 73 known sites are at least partially located on private or other lands; one site is on NPS land (Olympic National Park); 26 sites are at least partially on BLM lands; and 44 sites are at least partially on NFS lands across the region. Sites included on National Forests that encompass the project area include 12 sites on the Rogue River-Siskiyou National Forest and two sites on the Umpqua National Forest. The remaining 30 sites on NFS lands are on the Gifford Pinchot, Klamath, Mt. Baker-Snoqualmie, Mt. Hood, Okanogan-Wenatchee, Six Rivers, and Willamette National Forests.

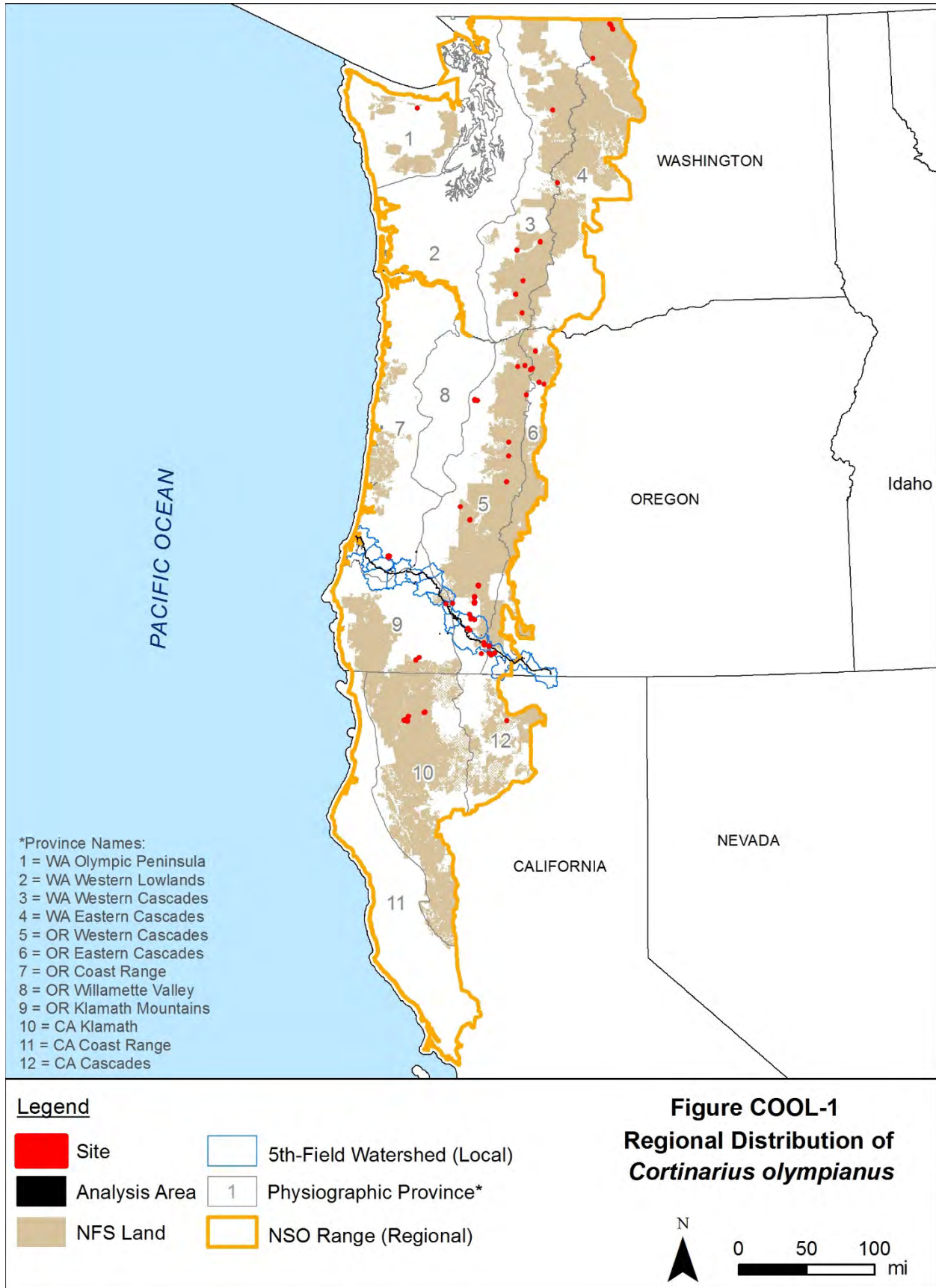
Across the NSO range, 27 sites are at least partially located in reserve lands managed by the Forest Service, including 16 in LSRs and 11 in Congressionally Reserved areas (see Figure COOL-2). This represents 61 percent of the total NFS-managed sites in the region. The remaining Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. Additionally, nine sites are entirely in reserve lands managed by BLM, which represents 35 percent of the total number of BLM-managed sites in the region. While the sites in BLM reserves and the single NPS site are not covered by the S&M Standards and Guidelines, they will likely receive some degree of protection under BLM reserve management and National Park management.

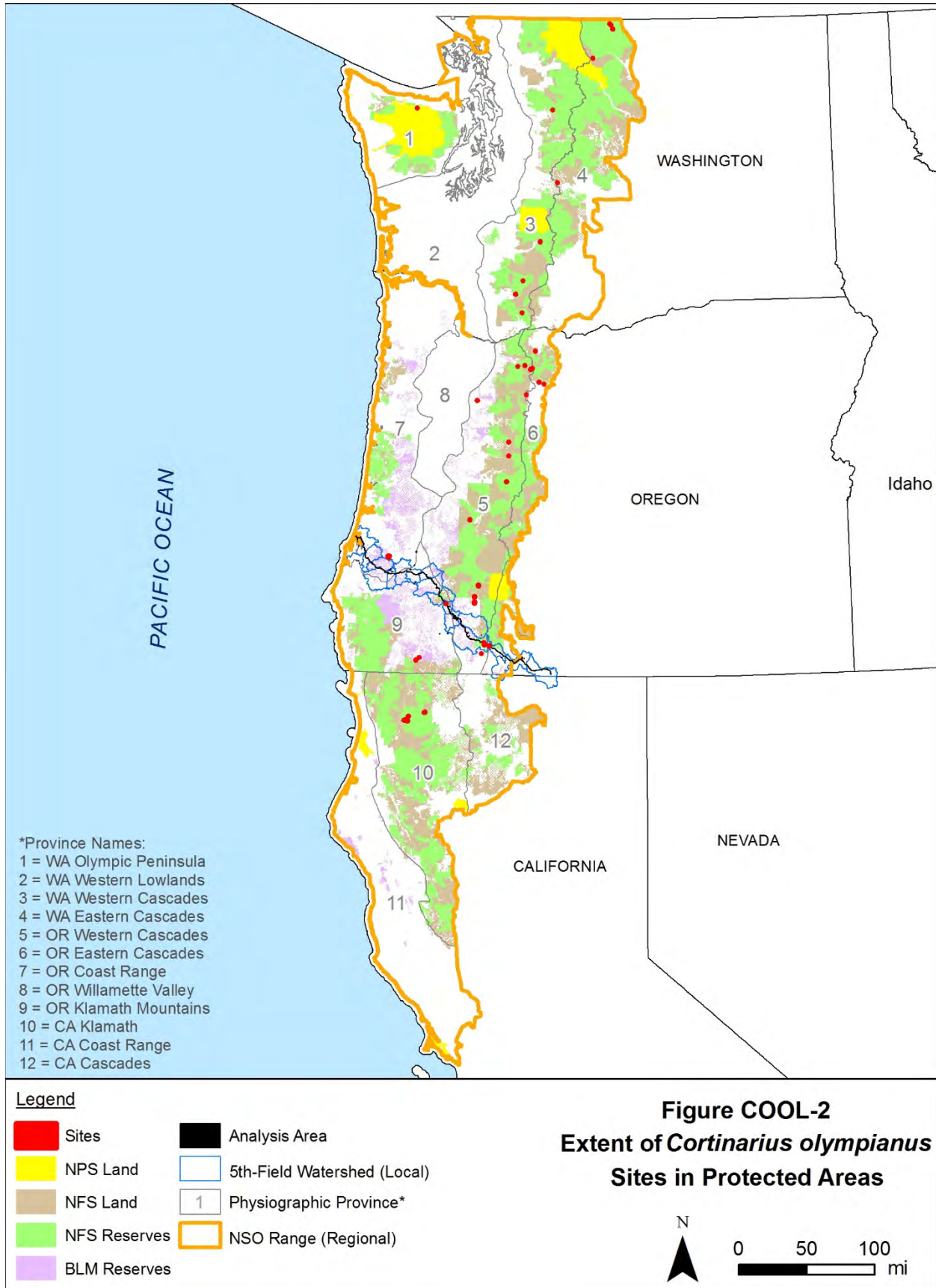
Cortinarius olympianus is primarily found in LSOG forests based on available data (65 of 74 total sites are in LSOG), but it is also found in non-LSOG forests and may not be restricted to LSOG conditions based on available information on its life history and habitat requirements. Based on current site locations, the species is found in coniferous forests across a wide elevation range and has been documented in most of the NSO range. Due to the extent of known sites, the amount of potential habitat on both NFS and BLM lands in the region, and the level of protection offered by NFS and BLM reserve land, both land ownerships are included in this potential habitat discussion. Coniferous forests, including the LSOG component of these forests, across the NSO range could provide habitat for *C. olympianus* and support additional sites. These forests encompass an estimated 16.3 million acres on BLM and NFS lands in the region, including an estimated 9.9 million acres in reserve land allocations (61 percent of the forests; Table COOL-4). Of this acreage, an estimated 5 million acres are LSOG (see Figure COOL-3), including 3.3 million acres in reserve land allocations (66 percent of the forests). Although coniferous forests are widespread across the region, LSOG coniferous forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

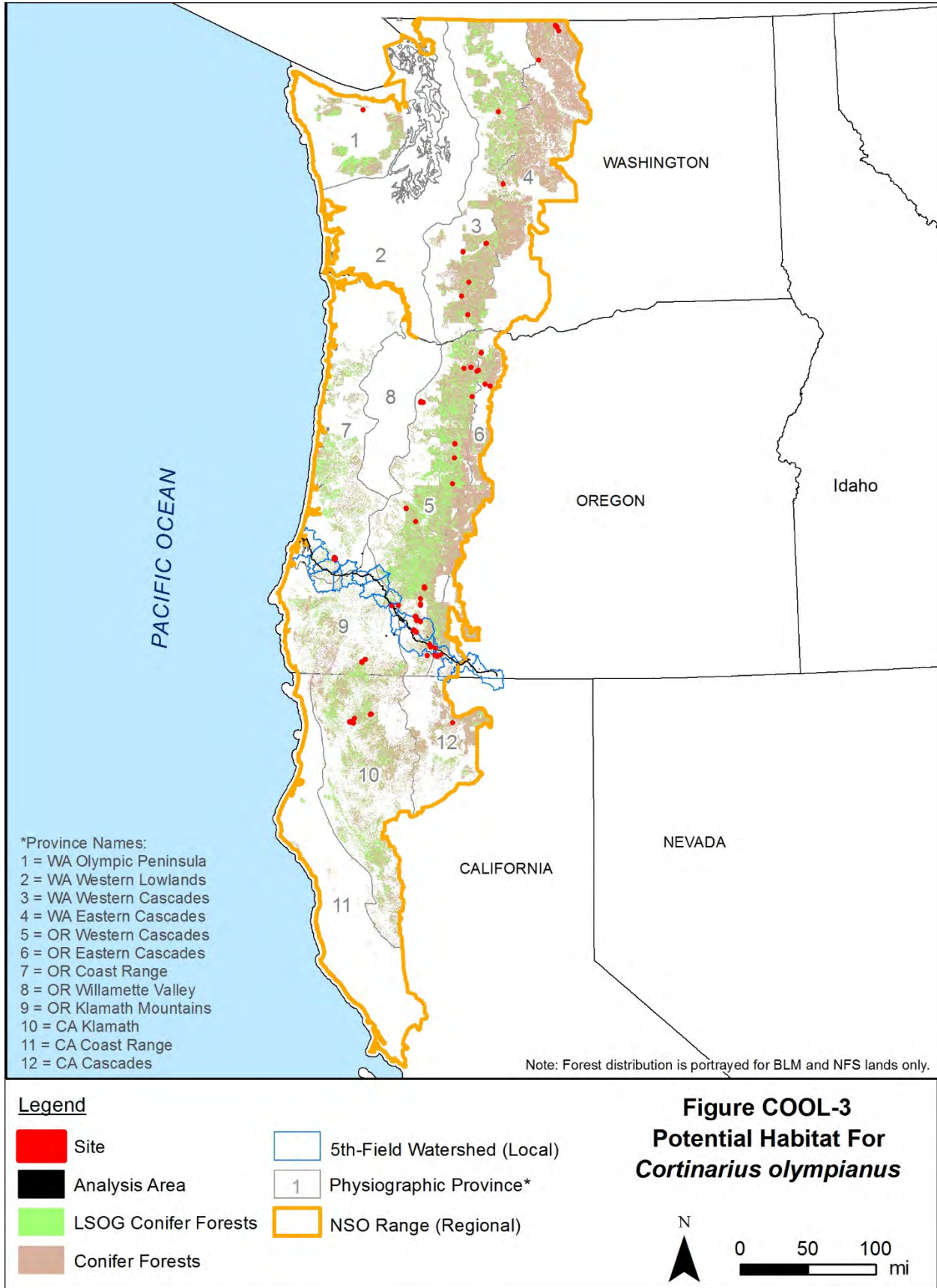
TABLE COOL-4

| Extent of Forests That Could Provide Habitat for <i>Cortinarius olympianus</i> on NFS and BLM Lands ^{a/} | | | | |
|---|--------------------|-----------|-------------------------|-----------|
| Location | Coniferous Forests | | LSOG Coniferous Forests | |
| | Total | Reserves | Total | Reserves |
| Regional Area | 16,275,479 | 9,902,802 | 5,025,899 | 3,337,509 |
| Local Area | 454,206 | 285,292 | 161,143 | 116,561 |
| Project Area | 1,018 | 686 | 294 | 207 |

Data source: Gradient nearest neighbor vegetation data from Moeur et al. 2011
 Note: Areas are presented in acres.
^{a/} The area estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.







Local Distribution

Within the local area, *C. olympianus* is distributed across seven 5th-field watersheds that overlap the project area (see Figure COOL-4 and Table COOL-5.) The 17 sites in the local area are scattered across the eastern half of the project area, with several clustered sites located in the Cascade Range. Across these watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas based on the proximity of other sites in the region. Within the Cascade Range, several sites are located on NFS lands within 15 miles north of the project area. Several more sites occur approximately eight miles south of the project area in the Cascade Range, however, these sites are at least partially on Harvest Land Base and would not likely be protected under BLM management.

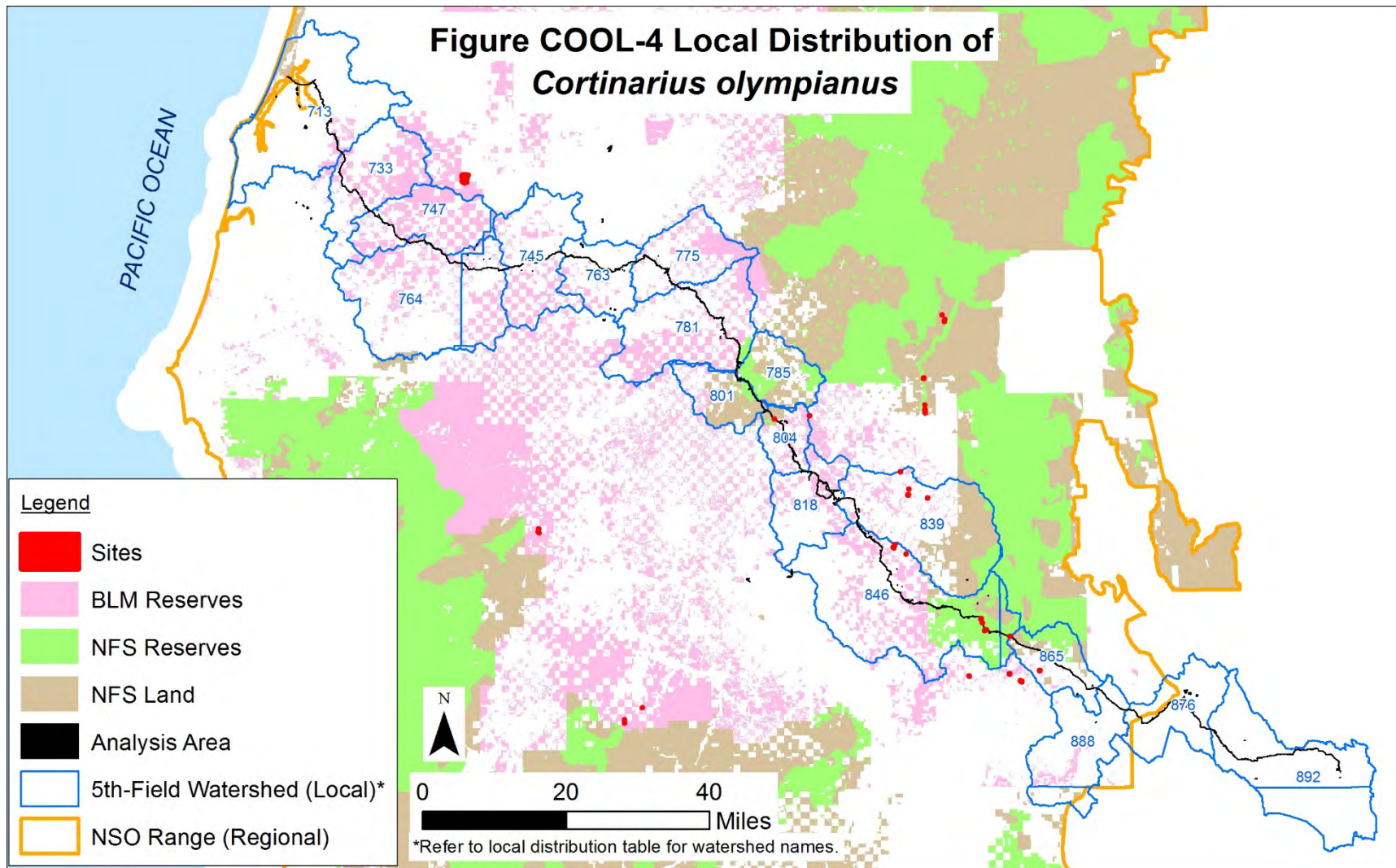
Of the 17 sites in the local area, six are at least partially on NFS lands. Most of these sites are located on lands designated as LSR, with one site located on Other (Matrix). Three sites are partially on private lands and 11 sites are at least partially on BLM lands. Of the local area sites, five sites are in NFS reserve lands, representing 29 percent of the NFS sites. While several sites on BLM lands in the local area are partially in reserves, all 11 sites on BLM lands in the local area are at least partially in Harvest Land Base.

Coniferous forests encompass approximately 454,206 acres on BLM and NFS lands in the local area, with 285,292 acres in reserve land allocations (63 percent of the forests). Of this acreage, an estimated 161,143 acres are LSOG, including 116,561 acres in reserves (72 percent of the forests).

Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures COOL-3 and COOL-4).

| Watershed (HUC5 ID) | Number of Sites | Number of Sites in NFS Reserve Lands | Number of Sites in BLM Reserve Lands |
|--|-----------------|--------------------------------------|--------------------------------------|
| Big Butte Creek (839) | 5 | - | 3 |
| Coos Bay Frontal (713) | - | - | - |
| East Fork Coquille River (747) | - | - | - |
| Elk Creek-South Umpqua (785) | - | - | - |
| Klamath River-John C Boyle Reservoir (888) | - | - | - |
| Lake Ewauna-Upper Klamath River (876) | - | - | - |
| Little Butte Creek (846) | 9 | 5 | 4 |
| Lower Lost River (892) | - | - | - |
| Middle Fork Coquille River (764) | - | - | - |
| Middle South Umpqua River (763) | - | - | - |
| Myrtle Creek (775) | - | - | - |
| North Fork Coquille River (733) | - | - | - |
| Olalla Creek-Lookingglass Creek (745) | - | - | - |
| Rogue River-Shady Cove (818) | - | - | - |
| South Umpqua River (781) | - | - | - |
| Spencer Creek (865) | 2 | - | 1 |
| Trail Creek (804) | 1 | - | - |
| Upper Cow Creek (801) | - | - | - |

Data sources: Processed BLM and Forest Service GIS data, August 2, 2017; HUC5 Watershed layer, August 23, 2011
Notes: Number of sites in reserves include sites that are only partially in reserves.



Analysis/Project Area Distribution

The analysis and project areas contain five sites of *C. olympianus*, all of which are on NFS lands on the Umpqua National Forest and Rogue River-Siskiyou National Forest. The analysis area sites are distributed across four 5th-field watersheds in the central to eastern portion of the analysis area. These sites occur in both the Western Cascade Range and in the Klamath Mountains. Sites in the Western Cascade Range are clustered in one group, while the two sites in the Klamath Mountains are more scattered. Many sites are also located within the immediate vicinity of the analysis area in the Cascade Range (see Local Distribution discussion above), including several sites within 15 miles. A single site is located four miles east of the two sites in the Klamath Mountains, however, the site is located on BLM Harvest Land Base and would not likely be protected under BLM management. Several sites are located approximately 30 miles to the southwest of the two analysis area sites in the Klamath Mountains. These sites are located entirely in BLM reserves and thus are likely protected under BLM management.

Of the five sites in the analysis area, four are in reserves (LSRs) and one is located on lands designated as Other (Matrix).

Surveys for the PCGP Project resulted in nine total observations of individuals of the species in or near the project area during 2010 (Siskiyou BioSurvey LLC 2012a, 2016 [unpublished surveys]). Eight of these recorded observations comprise the five sites in the analysis area; the other observation is in a site outside the analysis area. Within the project area, one site is located at MP 112.7 and the other four sites are located between approximately MPs 162.6 and 167.8.

Project Impacts

Analysis

The PCGP Project would affect five sites out of the 44 sites on NFS lands in the region, representing approximately 11 percent of the sites (or five out of 73 total sites on all lands in the NSO range). Table COOL-6 presents an overview of the features of the PCGP Project that would affect the *C. olympianus* sites. The construction corridor and associated work and storage areas would affect approximately 7.3 acres within the sites (about 26 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. olympianus* in and near the project area.

The following discussion provides an overview of the types of impacts that would be expected at the sites based on the features of the PCGP Project that could affect site persistence.

| TABLE COOL-6 | | |
|---|--------------------------|----------------------------------|
| Impacts to <i>Cortinarius olympianus</i> Sites on NFS Lands in the Project Area | | |
| Project Activity | Number of Sites Affected | Area of Disturbance within Sites |
| Construction Corridor | 5 | 5.3 ac |
| Temporary Extra Work Area (TEWA) | 2 | 0.7 ac |
| Uncleared Storage Area (UCSA) | 4 | 1.3 ac |
| Roads (TMP) | - | - |
| Other Minimal Disturbance Activities | - | - |
| ac = acres | | |
| Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities. | | |

The PCGP project would result in ground disturbance and vegetation removal in all five sites in the analysis area (Table COOL-7). The only recorded observations of the species in three of the sites (MP 163.1, MP 164.2-164.4, and MP 167.8) would likely be removed during activities within the corridor (see Figures COOL-5, COOL-6, and COOL-7). The only recorded observations of the species in one additional site (MP 112.7) is outside the project area and would not be directly affected; however, the observations are within 30 feet of the project area and would be subject to indirect effects associated with the PCGP project. One site (MP 162.6) includes two observations, one of which is within the corridor and would likely be removed, and the other is approximately 285 feet outside the project area and would not be directly affected. For all of the sites, individuals outside the corridor and TEWAs may also be subject to indirect effects associated with the PCGP Project based on the proximity of project activities to the sites, as discussed below.

Vegetation removal and grading activities in the 95-foot wide construction corridor would disturb about 5.3 acres of vegetation and soil within five sites and could result in the removal of *C. olympianus* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.7 acres within two sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *C. olympianus* in adjacent areas by removing its habitat, disturbing the roots of host trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species; however, the mushroom appears to be somewhat resilient to open canopy and edge effects based on the proximity of some observations to roads. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A 30-foot wide portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 1.3 acres of understory habitat in four sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species. *Cortinarius olympianus* is not likely to persist at four of the sites because of the extent of impacts within the sites and the proximity of the recorded observations to the corridor (see Table COOL-7). *Cortinarius olympianus* is likely to persist at one of the sites (MP 162.6), despite impacts to some individuals, because one of the two observations within the site is located approximately 380 feet from the corridor, where direct effects are not anticipated and indirect effects are unlikely.

| Site Location | Source of Impacts | Area of Disturbance | Individuals Likely to Persist? |
|----------------|-------------------|---------------------|--------------------------------|
| MP 112.7 | Corridor | 0.5 ac | No |
| | UCSA | 0.2 ac | |
| MP 162.6 | Corridor | 0.8 ac | Yes |
| | UCSA | 0.5 ac | |
| MP 163.1 | Corridor | 0.9 ac | No |
| | TEWA | 0.2 ac | |
| | UCSA | 0.2 ac | |
| MP 164.2-164.4 | Corridor | 2.2 ac | No |
| | TEWA | 0.5 ac | |
| | UCSA | 0.4 ac | |
| MP 167.8 | Corridor | 0.8 ac | No |

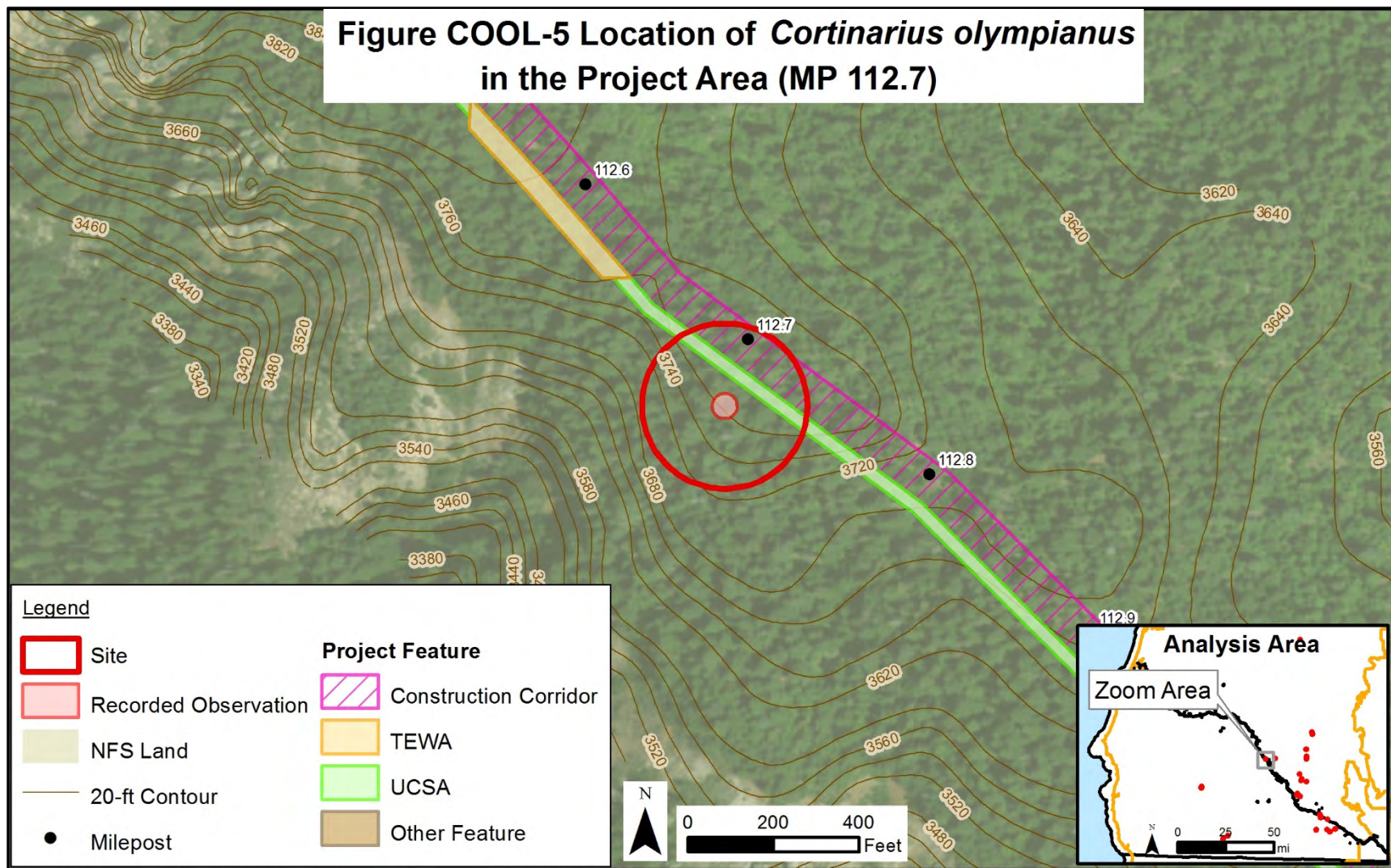
Notes: MP = milepost; ac = acres

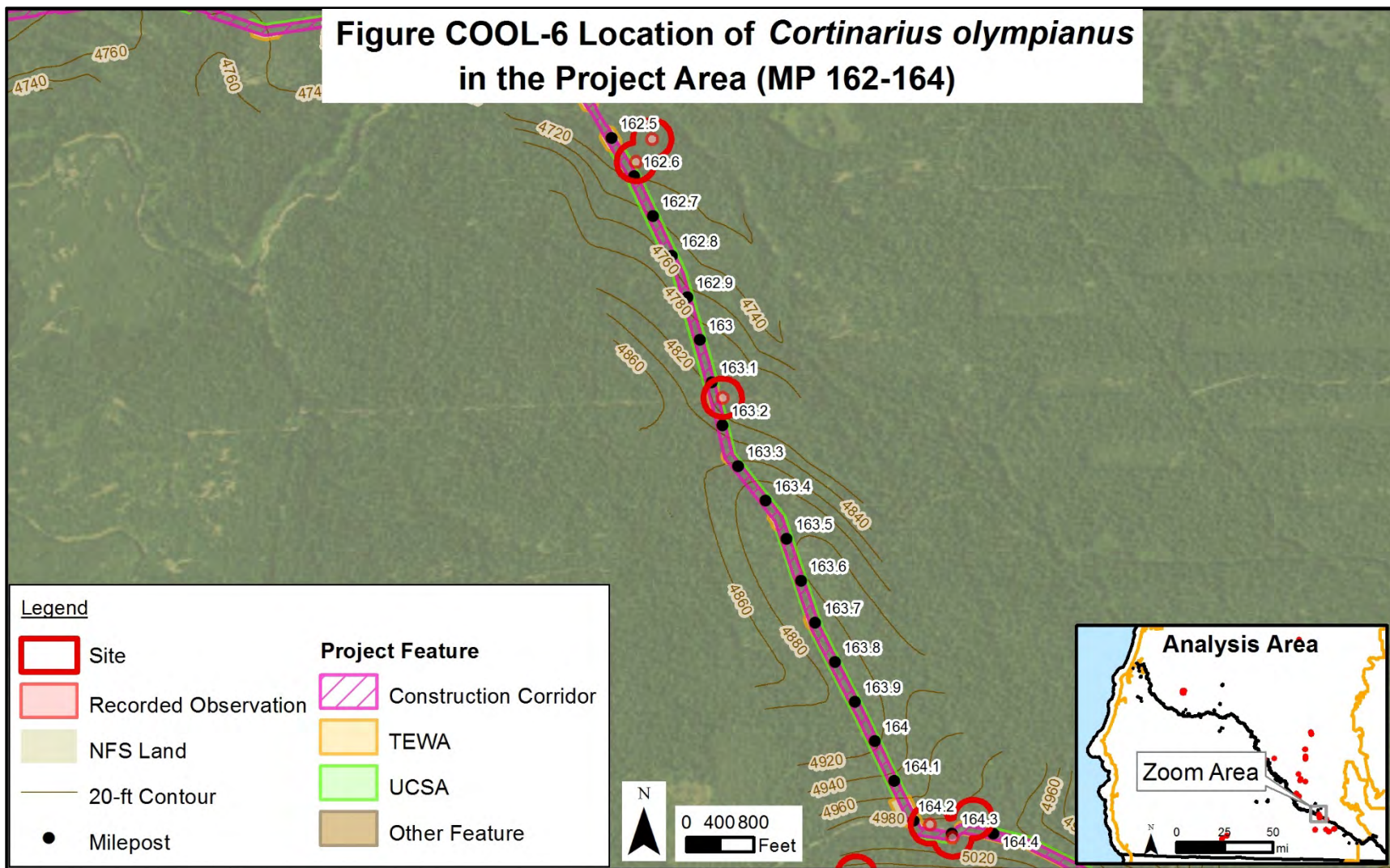
Based on this analysis, *C. olympianus* is not likely to persist at four of the five sites in the analysis area following project implementation. The site in the analysis area that is expected to persist is part of a small cluster of sites in the Little Butte Creek watershed in the Cascade Range. While the majority of the group will be removed by the PCGP project, one additional site would remain outside the analysis area, approximately 2 miles south of the analysis area site.

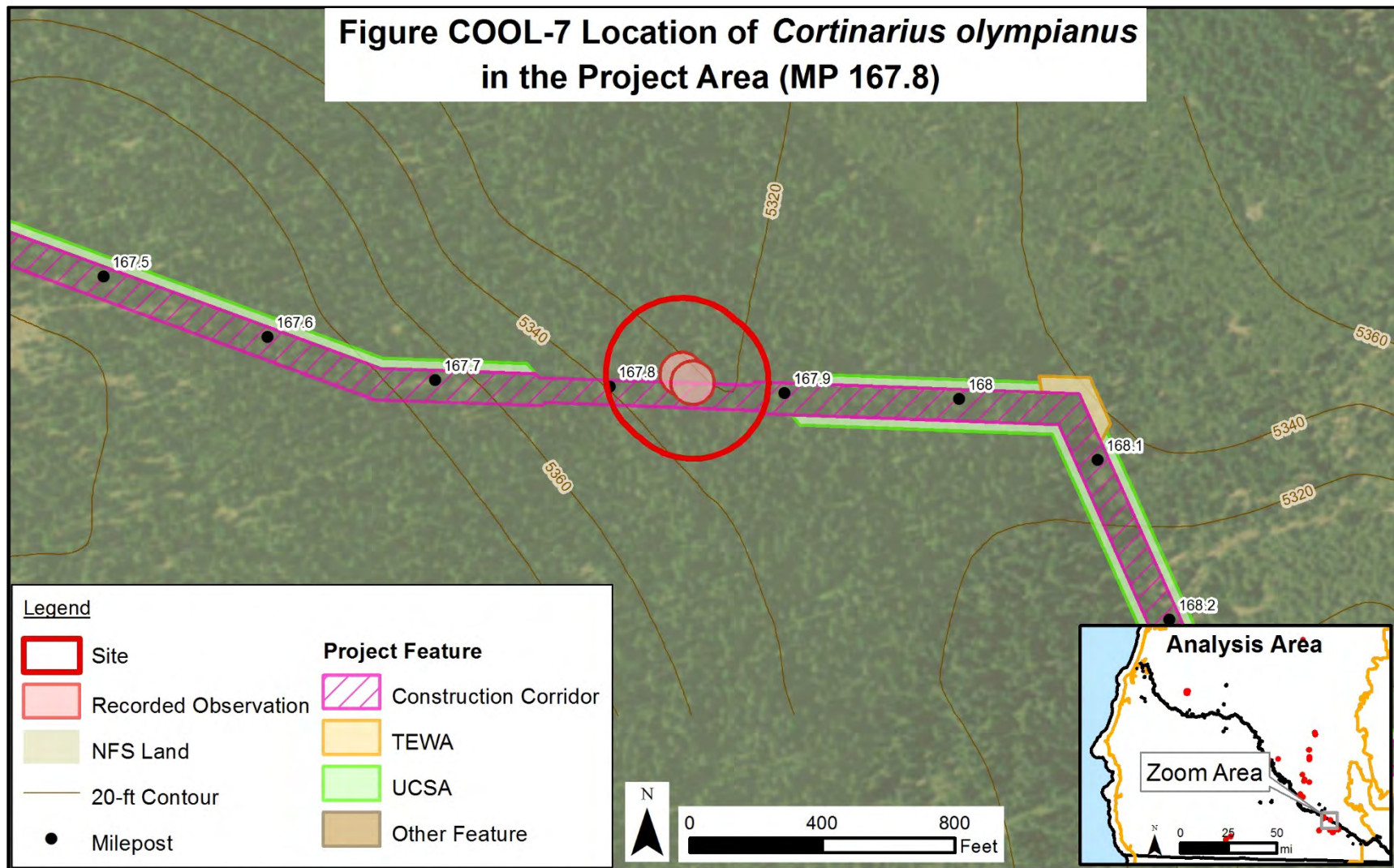
Across the project area, the PCGP Project would remove an estimated 816 acres of coniferous forests, including 227 acres of LSOG coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *C. olympianus*. Within this impact area, about 427 acres (about 52 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A 30-foot wide corridor would be maintained in low-growing vegetation across the project area, resulting in a loss of about 190 acres of coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the four sites as a result of the PCGP Project, two sites of *C. olympianus* would remain on NFS land in the local area, and 40 sites, including 23 in reserves, would remain on NFS lands in the NSO range. While an additional 11 sites would remain on BLM lands in the local area, they are located on Harvest Land Base and are not likely protected under BLM management. A total of 26 sites, including nine entirely in reserves would remain on BLM lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but the NFS sites would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 23 sites in NFS reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. While sites on BLM lands are not subject to S&M Standards and Guidelines protections, the nine sites entirely in reserves would likely receive some level of protection under BLM management.







Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states “instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision” (Standards and Guidelines, pg. 4). The Forest Service has embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *Cortinarius olympianus* is a Category B (rare) S&M species across the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information received since the species was listed in the 2001 ROD, however, indicates that the species is more common than previously documented, as described below:
 - *Cortinarius olympianus* has a wide, but scattered, distribution across nine physiographic provinces and three states the region and a moderate-high number of overall sites (44 on NFS lands, 73 on all lands). The species is most abundant in the Cascade Range and Klamath Mountains, but it does not appear to be well distributed in its range due to its scattered distribution. The currently known number of sites on NFS and BLM lands has increased by 28 sites since 2007, with many sites documented during the PCGP Project surveys.
 - An estimated 52 percent of the sites (37 sites) on NFS and BLM lands are in reserves, which is an increase of about four sites in reserves since 2006 per Molina (2008).
- Coniferous forests (general habitat for the species) are widespread across the region and encompass approximately 16.3 million acres on BLM and NFS lands with an estimated 61 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented.
- The PCGP Project would affect four of 44 NFS-managed sites of *C. olympianus*, representing approximately 9 percent of the sites on NFS lands in the NSO range. Assuming site persistence cannot be maintained at the four sites, a low-moderate number of sites (40) would remain on NFS lands in the region with a wide, but scattered, distribution across Washington, Oregon, and California. One site (in LSRs) would remain on NFS lands in the local vicinity of the analysis area. Nine sites would remain entirely in BLM reserves in the region. The distribution of sites and extent of the species’ range within the NSO range following implementation of the PCGP Project would be fairly similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at four sites in LSRs, but the percentage of sites in NFS reserves would be about the same (approximately 60 percent). Of the remaining sites in NFS reserves, 12 are in LSRs where management actions are restricted to those activities that benefit LSOG forests and 11 are in Congressionally Reserved areas where management activities that may adversely affect *C. olympianus* are unlikely. A total of nine sites would remain entirely in BLM reserves, including LSRs where management actions are restricted to those activities that benefit LSOG forests, District Designated Reserves where management activities that may adversely affect *C. olympianus* are

unlikely, and Riparian Reserves where management actions are restricted to those activities that benefit the conservation of riparian areas and riparian-associated species.

- The PCGP Project would result in a permanent loss of an estimated 190 acres of coniferous forests (less than 1 percent of the total regional acreage). An estimated 9.9 million acres (61 percent) of coniferous forests and 3.3 million acres (66 percent) of LSOG coniferous forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. olympianus*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. *Cortinarius olympianus* is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.11.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. olympianus* at five sites on NFS lands; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 40 sites would remain on NFS lands across the region and two sites would remain on NFS land in the local area. Additionally, nine sites would remain in BLM reserves in the region. Out of the four sites affected, three sites are in the Cascade Range where the species is fairly common. Several NFS sites are within 15 miles of the analysis area in the Cascade Range. The one site is affected in the Klamath Mountains is approximately 20 miles west of the same group of NFS sites in the Cascade Range. Many more sites are located on BLM lands in the local area and general vicinity in the Cascade Range; however, these sites are at least partially on Harvest Land Base and would not likely be protected. While the forests at these locations remain un-harvested, it can be assumed the sites would remain present and contribute to the species distribution and recolonization. The remaining *C. olympianus* sites would allow for dispersal between the Cascade Range and the Klamath Mountains. The species' distribution and range within the NSO range following project implementation would be fairly similar to its currently known distribution and range. *Cortinarius olympianus* would persist in the region without considering the five sites as part of the population.
- The PCGP Project would remove approximately 816 acres of coniferous forests and 227 acres of LSOG coniferous forests (a negligible amount of the forests). An estimated 52 percent of the forests would be restored to similar conditions or shrublands, but a 30-foot wide early-successional corridor would remain across the project area. An estimated 9.9 million acres (61 percent) of coniferous forests and 3.3 million acres (66 percent) of LSOG coniferous forests would remain in reserves in the NSO range. While *C. olympianus* is somewhat uncommon in the Klamath Mountains in the vicinity of the project area, two of the sites in the Klamath Mountains were found during recent PCGP surveys (2014 and 2016). The sites in the analysis area in the Cascade Range were also found during PCGP surveys in 2010. It is anticipated more sites are located in unsurveyed areas where suitable

habitat exists based on the increased number of sites documented with increased surveys since 1998.

- The remaining sites on NFS lands are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Additionally, the remaining sites in BLM reserves are expected to receive some level of protection under BLM management. Although a single natural disturbance event or combination of events could affect a significant portion of sites in the Cascade Range, other sites are scattered across the region and are less likely to be affected by a single event.

The PCGP Project would not be able to avoid impacts to all *C. olympianus* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the four *C. olympianus* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the NFS land management plans would waive implementation of Management Recommendations for *C. olympianus* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term. The monitoring plan shall be approved by the Forest Service.

2.12 CORTINARIUS VERRUCISPORUS

Cortinarius verrucisporus is a gilled mushroom species in the Cortinariaceae family and has no common name.

2.12.1 Regulatory Status and Ranking

The 2001 ROD, including the 2003 ASR modifications to the S&M species list, identifies *C. verrucisporus* as a Category B (rare) species. ORBIC evaluated *C. verrucisporus* in its 2004 *Survey and Manage Assessment* for BLM and the Forest Service (ORBIC 2004) and again in its most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2016). In 2016, the species was considered to be between at moderate risk of extinction due to a restricted range, relatively few populations, recent and widespread declines; and uncommon but not rare with some cause for long-term concern due to declines within its global range (G3G4). It is also considered to be at moderate to high risk of extinction due to a very restricted range, with very few populations and steep declines within Oregon (S2S3). It is not considered a BLM Sensitive or Strategic species in Oregon but it is considered a Forest Service Strategic species in Oregon.

2.12.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to this analysis. Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are discussed below under Persistence Evaluation. The background information in this section is used to support the persistence evaluation in the following section, which is updated with more recent information (e.g., recent survey data) specifically used for the persistence evaluation.

Life History

Cortinarius verrucisporus is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) and forms sporocarps beneath the soil surface (Castellano and O'Dell 1997). Fruiting generally occurs in spring and rarely in the fall (Desjardin et al. 2015). It is considered a sequestrate fungi and thus presumed to be dependent on mycophagy (consumption of fungi by animals) for spore dispersal (Castellano and O'Dell 1997). The species has moderate dispersal capability such that extirpated populations generally become reestablished through natural recolonization (unaided by humans) (ORBIC 2004).

Range

Cortinarius verrucisporus is known across western North America, located from Colorado and Idaho to the Pacific Northwest (ORBIC 2004). In the Pacific Northwest, the species has been found on east side of the Cascades in Washington, Oregon, and northern California as well as northern and central Sierra Nevada (ORBIC 2004). It is considered to have a fairly narrow range extent due to its limited habitat preference (ORBIC 2004). The currently known range of the species within the NSO range based on 2017 data is discussed below under Species Distribution.

Although information on the species' historical range is not known, it was likely similar to the current range, with populations distributed across western North America. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed below under Threats.

Population Status

ORBIC (2004) reported six to 20 occurrences of *C. verrucisporus* distributed across the species' range. In the Pacific Northwest, up to 20 occurrences were in California, less than five occurrences were in Oregon, and only one occurrence was in Washington (ORBIC 2004). Arora (1986) reported the species to be common in the Sierra Nevada but has been more recently reported by Desjardin et al. (2015) as being uncommon in the Sierra Nevada and Cascade Ranges. Long term trends for the species show relative stability to moderate decline in both its global range and in California; in Oregon the species is in moderate decline; and the long term trends is unknown in Washington (ORBIC 2004). The species was not found in any locations during Random Multi-Species surveys across the NSO range between 2001 and 2004 (USDA and USDI 2007). Molina (2008) documented three new sites of *C. verrucisporus* in the NSO range between 1998 and 2006, and 10 total sites were documented by 2006, including three in reserves or protected areas. The 2007 Final SEIS reported seven sites on NFS and BLM lands and eight total sites on all lands in the NSO range (USDA and USDI 2007).

Pre-disturbance surveys are not practical for Category B species. Instead, equivalent-effort surveys were conducted during the fall and spring from 2010 to 2016 in old-growth stands in the PCGP Project area and within 100 feet of habitat removal to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). The equivalent-effort surveys targeted all Category B species, including *C. verrucisporus*, and resulted in four new observations of individuals or populations of *C. verrucisporus*. Based on the increased number of known sites since 1998 as a result of the increased number of surveys (a 43 percent increase between 1998 and 2006 per Molina 2008 records), additional surveys would be expected to locate additional populations within the

NSO range, particularly in the Cascade Range where most observations have been reported. The current estimated number of sites and distribution of the species based on 2017 data are provided below under Species Distribution.

Habitat

Cortinarius verrucisporus prefers dry late-successional conifer forests in elevations above 4,000 feet msl. It has a solitary to scattered habit and forms mature sporocarps beneath the soil surface in association with the roots of California red fir and possibly other true fir species (Desjardin et al. 2015) as well as whitebark pine (*Pinus albicaulis*) (Moser 2004). Research in Yosemite National Park revealed that forested areas that were burned at least eight years before sampling had thicker litter layers than more recently burned sites, and these thicker layers were positively associated with truffles; including other sequestrate fungi such as *C. verrucisporus* (Meyer et al. 2008).

Threats

This taxon is believed to be at high risk in the Pacific Northwest because of its rarity and dependent mycorrhizal association with old-growth legacy, high-elevation conifers (Castellano and O'Dell 1997). Actions that disrupt stand conditions necessary for *C. verrucisporus* survival, particularly damage to host trees and soil disturbance, are major threats to this species. This includes logging that removes its presumed mycorrhizal host and other actions that cause disturbance to the soil, particularly road, trail, and campground construction (Castellano and O'Dell 1997). Other possible threats include hot fires, drought, climate change, and insect infestations.

Management Requirements

As a Category B S&M species, the direction under the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). This statement is no longer applicable on BLM lands under the 2016 BLM RMPs, although it is still valid on NFS lands within the range of the NSO. Management recommendations were developed for *C. verrucisporus* along with several other species (a subset of Group 10 of Castellano and O'Dell 1997). The primary guidance is to identify likely habitats on federal lands that may support populations, survey these sites to reveal populations, and manage them to retain forest structure and soil conditions. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *C. verrucisporus*:

- As a mycorrhizal species, *C. verrucisporus* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.12.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new site information, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. verrucisporus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and the Forest Service (Oregon/Washington regional offices) and converted into sites in accordance with the methodology described in Chapter 1. Table COVE-1 shows the total number of known sites in the regional (NSO range), local (18 5th-field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 83 observations from BLM and Forest Service geodatabases were converted into 52 sites in the NSO range (region). Table COVE-2 shows the total number of sites on NFS land and other land ownerships across the regional, local, and analysis areas. Table COVE-3 shows the total number of sites within each land use allocation defined in the 1994 ROD and 2016 RMPs across the regional, local, and analysis areas. Figure COVE-1 displays the regional distribution of the species across NFS lands, Figure COVE-2 displays the extent of known sites located in protected areas (NFS lands, NFS reserves, BLM reserves, and NPS lands), and Figure COVE-3 displays the species' regional distribution as well as the extent of coniferous forests above 4,000 feet and LSOG coniferous forests above 4,000 feet on BLM and NFS lands.

| TABLE COVE-1 | |
|---|-----------------|
| Number of <i>Cortinarius verrucisporus</i> Sites (2017) | |
| Location* | Number of Sites |
| Regional Area | 52 |
| Local Area | 17 |
| Analysis Area (Project Area) | 5 (5) |
| Data source: Processed BLM and Forest Service GIS data, August 2, 2017 | |
| *Definitions of regional, local, analysis, and project areas are provided in Chapter 1. | |

| TABLE COVE-2 | | | |
|---|----------------|-------------|---------------------|
| Distribution of <i>Cortinarius verrucisporus</i> across Federal, Private, and Other Lands | | | |
| Land Ownership | Regional Sites | Local Sites | Analysis Area Sites |
| Forest Service | 32 | 8 | 5 |
| BLM | 21 | 10 | - |
| NPS | - | - | - |
| Fish and Wildlife Service | - | - | - |
| Other (Private, State, etc.) | 5 | 3 | - |
| Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011 | | | |
| Notes: Columns are not additive because some sites occur on lands in multiple ownerships. | | | |

| TABLE COVE-3 | | | |
|---|----------------|-------------|---------------------|
| Distribution of <i>Cortinarius verrucisporus</i> across 1994 ROD and 2016 RMPs Land Allocations | | | |
| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
| Adaptive Management Area (AMA) | - | - | - |
| Adaptive Management Reserves (AMR) | - | - | - |
| Administratively Withdrawn (AW) | 11 | - | - |
| Congressionally Reserved (CR) | - | - | - |
| Late Successional Reserve (LSR) | 5 | - | - |
| Marbled Murrelet Area (LSR3) | - | - | - |
| Northern Spotted Owl Activity Center (LSR4) @/ | - | - | - |
| Managed Late Successional Area (MLSA) | 1 | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | 20 | 8 | 5 |
| Riparian Reserve | - | - | - |

TABLE COVE-3

| Distribution of <i>Cortinarius verrucisporus</i> across 1994 ROD and 2016 RMPs Land Allocations | | | |
|---|----------------|-------------|---------------------|
| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
| Bureau of Land Management | Regional Sites | Local Sites | Analysis Area Sites |
| Administratively Withdrawn (AW) | - | - | - |
| Congressional Reserve | - | - | - |
| District Designated Reserve | 10 | 6 | - |
| Harvest Land Base | 20 | 10 | - |
| Late Successional Reserve | 5 | 4 | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | - | - | - |
| Riparian Reserve | 1 | - | - |

Data sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0; 2016 RMP land allocation data, August 2016.
 Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
 a/ Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center.

Regional Distribution

Cortinarius verrucisporus has a somewhat limited distribution across two physiographic provinces in Oregon (Eastern Cascades), and California (Cascades) (see Figure COVE-1). All sites are found along the eastern Cascade Range, with sites generally clustered in three groups in central Oregon, southern Oregon, and northern California. Each group of sites is separated by 60 to 70 miles. *Cortinarius verrucisporus* does not appear to be well distributed within its range in the NSO range.

Five of 52 known sites are at least partially located on private or other lands; 21 sites are at least partially on BLM lands; and 32 sites are at least partially on NFS lands across the region. Sites included on National Forests that encompass the project area include 16 sites on the Fremont-Winema National Forest. The remaining sites on NFS lands include eight sites on the Deschutes National Forest and eight sites on the Shasta-Trinity National Forest.

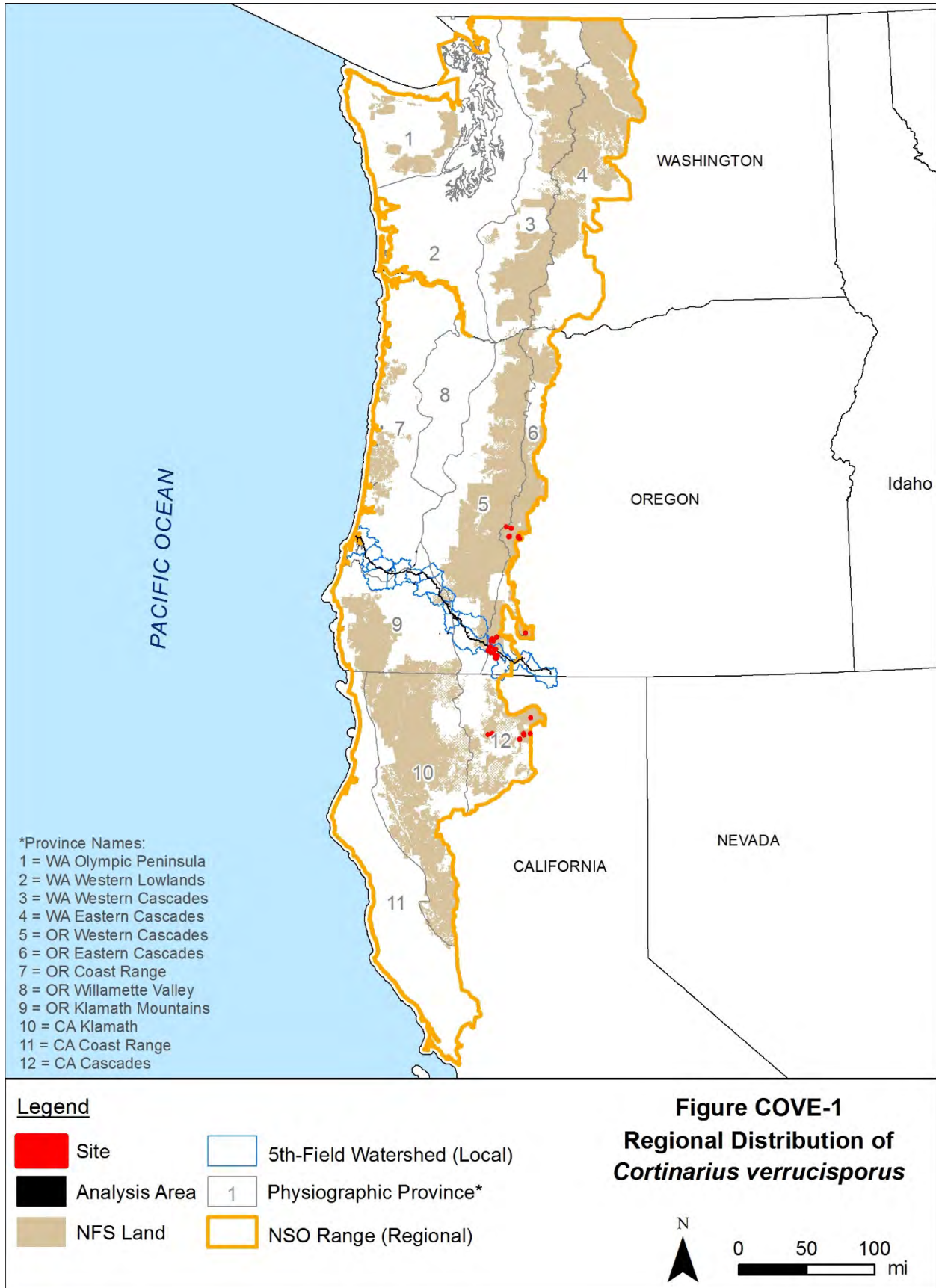
Across the NSO range, five sites are at least partially located in reserve lands managed by the Forest Service (LSRs) (see Figure COVE-2). This represents 16 percent of the total Forest Service-managed sites in the region. The remaining Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. Additionally, one site is entirely in reserve lands managed by BLM, which represents 5 percent of the total number of BLM-managed sites in the region. While sites on BLM lands are not covered by the S&M Standards and Guidelines, the single site entirely in reserves will likely receive some degree of protection under BLM reserve management.

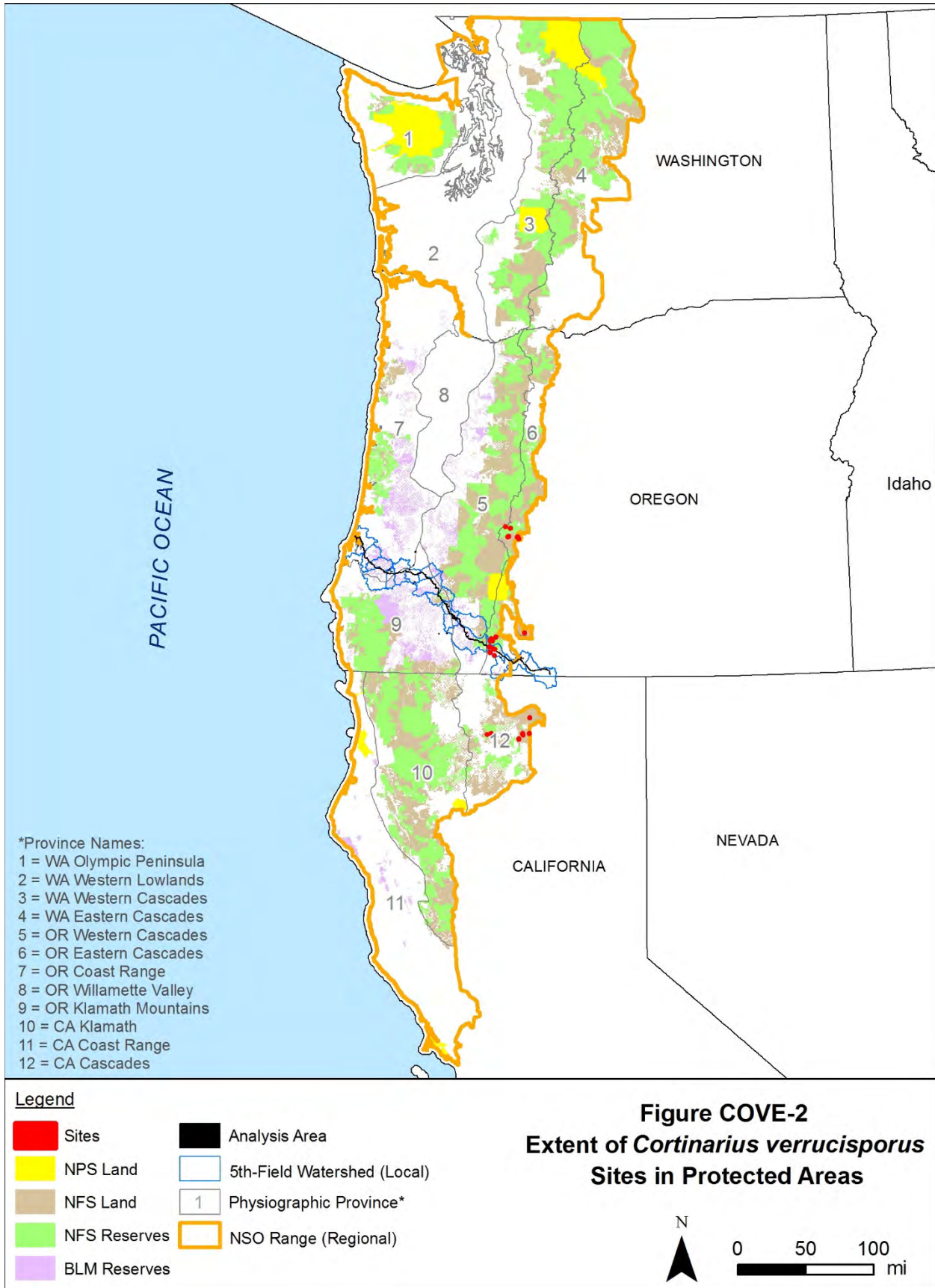
Cortinarius verrucisporus is more commonly found in LSOG forests based on available data (38 of 52 total sites are in LSOG), but it is also found in non-LSOG forests and may not be restricted to LSOG conditions based on available information on its life history and habitat requirements. Based on current site locations, the species is found in coniferous forests above 4,000 feet msl and has only been documented in Oregon and California. Due to the extent of known sites, the amount of potential habitat on both NFS and BLM lands in the region, and the level of protection offered by NFS and BLM reserve land, both land ownerships are included in this potential habitat discussion. Coniferous forests above 4,000 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *C. verrucisporus* and support additional sites. These forests encompass an estimated 7.5 million acres on BLM and NFS lands in the region,

including an estimated 4.7 million acres in reserve land allocations (63 percent of the forests; Table COVE-4). Of this acreage, an estimated 1.7 million acres are LSOG (see Figure COVE-3), including 1.1 million acres in reserve land allocations (67 percent of the forests). Although coniferous forests above 4,000 feet msl are widespread across the region, LSOG coniferous forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

| Location | Coniferous Forests above 4,000 feet | | LSOG Coniferous Forests above 4,000 feet | |
|---------------|-------------------------------------|-----------|--|-----------|
| | Total | Reserves | Total | Reserves |
| Regional Area | 7,471,720 | 4,733,729 | 1,688,359 | 1,127,276 |
| Local Area | 149,778 | 76,805 | 40,914 | 24,405 |
| Project Area | 422 | 277 | 122 | 76 |

Data source: Gradient nearest neighbor vegetation data from Moeur et al. 2011
 Note: Areas are presented in acres.
^{a/} The area estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.







Legend

- Site
- Analysis Area
- LSOG Conifer Above 4,000 ft
- Conifer Forests Above 4,000 ft
- 5th-Field Watershed (Local)
- 1 Physiographic Province*
- NSO Range (Regional)

Figure COVE-3
Potential Habitat For
Cortinarius verrucisporus



Local Distribution

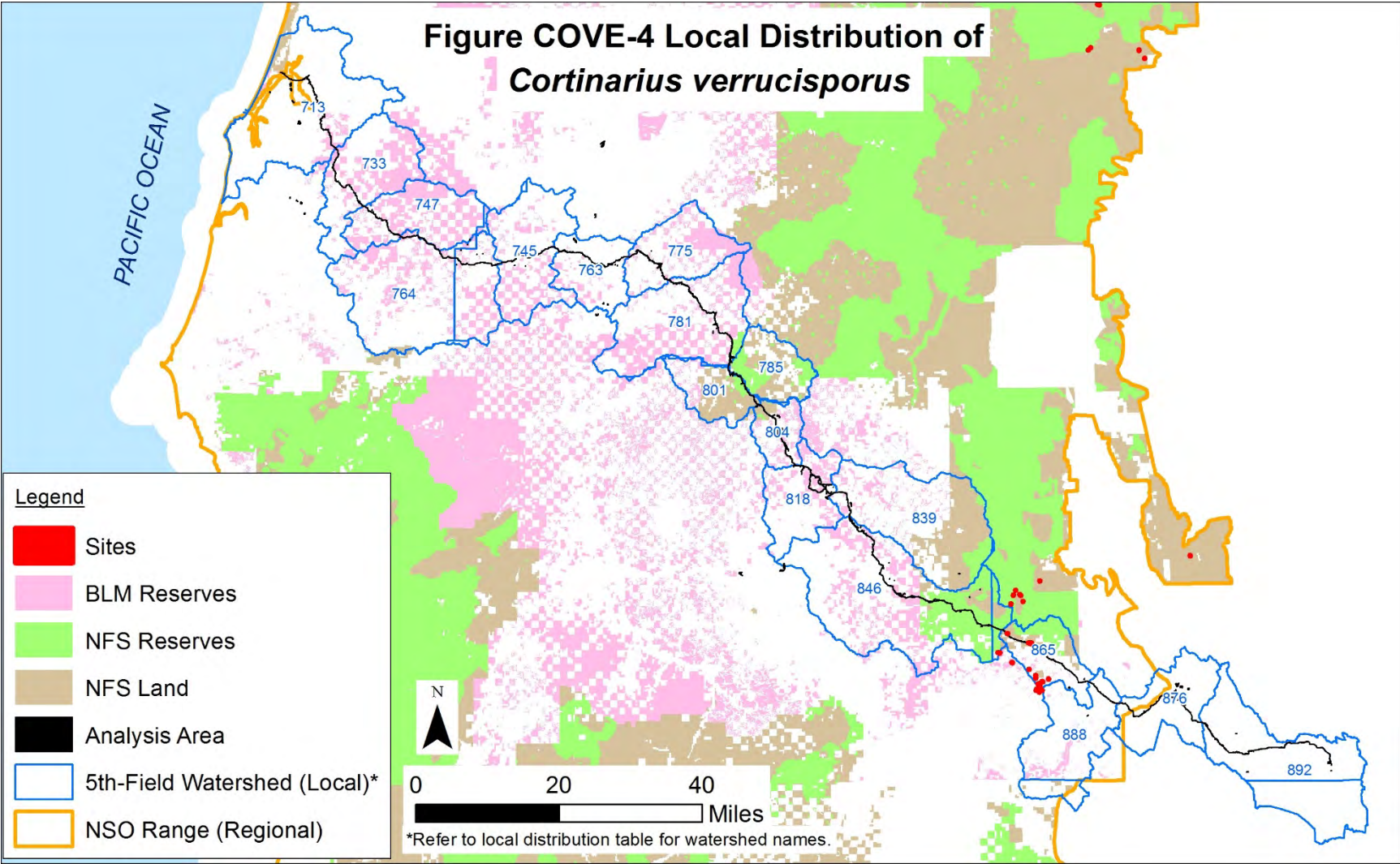
Within the local area, *C. verrucisporus* is found in two 5th-field watersheds that overlap the project area (see Table COVE-5 and Figure COVE-4). The 17 sites in the local area are clustered and near one another in the eastern Cascade Range. Across these watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous forests, and opportunities for dispersal exist within the local area and to nearby regional areas based on the proximity of other sites in the region. Many sites are located on NFS lands within 10 miles north of the project area. Many more sites occur approximately five miles south of the project area in the eastern Cascade Range, however, the majority of the sites are at least partially on Harvest Land Base and would not likely be protected under BLM management. The sites in the local area represent the southern extent of the central group of sites in southern Oregon, with the nearest sites located approximately 60 miles south of the local area in the Cascade Range in California.

| Watershed (HUC5 ID) | Number of Sites | Number of Sites in NFS Reserve Lands | Number of Sites in BLM Reserve Lands |
|--|-----------------|--------------------------------------|--------------------------------------|
| Big Butte Creek (839) | - | - | - |
| Coos Bay Frontal (713) | - | - | - |
| East Fork Coquille River (747) | - | - | - |
| Elk Creek-South Umpqua (785) | - | - | - |
| Klamath River-John C Boyle Reservoir (888) | - | - | - |
| Lake Ewauna-Upper Klamath River (876) | - | - | - |
| Little Butte Creek (846) | 2 | - | 2 |
| Lower Lost River (892) | - | - | - |
| Middle Fork Coquille River (764) | - | - | - |
| Middle South Umpqua River (763) | - | - | - |
| Myrtle Creek (775) | - | - | - |
| North Fork Coquille River (733) | - | - | - |
| Olalla Creek-Lookingglass Creek (745) | - | - | - |
| Rogue River-Shady Cove (818) | - | - | - |
| South Umpqua River (781) | - | - | - |
| Spencer Creek (865) | 15 | - | 7 |
| Trail Creek (804) | - | - | - |
| Upper Cow Creek (801) | - | - | - |

Data sources: Processed BLM and Forest Service GIS data, August 2, 2017; HUC5 Watershed layer, August 23, 2011
 Note: Number of sites in reserves include sites that are only partially in reserves.

Of the 17 sites in the local area, eight are at least partially on NFS lands, with all eight sites located on Other (Matrix). Three sites are partially on private lands and 10 sites are at least partially on BLM lands. While several sites on BLM lands in the local area are partially in reserves, all 10 sites on BLM lands are at least partially in Harvest Land Base.

Coniferous forests encompass approximately 149,778 acres on BLM and NFS lands in the local area, with 76,805 acres in reserve land allocations (51 percent of the forests). Of this acreage, an estimated 40,914 acres are LSOG, including 24,405 acres in reserves (60 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures COVE-3 and COVE-4).



Analysis/Project Area Distribution

The analysis and project areas contain five sites of *C. verrucisporus*, all of which are on NFS lands on the Fremont-Winema National Forest. The analysis area sites occur in one 5th-field watershed (Spencer Creek) in the eastern Cascade Range. Four sites are clustered in a group, while one site is fairly isolated, located approximately 4 miles west of the group of sites. Many sites are also located within the immediate vicinity of the analysis area in the eastern Cascade Range (see Local Distribution discussion above), including several sites within 10 miles. All five sites in the analysis area are located on lands designated as Other (Matrix). Surveys for the PCGP Project resulted in nine total observations of individuals of the species in or near the project area during 2010 (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). Six of these recorded observations comprise the five sites in the analysis area; the other observation is in a site outside the analysis area. Within the project area, one site is located at approximately MP 168.8 and the other four sites are between MPs 172.1 and 173.3.

Project Impacts

Analysis

The PCGP Project would affect five sites out of the 32 sites on NFS lands in the region, representing approximately 16 percent of the sites (or five out of 52 total sites on all lands in the NSO range). Table COVE-6 presents an overview of the features of the PCGP Project that would affect the *C. verrucisporus* sites. The construction corridor and associated work and storage areas would affect approximately 4.4 acres within the sites (about 28 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. verrucisporus* in and near the project area. Due to the proportion of sites affected, the effects on five sites could potentially alter the distribution of the species in the NSO range if site persistence is affected.

The following discussion provides an overview of the types of impacts that would be expected at the sites based on the features of the PCGP Project that could affect site persistence.

| TABLE COVE-6 | | |
|---|--------------------------|----------------------------------|
| Impacts to <i>Cortinarius verrucisporus</i> Sites on NFS Lands in the Project Area | | |
| Project Activity | Number of Sites Affected | Area of Disturbance within Sites |
| Construction Corridor | 5 | 3.4 ac |
| Temporary Extra Work Area (TEWA) | 2 | 0.5 ac |
| Uncleared Storage Area (UCSA) | 3 | 0.5 ac |
| Roads (TMP) | - | - |
| Other Minimal Disturbance Activities | - | - |
| ac = acres | | |
| Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities. | | |

The PCGP Project would result in ground disturbance and vegetation removal in five out of the seven sites in the analysis area (Table COVE-7). The only recorded observations of the species in three of the sites (MP 172.1, MP 172.5, and MP 173.3) would likely be removed by construction within the corridor or establishment of TEWAs (see Figures COVE-5 and COVE-6). The site at MP 168.8 is a large site and includes two observations, one of which is within a TEWA and would likely be removed. The remaining observation is outside the project area and would not be directly

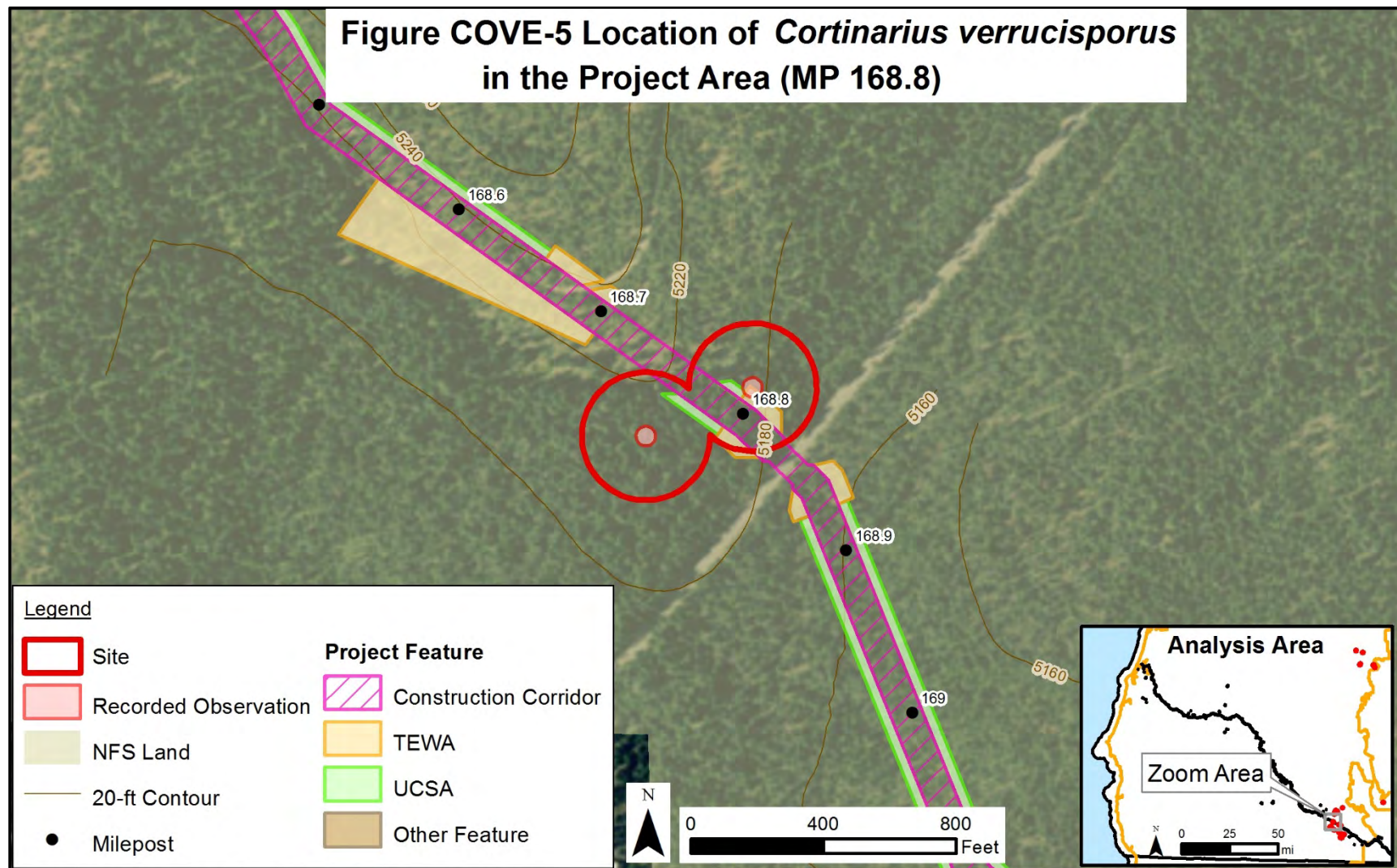
affected. The site at MP 172.6 includes one observation that is outside the project area and would not be directly affected. For all of the sites, individuals outside the corridor and TEWAs may also be subject to indirect effects associated with the PCGP Project based on the proximity of project activities to the sites, as discussed below.

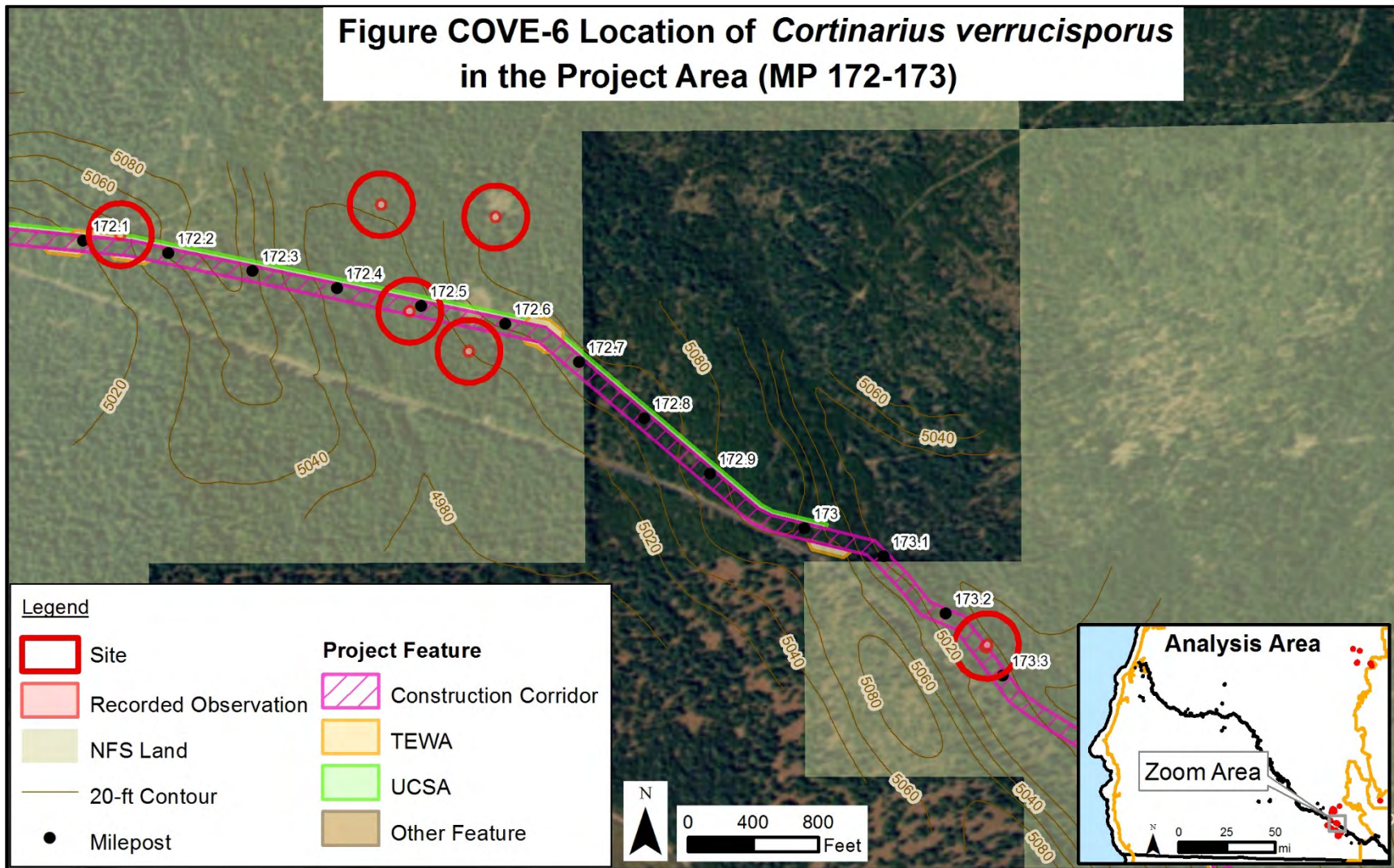
| Site Location | Source of Impacts | Area of Disturbance | Individuals Likely to Persist? |
|---------------|-------------------|---------------------|--------------------------------|
| MP 168.8 | Corridor | 0.8 ac | Yes |
| | TEWA | 0.2 ac | |
| | UCSA | 0.2 ac | |
| MP 172.1 | Corridor | 0.8 ac | No |
| | TEWA | 0.2 ac | |
| | UCSA | 0.1 ac | |
| MP 172.5 | Corridor | 0.8 ac | No |
| | UCSA | 0.2 ac | |
| MP 172.6 | Corridor | 0.2 ac | Yes |
| MP 173.3 | Corridor | 0.8 ac | No |

Notes: MP = milepost; ac = acres

Establishment of the 95-foot wide construction corridor and TEWAs would likely remove *C. verrucisporus* individuals in five sites and modify microclimate conditions around individuals that are not removed. The removal of forests and host trees and disturbance to soil could negatively affect *C. verrucisporus* in adjacent areas by removing its habitat, disturbing the roots of host trees, and affecting its mycorrhizal association with the trees, although the species appears to be somewhat resilient to edge effects in some areas (e.g., it has been found along roadsides). Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A 30-foot wide portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. *Cortinarius verrucisporus* is not likely to persist at three of the sites because of the extent of impacts within the sites and the proximity of the recorded observations to the corridor (see Table COVE-7). *Cortinarius verrucisporus* is likely to persist at the remaining two sites (MP 168.8 and MP 172.6), despite impacts to some individuals, because some observations within those sites are more than 100 feet from the corridor, where direct effects are not anticipated and indirect effects are unlikely. The site at MP 168.8 is comprised of two observations, one of which is located approximately 135 feet from the corridor in a moderately forested area and is likely to persist. The site at MP 172.6 is comprised of a single observation which is located approximately 140 feet downslope of the corridor in a heavily forested area and is likely to persist.

Based on this analysis, *C. verrucisporus* is not likely to persist at three of the five sites in the analysis area following project implementation. The two sites that are expected to persist in the analysis area are located in the eastern Cascade Range in southern Oregon and several sites are located on NFS lands in the vicinity. The species would continue to be locally abundant in the southern Cascade Range in Oregon. All three affected sites are on land designated as Other (Matrix).





Across the project area, the PCGP Project would remove an estimated 338 acres of coniferous forests, including 94 acres of LSOG coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *C. verrucisporus*. Within this impact area, about 188 acres (about 56 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A 30-foot wide corridor would be maintained in low-growing vegetation across the project area, resulting in a loss of about 85 acres of coniferous forests above 4,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the three sites as a result of the PCGP Project, five sites of *C. verrucisporus* would remain on NFS land in the local area. A total of 29 sites, including five in reserves, would remain on NFS lands in the NSO range. While an additional 10 sites would remain on BLM lands in the local area, they are located at least partially on Harvest Land Base and would not likely be protected under BLM management. A total of 21 sites, including one entirely in reserves would remain on BLM lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but the NFS sites would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The five sites in NFS reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. While sites on BLM lands are not subject to S&M Standards and Guidelines protections, the one site entirely in reserves would likely receive some level of protection under BLM management.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states “instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision” (Standards and Guidelines, pg. 4). The Forest Service has embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *Cortinarius verrucisporus* is a Category B (rare) S&M species across the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information received since the species was listed in the 2001 ROD, however, indicates that more information about the species’ distribution is available, as described below:
 - *Cortinarius verrucisporus* has a somewhat limited distribution across two physiographic provinces and two states the region and a low-moderate number of overall sites (32 on NFS lands, 52 on all lands). The species does not appear to be well distributed in its range. The currently known number of sites on NFS and BLM lands has increased by 45 sites since 2007, with several sites documented during the PCGP Project surveys.

- An estimated 12 percent of the sites (6 sites) are in NFS or BLM reserves, which is an increase of about three sites in reserves since 2006 per Molina (2008).
- Coniferous forests above 4,000 feet msl (general habitat for the species) are widespread across the region and encompass approximately 7.5 million acres on BLM and NFS lands with an estimated 63 percent in reserves. Most of the forests are found in the Cascade Range where all sites are documented.
- The PCGP Project would affect three of 32 Forest Service-managed sites of *C. verrucisporus*, representing approximately 9 percent of the sites on NFS lands in the NSO range. Assuming site persistence cannot be maintained at the five sites, a low-moderate number of sites (29) would remain on NFS lands in the region with a somewhat limited distribution in the Cascade Range in Oregon and California. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be fairly similar to the currently documented distribution and range.
- The PCGP Project would not affect site persistence at sites in reserves, and the percentage of sites in NFS reserves would remain about the same (17 percent). The five sites in NFS reserves are in LSRs where management actions are restricted to those activities that benefit LSOG forests. One site would remain entirely on LSRs and Riparian Reserves on BLM lands.
- The PCGP Project would result in a permanent loss of an estimated 85 acres of coniferous forests above 4,000 feet msl (less than 1 percent of the total regional acreage). An estimated 4.7 million acres (63 percent) of coniferous forests above 4,000 feet msl and 1.1 million acres (67 percent) of LSOG coniferous forests above 4,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. verrucisporus*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. *Cortinarius verrucisporus* is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.12.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. verrucisporus* at five sites on NFS lands; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 29 sites would remain on NFS lands across the region and five sites would remain on NFS land in the local area. Additionally, one site would remain entirely in BLM reserves in the region. The three sites affected are in the eastern Cascade Range in southern Oregon where the species is fairly common. Several sites are located on NFS lands within 10 miles north of the project area. Many more sites are located on BLM lands in the general vicinity; however, most are at least partially on Harvest Land Base and would not likely be protected. For the time that the sites remain on BLM lands,

it can be assumed the sites would contribute to the species distribution and recolonization in the area. The remaining sites in southern Oregon would allow for dispersal between groups of sites across the Cascade Range in Oregon and California. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *Cortinarius verrucisporus* would persist in the region without considering the five sites as part of the population.

- The PCGP Project would remove approximately 338 acres of coniferous forests above 4,000 feet msl and 94 acres of LSOG coniferous forests above 4,000 feet msl (a negligible amount of the forests). An estimated 56 percent of the forests would be restored to similar conditions or shrublands, but a 30-foot wide early-successional corridor would remain across the project area. An estimated 4.7 million acres (63 percent) of coniferous forests above 4,000 feet msl and 1.1 million acres (67percent) of LSOG coniferous forests above 4,000 feet msl would remain in reserves in the NSO range. It is anticipated more sites are located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites on NFS lands are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Additionally, the single site in BLM reserves are expected to receive some level of protection under BLM management. Although a single natural disturbance event or combination of events could affect a significant portion of sites in the Cascade Range, other sites are scattered across Oregon and California and are less likely to be affected by a single event.

The PCGP Project would not be able to avoid impacts to all *C. verrucisporus* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the three *C. verrucisporus* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the NFS land management plan that applies to the affected sites would waive implementation of Management Recommendations for *C. verrucisporus* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term. The monitoring plan shall be approved by the Forest Service.

2.13 CUDONIA MONTICOLA

Cudonia monticola is a litter saprobe in the Cudoniaceae family and is commonly known as mountain cudonia.

2.13.1 Regulatory Status and Ranking

The 2001 ROD, including the 2003 ASR modifications to the S&M species list, identifies *C. monticola* as a Category B (rare) species. ORBIC evaluated *C. monticola* in its 2004 *Survey and Manage Assessment* for BLM and the Forest Service (ORBIC 2004) and again in its publication of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2007) but it was not included in the 2010 or subsequent publications. In 2007, the species was considered to be at moderate risk of extinction due to a restricted range, relatively few populations, and recent and widespread declines within its global range and in Oregon (G3, S3, respectively). It was also considered at

high risk of extinction due to a very restricted range, very few populations and steep declines within Oregon (S2). The species is not currently on any ORBIC lists. It is not considered a Forest Service or BLM Sensitive or Strategic species in Oregon.

2.13.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to this analysis. Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are discussed below under Persistence Evaluation. The background information in this section is used to support the persistence evaluation in the following section, which is updated with more recent information (e.g., recent survey data) specifically used for the persistence evaluation.

Life History

Cudonia monticola is a saprophytic fungus which feeds on dead and decaying organic material and plays a vital role in decomposition and nutrient recycling (Cushman and Huff 2007). Fruit bodies can be found in the spring (Arora 1986), late summer, and autumn (Castellano et al. 2003) but are irregular and seldom abundant (ORBIC 2004). Optimal moisture and cool to moderate temperatures are required for fruiting to occur (ORBIC 2004). Spores are produced on the surface of the head, not on the gills (ORBIC 2004) and very little is known about its dispersal mechanisms or reproductive biology.

Range

Cudonia monticola is endemic to western North America, and has been documented from British Columbia south to northern California. It has also been located from Arizona to Wyoming and Idaho (ORBIC 2004). In the Pacific Northwest, it has been documented on the west coast, Cascade Range, and Klamath Mountains (ORBIC 2004). The currently known range of the species within the NSO range based on 2017 data is presented below under Species Distribution.

Although information on the species' historical range is not known, it was likely similar to the current range, with populations distributed across western North America. Local distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed below under Threats.

Population Status

ORBIC (2004) reported 17 occurrences of *C. monticola* within Washington, Oregon, and California. An estimated 13 occurrences were in Oregon, one to five occurrences were in California, and three occurrences were in Washington (ORBIC 2004). The number of occurrences in British Columbia, Arizona, Wyoming, and Idaho is unknown. Long term trends for the species are unknown (ORBIC 2004). The species was found in six locations during Random Multi-Species surveys across the NSO range between 2001 and 2004 (USDA and USDI 2007). Molina (2008) documented 25 new sites of *C. monticola* in the NSO range between 1998 and 2006, and 28 total sites were documented by 2006, including 14 in reserves or protected areas. The 2007 Final SEIS reported 12 sites on NFS and BLM lands and 12 total sites on all lands in the NSO range (USDA and USDI 2007).

Pre-disturbance surveys are not practical for Category B species. Instead, equivalent-effort surveys were conducted during the fall and spring from 2010 to 2016 in old-growth stands in the PCGP Project area and within 100 feet of habitat removal to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). The equivalent-effort surveys targeted all Category B species, including *C. monticola*, and resulted in one new observation of individuals or populations of *C. monticola*. Based on the increased number of known sites since 1998 as a result of the increased number of surveys (an approximately nine-fold increase between 1998 and 2006 per Molina 2008 records), additional surveys would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2017 data are provided below under Species Distribution.

Habitat

Cudonia monticola is found on woody debris and spruce needles (Castellano et al. 2003) in mature, moist coniferous forests with white fir, Douglas fir and pine (Knorr 2007). It is often found in areas with thick duff or moss that is shaded much of the day so the humidity remains high at the ground level (ORBIC 2004). It is also associated with decomposed wood which may be buried (ORBIC 2004).

Threats

Ground-disturbing activities that reduce the amount of rotting wood and interrupt the addition of fresh wood to rot could impact the species (ORBIC 2004). Other threats include logging, thinning, or other activities that would change the humidity, light patterns, and composition of its habitat (ORBIC 2004). It can also be negatively affected by canopy removal, which is needed to retain moisture within the litter layer.

Management Recommendations

As a Category B S&M species, the direction under the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). This statement is no longer applicable on BLM lands under the 2016 BLM RMPs, although it is still valid on NFS lands within the range of the NSO. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *C. monticola*:

- As a litter saprobe, *C. monticola* feeds on dead and decaying organic material and plays a vital role in decomposition and nutrient recycling. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.13.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new site information, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *C. monticola* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and the Forest Service (Oregon/Washington regional offices) and converted into sites in accordance with the methodology described in Chapter 1. Table CUMO-1 shows the total number of known sites in the regional (NSO range), local (18 5th-field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 95 observations from BLM and Forest Service geodatabases were converted into 82 sites in the NSO range (region). Table CUMO-2 shows the total number of sites on NFS land and other land ownerships across the regional, local, and analysis areas. Table CUMO-3 shows the total number of sites within each land use allocation defined in the 1994 ROD and 2016 RMPs across the regional, local, and analysis areas. Figure CUMO-1 displays the regional distribution of the species across NFS lands, Figure CUMO-2 displays the extent of known sites located in protected areas (NFS lands, NFS reserves, BLM reserves, and NPS lands), and Figure CUMO-3 displays the species' regional distribution as well as the extent of coniferous forests below 6,000 feet msl and LSOG coniferous forests below 6,000 feet msl on BLM and NFS lands.

| TABLE CUMO-1 | |
|---|-----------------|
| Number of <i>Cudonia monticola</i> Sites (2017) | |
| Location* | Number of Sites |
| Regional Area | 82 |
| Local Area | 19 |
| Analysis Area (Project Area) | 1 (1) |
| Data source: Processed BLM and Forest Service GIS data, August 2, 2017 | |
| *Definitions of regional, local, analysis, and project areas are provided in Chapter 1. | |

| TABLE CUMO-2 | | | |
|---|----------------|-------------|---------------------|
| Distribution of <i>Cudonia monticola</i> across Federal, Private, and Other Lands | | | |
| Land Ownership | Regional Sites | Local Sites | Analysis Area Sites |
| Forest Service | 35 | 1 | 1 |
| BLM | 45 | 17 | - |
| NPS | - | - | - |
| Fish and Wildlife Service | - | - | - |
| Other (Private, State, etc.) | 10 | 4 | - |
| Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011 | | | |
| Notes: Columns are not additive because some sites occur on lands in multiple ownerships. | | | |

| TABLE CUMO-3 | | | |
|---|----------------|-------------|---------------------|
| Distribution of <i>Cudonia monticola</i> across 1994 ROD and 2016 RMPs Land Allocations | | | |
| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
| Adaptive Management Area (AMA) | 5 | - | - |
| Adaptive Management Reserves (AMR) | - | - | - |
| Administratively Withdrawn (AW) | 2 | - | - |
| Congressionally Reserved (CR) | 4 | - | - |
| Late Successional Reserve (LSR) | 7 | - | - |
| Marbled Murrelet Area (LSR3) | - | - | - |
| Northern Spotted Owl Activity Center (LSR4) a/ | - | - | - |
| Managed Late Successional Area (MLSA) | - | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | 19 | 1 | 1 |
| Riparian Reserve | - | - | - |

| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
|------------------------------------|----------------|-------------|---------------------|
| Bureau of Land Management | Regional Sites | Local Sites | Analysis Area Sites |
| Administratively Withdrawn (AW) | - | - | - |
| Congressional Reserve | - | - | - |
| District Designated Reserve | 9 | 2 | - |
| Harvest Land Base | 19 | 5 | - |
| Late Successional Reserve | 28 | 15 | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | - | - | - |
| Riparian Reserve | 22 | 5 | - |

Data sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0; 2016 RMP land allocation data, August 2016.

Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.

a/ Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center.

Regional Distribution

Cudonia monticola has a wide, but scattered, distribution across seven physiographic provinces in Washington (Western and Eastern Cascades), Oregon (Coast Range, Cascades East and West, and Klamath Mountains), and California (Klamath) (see Figure CUMO-1). Most sites are found along the Cascade Range in Oregon, with scattered sites or groups of sites in the Klamath Mountains, Coast Range, and other outlying areas. Although *C. monticola* is widely distributed across the NSO range, its distribution is scattered with few clusters of sites, despite the extent of forests that may provide suitable habitat, and the species does not appear to be well distributed within its range in the NSO range.

Ten of 82 known sites are at least partially located on private or other lands; 45 sites are at least partially on BLM lands; and 35 sites are at least partially on NFS lands across the region. Sites included on National Forests that encompass the project area include five sites on the Umpqua National Forest and three sites on the Rogue River-Siskiyou National Forest. The remaining 27 sites on NFS lands are on the Deschutes, Gifford Pinchot, Mt. Baker-Snoqualmie, Mt. Hood, Okanogan-Wenatchee, Siuslaw, Six Rivers, and Willamette National Forests.

Across the NSO range, nine sites are entirely located in reserve lands managed by the Forest Service, including seven sites at least partially in LSRs and four sites at least partially in Congressionally Reserved areas (see Figure CUMO-2). This represents 26 percent of the total Forest Service-managed sites in the region. The remaining Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. Additionally, 26 sites are entirely in reserve lands managed by BLM, which represents 58 percent of the total number of BLM-managed sites in the region. While the sites on BLM lands are not covered by the S&M Standards and Guidelines, the sites entirely in reserves will likely receive some degree of protection under BLM reserve management.

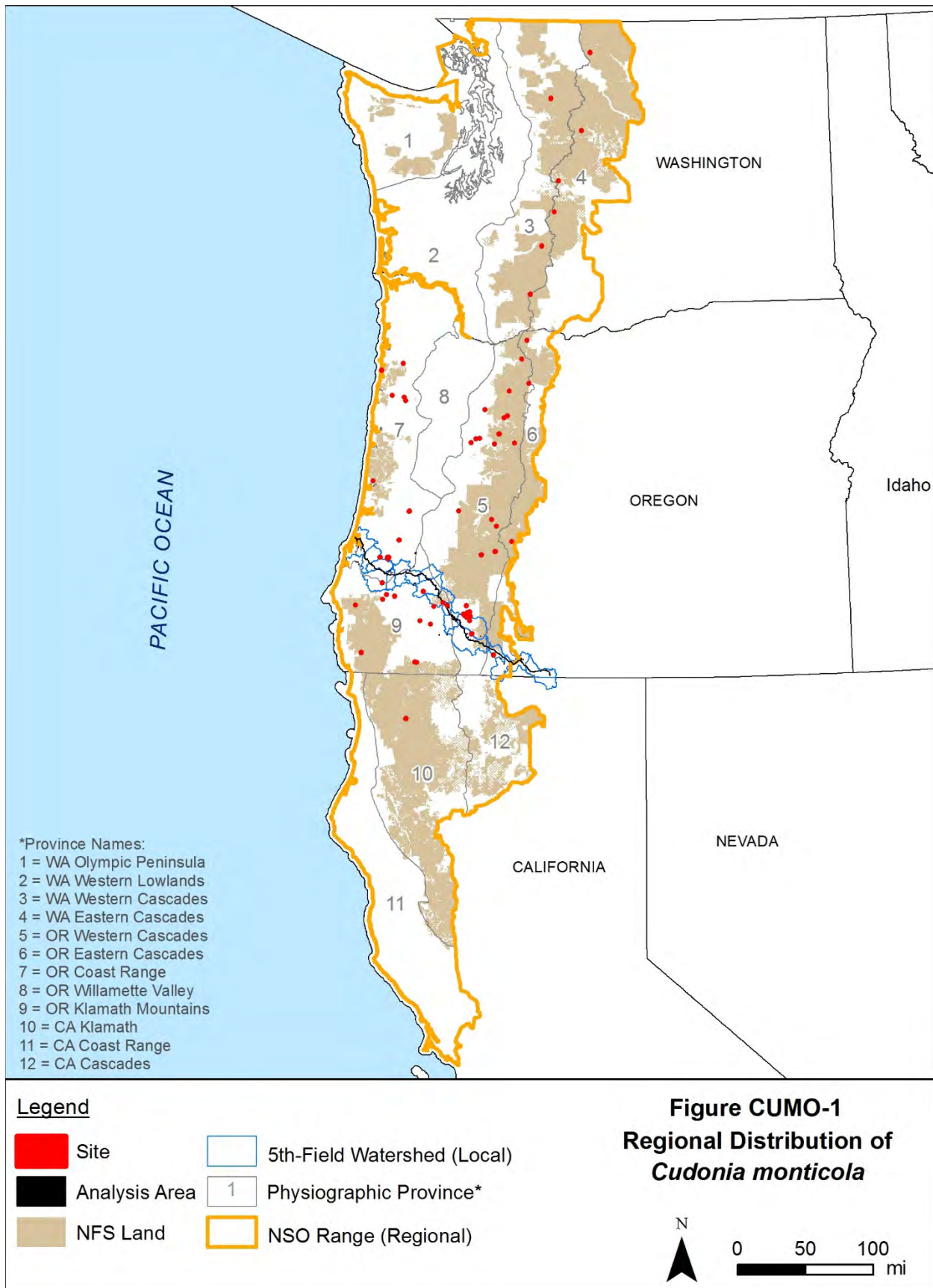
Cudonia monticola is primarily found in LSOG forests based on available data (66 of 82 total sites are in LSOG), but it is also found in non-LSOG forests and may not be restricted to LSOG conditions based on available information on its life history and habitat requirements. Based on current site locations, the species is found in coniferous forests below 6,000 feet msl and has been

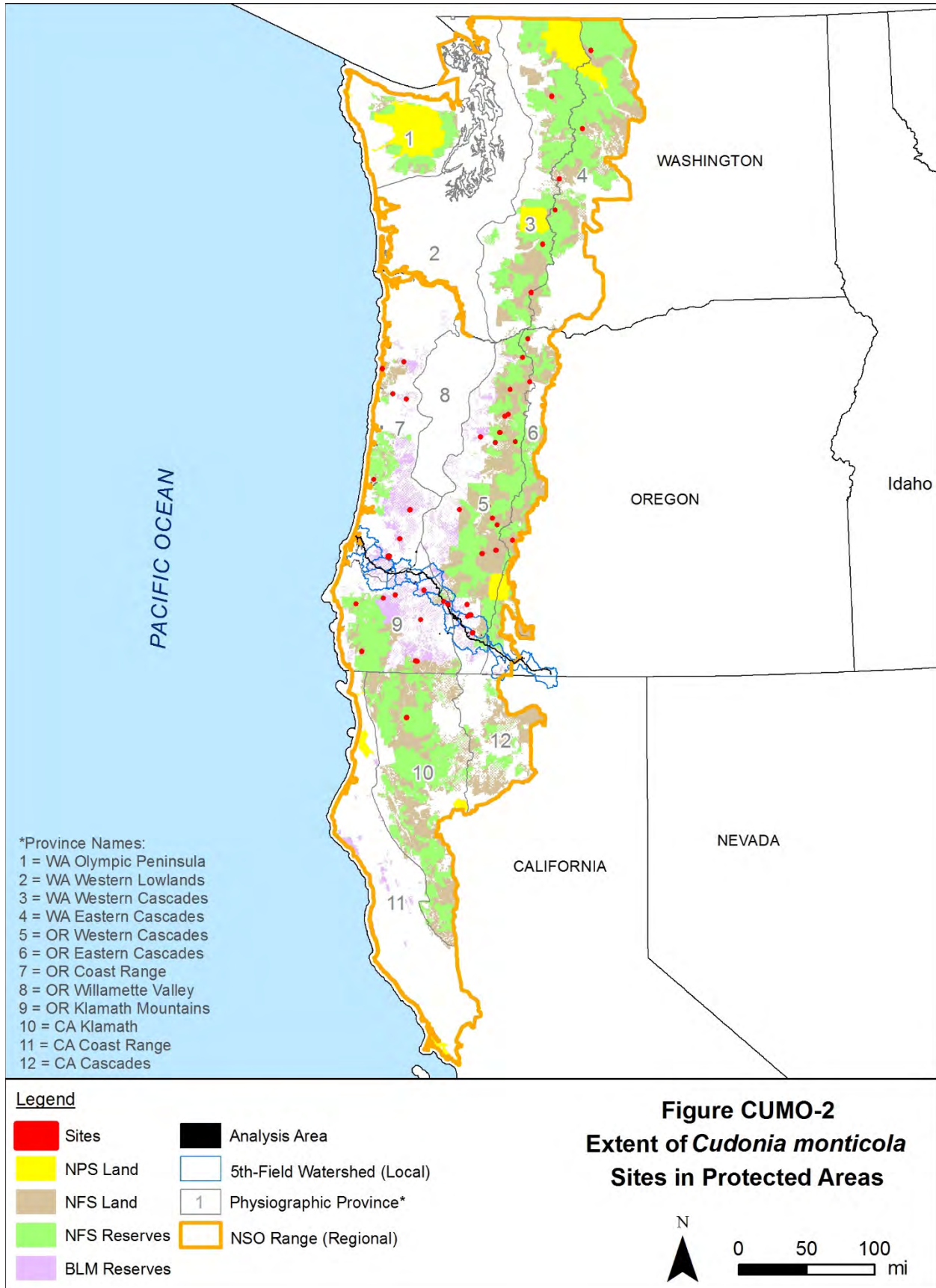
documented in most of the NSO range. Due to the extent of known sites, the amount of potential habitat on both NFS and BLM lands in the region, and the level of protection offered by NFS and BLM reserve land, both land ownerships are included in this potential habitat discussion. Coniferous forests below 6,000 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *C. monticola* and support additional sites. These forests encompass an estimated 15.1 million acres on BLM and NFS lands in the region, including an estimated 9.1 million acres in reserve land allocations (60 percent of the forests; Table CUMO-4). Of this acreage, an estimated 4.9 million acres are LSOG (see Figure CUMO-3), including 3.2 million acres in reserve land allocations (66 percent of the forests). Although coniferous forests below 6,000 feet msl are widespread across the region, LSOG coniferous forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

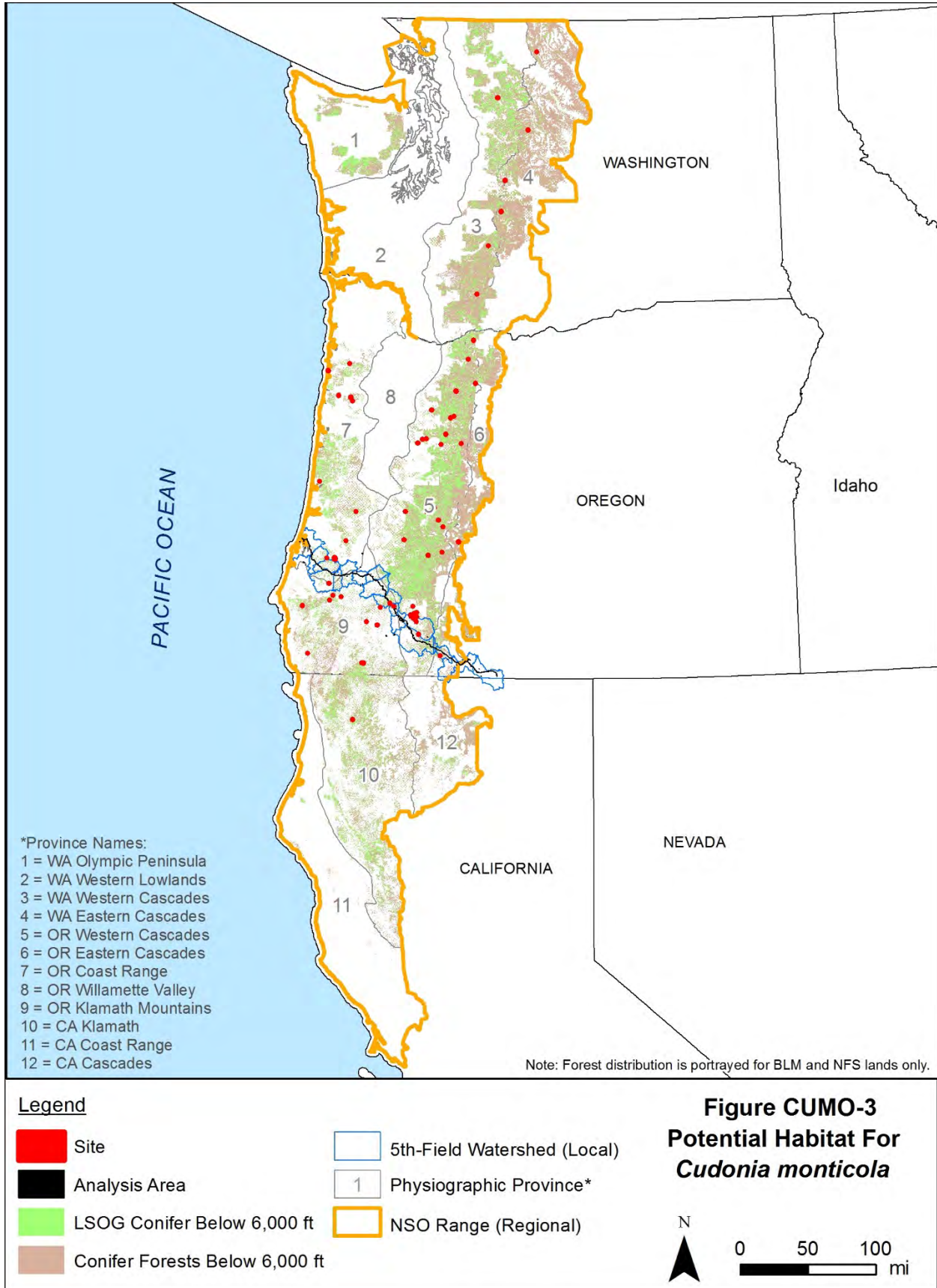
TABLE CUMO-4

| Extent of Forests That Could Provide Habitat for <i>Cudonia monticola</i> on NFS and BLM Lands ^{a/} | | | | |
|--|-------------------------------------|-----------|--|-----------|
| Location | Coniferous Forests below 6,000 feet | | LSOG Coniferous Forests below 6,000 feet | |
| | Total | Reserves | Total | Reserves |
| Regional Area | 15,108,825 | 9,057,899 | 4,869,845 | 3,235,553 |
| Local Area | 442,108 | 276,754 | 159,211 | 114,927 |
| Project Area | 10,23 | 691 | 298 | 211 |

Data source: Gradient nearest neighbor vegetation data from Moeur et al. 2011
 Note: Areas are presented in acres.
^{a/} The area estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.







Local Distribution

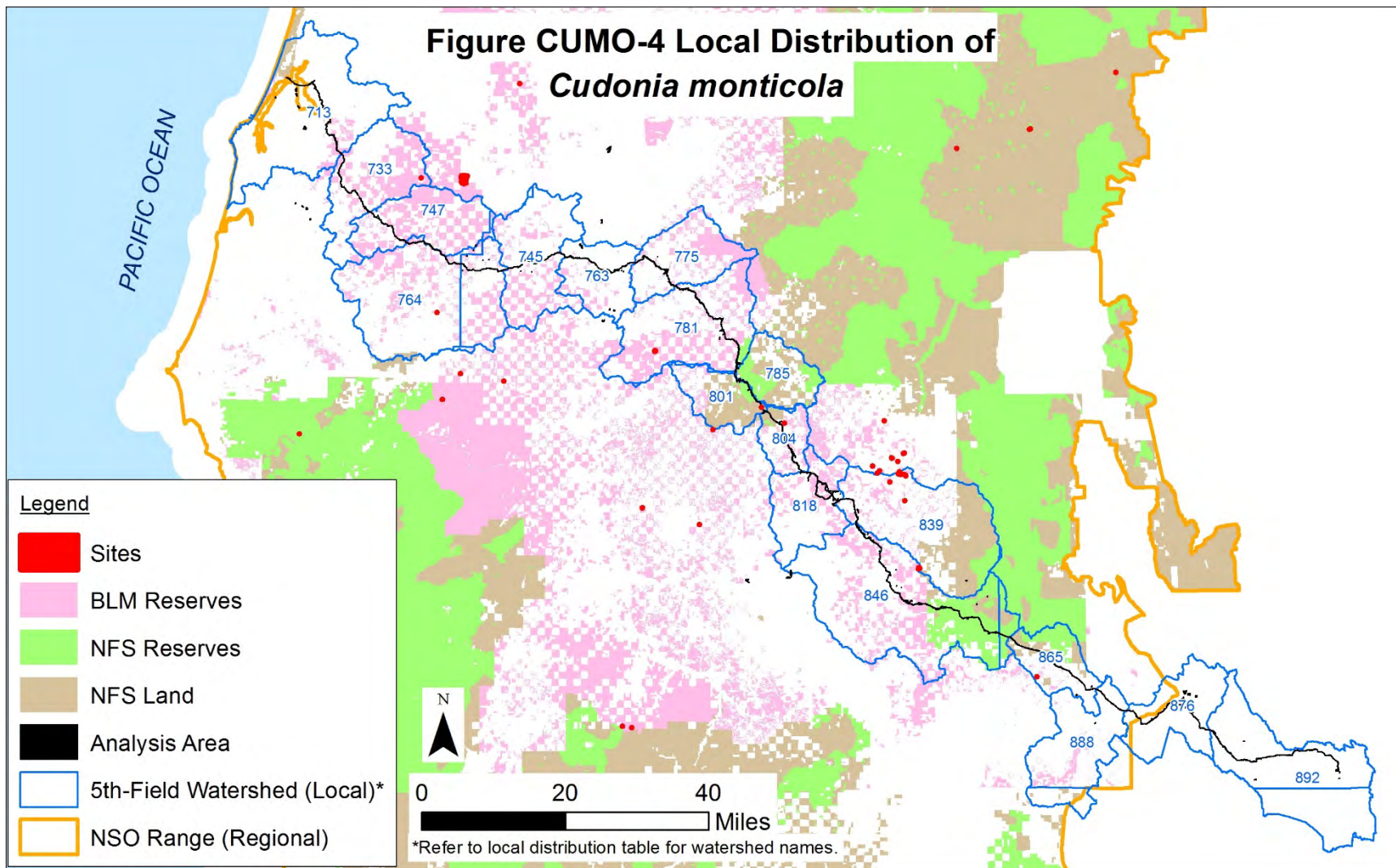
Within the local area, *C. monticola* is distributed across eight 5th-field watersheds that overlap the project area (see Figure CUMO-4 and Table CUMO-5.) The 19 sites in the local area are scattered across the majority of the project area, with several clustered sites located in the Big Butte Creek and Little Butte Creek watersheds in the western Cascade Range. The remaining watersheds contain fairly isolated or scattered sites. Across these watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous forests below 6,000 feet msl, and opportunities for dispersal exist within the local area and to nearby regional areas based on the proximity of other sites in the region. Several sites are located approximately 10 miles north of the project area in the Cascade Range, several more sites are located within 20 miles south of the project area in the Klamath Mountains, and one large multi-observation site is located 10 miles north of the project in the Coast Range. The majority of these nearby regional sites are either on NFS lands or located entirely in BLM reserves.

Of the 19 sites in the local area, one is on NFS lands on lands designated as Other (Matrix). Four sites are at least partially on private lands and 17 sites are at least partially on BLM lands. Of the sites on BLM lands, 12 sites are entirely in BLM reserves, representing 71 percent of the sites on BLM lands in the local area.

Coniferous forests below 6,000 feet msl encompass approximately 442,108 acres on BLM and NFS lands in the local area, with 276,754 acres in reserve land allocations (63percent of the forests). Of this acreage, an estimated 159,211 acres are LSOG, including 114,927 acres in reserves (72 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures CUMO-3 and CUMO-4).

| Watershed (HUC5 ID) | Number of Sites | Number of Sites in NFS Reserve Lands | Number of Sites in BLM Reserve Lands |
|--|-----------------|--------------------------------------|--------------------------------------|
| Big Butte Creek (839) | 9 | - | 9 |
| Coos Bay Frontal (713) | - | - | - |
| East Fork Coquille River (747) | - | - | - |
| Elk Creek-South Umpqua (785) | - | - | - |
| Klamath River-John C Boyle Reservoir (888) | - | - | - |
| Lake Ewauna-Upper Klamath River (876) | - | - | - |
| Little Butte Creek (846) | 4 | - | 4 |
| Lower Lost River (892) | - | - | - |
| Middle Fork Coquille River (764) | 1 | - | 1 |
| Middle South Umpqua River (763) | - | - | - |
| Myrtle Creek (775) | - | - | - |
| North Fork Coquille River (733) | 1 | - | - |
| Olalla Creek-Lookingglass Creek (745) | - | - | - |
| Rogue River-Shady Cove (818) | - | - | - |
| South Umpqua River (781) | 1 | - | 1 |
| Spencer Creek (865) | 1 | - | 1 |
| Trail Creek (804) | 1 | - | 1 |
| Upper Cow Creek (801) | 1 | - | - |

Data sources: Processed BLM and Forest Service GIS data, August 2, 2017; HUC5 Watershed layer, August 23, 2011
 Note: Number of sites in reserves may include sites that are only partially in reserves.



Analysis/Project Area Distribution

The analysis and project areas contain one *C. monticola* site, located in the Upper Cow Creek watershed on the Umpqua National Forest. The analysis area site is located in the central portion of the project area in the Klamath Mountains and is located on lands designated as Other (Matrix). Many sites are located within 20 miles of the analysis site, including several sites east of the analysis area site in the Cascade Range and several more sites west and southwest of the analysis area site in the Klamath Range. While the sites in close vicinity to the analysis area site are all on BLM lands, about half are entirely within reserves and would likely receive some level of protection under BLM reserve management. Additional sites on NFS lands are located approximately 50 miles from the analysis area in the Cascade Range and Klamath Mountains.

Surveys for the PCGP Project resulted in one observation of individuals of the species in or near the project area during 2010 (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). This recorded observation comprises the only site in the analysis area located at approximately MP 109.7.

Project Impacts

Analysis

The PCGP Project would affect one out of the 35 sites on NFS lands in the region, representing approximately 3 percent of the sites (or one out of 82 total sites on all lands in the NSO range). Table CUMO-6 presents an overview of the features of the PCGP Project that would affect the *C. monticola* site. The construction corridor and associated work and storage areas would affect approximately 0.55 acres within the site (about 20 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *C. monticola* in and near the project area.

The following discussion provides an overview of the types of impacts that would be expected at the site based on the features of the PCGP Project that could affect site persistence.

| TABLE CUMO-6 | | |
|---|--------------------------|----------------------------------|
| Impacts to <i>Cudonia monticola</i> Sites on NFS Lands in the Project Area | | |
| Project Activity | Number of Sites Affected | Area of Disturbance within Sites |
| Construction Corridor | 1 | 0.5 ac |
| Temporary Extra Work Area (TEWA) | 1 | 0.05 ac |
| Uncleared Storage Area (UCSA) | - | - |
| Roads (TMP) | - | - |
| Other Minimal Disturbance Activities | - | - |
| ac = acres | | |
| Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities. | | |

Vegetation removal and grading activities in the 95-foot wide construction corridor would disturb about 0.5 acre of vegetation and soil within the site and could result in the removal of *C. monticola* individuals. Disturbance in the TEWAs would result in similar impacts on about 0.05 acre within the site. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and woody debris could negatively affect *C. monticola* in adjacent areas by removing its habitat, potentially affecting site

persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A 30-foot wide portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project.

Across the project area, the PCGP Project would remove an estimated 819 acres of coniferous forests below 6,000 feet msl, including 229 acres of LSOG coniferous forests below 6,000 feet msl. These impacts would result in a reduction of habitat that may be suitable for *C. monticola*. Within this impact area, about 428 acres (about 52 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A 30-foot wide corridor would be maintained in low-growing vegetation across the project area, resulting in a loss of about 190 acres of coniferous forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the single site as a result of the PCGP Project, no sites would remain on NFS land in the local area, and 34 sites, including nine in reserves, would remain on NFS lands in the NSO range. A total of 17 sites would remain on BLM lands in the local area, including 12 entirely in reserves, and 45 sites would remain on BLM lands in the NSO range, including 26 entirely in reserves. The remaining sites could be affected by natural hazards (e.g., fire, drought), but the NFS sites would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The nine sites in NFS reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. While sites on BLM lands are not subject to S&M Standards and Guidelines protections, the 26 sites entirely in reserves would likely receive some level of protection under BLM management.

Based on these site counts, approximately 26 percent of the remaining *C. monticola* sites on NFS lands in the NSO range would be protected in reserves and 44 percent of the sites on federal lands in the NSO range would be protected in either NFS or BLM reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states “instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision” (Standards and Guidelines, pg. 4). The Forest Service has embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *Cudonia monticola* is a Category B (rare) S&M species across the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information

received since the species was listed in the 2001 ROD, however, indicates that the species appears to be more common than previously documented, as described below:

- *Cudonia monticola* has a wide, but scattered, distribution across seven physiographic provinces and three states the region and a moderate-high number of overall sites (35 on NFS lands, 82 on all lands). The species is most abundant in the Cascade Range and Klamath Mountains, but it does not appear to be well distributed in its range. The currently known number of sites on NFS and BLM lands has increased by 68 sites since 2007, with one site documented during the PCGP Project surveys.
- An estimated 44 percent of the sites (35 sites) on NFS and BLM lands are in reserves, which is an increase of about 21 sites in reserves since 2006 per Molina (2008).
- Coniferous forests below 6,000 feet msl (general habitat for the species) are widespread across the region and encompass approximately 15.1 million acres on BLM and NFS lands with an estimated 60 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented.
- The PCGP Project would affect one of 35 Forest Service-managed sites of *C. monticola*, representing approximately 3 percent of the sites on NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a low-moderate number of sites (34) would remain on NFS lands in the region with a wide, but scattered, distribution across Washington, Oregon, and California. No sites would remain on NFS lands in the local area. A total of 26 sites would remain entirely in BLM reserves in the NSO range and 12 sites would remain entirely in BLM reserves in the local area. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves, and the percentage of sites in NFS reserves would be about the same (approximately 26 percent). Of the sites in NFS reserves, seven are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and four are in Congressionally Reserved areas where management activities that may adversely affect *C. monticola* are unlikely. A total of 26 sites would remain entirely in BLM reserves, including LSRs where management actions are restricted to those activities that benefit LSOG forests, District Designated Reserves where management activities that may adversely affect *C. monticola* are unlikely, and Riparian Reserves where management actions are restricted to those activities that benefit the conservation of riparian areas and riparian-associated species.
- The PCGP Project would result in a permanent loss of an estimated 190 acres of coniferous forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 9.1 million acres (60 percent) of coniferous forests and 3.2 million acres (66 percent) of LSOG coniferous forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *C. monticola*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. *Cudonia monticola* is a Category B species for

which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.13.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *C. monticola* at one site on NFS lands; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 34 sites would remain on NFS lands across the region, and no sites would remain on NFS lands in the local area. Additionally, 45 sites would remain on BLM lands in the region, including 26 sites entirely in reserves, and 17 sites would remain on BLM lands in the local area, including 12 entirely in reserves. The PCGP Project would affect site persistence of *C. monticola* at one site on NFS lands. The site in the analysis area represents the only site on NFS lands in close proximity to the project area; the nearest sites on NFS lands are approximately 50 miles to the northeast in the Cascade Range and 60 miles to the west in the Klamath Mountains. Sites on BLM lands are much more abundant in the vicinity of the analysis area, and many sites are distributed across the Coast Range, Klamath Mountains, and Western Cascade Range in southern Oregon. Approximately half of the regional sites on BLM lands are located entirely in BLM reserves, and it is expected that BLM management would enable the majority of the sites in reserves to persist. Due to the significant number of sites located on BLM lands in the local area (17) with a large proportion of sites in BLM reserves (71 percent), it can be assumed that the species would be protected and remain common in the local area. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *Cudonia monticola* would persist in the region without considering the single site as part of the population.
- The PCGP Project would remove approximately 819 acres of coniferous forests and 229 acres of LSOG coniferous forests below 6,000 feet msl (a negligible amount of the forests). An estimated 52 percent of the forests would be restored to similar conditions or shrublands, but a 30-foot wide early-successional corridor would remain across the project area. An estimated 9.1 million acres (60 percent) of coniferous forests and 3.2 million acres (66percent) of LSOG coniferous forests below 6,000 feet msl would remain in reserves in the NSO range. It is anticipated more sites are located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites on NFS lands are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Additionally, the remaining sites in BLM reserves are expected to receive some level of protection under BLM management. Although a single natural disturbance event or combination of events could affect a significant portion of sites in the western Cascade Range in southern Oregon, other sites are scattered across the region and are less likely to be affected by a single event.

The PCGP Project would not be able to avoid impacts to the *C. monticola* site in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the single *C. monticola* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the NFS land management plan that applies the affected site would waive implementation of Management Recommendations for the *C. monticola* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term. The monitoring plan shall be approved by the Forest Service.

2.14 GALERINA ATKINSONIANA

Galerina atkinsoniana is a litter saprobe or parasite in the Cortinariaceae family and does not have a common name.

2.14.1 Regulatory Status and Ranking

The 2001 ROD identifies *G. atkinsoniana* as a Category B (rare) species. While the 2003 Annual Species Review removed *G. atkinsoniana* from the S&M list, it is considered one of twelve special consideration species and it is included in this evaluation with the 2001 ROD Category B ranking. ORBIC did not evaluate *G. atkinsoniana* in its 2004 *Survey and Manage Assessment* for BLM and the Forest Service (ORBIC 2004) and has not ranked the species in current or past publications of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2001, 2004, 2007, 2010, 2013, and 2016). It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.14.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to this analysis. Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are discussed below under Persistence Evaluation. The background information in this section is used to support the persistence evaluation in the following section, which is updated with more recent information (e.g., recent survey data) specifically used for the persistence evaluation.

Life History

Galerina atkinsoniana is considered saprophytic (Castellano et al. 2003) and obtains its nutrients by the chemical decomposition of dead plant matter (Cushman and Huff 2007). It has also been thought to parasitize mosses (Castellano et al. 2003) and may be dependent on them for growth and reproduction (Hothausen et al. 1994). Fruit bodies are produced primarily during the summer and fall but it may fruit at other times depending on the site and geographic location (Hothausen et al. 1994). Very little is known about its dispersal mechanisms or reproductive biology.

Range

Galerina atkinsoniana is widely distributed throughout the Northern Hemisphere (Castellano et al. 2003) but is thought to have a spotty distribution (ORBIC 2004). It is known from Europe, Russia, Japan, and North America (ORBIC 2004) and reportedly common in Idaho and found occasionally in Wyoming and Colorado (Evenson 2015). In the range of the NSO, the species has a uniform but scattered distribution from Mt. Hood National Forest in Oregon to the California

border. In Washington, it is restricted to Mt. Baker-Snoqualmie National Forest and Mt. Rainier National Park (ORBIC 2004).

Population Status

ORBIC (2004) reported 50 occurrences of *G. atkinsoniana* within California, Oregon, and Washington. An estimated 40 occurrences were in Oregon, four occurrences were in California, and four to 12 occurrences were in Washington (ORBIC 2004). The number of occurrences outside of the western United States is unknown. The long term trend for the species is relatively stable with *G. atkinsoniana* being common enough throughout its boreal range (ORBIC 2004). The species was found in 57 locations during Random Multi-Species surveys across the NSO range from 2001 to 2004 (USDA and USDI 2007). Molina (2008) documented 93 new sites of *G. atkinsoniana* in the NSO range between 1998 and 2006, and 102 total sites were documented by 2006, including 78 in reserves or protected areas. The 2007 Final SEIS reported 83 sites on NFS and BLM lands and 83 total sites on all lands in the NSO range (USDA and USDI 2007).

Pre-disturbance surveys are not practical for Category B species. Instead, equivalent-effort surveys were conducted during the fall and spring from 2010 to 2016 in old-growth stands in the PCGP Project area and within 100 feet of habitat removal to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). The equivalent-effort surveys targeted all Category B species, including *G. atkinsoniana*, and resulted in one new observation of individuals or populations of *G. atkinsoniana*. Based on the increased number of known sites since 1998 as a result of the increased number of surveys (an approximately 10-fold increase between 1998 and 2006 per Molina 2008 records), additional surveys would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2017 data are provided below under Species Distribution.

Habitat

Galerina atkinsoniana is found in boreal forests with full canopies and sufficient moss and needle litter (ORBIC 2004). It is found single to gregarious and within spruce and Douglas fir forests (Castellano et al. 2003). It is often found in moist habitats (e.g. riparian areas), including moist late-successional forests with little to no disturbance (Roger 1998), but in Oregon it has also been collected from protected sites in recently thinned and clear-cut stands (Norvell and Exeter 2004).

Threats

ORBIC (2004) states that the primary threats to *G. atkinsoniana* are actions that remove canopy cover resulting in exposure to full sun as well as the loss of substrate. Air pollution and global climate change could also cause a decline in this species since it is closely associated with mosses, which are sensitive to bad air quality and warming temperatures. (Hothausen et al. 1994).

Management Recommendations

As a Category B S&M species, the direction under the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). This statement is no longer applicable on BLM lands under the 2016 BLM RMPs, although it is still valid on NFS lands within the range of the NSO. No management recommendations have been developed for *G. atkinsoniana* because it was removed from the S&M list after 2001.

2.14.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new site information, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *G. atkinsoniana* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and the Forest Service (Oregon/Washington regional offices) and converted into sites in accordance with the methodology described in Chapter 1. Table GAAT-1 shows the total number of known sites in the regional (NSO range), local (18 5th-field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 145 observations from BLM and Forest Service geodatabases were converted into 96 sites in the NSO range (region). Table GAAT-2 shows the total number of sites on NFS land and other land ownerships across the regional, local, and analysis areas. Table GAAT-3 shows the total number of sites within each land use allocation defined in the 1994 ROD and 2016 RMPs across the regional, local, and analysis areas. Figure GAAT-1 displays the regional distribution of the species across NFS lands, Figure GAAT-2 displays the extent of known sites located in protected areas (NFS lands, NFS reserves, BLM reserves, and NPS lands), and Figure GAAT-3 displays the species' regional distribution as well as the extent of coniferous forests below 4,500 feet and LSOG coniferous forests below 4,500 feet on BLM and NFS lands.

| Number of <i>Galerina atkinsoniana</i> Sites (2017) | |
|---|-----------------|
| Location* | Number of Sites |
| Regional Area | 96 |
| Local Area | 8 |
| Analysis Area (Project Area) | 1 (1) |

Data source: Processed BLM and Forest Service GIS data, August 2, 2017
 *Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

| Distribution of <i>Galerina atkinsoniana</i> across Federal, Private, and Other Lands | | | |
|---|----------------|-------------|---------------------|
| Land Ownership | Regional Sites | Local Sites | Analysis Area Sites |
| Forest Service | 68 | 2 | 1 |
| BLM | 28 | 6 | - |
| NPS | - | - | - |
| Fish and Wildlife Service | - | - | - |
| Other (Private, State, etc.) | 6 | 1 | - |

Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
 Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
|--|----------------|-------------|---------------------|
| Adaptive Management Area (AMA) | 2 | - | - |
| Adaptive Management Reserves (AMR) | - | - | - |
| Administratively Withdrawn (AW) | 6 | - | - |
| Congressionally Reserved (CR) | 16 | - | - |
| Late Successional Reserve (LSR) | 39 | 1 | - |
| Marbled Murrelet Area (LSR3) | 1 | - | - |
| Northern Spotted Owl Activity Center (LSR4) ^{a/} | 1 | - | - |
| Managed Late Successional Area (MLSA) | - | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | 10 | 1 | 1 |
| Riparian Reserve | - | - | - |
| Bureau of Land Management | Regional Sites | Local Sites | Analysis Area Sites |
| Administratively Withdrawn (AW) | - | - | - |
| Congressional Reserve | - | - | - |
| District Designated Reserve | 10 | 4 | - |
| Harvest Land Base | 10 | 3 | - |
| Late Successional Reserve | 16 | 2 | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | - | - | - |
| Riparian Reserve | 14 | 2 | - |

Data sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0; 2016 RMP land allocation data, August 2016.
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
^{a/} Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center.

Regional Distribution

Galerina atkinsoniana has a wide, but scattered, distribution across eight physiographic provinces in Washington (Western and Eastern Cascades and Olympic Peninsula) and Oregon (Coast Range, Cascades East and West, Willamette Valley, and Klamath Mountains) (see Figure GAAT-1). Most sites are found along the Cascade Range, with scattered sites or groups of sites in the Klamath Mountains, Coast Range, and other outlying areas. Some clusters of sites are located in the Cascade Range, Klamath Mountains, and Coast Range; however, many sites appear scattered across the NSO range. *Galerina atkinsoniana* appears to be well distributed in the western Cascade Range in Oregon and Washington based on the abundance and size of sites, proximity of sites to one another, and distribution of the species across forests that may provide suitable habitat in the mountain range.

Six of 96 known sites are at least partially located on private or other lands; 28 sites are at least partially on BLM lands; and 68 sites are at least partially on NFS lands across the region. Sites included on National Forests that encompass the project area include two sites on the Rogue River-Siskiyou National Forest and four sites on the Umpqua National Forest. The remaining 62 sites on NFS lands are on the Gifford Pinchot, Mt. Baker-Snoqualmie, Mt. Hood, Okanogan-Wenatchee, Olympic, Siuslaw, and Willamette National Forests.

Across the NSO range, 55 sites are at least partially located in reserve lands managed by the Forest Service, including 39 at least partially in LSRs, 16 at least partially in Congressionally Reserved areas, one in a Marbled Murrelet Area, and one in a Known Owl Activity Center (see Figure GAAT-2). This represents 81 percent of the total Forest Service-managed sites in the region. The remaining Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components.

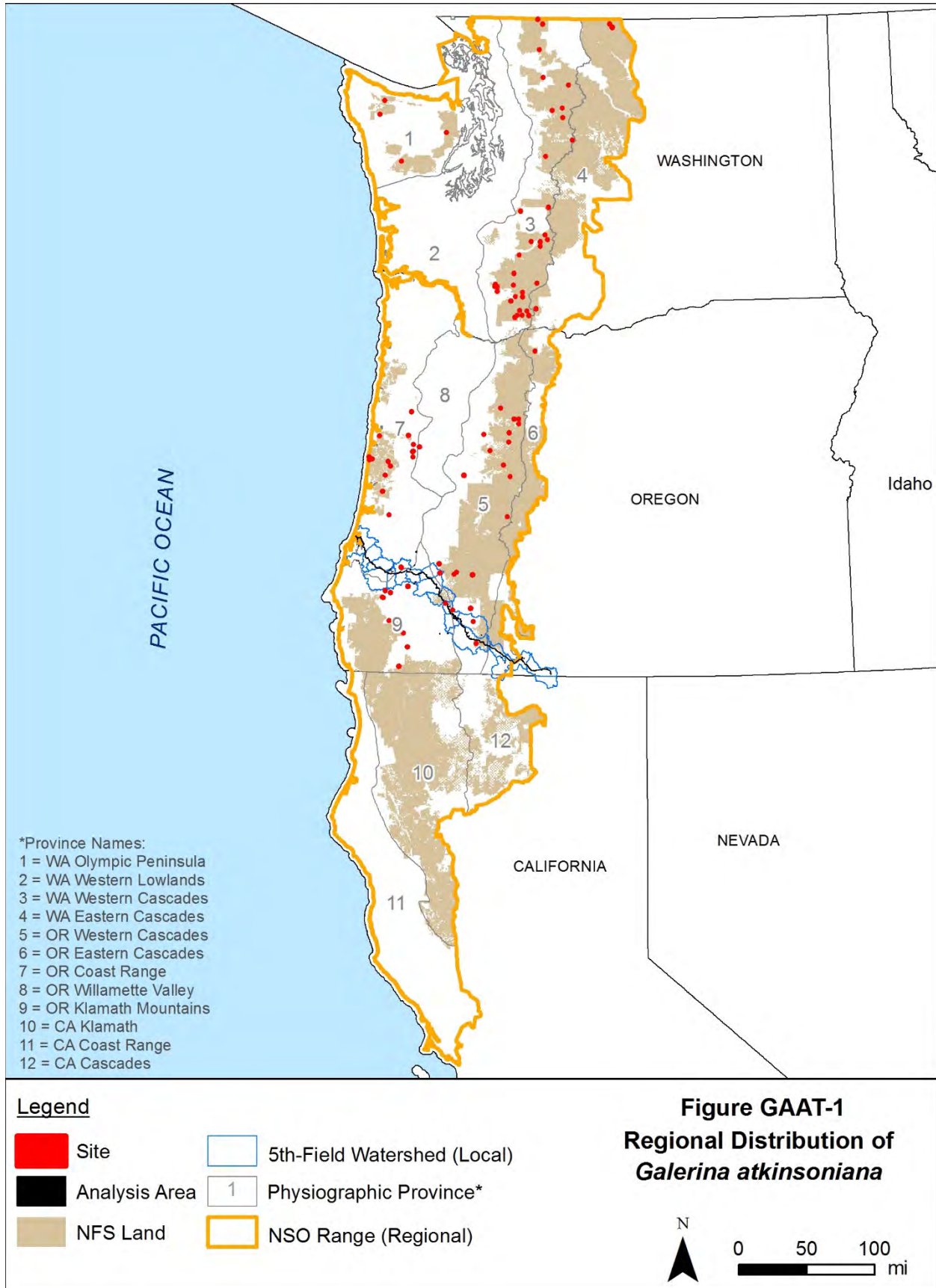
Additionally, 18 sites are entirely in reserve lands managed by BLM, which represents 64 percent of the total number of BLM-managed sites in the region. While the sites on BLM lands are not covered by the S&M Standards and Guidelines, the sites entirely in reserves will likely receive some degree of protection under BLM reserve management.

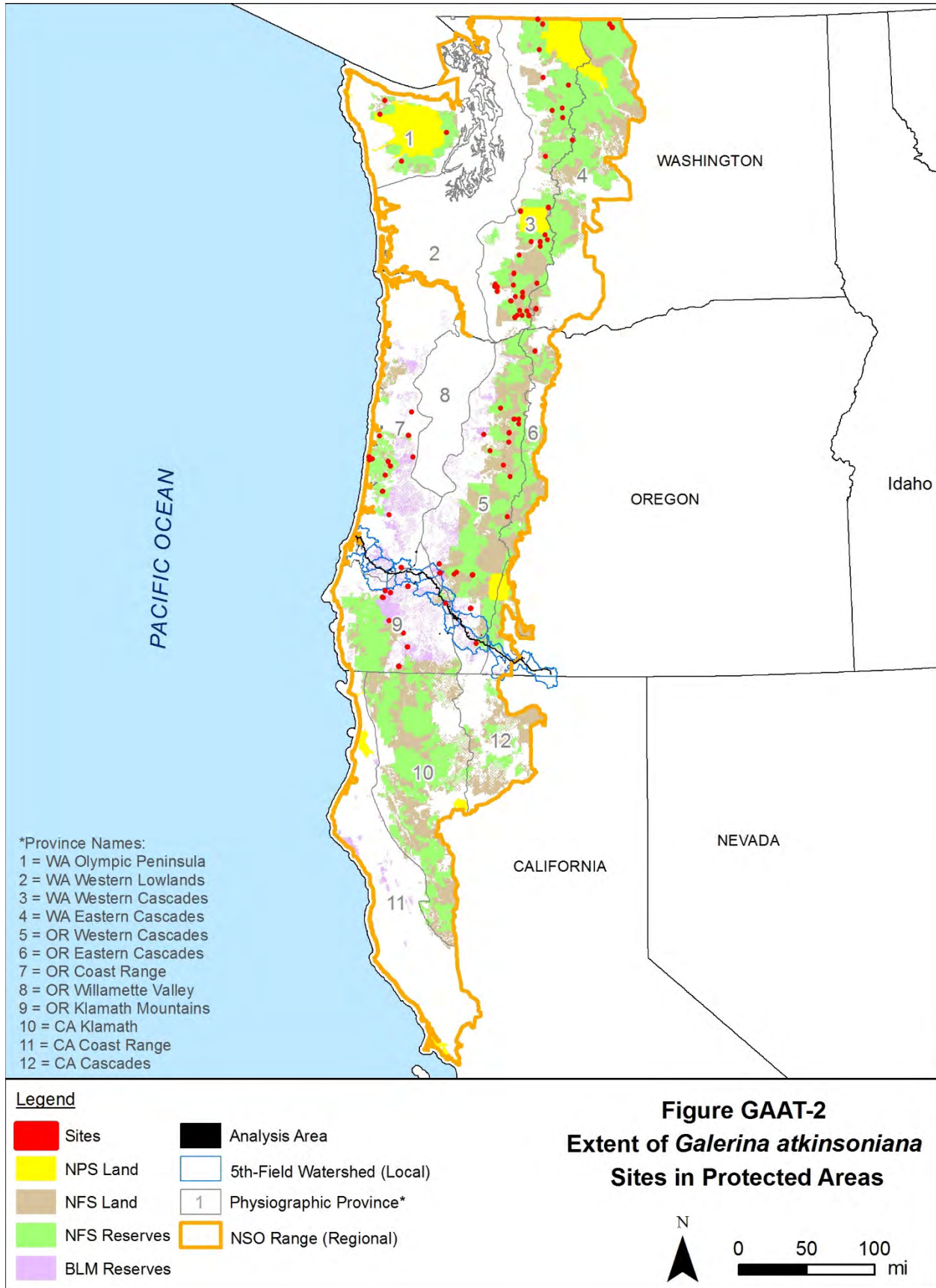
Galerina atkinsoniana is primarily found in LSOG forests based on available data (79 of 96 total sites are in LSOG), but it is also found in non-LSOG forests and may not be restricted to LSOG conditions based on available information on its life history and habitat requirements. Based on current site locations, the species is found in coniferous forests below 4,500 feet msl and has been documented in Washington and Oregon. Due to the extent of known sites, the amount of potential habitat on both NFS and BLM lands in the region, and the level of protection offered by NFS and BLM reserve land, both land ownerships are included in this potential habitat discussion. Coniferous forests below 4,500 feet msl, including the LSOG component of these forests, across the NSO range could provide habitat for *G. atkinsoniana* and support additional sites. These forests encompass an estimated 10.7 million acres on BLM and NFS lands in the region, including an estimated 6.3 million acres in reserve land allocations (59 percent of the forests; Table GAAT-4). Of this acreage, an estimated 4.9 million acres are LSOG (see Figure GAAT-3), including 2.6 million acres in reserve land allocations (66 percent of the forests). Although coniferous forests below 4,500 feet are widespread across the region, LSOG coniferous forests below 4,500 feet are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

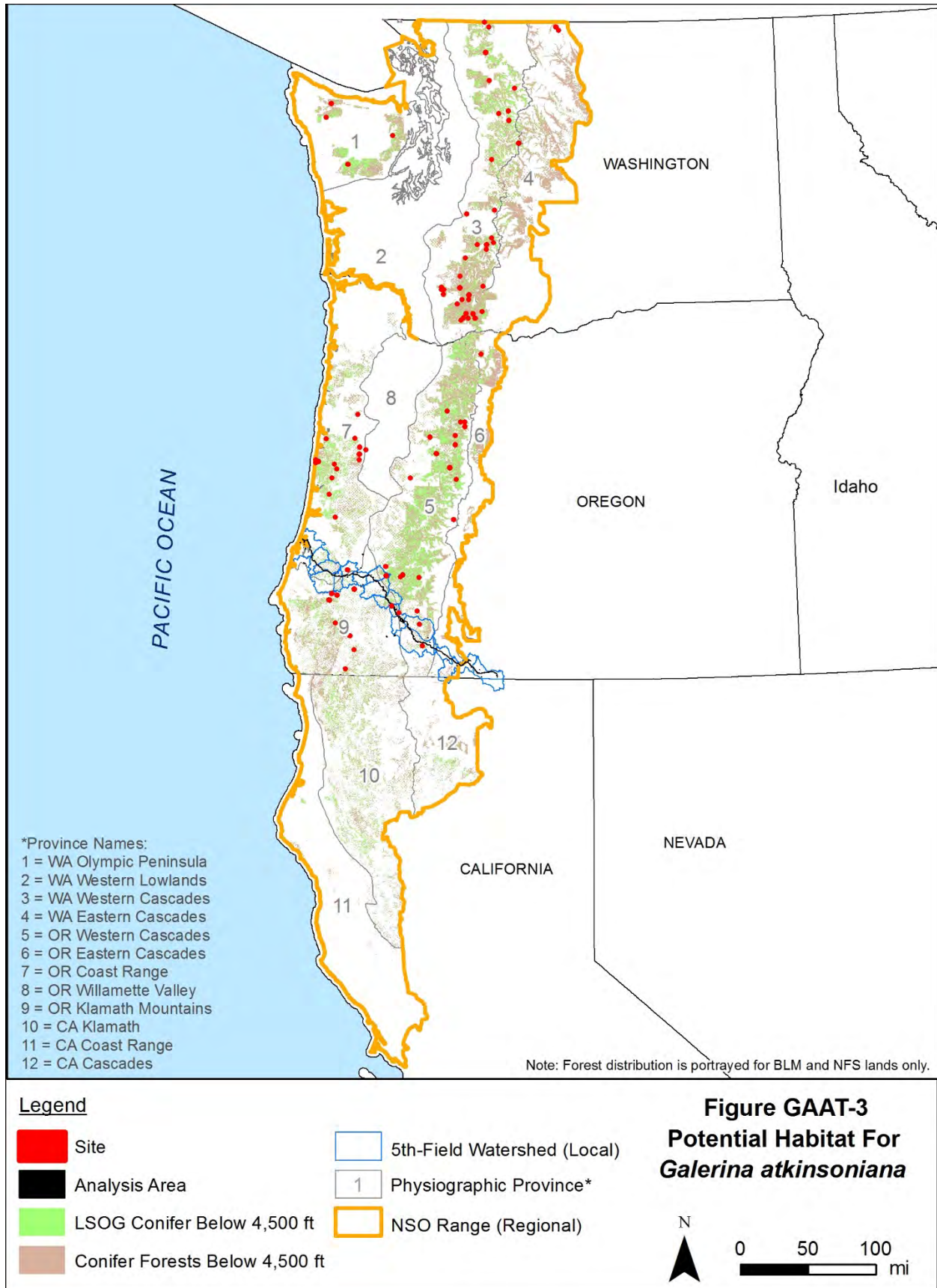
TABLE GAAT-4

| Extent of Forests That Could Provide Habitat for <i>Galerina atkinsoniana</i> on NFS and BLM Lands ^{a/} | | | | |
|--|-------------------------------------|-----------|--|-----------|
| Location | Coniferous Forests below 4,500 feet | | LSOG Coniferous Forests below 4,500 feet | |
| | Total | Reserves | Total | Reserves |
| Regional Area | 10,705,684 | 6,266,445 | 3,942,115 | 2,601,548 |
| Local Area | 344,154 | 221,869 | 128,796 | 95,925 |
| Project Area | 714 | 484 | 199 | 139 |

Data source: Gradient nearest neighbor vegetation data from Moerur et al. 2011
 Note: Areas are presented in acres.
^{a/} The area estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.







Local Distribution

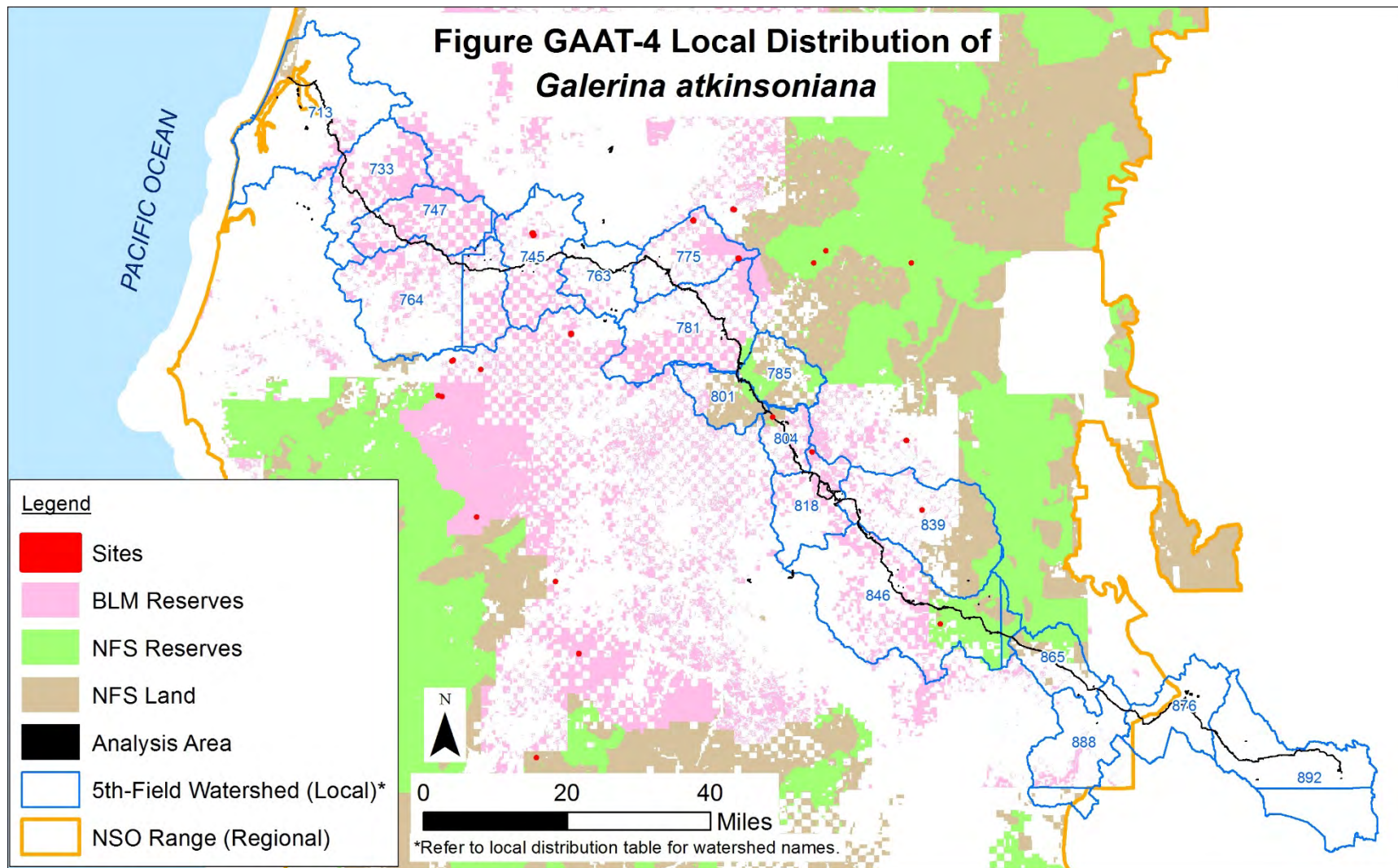
Within the local area, *G. atkinsoniana* is distributed across six 5th-field watersheds that overlap the project area (see Table GAAT-5 and Figure GAAT-4). The eight sites in the local area are scattered across the central third of the project area. Across these watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous forests below 4,500 feet msl, and opportunities for dispersal exist within the local area and to nearby regional areas based on the proximity of other sites in the region. Within the Cascade Range, several sites are located on NFS lands within 15 miles northeast of the project area. Several more sites are located on BLM lands within 15 miles south of the project area in the Klamath Mountains. The majority of these sites are located entirely in BLM reserves and would likely receive some level of protection under BLM management.

| Watershed (HUC5 ID) | Number of Sites | Number of Sites in NFS Reserve Lands | Number of Sites in BLM Reserve Lands |
|--|-----------------|--------------------------------------|--------------------------------------|
| Big Butte Creek (839) | 1 | - | - |
| Coos Bay Frontal (713) | - | - | - |
| East Fork Coquille River (747) | - | - | - |
| Elk Creek-South Umpqua (785) | - | - | - |
| Klamath River-John C Boyle Reservoir (888) | - | - | - |
| Lake Ewauna-Upper Klamath River (876) | - | - | - |
| Little Butte Creek (846) | 1 | 1 | - |
| Lower Lost River (892) | - | - | - |
| Middle Fork Coquille River (764) | - | - | - |
| Middle South Umpqua River (763) | - | - | - |
| Myrtle Creek (775) | 2 | - | 2 |
| North Fork Coquille River (733) | - | - | - |
| Olalla Creek-Lookingglass Creek (745) | 2 | - | 2 |
| Rogue River-Shady Cove (818) | 1 | - | 1 |
| South Umpqua River (781) | - | - | - |
| Spencer Creek (865) | - | - | - |
| Trail Creek (804) | 1 | - | - |
| Upper Cow Creek (801) | - | - | - |

Data sources: Processed BLM and Forest Service GIS data, August 2, 2017; HUC5 Watershed layer, August 23, 2011
 Note: Number of sites in reserves may include sites that are only partially in reserves.

Of the eight sites in the local area, two are on NFS lands, one of which is on LSRs and the other is on Other (Matrix). One site is partially on private lands and six sites are at least partially on BLM lands, two of which are located entirely in BLM reserves.

Coniferous forests below 4,500 feet encompass approximately 344,154 acres on BLM and NFS lands in the local area, with 221,869 acres in reserve land allocations (64 percent of the forests). Of this acreage, an estimated 128,796 acres are LSOG, including 95,925 acres in reserves (74 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures GAAT-3 and GAAT-4).



Analysis/Project Area Distribution

The analysis and project areas contain one *G. atkinsoniana* site, which is located in the Trail Creek watershed on the Umpqua National Forest. The analysis area site is located in the central portion of the project area on lands designated as Other (Matrix). Several sites are also located in the site’s immediate vicinity in the Cascade Range, including several sites on NFS lands within 20 miles. Several more sites are located entirely in BLM reserves within 15 miles east of the analysis area site in the Cascade Range and within 30 miles west of the analysis area site in the Klamath Mountains (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in one observation of individuals of the species in or near the project area during 2010 (Siskiyou BioSurvey LLC 2012a). This recorded observation comprises the one site in the analysis area located at approximately MPs 112.2.

Project Impacts

Analysis

The PCGP Project would affect one site out of the 68 sites on NFS lands in the region, representing approximately 1 percent of the sites (or one out of 96 total sites on all lands in the NSO range). Table GAAT-6 presents an overview of the features of the PCGP Project that would affect the *G. atkinsoniana* sites. The construction corridor and associated work and storage areas would affect approximately 0.5 acre within the site (about 19 percent of the site). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts *G. atkinsoniana* in and near the project area.

| TABLE GAAT-6 | | |
|---|--------------------------|----------------------------------|
| Impacts to <i>Galerina atkinsoniana</i> Sites on NFS Lands in the Project Area | | |
| Project Activity | Number of Sites Affected | Area of Disturbance within Sites |
| Construction Corridor | 1 | 0.3 ac |
| Temporary Extra Work Area (TEWA) | 1 | 0.1 ac |
| Uncleared Storage Area (UCSA) | 1 | 0.1 ac |
| Roads (TMP) | - | - |
| Other Minimal Disturbance Activities | - | - |
| ac = acres | | |
| Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities. | | |

The following discussion provides an overview of the types of impacts that would be expected at the sites based on the features of the PCGP Project that could affect site persistence.

Vegetation removal and grading activities in the 95-foot wide construction corridor would disturb about 0.3 acre of vegetation and soil within the site and could result in the removal of *G. atkinsoniana* individuals. Disturbance in the TEWAs would result in similar impacts on about 0.1 acre within the site. The establishment of the corridor could modify microclimate conditions around individuals adjacent to the corridor. The removal of forests, woody debris, and mosses could negatively affect *G. atkinsoniana* in adjacent areas by removing its habitat, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the site no longer suitable for the species. Restored portions of the corridor and TEWAs

would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A 30-foot wide portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.1 acre of understory habitat in the site, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

Across the project area, the PCGP Project would remove an estimated 576 acres of coniferous forests below 4,500 feet msl, including 153 acres of LSOG coniferous forests below 4,500 feet msl. These impacts would result in a reduction of habitat that may be suitable for *G. atkinsoniana*. Within this impact area, about 297 acres (about 52 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some restored areas may provide habitat for the species during the life of the PCGP Project. A 30-foot wide corridor would be maintained in low-growing vegetation across the project area, resulting in a loss of about 125 acres of coniferous forests. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests below 4,500 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the single site as a result of the PCGP Project, one site of *G. atkinsoniana* would remain in LSRs on NFS land in the local area, and 67 sites, including 55 in reserves, would remain on NFS lands in the NSO range. Six sites, including two entirely in reserves would remain on BLM lands in the local area, and 28 sites, including 18 entirely in reserves would remain on BLM lands in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but the NFS sites would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 55 sites in NFS reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. While sites on BLM lands are not subject to S&M Standards and Guidelines protections, the 18 sites entirely in reserves would likely receive some level of protection under BLM management.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states “instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision” (Standards and Guidelines, pg. 4). The Forest Service has embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *Galerina atkinsoniana* is a Category B (rare) S&M species across the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information received since the species was listed in the 2001 ROD, however, indicates that the species appears to be more common than previously documented, as described below:
 - *Galerina atkinsoniana* has a wide, but scattered, distribution across eight physiographic provinces and two states the region and a moderate-high number of overall sites (68 on

NFS lands, 96 on all lands). The species is well distributed in the Western Cascade Range in Oregon and Washington. The currently known number of sites on NFS and BLM lands has increased by 13 sites since 2007, with one site documented during the PCGP Project surveys.

- An estimated 76 percent of the sites (73 sites) on NFS and BLM lands are in reserves, which is a decrease of sites in reserves since 2006 per Molina (2008).
- Coniferous forests below 4,500 feet msl (general habitat for the species) are widespread across the region and encompass approximately 10.7 million acres on BLM and NFS lands with an estimated 59 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented.
- The PCGP Project would affect one of 68 Forest Service-managed sites of *G. atkinsoniana*, representing approximately 1 percent of the sites on NFS lands in the NSO range. Assuming site persistence cannot be maintained at the single site, a moderate-high number of sites (67) would remain on NFS lands in the region with a wide, but scattered, distribution across Washington and Oregon. One site (in LSRs) would remain on NFS lands in the local vicinity of the analysis area. Additionally, 28 sites, including 18 entirely in reserves would remain on BLM lands in the region, and six sites, including two entirely in reserves would remain on BLM lands in the local area. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves, and the percentage of sites in NFS reserves would be about the same (approximately 80 percent). Of the sites in NFS reserves, 41 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and 16 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *G. atkinsoniana* are unlikely. A total of 18 sites would remain entirely in BLM reserves, including LSRs where management actions are restricted to those activities that benefit LSOG forests, District Designated Reserves where management activities that may adversely affect *G. atkinsoniana* are unlikely, and Riparian Reserves where management actions are restricted to those activities that benefit the conservation of riparian areas and riparian-associated species.
- The PCGP Project would result in a permanent loss of an estimated 125 acres of coniferous forests below 4,500 feet msl (less than 1 percent of the total regional acreage). An estimated 6.3 million acres (59 percent) of coniferous forests below 4,500 feet msl and 2.6 million acres (66 percent) of LSOG coniferous forests below 4,500 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *G. atkinsoniana*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. *Galerina atkinsoniana* is treated as a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of

the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.14.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *G. atkinsoniana* at one site on NFS lands; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 67 sites would remain on NFS lands across the region and one site would remain on NFS land in the local area. Additionally, 18 sites would remain entirely in BLM reserves in the region and two sites would remain entirely in BLM reserves in the local area. The site affected in the analysis area is one out of many scattered sites in the Klamath Mountains, Cascade Range, and Coast Range in southern Oregon. Several sites are located on NFS lands and BLM reserves within 20 miles of the site. The remaining *G. atkinsoniana* sites would allow for connectivity and dispersal between the mountain ranges. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *Galerina atkinsoniana* would persist in the region without considering the single site as part of the population.
- The PCGP Project would remove approximately 576 acres of coniferous forests below 4,500 feet msl and 153 acres of LSOG coniferous forests below 4,500 feet msl (a negligible amount of the forests). An estimated 52 percent of the forests would be restored to similar conditions or shrublands, but a 30-foot wide early-successional corridor would remain across the project area. An estimated 6.3 million acres (59 percent) of coniferous forests below 4,500 feet msl and 2.6 million acres (66 percent) of LSOG coniferous forests below 4,500 feet msl would remain in reserves in the NSO range. It is anticipated more sites are located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites on NFS lands are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Additionally, the remaining sites in BLM reserves are expected to receive some level of protection under BLM management. A single natural disturbance event or combination of events would not affect a significant portion of sites since the sites are fairly scattered across the region and are not likely to be affected by a single event.

The PCGP Project would not be able to avoid impacts to the *G. atkinsoniana* site in the analysis area, although some individuals within the sites may persist following project implementation. Based on the above conclusions, avoidance of the *G. atkinsoniana* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the NFS land management plan that applies to the affected site would waive implementation of Management Recommendations for the *G. atkinsoniana* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term. The monitoring plan shall be approved by the Forest Service.

2.15 GASTROBOLETUS SUBALPINUS

Gastroboletus subalpinus is a bolete mushroom species in the Boletaceae family and does not have a common name.

2.15.1 Regulatory Status and Ranking

The 2001 ROD, including the 2003 ASR modifications to the S&M species list, identifies *G. subalpinus* as a Category B (rare) species. ORBIC evaluated *G. subalpinus* in its 2004 *Survey and Manage Assessment* for BLM and the Forest Service (ORBIC 2004), but it was not included in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2016). In 2004, the species was considered to be uncommon but not rare with some cause for long-term concern due to declines or other factors within its global range and in Oregon (G4, S4, respectively). The species is not currently on any ORBIC lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.15.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to this analysis. Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are discussed below under Persistence Evaluation. The background information in this section is used to support the persistence evaluation in the following section, which is updated with more recent information (e.g., recent survey data) specifically used for the persistence evaluation.

Life History

Relatively little is known about the autecology or reproductive biology of *G. subalpinus*. It forms sequestrate sporocarps in soil that develop and mature beneath the surface (Castellano and O'Dell 1997). It is presumed that it forms ectomycorrhiza, which form symbiotic associations with host plant roots. *Gastroboletus subalpinus* spores are assumed to disperse through mycophagy (i.e., through animal consumption). The species has been documented fruiting in September and October throughout its known range (Castellano et al. 1999).

Range

Gastroboletus subalpinus is endemic to California and Oregon (Holthausen et al. 1994, Castellano and O'Dell 1997, Castellano et al. 1999). Based on data available in 1994, the species' range was restricted to the Cascade Range in Oregon and the northern Sierra Nevada in California (Holthausen et al. 1994). The currently known range of the species within the NSO range based on 2017 data is discussed below under Species Distribution.

Although information on the species' historical range is not known, its range may have been similar to the current range, with populations limited to the Pacific Northwest. It may have had more abundant local distributions across its range, but habitat modifications and other environmental factors, as discussed below under Threats, may have reduced available habitat and further restricted the species' distribution.

Population Status

ORBIC (2004) reported *G. subalpinus* from an estimated 22 element occurrences in the NSO range in 2004. An estimated 11 of these occurrences were in Oregon, and 11 occurrences were in California (ORBIC 2004). In 2004, *G. subalpinus* had a limited range, and populations trends were unknown (ORBIC 2004). The species was not found during Random Multi-Species surveys across the NSO range between 2001 and 2004 (USDA and USDI 2007). Molina (2008) documented 27 new sites of *G. subalpinus* in the NSO range between 1998 and 2006, and 48 total sites were documented by 2006, including 24 in reserves or protected areas. The 2007 Final SEIS reported 38 sites on NFS and BLM lands and 39 total sites on all lands in the NSO range (USDA and USDI 2007).

Pre-disturbance surveys are not practical for Category B species. Instead, equivalent-effort surveys were conducted during the fall and spring between 2010 and 2016 in old-growth stands in the PCGP Project area and within 100 feet of habitat removal to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). These surveys targeted all Category B species, including *G. subalpinus*, and resulted in two new observations of *G. subalpinus*. Based on the increased number of known sites since 1998 as a result of the increased number of surveys (a two-fold increase between 1998 and 2006 per Molina 2008 records), additional surveys would be expected to locate additional populations within the NSO range, particularly in the Cascade Range where the species is most abundant. The current estimated number of sites and distribution of the species based on 2017 data are provided below under Species Distribution.

Habitat

Gastroboletus subalpinus grows in association with the roots of assorted species in the Pine family, particularly mountain hemlock, California red fir, lodgepole pine, or whitebark pine (Castellano and O'Dell 1997). Based on data available in 1994, *G. subalpinus* was only found in coniferous forests above 4,500 feet msl (Holthausen et al. 1994). *Gastroboletus subalpinus* has been documented in disturbed areas, such as campgrounds and roadsides, and appears to be resilient to low intensity fire (Trappe, pers. comm. 2013). *Gastroboletus subalpinus* may prefer specific microclimate conditions of LSOG forests and in one study showed significant positive correlations with stand age (> 225 years) (Trappe et al. 2009); however, it may not be restricted to these conditions.

Threats

Threats to *G. subalpinus* include actions that disturb soil and remove overstory host trees, such as logging (Castellano and O'Dell 1997). Trampling and soil compaction from recreational uses may threaten the species because many occurrences are found in high recreational use areas (Holthausen et al. 1994); however, the species appears to be resilient to such disturbances (Trappe, pers. comm. 2013). Fire is not considered a major threat because the species is found at higher elevations in cool, wet areas that are less prone to fire (Castellano and O'Dell 1997).

Management Recommendations

As a Category B S&M species, the direction under the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). This statement is no longer applicable on BLM lands under the 2016 BLM RMPs, although it is still valid on NFS

lands within the range of the NSO. Management recommendations were developed for *G. subalpinus* with several other species (Group 2 of Castellano and O’Dell 1997). The primary guidance is to maintain current habitat and microclimatic conditions and avoid disturbance at all known locations on federal lands. In order to maintain habitat conditions around known locations, impacts from soil disturbing activities should be minimized and damage to or removal of host trees should be prevented. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *G. subalpinus*:

- As a mycorrhizal species, *G. subalpinus* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.15.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species’ currently known distribution within the NSO range based on new site information, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *G. subalpinus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and the Forest Service (Oregon/Washington regional offices) and converted into sites in accordance with the methodology described in Chapter 1. Table GASU-1 shows the total number of known sites in the regional (NSO range), local (18 5th-field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 97 observations from BLM and Forest Service geodatabases were converted into 91 sites in the NSO range (region). Table GASU-2 shows the total number of sites on NFS land and other land ownerships across the regional, local, and analysis areas. Table GASU-3 shows the total number of sites within each land use allocation defined in the 1994 ROD and 2016 RMPs across the regional, local, and analysis areas. Figure GASU-1 displays the regional distribution of the species across NFS lands, Figure GASU-2 displays the extent of known sites located in protected areas (NFS lands, NFS reserves, BLM reserves, and NPS lands), and Figure GASU-3 displays the species’ regional distribution as well as the extent of coniferous forests and LSOG coniferous forests between 2,000 and 7,000 feet msl on BLM and NFS lands within the currently known range of the species.

| Location* | Number of Sites |
|------------------------------|-----------------|
| Regional Area | 91 |
| Local Area | 2 |
| Analysis Area (Project Area) | 2 (1) |

Data source: Processed BLM and Forest Service GIS data, August 2, 2017
*Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

| Land Ownership | Regional Sites | Local Sites | Analysis Area Sites |
|------------------------------|----------------|-------------|---------------------|
| Forest Service | 81 | 2 | 2 |
| BLM | 1 | - | - |
| NPS | 7 | - | - |
| Fish and Wildlife Service | - | - | - |
| Other (Private, State, etc.) | 2 | - | - |

Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
|---|----------------|-------------|---------------------|
| Adaptive Management Area (AMA) | - | - | - |
| Adaptive Management Reserves (AMR) | - | - | - |
| Administratively Withdrawn (AW) | 18 | - | - |
| Congressionally Reserved (CR) | 22 | - | - |
| Late Successional Reserve (LSR) | 13 | - | - |
| Marbled Murrelet Area (LSR3) | - | - | - |
| Northern Spotted Owl Activity Center (LSR4) a/ | 2 | - | - |
| Managed Late Successional Area (MLSA) | - | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | 37 | 2 | 2 |
| Riparian Reserve | - | - | - |
| Bureau of Land Management | Regional Sites | Local Sites | Analysis Area Sites |
| Administratively Withdrawn (AW) | - | - | - |
| Congressional Reserve | 1 | - | - |
| District Designated Reserve | - | - | - |
| Harvest Land Base | - | - | - |
| Late Successional Reserve | - | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | - | - | - |
| Riparian Reserve | - | - | - |

Data sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0; 2016 RMP land allocation data, August 2016.
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
a/ Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center.

Regional Distribution

Gastroboletus subalpinus has a somewhat wide distribution across five physiographic provinces in Washington (Eastern Cascades), Oregon (Cascades East and West), and California (Klamath and Cascades) (see Figure GASU-1). Most sites are found along the Cascade Range in Oregon and California, with isolated sites located in the Klamath Mountains in California and Cascade Range in Washington. The sites in the Cascade Range are distributed across Oregon and California in many clusters of sites. *Gastroboletus subalpinus* appears to be well distributed in the eastern Cascade Range in Oregon based on the abundance and size of sites, proximity of sites to one another, and distribution of the species across forests that may provide suitable habitat in the mountain range.

Two of the 91 known sites in the region are on private land; seven sites are on NPS lands (Crater Lake National Park); one site is on BLM lands; and 81 sites are on NFS lands across the region. Sites included on National Forests that encompass the project area include 17 sites on the Fremont-

Winema National Forest, seven sites on the Umpqua National Forest, and two sites on the Rogue River-Siskiyou National Forest. The remaining 58 sites on NFS lands are on the Deschutes, Gifford Pinchot, Modoc, Mt. Hood, Shasta-Trinity, Six Rivers, and Willamette National Forests.

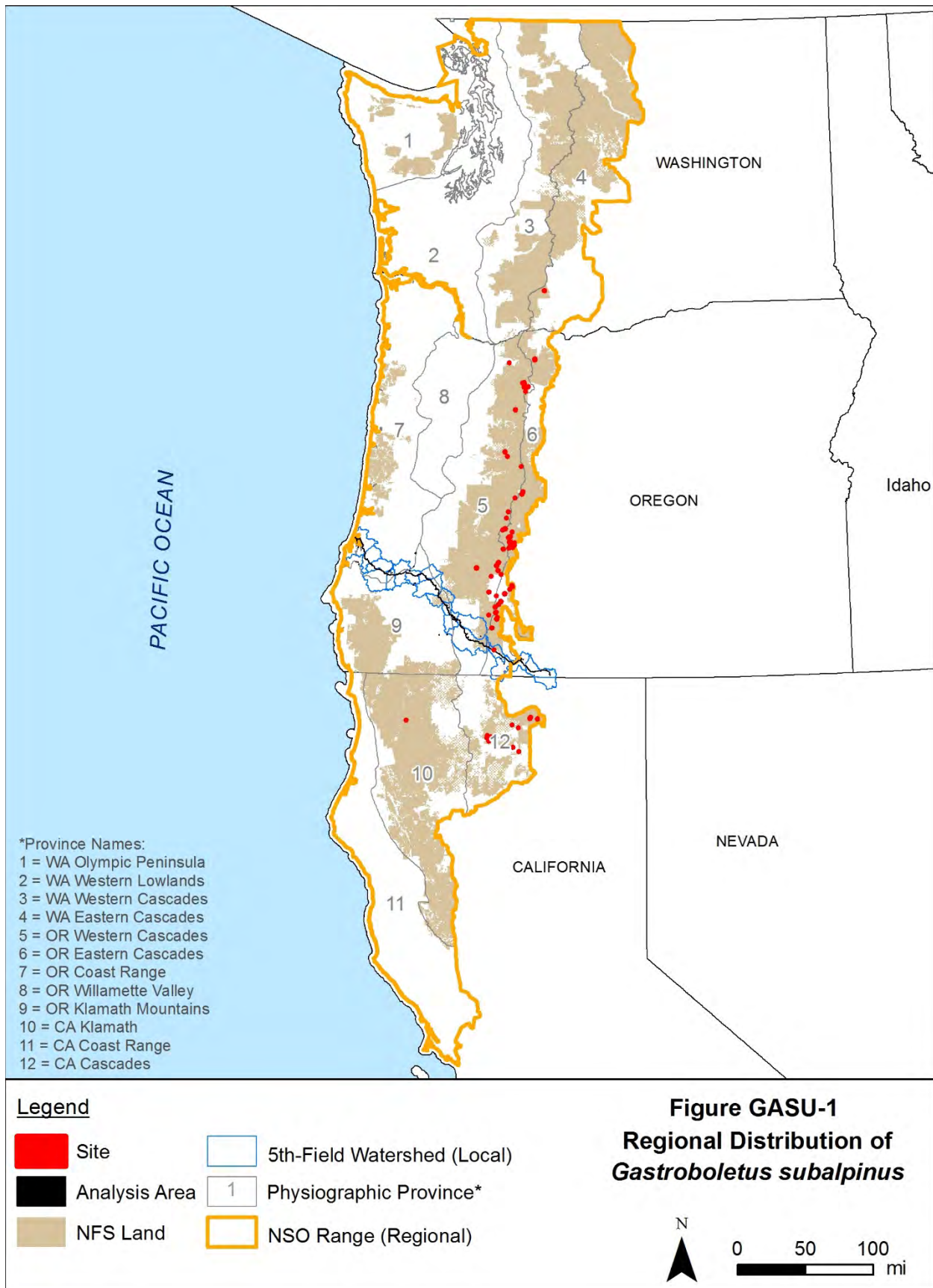
Across the NSO range, 36 sites are at least partially located in reserve lands managed by the Forest Service, including 13 at least partially in LSRs, 22 at least partially in Congressionally Reserved areas, and two at least partially in Known Owl Activity Centers (see Figure GASU-2). This represents 44 percent of the total Forest Service-managed sites in the region. The remaining Forest Service-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The single site on BLM lands is in Congressional Reserves. While the single site in BLM reserves and the seven sites on NPS land are not covered by the S&M Standards and Guidelines, they likely receive some degree of protection under BLM management and National Park management.

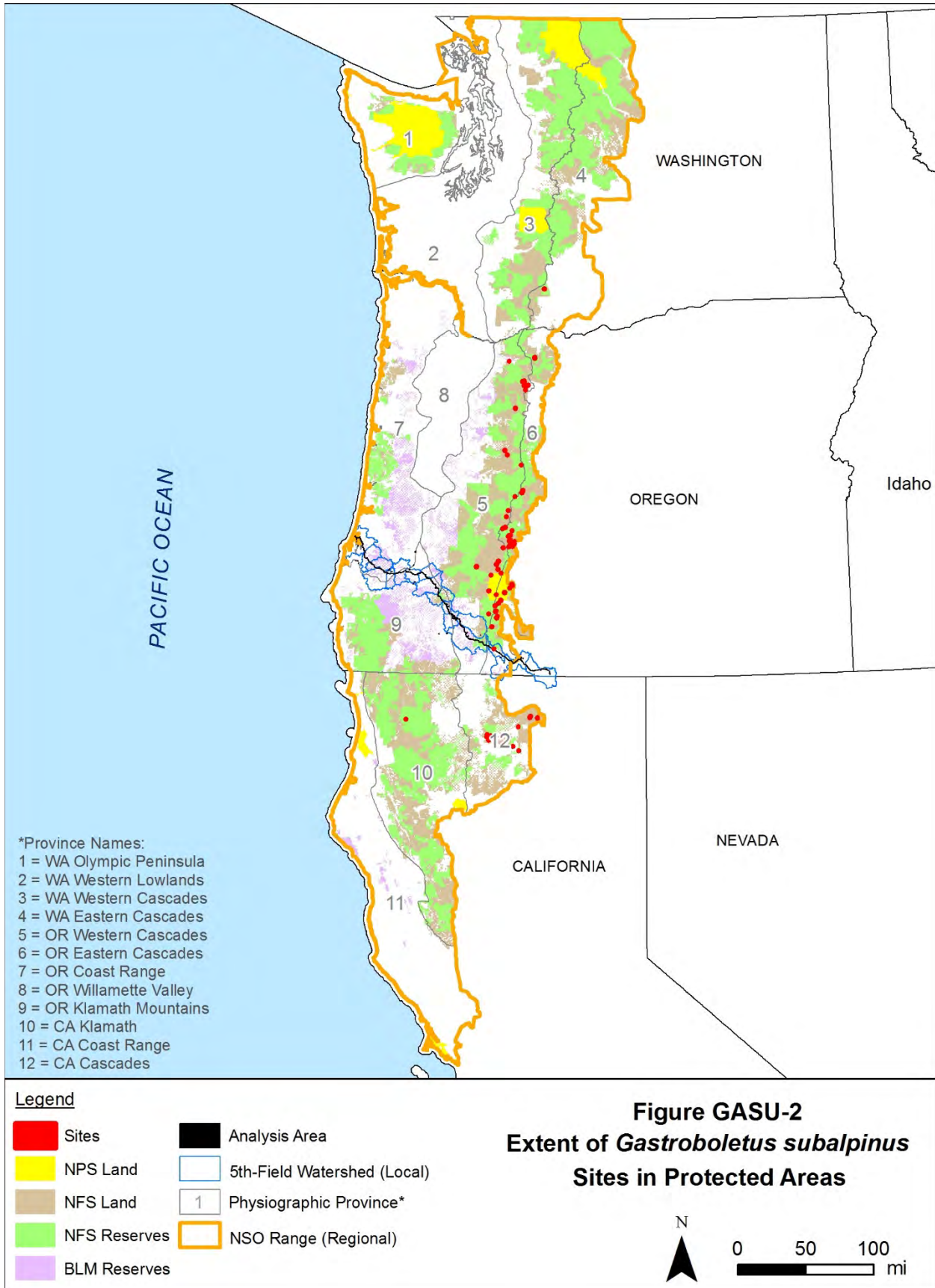
Gastroboletus subalpinus is more often found in LSOG forests based on available data (40 of 91 total sites are in LSOG), but it is also relatively common in non-LSOG forests and is found in areas that have been disturbed by recreational activities. Based on current site locations, the species has been found in coniferous forests between about 2,000 and 7,000 feet msl and has only been documented in parts of the NSO range. Due to the extent of known sites, the amount of potential habitat on both NFS and BLM lands in the region, and the level of protection offered by NFS and BLM reserve land, both land ownerships are included in this potential habitat discussion. Coniferous forests, including the LSOG component of these forests across the NSO range could provide habitat for *G. subalpinus* and support additional sites. These forests encompass an estimated 14 million acres on BLM and NFS lands, including an estimated 8.3 million acres in reserve land allocations (59 percent of the forests; Table GASU-4). Of this acreage, an estimated 4 million acres are LSOG (see Figure GASU-3), including 2.6 million acres in reserve land allocations (64 percent of the forests). Although coniferous forests between 2,000 and 7,000 feet msl are widespread across the mountain ranges, LSOG coniferous forests are less common.

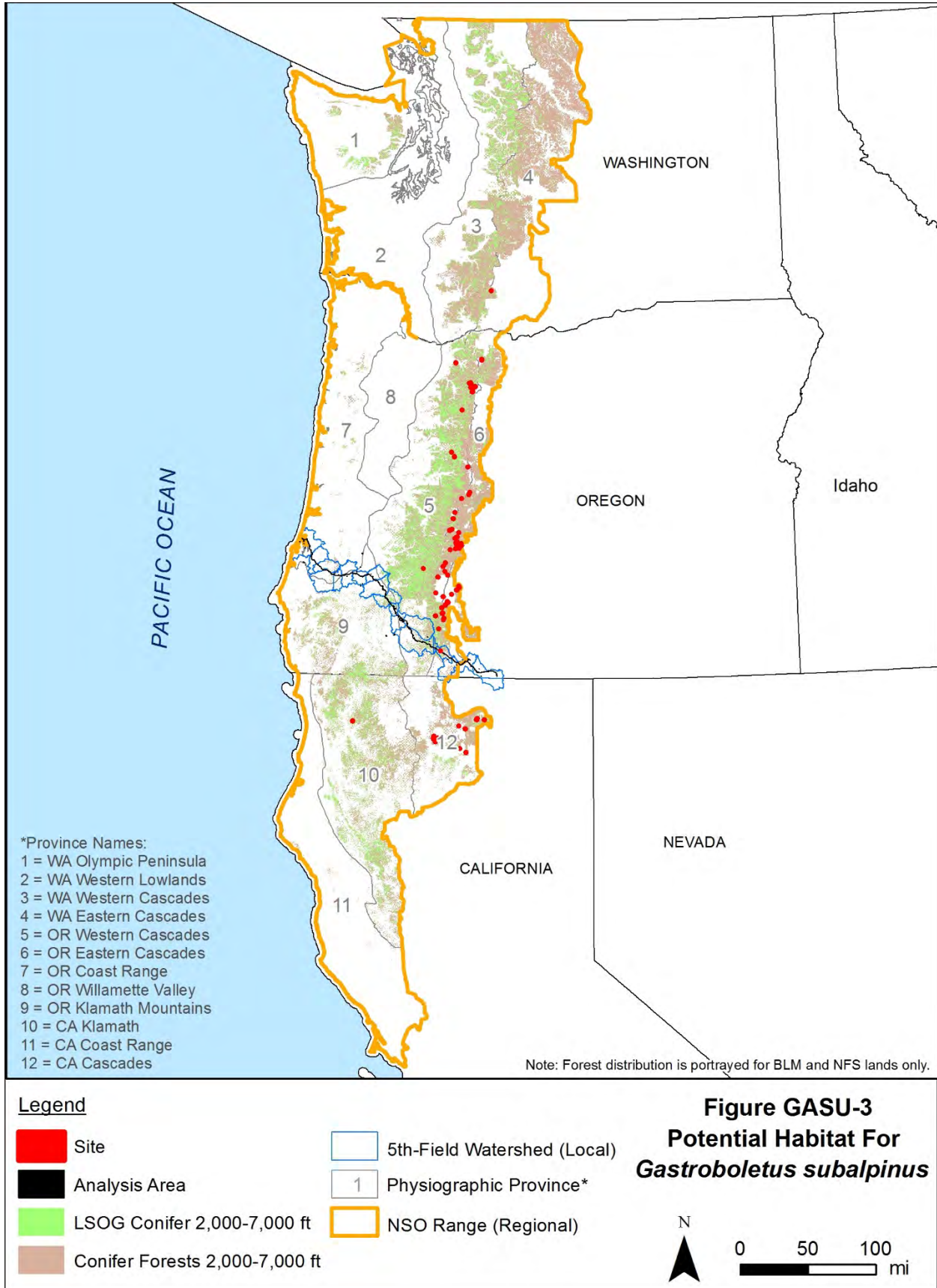
TABLE GASU-4

| Extent of Forests That Could Provide Habitat for <i>Gastroboletus subalpinus</i> on NFS and BLM Lands ^{a/} | | | | |
|---|---|-----------|---------------------------------------|-----------|
| Location | Coniferous Forests between 2,000-7,000 feet | | LSOG Forests between 2,000-7,000 feet | |
| | Total | Reserves | Total | Reserves |
| Regional Area | 13,968,404 | 8,257,684 | 4,020,181 | 2,563,746 |
| Local Area | 328,613 | 178,814 | 104,916 | 65,073 |
| Project Area | 789 | 518 | 225 | 152 |

Data source: Gradient nearest neighbor vegetation data from Moeur et al. 2011
 Note: Areas are presented in acres.
^{a/} The area estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.







Local Distribution

Within the local area, *G. subalpinus* is found in one 5th-field watershed (Spencer Creek) that overlaps the project area (see Table GASU-5 and Figure GASU-4). The two sites in the local area are on NFS land designated as Other (Matrix) in the Fremont-Winema National Forest. The two sites are within 500 feet of each other in the eastern Cascade Range and are a part of many sites in the region that are scattered across the Cascade Range in Oregon. Although the nearest site is more than 16 miles north of the local area sites in the Cascade Range, dispersal opportunities may exist between sites via animal vectors based on the extent of forests that may provide suitable habitat within the Cascade Range.

Coniferous forests between 2,000 and 7,000 feet msl encompass approximately 328,613 acres on BLM and NFS lands in the local area, with 178,814 acres in reserve land allocations (54 percent of the forests). Of this acreage, an estimated 104,916 acres are LSOG, including 65,073 acres in reserve land allocations (62 percent of the forests). Other sites may be located in the Cascade Range and Klamath Mountains in areas that have not been previously surveyed.

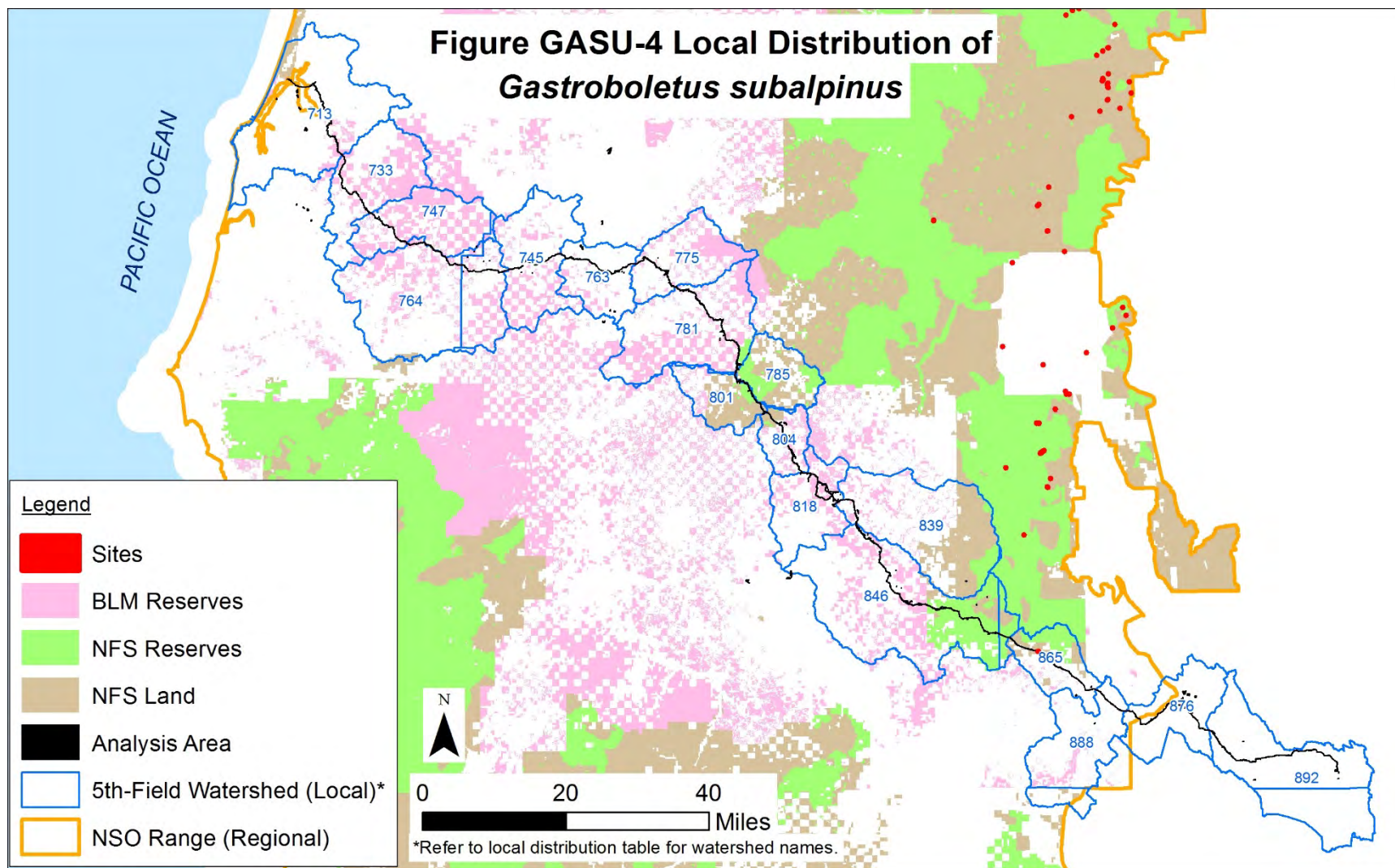
| TABLE GASU-5 | | | |
|--|-----------------|--------------------------------------|--------------------------------------|
| Distribution of <i>Gastroboletus subalpinus</i> in Local 5 th -Field Watersheds | | | |
| Watershed (HUC5 ID) | Number of Sites | Number of Sites in NFS Reserve Lands | Number of Sites in BLM Reserve Lands |
| Big Butte Creek (839) | - | - | - |
| Coos Bay Frontal (713) | - | - | - |
| East Fork Coquille River (747) | - | - | - |
| Elk Creek-South Umpqua (785) | - | - | - |
| Klamath River-John C Boyle Reservoir (888) | - | - | - |
| Lake Ewauna-Upper Klamath River (876) | - | - | - |
| Little Butte Creek (846) | - | - | - |
| Lower Lost River (892) | - | - | - |
| Middle Fork Coquille River (764) | - | - | - |
| Middle South Umpqua River (763) | - | - | - |
| Myrtle Creek (775) | - | - | - |
| North Fork Coquille River (733) | - | - | - |
| Olalla Creek-Lookingglass Creek (745) | - | - | - |
| Rogue River-Shady Cove (818) | - | - | - |
| South Umpqua River (781) | - | - | - |
| Spencer Creek (865) | 2 | - | - |
| Trail Creek (804) | - | - | - |
| Upper Cow Creek (801) | - | - | - |

Data sources: Processed BLM and Forest Service GIS data, August 2, 2017; HUC5 Watershed layer, August 23, 2011

Analysis/Project Area Distribution

The analysis and project areas contain two sites of *G. subalpinus*. These are the same sites as described in the Local Distribution discussion above.

Surveys for the PCGP Project resulted in two observations of *G. subalpinus* in the survey area during fall of 2011 and 2013 (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). These observations comprise two sites located at approximately MPs 172.5 and 172.6.



Project Impacts

Analysis

The PCGP Project would affect two sites out of the 81 sites on NFS lands in the region, representing approximately 2 percent of the sites (or one out of 91 total sites on all lands in the NSO range). Table GASU-6 presents an overview of the features of the PCGP Project that would affect the *G. subalpinus* sites. The construction corridor and associated work and storage areas would affect approximately 1.0 acre within one of the sites (about 38 percent of the site). The other site is located outside of the project area and would not be directly affected. Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *G. subalpinus* in and near the project area.

| Project Activity | Number of Sites Affected | Area of Disturbance within Sites |
|--------------------------------------|--------------------------|----------------------------------|
| Construction Corridor | 1 | 0.8 ac |
| Temporary Extra Work Area (TEWA) | 1 | 0.01 ac |
| Uncleared Storage Area (UCSA) | 1 | 0.2 ac |
| Roads (TMP) | - | - |
| Other Minimal Disturbance Activities | - | - |

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

The following discussion provides an overview of the types of impacts that would be expected at the sites based on the features of the PCGP Project that could affect site persistence.

Vegetation removal and grading activities in the 95-foot wide construction corridor would disturb about 0.8 acre of vegetation and soil within one site and could result in the removal of *G. subalpinus* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.01 acre within the same site. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *G. subalpinus* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A 30-foot wide portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.2 acre of understory habitat in one site, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

The other *G. subalpinus* site in the analysis area (adjacent to the southern boundary of project area at MP 172.5) is not likely to be affected by activities within the corridor or TEWAs. The observation within the site is located approximately 170 feet from the corridor in a forested area (see Figure GASU-5). Vegetation removal and disturbance in the project area are not expected to

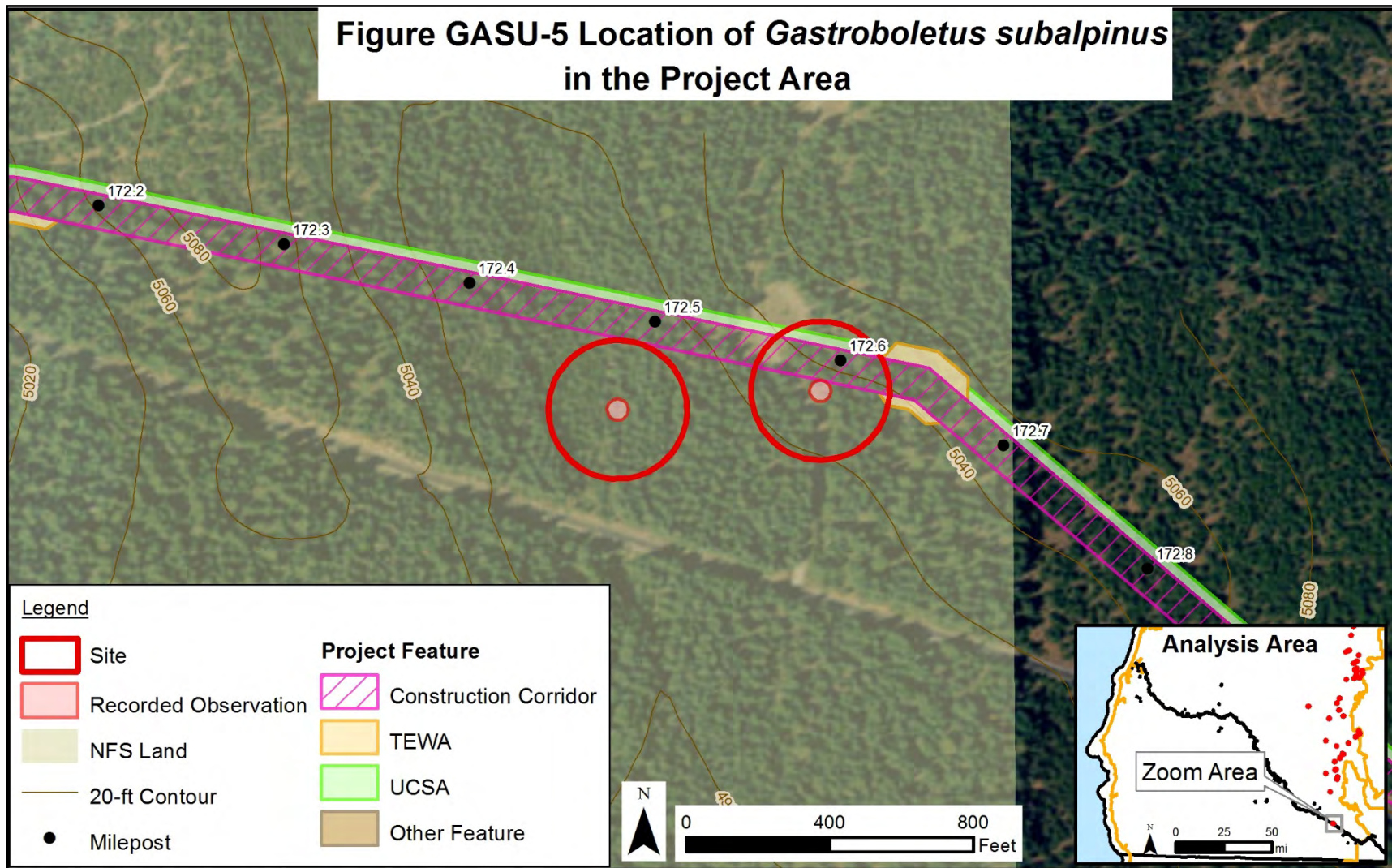
affect microclimate conditions in the site based on its distance from project activities and the existing habitat conditions.

Based on this analysis, *G. subalpinus* is not likely to persist at one of the two sites in the analysis area following project implementation. A single site would persist in the analysis area and local area in the Cascade Range and the species would continue to be common in the eastern Cascade Range in Oregon.

Across the project area, the PCGP Project would remove an estimated 634 acres of coniferous forests between 2,000–7,000 feet msl, including 171 acres of LSOG coniferous forests. These impacts would result in a reduction of habitat that may be suitable for *G. subalpinus*. Within this impact area, about 332 acres (52 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A 30-foot wide corridor would be maintained in low-growing vegetation across the project area, resulting in a permanent loss of about 145 acres of coniferous forests between 2,000 and 7,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests between 2,000 and 7,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at one out of the two sites in the analysis area as a result of the PCGP Project, one site of *G. subalpinus* would remain on NFS lands in the local area, and 80 sites, including 36 in reserves, would remain on NFS lands in the NSO range. Additionally, one site would remain entirely in BLM reserves (Congressional Reserves) and seven sites would remain on NPS lands. The remaining sites could be affected by natural hazards (e.g., fire, drought), but the NFS sites would be subject to the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 36 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. While sites on BLM and NPS lands are not subject to S&M Standards and Guideline protections, the single site in BLM reserves and seven sites on NPS lands would likely receive some level of protection under BLM management and National Park management. Based on these site counts, approximately 46 percent of the remaining *G. subalpinus* sites on NFS lands in the NSO range would be protected in reserves.



Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states “instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision” (Standards and Guidelines, pg. 4). The Forest Service has embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *Gastroboletus subalpinus* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information received since the species was listed in the 2001 ROD, however, indicates that the species appears to be more common than previously documented, as described below:
 - *Gastroboletus subalpinus* has a somewhat wide distribution in five physiographic provinces and three states in the NSO range and has a moderate-high number of overall sites (81 on NFS lands, 91 on all lands). The species appears to be well distributed in the eastern Cascade Range in Oregon. The currently known number of sites on federal lands has increased by 51 sites on NFS and BLM lands since 2007, with two sites documented during the PCGP Project surveys.
 - An estimated 45 percent of the sites (37 sites) are in reserves, which is an increase of about 13 sites in reserves since 2006 per Molina (2008).
- Coniferous forests between 2,000 and 7,000 feet msl (general habitat for the species) are widespread across the Cascade Range and Klamath Mountains, where all sites are documented, and encompass approximately 14 million acres on BLM and NFS lands with an estimated 59 percent in reserves.
- The PCGP Project would affect one of 81 Forest Service-managed sites of *G. subalpinus*, representing approximately 2 percent of the sites on NFS lands in the NSO range. Assuming site persistence cannot be maintained at the site, a moderate-high number of sites (80) would continue to be documented on NFS lands in the Cascade Range and Klamath Mountains. One site would remain in the analysis area, and many other sites would remain in close vicinity in the Cascade Range. The distribution of sites and extent of the species’ range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves. Of the remaining sites on NFS lands, 15 are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, 22 are at least partially in Congressionally Reserved areas where management activities that may adversely affect *G. subalpinus* are unlikely. Additionally, one site on BLM lands would remain in Congressional Reserves and would likely be protected.
- The PCGP Project would result in a permanent loss of an estimated 145 acres of coniferous forests between 2,000 and 7,000 feet msl (less than 1 percent of the total acreage in the NSO range). An estimated 8.3 million acres (59 percent) of coniferous forests and 2.6

million acres (64 percent) of LSOG coniferous forests between 2,000 and 7,000 feet msl would remain in reserves across the NSO range.

- The remaining forests could support additional populations of *G. subalpinus*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. *Gastroboletus subalpinus* is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.15.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *G. subalpinus* at one site on NFS lands; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 80 sites would remain on NFS lands across the region, and one site would remain NFS lands in the local area. Although the PCGP Project would affect site persistence of *G. subalpinus* at one site, this site is part of the many sites in the Cascade Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *Gastroboletus subalpinus* would persist in the region without considering the site as part of the population.
- The PCGP Project would remove approximately 634 acres of coniferous forests and 171 acres of LSOG coniferous forests between 2,000 and 7,000 feet msl (a negligible amount of the forests). An estimated 52 percent of the forests would be restored to similar conditions or shrublands, but a 30-foot wide early-successional corridor would remain across the project area. An estimated 8.3 million acres (59 percent) of coniferous forests and 2.6 million acres (64 percent) of LSOG coniferous forests between 2,000–7,000 feet msl would remain in reserves across the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites on NFS lands are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Additionally, the single site in BLM reserves and seven sites on NPS lands are expected to receive some level of protection under their respective management agencies. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed across the Cascade Range and Klamath Mountains in Oregon and California.

The PCGP Project would not be able to avoid impacts to all *G. subalpinus* sites in the analysis area, although some individuals within the site affected may persist following project implementation. Based on the above conclusions, avoidance of the single *G. subalpinus* site is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence. Amendments to the NFS land management plan that applies to the affected sites would waive implementation of Management Recommendations for the *G.*

subalpinus site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near the affected site over the long term. The monitoring plan shall be approved by the Forest Service.

2.16 GOMPHUS CLAVATUS

Gomphus clavatus is a chanterelle mushroom species in the Gomphaceae family and is commonly known as pig's ears or the pig's ear gomphus.

2.16.1 Regulatory Status and Ranking

The 2001 ROD, including the 2003 ASR modifications to the S&M species list, identifies *G. clavatus* as a Category F (uncommon) species. ORBIC evaluated *G. clavatus* in its 2004 *Survey and Manage Assessment* for BLM and the Forest Service (ORBIC 2004), but it was not re-evaluated in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2016). In 2004, the species was considered to be uncommon but not rare, with some cause for long-term concern due to declines or other factors within its global range and in Oregon (G4, S4, respectively). The species is not currently on any ORBIC lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.16.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to this analysis. Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are discussed below under Persistence Evaluation. The background information in this section is used to support the persistence evaluation in the following section, which is updated with more recent information (e.g., recent survey data) specifically used for the persistence evaluation.

Life History

Gomphus clavatus is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) (ORBIC 2004). It grows closely gregarious to caespitose in clusters or arcs (Castellano et al. 2003, The Fungi of California 2010). According to the ORBIC (2004), dispersal occurs through mycelial interactions with other individuals and their mycorrhizal partners rather than spore dispersal. Longevity of individuals and specific biological requirements are unknown. *Gomphus clavatus* has been documented fruiting in autumn or from late fall to mid-winter, depending on its location within its range (Castellano et al. 2003, The Fungi of California 2010). Fruiting may not occur every year (ORBIC 2004).

Range

Gomphus clavatus is widely distributed across northern temperate forests in North America and Europe (Castellano et al. 2003). Based on data available in 2004, *G. clavatus* was considered widely distributed and was most common in Oregon in the Cascade Range, and along the Pacific coast from Oswald West State Park south to the California border (ORBIC 2004). The currently known range of the species within the NSO range based on 2017 data is discussed below under Species Distribution.

Although information on the species' historical range is not known, it was likely similar to the current range, with populations distributed across North America and Europe. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed below under Threats.

Population Status

ORBIC (2004) reported *G. clavatus* from about 197 element occurrences in North America in 2004, with an estimated 121 of these occurrences in the Pacific Northwest and 78–95 in the range of the NSO. Most of the occurrences in the Pacific Northwest were in Oregon (estimated 57), with fewer in California (34) and Washington (36) (ORBIC 2004). In 2004, the species was considered uncommon with a spotty distribution, but had a relatively stable population (ORBIC 2004). The species was found in 11 locations during Random Multi-Species surveys across the NSO range between 2001 and 2004 (USDA and USDI 2007). Molina (2008) documented 68 new sites of *G. clavatus* in the NSO range between 1998 and 2006, and 118 total sites were documented by 2006, including 60 in reserves or protected areas. The 2007 Final SEIS reported 85 sites on NFS and BLM lands and 110 total sites on all lands in the NSO range (USDA and USDI 2007).

Equivalent-effort surveys were conducted during the fall and spring from 2010 to 2016 in old-growth stands in the PCGP Project area and within 100 feet of habitat removal to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). *Gomphus clavatus* was considered a Category B species for the majority of the surveys conducted for PCGP. The equivalent-effort surveys targeted all Category B species, including *G. clavatus*, and resulted in 18 new observations of individuals or populations of *G. clavatus*. Based on the relatively high number of sites and the increased number of sites since 1998 with increased surveys (a two-fold increase between 1998 and 2006 per Molina 2008 records), additional surveys would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2017 data are provided below under Species Distribution.

Habitat

Gomphus clavatus is found in LSOG forests and appears to be restricted to fairly complex habitats (ORBIC 2004). It is typically found partially hidden in deep humus in coniferous forests (Castellano et al. 2003, Cushman and Huff 2007). *Gomphus clavatus* may prefer specific microclimate conditions of LSOG forests, but it may not be restricted to these conditions.

Threats

Threats to *G. clavatus* are those that affect its host tree. Natural catastrophes or human activities that imperil the health of conifers compromise both the tree and the fungus (ORBIC 2004). Catastrophic events, such as hot fires that might extirpate the community, and other activities that threaten the forest habitat, such as drought, insect infestations, road construction, development, and clear-cutting, also threaten the species. Unprotected populations are specifically at risk to road construction or other development and heavy logging, such as clear-cutting or heavy thinning. This mushroom is considered edible, but responsible harvesting is not viewed as a major threat to known populations.

Management Recommendations

For Category F S&M species, known sites are not required to be managed per the 2001 ROD; these species are expected to be assigned to another category or be removed from the list (USDA and USDI 2001).

2.16.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species’ currently known distribution within the NSO range based on new site information, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *G. clavatus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and the Forest Service (Oregon/Washington regional offices) and converted into sites in accordance with the methodology described in Chapter 1. Table GOCL-1 shows the total number of known sites in the regional (NSO range), local (18 5th-field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 228 observations from BLM and Forest Service geodatabases were converted into 189 sites in the NSO range (region). Table GOCL-2 shows the total number of sites on NFS land and other land ownerships across the regional, local, and analysis areas. Table GOCL-3 shows the total number of sites within each land use allocation defined in the 1994 ROD and 2016 RMPs across the regional, local, and analysis areas. Figure GOCL-1 displays the regional distribution of the species across NFS lands, Figure GOCL-2 displays the extent of known sites located in protected areas (NFS lands, NFS reserves, BLM reserves, and NPS lands), and Figure GOCL-3 displays the species’ regional distribution as well as the extent of coniferous and mixed hardwood-coniferous forests and LSOG forests below 6,000 feet msl on BLM and NFS lands.

| TABLE GOCL-1 | |
|---|-----------------|
| Number of <i>Gomphus clavatus</i> Sites (2017) | |
| Location* | Number of Sites |
| Regional Area | 189 |
| Local Area | 24 |
| Analysis Area (Project Area) | 3 (3) |
| Data source: Processed BLM and Forest Service GIS data, August 2, 2017 | |
| *Definitions of regional, local, analysis, and project areas are provided in Chapter 1. | |

| Land Ownership | Regional Sites | Local Sites | Analysis Area Sites |
|------------------------------|----------------|-------------|---------------------|
| Forest Service | 102 | 3 | 3 |
| BLM | 64 | 20 | - |
| NPS | 11 | - | - |
| Fish and Wildlife Service | - | - | - |
| Other (Private, State, etc.) | 19 | 4 | 1 |

Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
|---|----------------|-------------|---------------------|
| Adaptive Management Area (AMA) | 8 | - | - |
| Adaptive Management Reserves (AMR) | - | - | - |
| Administratively Withdrawn (AW) | 10 | - | - |
| Congressionally Reserved (CR) | 9 | - | - |
| Late Successional Reserve (LSR) | 37 | 1 | 1 |
| Marbled Murrelet Area (LSR3) | 1 | - | - |
| Northern Spotted Owl Activity Center (LSR4) a/ | 7 | - | - |
| Managed Late Successional Area (MLSA) | - | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | 41 | 2 | 2 |
| Riparian Reserve | - | - | - |
| Bureau of Land Management | Regional Sites | Local Sites | Analysis Area Sites |
| Administratively Withdrawn (AW) | - | - | - |
| Congressional Reserve | 7 | - | - |
| District Designated Reserve | 14 | 5 | - |
| Harvest Land Base | 18 | 7 | - |
| Late Successional Reserve | 34 | 16 | - |
| Not Designated (ND) | 9 | - | - |
| Other (Matrix, Other) | - | - | - |
| Riparian Reserve | 24 | 10 | - |

Data sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0; 2016 RMP land allocation data, August 2016.
Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
a/ Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center.

Regional Distribution

Gomphus clavatus is widely distributed across 10 physiographic provinces in Washington (Olympic Peninsula, Western Lowlands, and Western and Eastern Cascades), Oregon (Coast Range, Cascades East and West, and Klamath Mountain), and California (Coast and Klamath) (see Figure GOCL-1). Most sites are found along the western Cascade Range, where the sites tend to be clustered or relatively close to one another in groups. Scattered sites are located in the Klamath Mountains, Coast Range, and other outlying areas with some clusters of sites in western Oregon and northwestern California. *Gomphus clavatus* appears to be well distributed in the western Cascade Range in Oregon and Washington based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.

Nineteen of the 189 known regional sites are at least partially located on private, state, or other lands; 64 sites are at least partially on BLM lands; eleven sites are at least partially on NPS lands

(Mount Rainier and Olympic National Parks); and 102 sites are at least partially on NFS lands across the region. Sites included on the National Forests that encompass the project area include four sites on the Rogue River-Siskiyou National Forest, two sites on the Fremont-Winema National Forest, and 20 sites on the Umpqua National Forest. The remaining sites on NFS lands are on the Deschutes, Gifford Pinchot, Klamath, Mt. Baker-Snoqualmie, Mt. Hood, Okanogan-Wenatchee, Olympic, Shasta-Trinity, Siuslaw, Six Rivers, and Willamette National Forests.

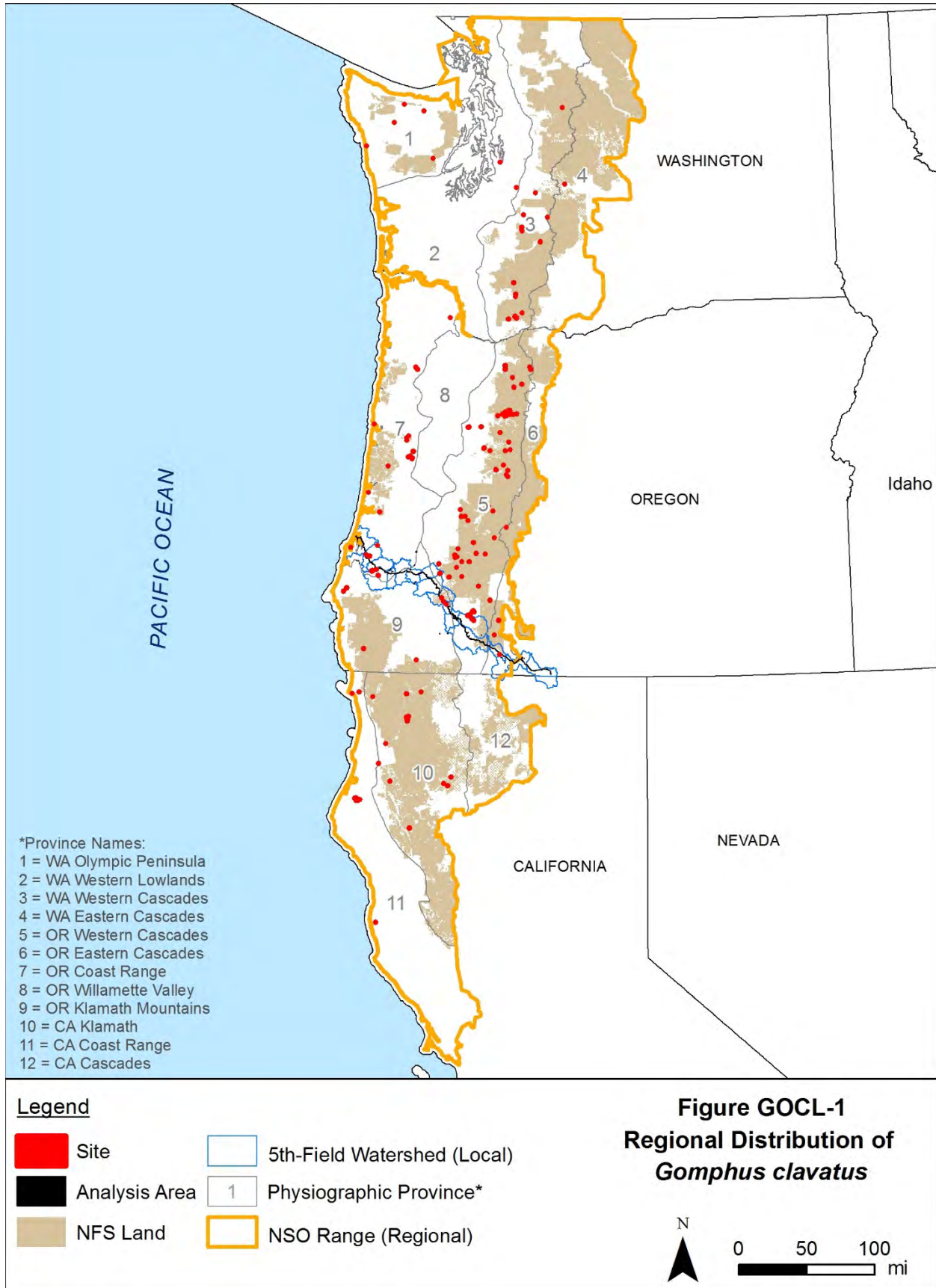
Across the NSO range, 53 sites are at least partially located in NFS reserve lands, including LSRs, Marbled Murrelet Areas, Known Owl Activity Centers, and Congressionally Reserved areas (see Figure GOCL-2). This represents 52 percent of the total sites on NFS lands in the region. The remaining NFS sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. Additionally, 37 sites are located entirely in BLM reserve lands, which represents 58 percent of the total number of sites on BLM lands in the region. While the 37 sites in BLM reserves and the eleven NPS sites are not covered by the S&M Standards and Guidelines, they likely receive some degree of protection through the BLM management and National Park management.

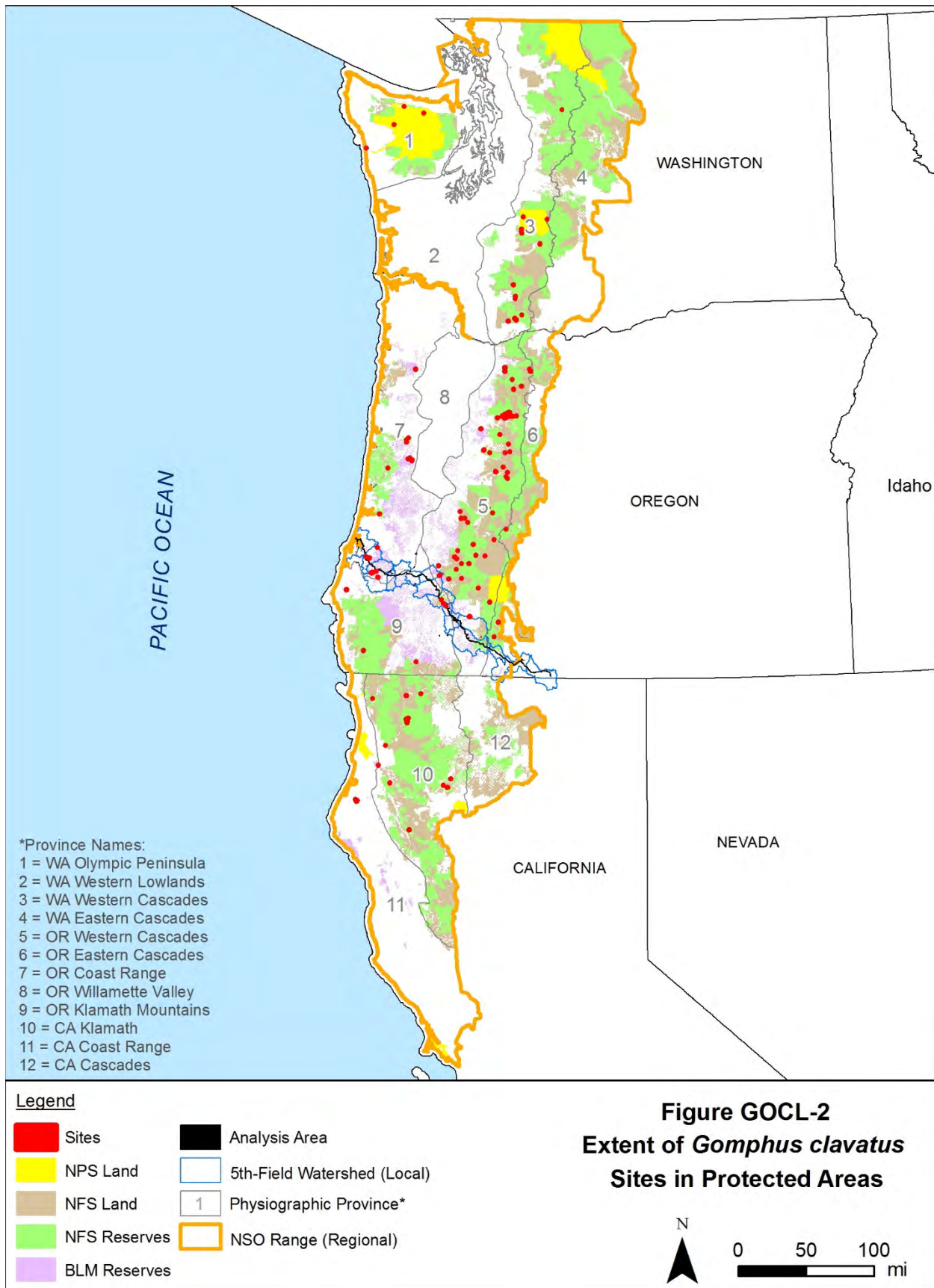
Gomphus clavatus is more common in LSOG forests based on available data (155 of 189 total sites are in LSOG), but it is also somewhat common in non-LSOG forests and may not be restricted to LSOG conditions. Based on current site locations, the species is found in coniferous and mixed hardwood-coniferous forests below about 6,000 feet msl and has been documented in most of the NSO range. Due to the extent of known sites, the amount of potential habitat on both NFS and BLM lands in the region, and the level of protection offered by NFS and BLM reserve land, both land ownerships are included in this potential habitat discussion. Coniferous and mixed hardwood-coniferous forests below 6,000 feet, including the LSOG component of these forests, within the NSO range could provide habitat for *G. clavatus* and support additional sites. These forests encompass an estimated 18.1 million acres on BLM and NFS lands in the region, including an estimated 10.7 million acres in reserve land allocations (59 percent of the forests; Table GOCL-4). Of this acreage, an estimated 5.9 million acres are LSOG (see Figure GOCL-3), including 3.9 million acres in reserve land allocations (66 percent of the forests). Although coniferous and mixed hardwood-coniferous forests below 6,000 feet msl are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

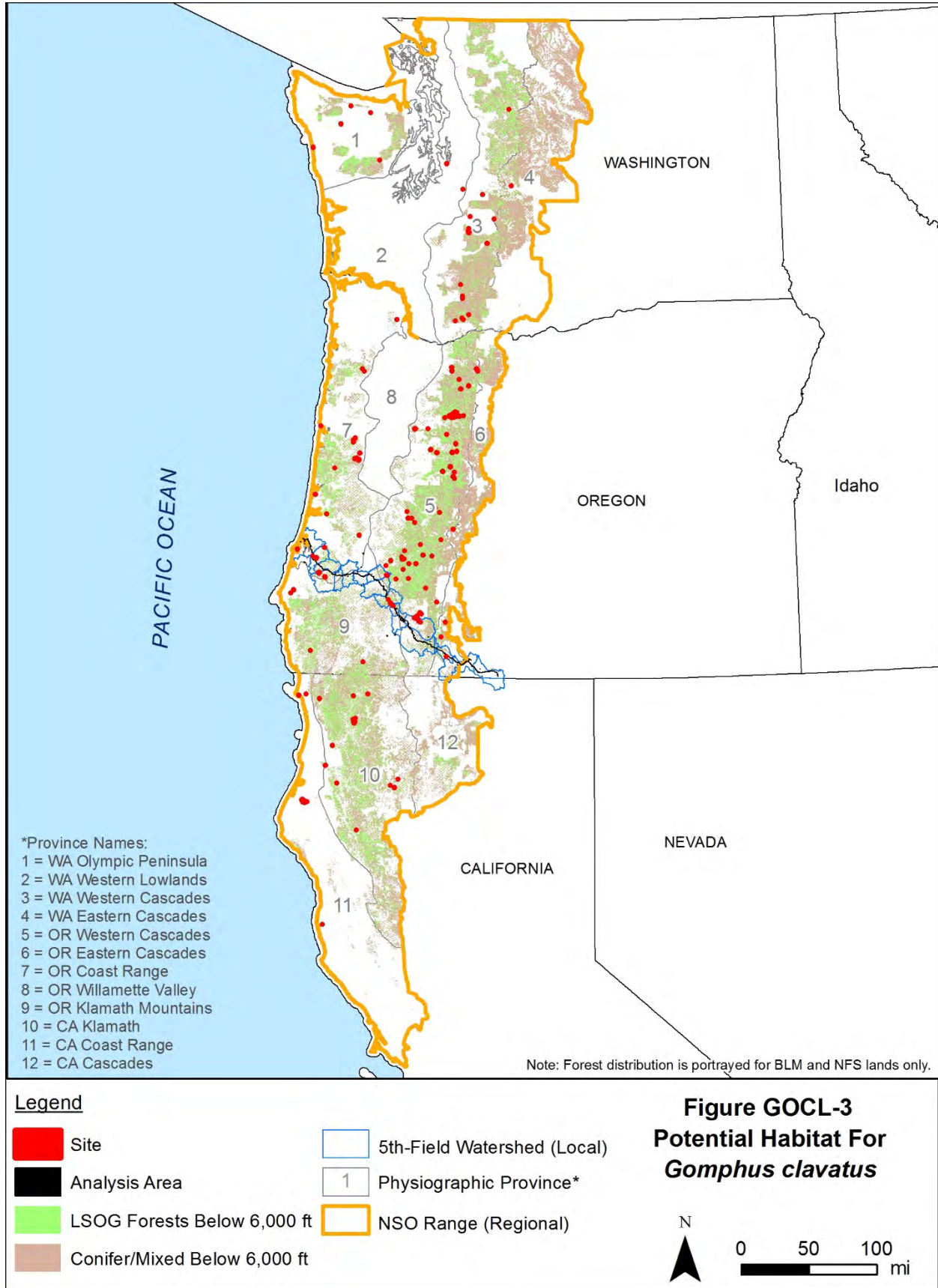
TABLE GOCL-4

| Extent of Forests That Could Provide Habitat for <i>Gomphus clavatus</i> on NFS and BLM Lands ^{a/} | | | | |
|---|---|------------|-------------------------------|-----------|
| Location | Coniferous and Mixed Forests below 6,000 feet | | LSOG Forests below 6,000 feet | |
| | Total | Reserves | Total | Reserves |
| Regional Area | 18,055,593 | 10,707,574 | 5,908,944 | 3,894,277 |
| Local Area | 568,307 | 369,371 | 181,349 | 133,178 |
| Project Area | 1,419 | 982 | 323 | 230 |

Data source: Gradient nearest neighbor vegetation data from Moerur et al. 2011
 Note: Areas are presented in acres.
^{a/} The area estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.







Local Distribution

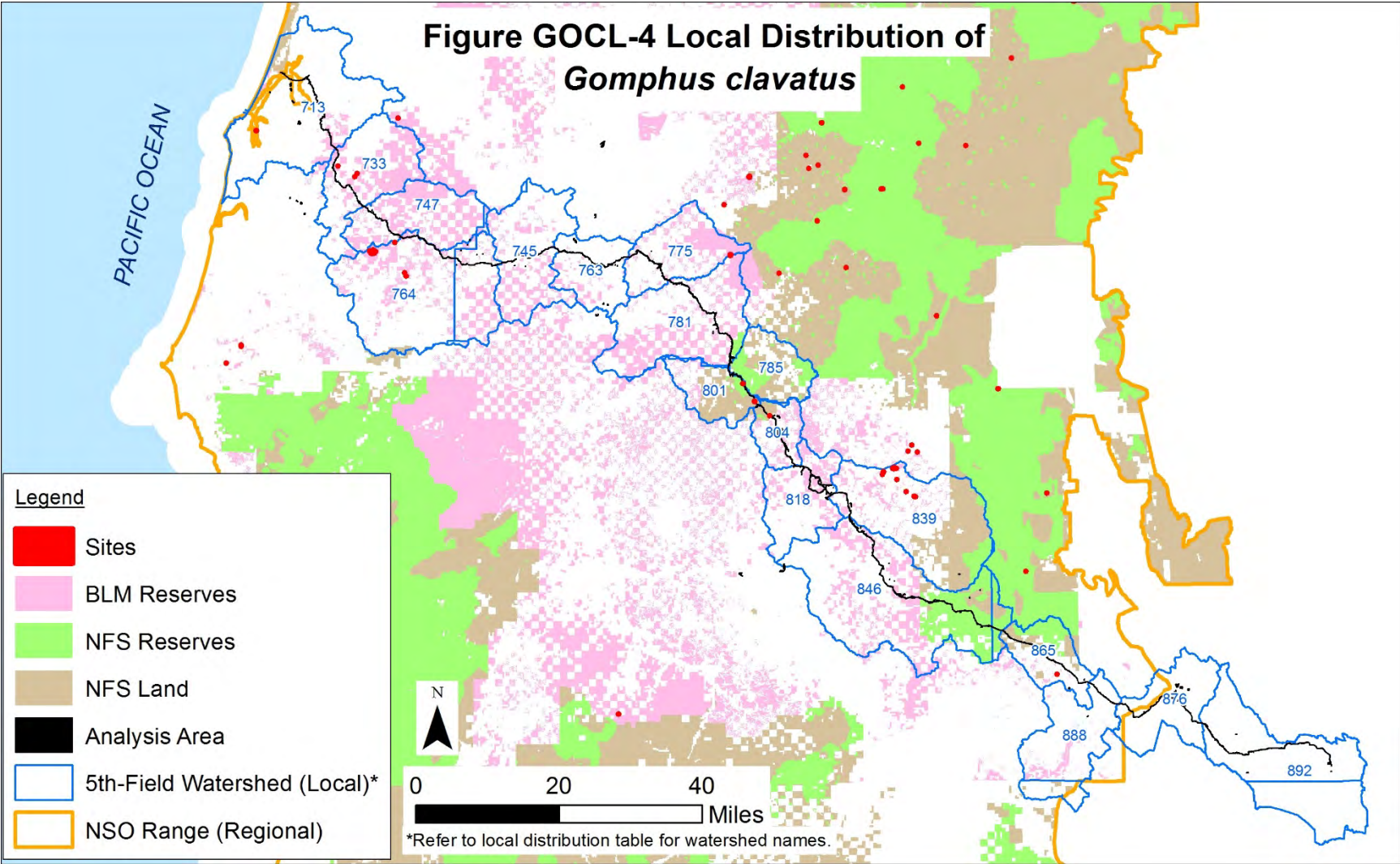
Within the local area, *G. clavatus* is distributed across nine 5th-field watersheds that overlap the project area (see Table GOCL-5 and Figure GOCL-4). Sites in the Big Butte Creek watershed are clustered and near one another and sites in other watersheds more scattered. Across these watersheds, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous and mixed forests, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located on NFS lands within 20 miles to the north in the Cascade Range.

Of the 24 sites in the local area, three sites are at least partially on NFS lands. These sites are located on lands designated as Other (Matrix) and LSR. Four sites are at least partially on private lands and 20 sites are at least partially on BLM lands. Of the 20 sites on BLM lands, 13 sites are entirely in reserves, representing 58 percent of the local sites.

Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl encompass approximately 568,307 acres on BLM and NFS lands in the local area, with 369,371 acres in reserve land allocations (65 percent of the forests). Of this acreage, an estimated 181,349 acres are LSOG, including 133,178 acres in reserves (73 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures GOCL-3 and GOCL-4).

| Watershed (HUC5 ID) | Number of Sites | Number of Sites in NFS Reserve Lands | Number of Sites in BLM Reserve Lands |
|--|-----------------|--------------------------------------|--------------------------------------|
| Big Butte Creek (839) | 11 | - | 11 |
| Coos Bay Frontal (713) | 1 | - | - |
| East Fork Coquille River (747) | - | - | - |
| Elk Creek-South Umpqua (785) | 1 a/ | 1 | - |
| Klamath River-John C Boyle Reservoir (888) | - | - | - |
| Lake Ewauna-Upper Klamath River (876) | - | - | - |
| Little Butte Creek (846) | - | - | - |
| Lower Lost River (892) | - | - | - |
| Middle Fork Coquille River (764) | 4 | - | 4 |
| Middle South Umpqua River (763) | - | - | - |
| Myrtle Creek (775) | 1 | - | 1 |
| North Fork Coquille River (733) | 3 | - | 3 |
| Olalla Creek-Lookingglass Creek (745) | - | - | - |
| Rogue River-Shady Cove (818) | - | - | - |
| South Umpqua River (781) | - | - | - |
| Spencer Creek (865) | 1 | - | 1 |
| Trail Creek (804) | 1 | - | - |
| Upper Cow Creek (801) | 2 a/ | 1 | - |

Data sources: Processed BLM and Forest Service GIS data, August 2, 2017; HUC5 Watershed layer, August 23, 2011
 Note: Number of sites in reserves includes those that are partially in reserves.
 Site counts are not additive because some sites occur in multiple watersheds and the counts overlap, as noted below:
 a/ One site is on both Elk Creek-South Umpqua and Upper Cow Creek watersheds.



Analysis/Project Area Distribution

The analysis and project areas contain three sites of *G. clavatus*. All three sites are on NFS lands (Umpqua National Forest), with one site partially on private land as well. The analysis area sites are found in three 5th-field watersheds (Elk Creek-South Umpqua, Trail Creek, and Upper Cow Creek). The sites are relatively close to one another in the central portion of the analysis area in the Klamath Mountains. Many sites are located entirely in BLM reserves in the immediate vicinity of the analysis area (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in 18 total observations of the species in 10 locations in or near the project area during 2010 and 2011 (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). These recorded observations comprise the three sites in the analysis area. Within the project area, one site is located at approximately MP 106.4, five observations comprise one site located between MPs 109.7 and 109.8, and one site located at MP 113.2.

Project Impacts

Analysis

The PCGP Project would affect three sites out of the 102 sites on NFS lands in the region, representing approximately 3 percent of the sites (or three out of 189 total sites on all lands in the NSO range). Table GOCL-6 presents an overview of the features of the PCGP Project that would affect the *G. clavatus* sites. The construction corridor and associated work and storage areas would affect approximately 4.2 acres within the sites (about 33 percent of the sites). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *G. clavatus* in and near the project area.

| Project Activity | Number of Sites Affected | Area of Disturbance within Sites |
|---|--------------------------|----------------------------------|
| Construction Corridor | 3 | 3.5 ac |
| Temporary Extra Work Area (TEWA) | 3 | 0.5 ac |
| Uncleared Storage Area (UCSA) | 1 | 0.2 ac |
| Roads (TMP) | - | - |
| Other Minimal Disturbance Activities | - | - |
| ac = acres | | |
| Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities. | | |

The following discussion provides an overview of the types of impacts that would be expected at the sites based on the features of the PCGP Project that could affect site persistence.

Vegetation removal and grading activities in the 95-foot wide construction corridor would disturb about 3.5 acres of vegetation and soil within three sites and could result in the removal of *G. clavatus* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 0.5 acre within three sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *G. clavatus* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not

disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A 30-foot wide portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 0.2 acre of understory habitat in one site, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species.

Across the project area, the PCGP Project would remove an estimated 1,142 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl, including 249 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *G. clavatus*. Within this impact area, about 567 acres (about 50 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A 30-foot wide corridor would be maintained in low-growing vegetation across the project area, resulting in a loss of about 246 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous and mixed forests below 6,000 feet msl across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the three sites as a result of the PCGP Project, no sites of *G. clavatus* would remain on NFS lands in the local area, and 20 sites would remain on BLM lands in the local area, including 13 entirely in reserves. A total of 99 sites would remain on NFS lands in the NSO range, including 52 in reserves, and 64 sites would remain on BLM lands in the NSO range, including 37 entirely in reserves. The remaining sites could be affected by natural hazards (e.g., fire, drought), but the NFS sites would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 52 sites in NFS reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. While the sites on BLM lands are not subject to the S&M Standards and Guidelines, the 37 sites entirely in reserves would receive some level of protection under BLM management. Based on these site counts, approximately 54 percent of the remaining *G. clavatus* sites on NFS and BLM lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states “instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision” (Standards and Guidelines, pg. 4). The Forest Service has embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *Gomphus clavatus* is a Category F (uncommon) S&M species throughout the NSO range. Per the 2001 ROD, information on Category F species is insufficient to determine what

level of management is needed for reasonable assurance of species persistence, and known sites are not required to be managed. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as described below:

- *Gomphus clavatus* has a wide distribution across 10 physiographic provinces and three states in the region and a moderate-high number of overall sites (102 on NFS lands, 189 on all lands). The species appears to be well distributed in the western Cascade Range in Oregon and Washington and is fairly common and widespread outside this mountain range. The currently known number of sites on BLM and NFS lands is an increase of 81 sites since 2007, with several sites documented during the PCGP Project surveys.
- An estimated 54 percent of the sites (90 sites) are in reserves, which is an increase of 30 sites in reserves since 2006 per Molina (2008).
- Coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (general habitat for the species) are widely distributed across the region and encompass approximately 18.1 million acres on BLM and NFS lands with an estimated 59 percent in reserves. Most of the forests are found in the Cascade Range and Klamath Mountains, where most sites are documented. The Coast Range and other areas also contain coniferous and mixed hardwood-coniferous forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *G. clavatus*.
- The PCGP Project would affect three of 102 NFS-managed sites of *G. clavatus*, representing approximately three percent of the sites on NFS lands in the NSO range. Assuming site persistence cannot be maintained at the three sites, a moderate-high number of sites (99) would continue to be documented on NFS lands in the region with a wide distribution across Washington, Oregon, and California. No sites would remain on NFS lands in the local area. Additionally, 37 sites would remain entirely in BLM reserves in the region, and 13 sites entirely in reserves would remain on BLM lands in the local area. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at one site in LSRs, but the percentage of sites in reserves would remain about the same (53 percent). Of the remaining sites, 44 sites are at least partially in LSRs where management actions are restricted to those activities that benefit LSOG forests, and nine are at least partially in Congressionally Reserved areas where management activities that may adversely affect *G. clavatus* are unlikely. Additionally, 37 sites would remain entirely in BLM reserves, including LSRs where management actions are restricted to those activities that benefit LSOG forests, Riparian Reserves where management actions are restricted to those activities that benefit the conservation of riparian areas and riparian-associated species, and Congressionally Reserved Reserves and District Designated Reserves where management activities that may adversely affect *G. clavatus* are unlikely.

- The PCGP Project would result in a permanent loss of an estimated 246 acres of coniferous and mixed hardwood-coniferous forests below 6,000 feet msl (less than 1 percent of the total regional acreage). An estimated 10.7 million acres (59 percent) of coniferous and mixed forests and 3.9 million acres (66 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *G. clavatus*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category F species for which its status is undetermined; therefore pre-disturbance surveys are not applicable. It is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.16.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *G. clavatus* at three sites on NFS lands; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence for the following reasons:

- With project implementation, 99 sites would remain on NFS lands across the region, and 37 sites would remain entirely in BLM reserves in the region. While no sites would remain on NFS lands in the local area, 13 sites would remain entirely in BLM reserves in the local area. The PCGP Project would affect site persistence of *G. clavatus* at three sites on NFS lands. The nearest sites on NFS lands include several scattered sites within 20 miles northeast of the analysis area in the Western Cascade Range. Sites on BLM lands are much more abundant than sites on NFS lands in the vicinity of the analysis area, and many sites entirely in reserves are located in western Cascades in southern Oregon. It is expected that BLM management would enable the majority of the sites in reserves to persist. Due to a moderate number of sites remaining on BLM lands in the local area (20) with a large proportion of sites entirely in BLM reserves (65 percent), it is presumed that many sites would be protected and the species would remain locally common. The species' distribution within the NSO range following project implementation would be similar to its currently known distribution. *Gomphus clavatus* would persist in the region without considering the three NFS sites as part of the population.
- The PCGP Project would remove approximately 1,142 acres of coniferous and mixed hardwood-coniferous forests and 249 acres of LSOG coniferous and mixed forests below 6,000 feet msl (a negligible amount of the forests). An estimated 67 percent of the forests would be restored to similar conditions or shrublands, but a 30-foot wide early-successional corridor would remain across the project area. An estimated 10.7 million acres (59 percent) of coniferous and mixed forests and 3.9 million acres (66 percent) of LSOG forests below 6,000 feet msl would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites on NFS lands are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable

future. Additionally, the remaining sites in BLM reserves are expected to receive some level of protection under the 2016 BLM RMPs. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

As a Category F species, the Forest Service does not require management of *G. clavatus*. This analysis is provided to assess potential impacts and to fulfill National Environmental Policy Act disclosure. The PCGP Project would not be able to avoid impacts to all *G. clavatus* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the three *G. clavatus* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence.

2.17 GOMPHUS KAUFFMANII

Gomphus kauffmanii is a chanterelle mushroom species in the Gomphaceae family and is commonly known as Kauffman's gomphus. It is also known as *Turbinellus kauffmanii*.

2.17.1 Regulatory Status and Ranking

The 2001 ROD, including the 2003 ASR modifications to the S&M species list, identifies *G. kauffmanii* as a Category E (rare) species. ORBIC evaluated *G. kauffmanii* in its 2004 *Survey and Manage Assessment* for BLM and the Forest Service (ORBIC 2004) and in the 2010 *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2010). It was not included in its most recent updates of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2013, ORBIC 2016). In 2010, the species was considered to be at moderate risk of extinction due to a restricted range, relatively few populations, recent and widespread declines, or other factors, within its global range and in Oregon (G3?, S3, respectively), although its global ranking was uncertain. The species is not currently on any ORBIC lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.17.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to this analysis. Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are discussed below under Persistence Evaluation. The background information in this section is used to support the persistence evaluation in the following section, which is updated with more recent information (e.g., recent survey data) specifically used for the persistence evaluation.

Life History

Gomphus kauffmanii is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) (ORBIC 2004). It grows into the soil matrix and forms symbiotic associations with the fine root systems of plants (Cushman and Huff 2007). It grows solitary, closely gregarious or loosely caespitose and is typically partially hidden in deep, rich humus under pine and true fir trees (Castellano et al. 2003). According to ORBIC (2004), individuals are dispersed through mycelial interactions with other individuals and their mycorrhizal partners, rather than through spore dispersal. Longevity of individuals and specific biological requirements are unknown. The

mushroom has been documented fruiting between autumn and early winter in western North America and in the summer in eastern North America, but it does not always fruit annually (ORBIC 2004).

Range

Gomphus kauffmanii is endemic to North America, where it is found on the west and east coasts (ORBIC 2004). In the west, the mushroom has been reported from British Columbia south through California, Nevada, and Arizona. In the east, it has been reported in Connecticut, North Carolina, and Tennessee. In Oregon, *G. kauffmanii* was known from populations near Coos Bay and in the Coast and Cascade Ranges (ORBIC 2004). The currently known range of the species within the NSO range based on 2017 data is discussed below under Species Distribution.

Although information on the species' historical range is not known, it was likely similar to the current range, with populations distributed in western and eastern North America. Local and regional distributions across its range may have varied based on specific habitat conditions and have likely been affected by habitat modifications and other environmental factors, as discussed below under Threats.

Population Status

ORBIC (2004) reported *G. kauffmanii* from an estimated 54 element occurrences in the Pacific Northwest in 2004. An estimated 22 of these occurrences were in Oregon, and fewer were in California (10) and Washington (14) (ORBIC 2004). ORBIC estimated that 53 of the species' occurrences were in protected areas in the NSO range in 2004. In 2004, *G. kauffmanii* was considered to be uncommon to rare with a spotty distribution, but it had a relatively stable population in the Pacific Northwest (ORBIC 2004). The species was found in two locations during Random Multi-Species surveys across the NSO range between 2001 and 2004 (USDA and USDI 2007). Molina (2008) documented 37 new sites of *G. kauffmanii* in the NSO range between 1998 and 2006, and 74 total sites were documented by 2006, including 45 in reserves or protected areas. The 2007 Final SEIS reported 59 sites on NFS and BLM lands and 70 total sites on all lands in the NSO range (USDA and USDI 2007).

Equivalent-effort surveys were conducted during the fall and spring from 2010 to 2016 in old-growth stands in the PCGP Project area and within 100 feet of habitat removal to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). While *G. kauffmanii* is a Category E species, it was considered to be a Category B species during the majority of the PCGP surveys. The equivalent-effort surveys targeted all Category B species, and resulted in 17 new observations of individuals or populations of *G. kauffmanii*. Additional surveys for other species in LSRs in nearby areas resulted in seven additional incidental observations of the species. These observations have increased the number of sites documented in BLM and Forest Service records by about 20 percent. Based on the increased number of known sites since 1998 as a result of the increased number of surveys (a two-fold increase between 1998 and 2006 per Molina 2008 records), additional survey effort would be expected to locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2017 data are provided below under Species Distribution.

Habitat

Gomphus kauffmanii is found in LSOG forests as well as younger forests and is primarily associated with true fir, Douglas-fir, pine, and hemlock trees (ORBIC 2004, Castellano et al. 2003, Holthausen et al. 1994, Trappe, pers. comm. 2013). It is typically found partially hidden in deep humus in coniferous forests (Castellano et al. 2003), but can grow to be about 10 inches tall (Trappe, pers. comm. 2013). Based on data available in 2007, observations were located between about 200 and 7,000 feet msl (Cushman and Huff 2007). *Gomphus kauffmanii* may prefer specific microclimate conditions of LSOG forests, but it is also found in younger forests and may not be restricted to these conditions.

Threats

Threats to *G. kauffmanii* are actions that affect its host tree. Natural catastrophes or human activities that imperil the health of conifers compromise both the tree and the fungus (ORBIC 2004). Catastrophic events, such as hot fires that might extirpate the community, and other activities that threaten the forest habitat, such as drought, insect infestations, road construction, development, and logging, also threaten the species. Unprotected populations are specifically at risk to road construction or other development and heavy logging, such as clean- or clear-cutting, or heavy thinning. This mushroom is considered edible, but responsible harvesting is not viewed as a major threat to the species.

Management Recommendations

For Category E S&M species, the direction under the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). This statement is no longer applicable on BLM lands under the 2016 BLM RMPs, although it is still valid on NFS lands within the range of the NSO. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *G. kauffmanii*:

- As a mycorrhizal species, *G. kauffmanii* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. Consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.17.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new site information, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *G. kauffmanii* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and the Forest Service (Oregon/Washington regional offices) and converted into sites in accordance with the methodology described in Chapter 1. Table GOKA-1 shows the total number of known sites in the regional (NSO range), local (18 5th-field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project

areas (PCGP Project corridor, associated work areas, and roads). An estimated 219 observations from BLM and Forest Service geodatabases were converted into 159 sites in the NSO range (region). Table GOKA-2 shows the total number of sites on BLM and NFS land and other land ownerships across the regional, local, and analysis areas. Table GOKA-3 shows the total number of sites within each land use allocation defined in the 1994 ROD and 2016 RMPs across the regional, local, and analysis areas. Figure GOKA-1 displays the regional distribution of the species across NFS lands, Figure GOKA-2, displays the extent of known sites located in protected areas (NFS lands, NFS reserves, BLM reserves, and NPS lands), and Figure GOKA-3 displays the species' regional distribution as well as the extent of all forest types and LSOG forests on BLM and NFS lands.

| Number of <i>Gomphus kauffmannii</i> Sites (2017) | |
|---|-----------------|
| Location* | Number of Sites |
| Regional Area | 159 |
| Local Area | 35 |
| Analysis Area (Project Area) | 7 (6) |

Data source: Processed BLM and Forest Service GIS data, August 2, 2017
 *Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

| Distribution of <i>Gomphus kauffmannii</i> across Federal, Private, and Other Lands | | | |
|---|----------------|-------------|---------------------|
| Land Ownership | Regional Sites | Local Sites | Analysis Area Sites |
| Forest Service | 99 | 14 | 7 |
| BLM | 39 | 20 | - |
| NPS | 10 | - | - |
| Fish and Wildlife Service | - | - | - |
| Other (Private, State, etc.) | 16 | 4 | - |

Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
 Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

| Distribution of <i>Gomphus kauffmannii</i> across 1994 ROD and 2016 RMPs Land Allocations | | | |
|---|----------------|-------------|---------------------|
| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
| Adaptive Management Area (AMA) | 1 | - | - |
| Adaptive Management Reserves (AMR) | - | - | - |
| Administratively Withdrawn (AW) | 27 | 1 | - |
| Congressionally Reserved (CR) | 7 | - | - |
| Late Successional Reserve (LSR) | 44 | 12 | 6 |
| Marbled Murrelet Area (LSR3) | - | - | - |
| Northern Spotted Owl Activity Center (LSR4) @/ | 2 | - | - |
| Managed Late Successional Area (MLSA) | 5 | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | 25 | 2 | 1 |
| Riparian Reserve | - | - | - |

TABLE GOKA-3

| Distribution of <i>Gomphus kauffmannii</i> across 1994 ROD and 2016 RMPs Land Allocations | | | |
|---|----------------|-------------|---------------------|
| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
| Bureau of Land Management | Regional Sites | Local Sites | Analysis Area Sites |
| Administratively Withdrawn (AW) | - | - | - |
| Congressional Reserve | - | - | - |
| District Designated Reserve | 12 | 5 | - |
| Harvest Land Base | 23 | 12 | - |
| Late Successional Reserve | 17 | 9 | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | - | - | - |
| Riparian Reserve | 11 | 6 | - |

Data sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0; 2016 RMP land allocation data, August 2016.

Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.

a/ Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center.

Regional Distribution

Gomphus kauffmannii is widely distributed across 11 physiographic provinces in Washington (Olympic Peninsula, Western Lowlands, and Western and Eastern Cascades), Oregon (Coast Range, Cascades East and West, and Klamath Mountain), and California (Coast, Cascades, and Klamath) (see Figure GOKA-1). Most sites are found along the western Cascade Range, where the sites tend to be clustered or relatively close to one another in groups. Scattered sites are located in the Klamath Mountains, Coast Range, and other outlying areas with some clusters of sites in western Oregon and northwestern California. *Gomphus kauffmannii* appears to be well distributed in the western Cascade Range in Oregon and Washington based on the abundance and size of sites, proximity of sites to one another, and distribution of sites across forests that may provide suitable habitat in the mountain range.

Ninety-nine of the 159 known sites in the region are at least partially located on NFS lands; 16 sites are at least partially located on private, state, or other lands; 10 sites are on NPS lands (Mount Rainier, Redwood, and Olympic National Parks); and 39 sites are at least partially on BLM lands across the region. Sites included on National Forests that encompass the project area include 15 sites on the Rogue River National Forest, 21 sites on the Fremont-Winema National Forest, and nine sites on the Umpqua National Forest. The remaining sites on NFS lands are on the Gifford Pinchot, Klamath, Modoc, Mt. Baker-Snoqualmie, Mt. Hood, Okanogan-Wenatchee, Olympic, Shasta-Trinity, Siuslaw, Six Rivers, and Willamette National Forests.

Across the NSO range, 53 sites are at least partially located in reserve lands managed by the Forest Service, including 44 in LSRs, two in Known Owl Activity Centers, and seven in Congressionally Reserved areas (see Figure GOKA-2). This represents 54 percent of the total sites on NFS lands in the region. The remaining NFS sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. Additionally, 16 sites are located entirely in BLM reserve lands. This includes sites on LSRs, District Designated Reserves, and Riparian Reserves, and represents 41 percent of the total sites on BLM lands in region. While the sites entirely in BLM reserves and the NPS sites are not covered by the S&M Standards and Guidelines, they likely receive some degree of protection through BLM reserve management and National Park Management.

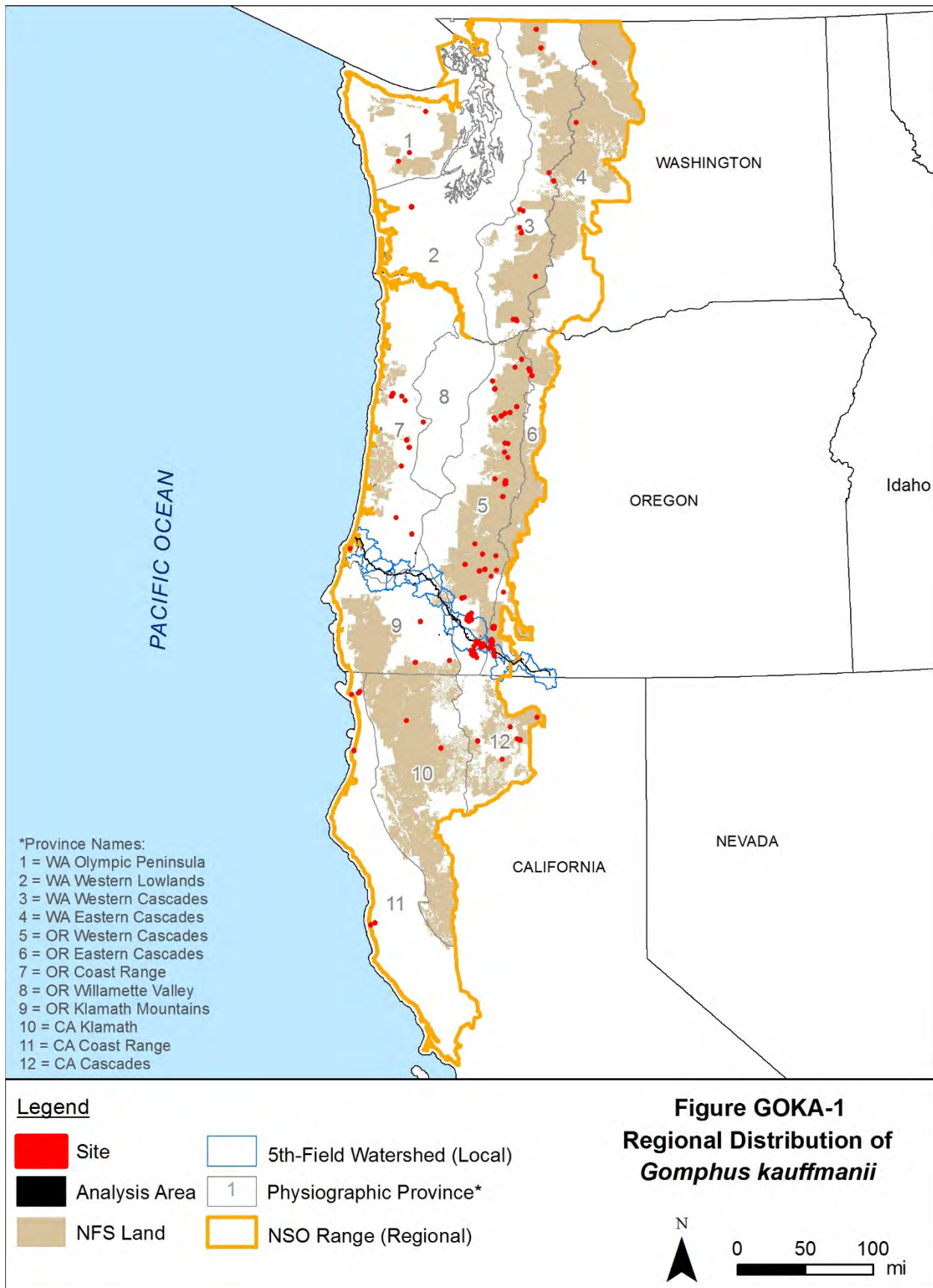
Gomphus kauffmanii is more common in LSOG forests based on available data (129 of 159 total sites are in LSOG), but it is also somewhat common in non-LSOG forests and has been documented in young forests. It may not be as restricted to LSOG conditions. Based on current site locations, the species is found in all forest types across a wide elevation range and has been documented in most of the NSO range. Due to the extent of known sites, the amount of potential habitat on both NFS and BLM lands in the region, and the level of protection offered by NFS and BLM reserve land, both land ownerships are included in this potential habitat discussion. Coniferous, mixed hardwood-coniferous, and hardwood forests, including the LSOG component of these forests, across the NSO range could provide habitat for *G. kauffmanii* and support additional sites. These forests encompass an estimated 20.4 million acres on BLM and NFS lands in the region, including an estimated 12.1 million acres in reserve land allocations (60 percent of the forests; Table GOKA-4). Of this acreage, an estimated 6.2 million acres are LSOG (see Figure GOKA-2), including 4.1 million acres in reserve land allocations (66 percent of the forests). Although coniferous, mixed hardwood-coniferous, and hardwood forests are widespread across the region, LSOG forests are less common and are primarily found in the Cascade and Coast Ranges and Klamath Mountains.

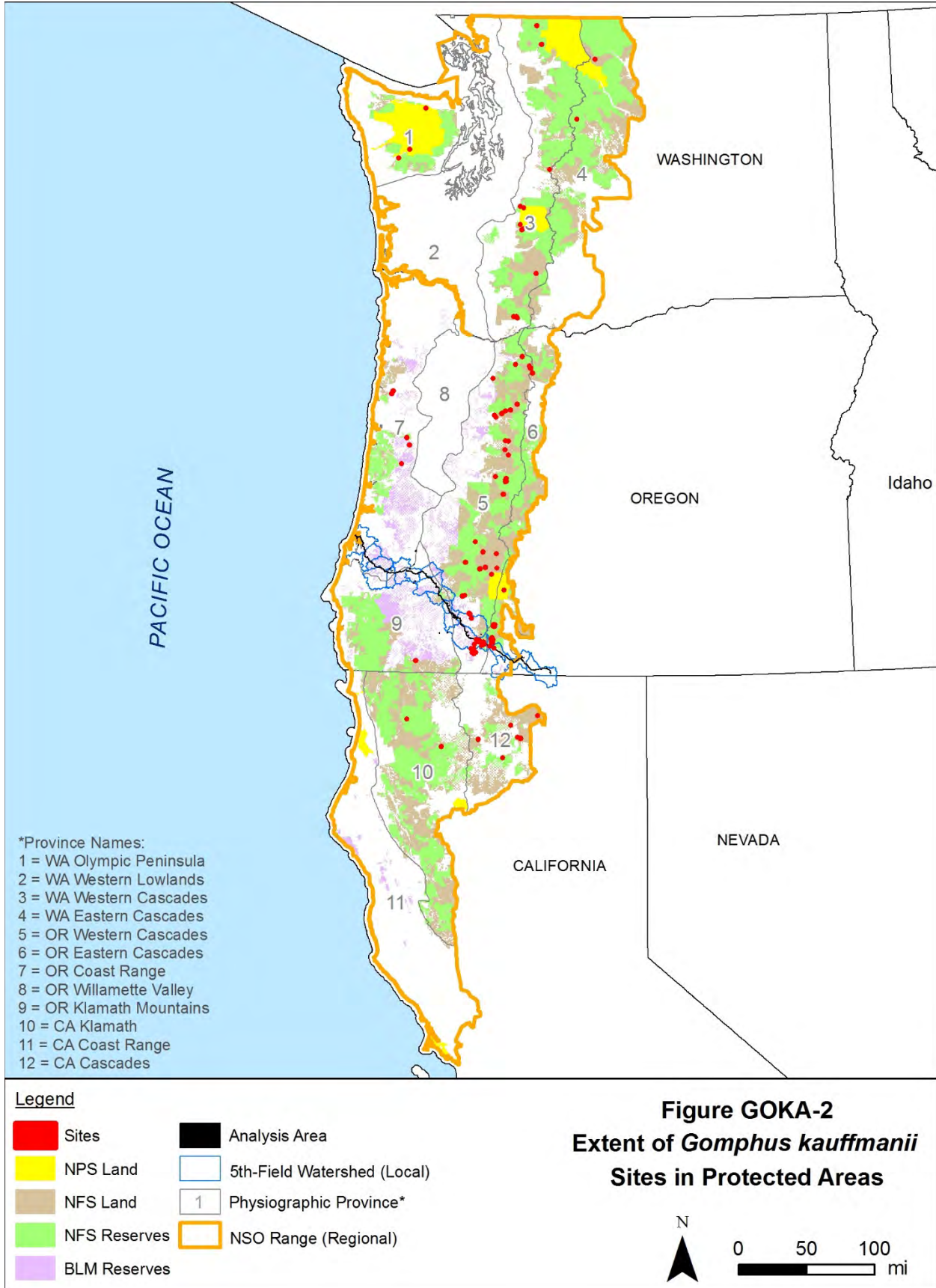
TABLE GOKA-4

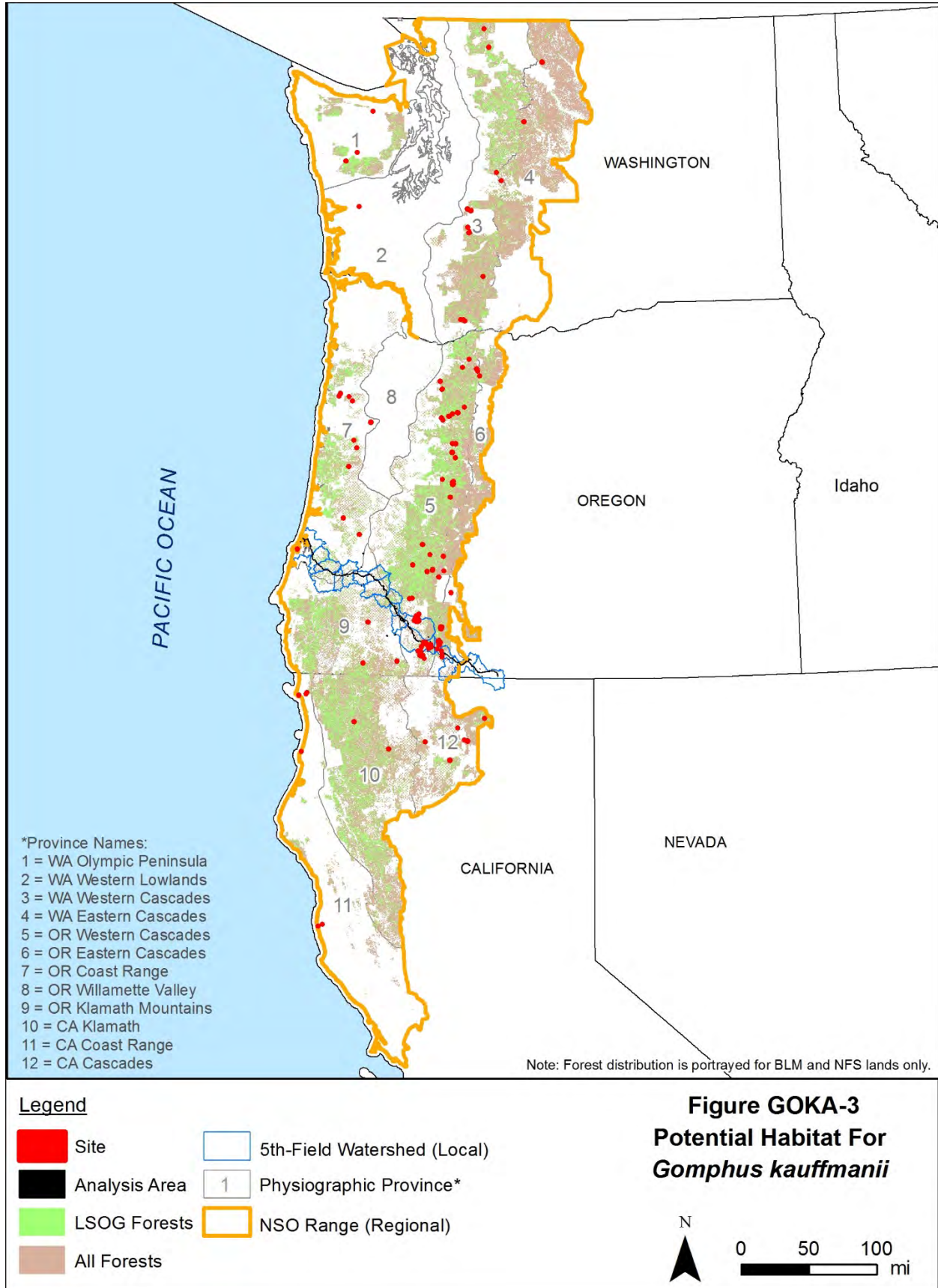
Extent of Forests That Could Provide Habitat for *Gomphus kauffmanii* on NFS and BLM Lands ^{a/}

| Location | All Forests | | LSOG Forests | |
|---------------|-------------|------------|--------------|-----------|
| | Total | Reserves | Total | Reserves |
| Regional Area | 20,349,175 | 12,108,434 | 6,243,140 | 4,099,347 |
| Local Area | 620,721 | 412,126 | 185,960 | 137,227 |
| Project Area | 1,527 | 1,062 | 322 | 229 |

Data source: Gradient nearest neighbor vegetation data from Moeur et al. 2011
 Note: Areas are presented in acres.
^{a/} The area estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.







Local Distribution

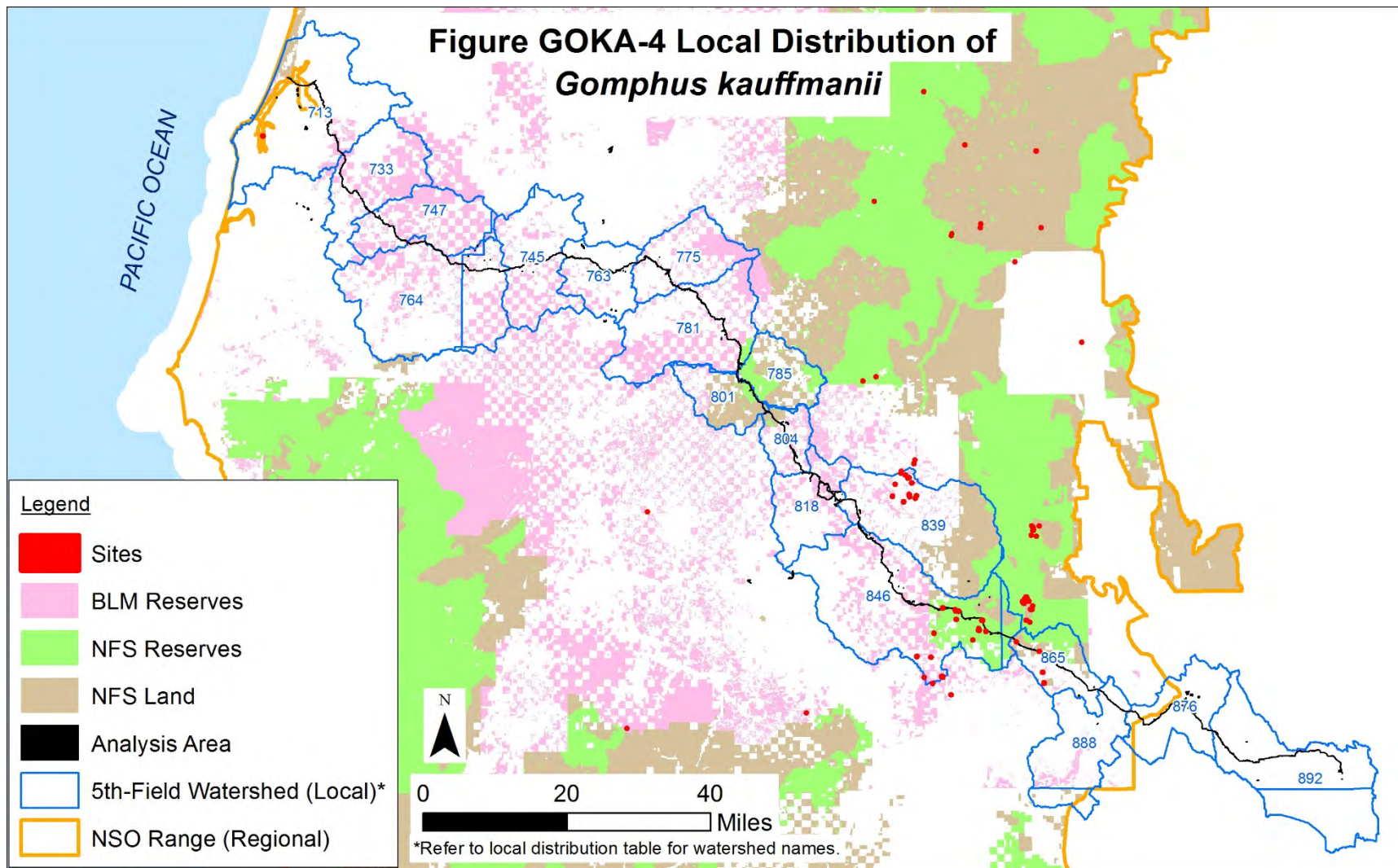
Within the local area, *G. kauffmanii* is found in four 5th-field watersheds that overlap the project area (see Table GOKA-5 and Figure GOKA-4). Most of the sites are clustered and near one another in the Cascade Range in the Big Butte Creek, Little Butte Creek, and Spencer Creek watersheds. The site in the Coos Bay Frontal watershed is distant from the other local sites and from others in the region (the nearest site is 40 miles northeast). Within the Cascade Range, multiple avenues of connectivity appear to be available between sites based on the extent of forests and abundance of sites in the mountain range, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located on NFS lands within 20 miles to the northeast in the Cascade Range.

Of the 35 sites in the local area, 14 sites are at least partially on NFS lands, including 12 sites partially in LSRs, one site in an Administratively Withdrawn area, and two sites on land designated as Other (Matrix). The 12 sites in LSRs represent 86 percent of the sites on NFS lands in the local area. Additionally, 20 sites are located on BLM lands, including eight entirely in reserves. The eight sites entirely in reserves represent 30 percent of the sites on BLM lands in the local area.

Coniferous, mixed hardwood-coniferous, and hardwood forests encompass approximately 620,721 acres on BLM and NFS lands in the local area, including 412,126 acres in reserve land allocations (66 percent of the forests). Of this acreage, an estimated 185,960 acres are LSOG, including 137,227 acres in reserve land allocations (74 percent of the forests). Other sites may also exist in the local area where surveys have not been completed, based on the number of sites in the local area, distribution of those sites, and the extent of forests that may provide suitable habitat (see Figures GOKA-3 and GOKA-4).

| Watershed (HUC5 ID) | Number of Sites | Number of Sites in NFS Reserve Lands | Number of Sites in BLM Reserve Lands |
|--|-----------------|--------------------------------------|--------------------------------------|
| Big Butte Creek (839) | 13 | - | 8 |
| Coos Bay Frontal (713) | 1 | - | - |
| East Fork Coquille River (747) | - | - | - |
| Elk Creek-South Umpqua (785) | - | - | - |
| Klamath River-John C Boyle Reservoir (888) | - | - | - |
| Lake Ewauna-Upper Klamath River (876) | - | - | - |
| Little Butte Creek (846) | 17 | 12 | 5 |
| Lower Lost River (892) | - | - | - |
| Middle Fork Coquille River (764) | - | - | - |
| Middle South Umpqua River (763) | - | - | - |
| Myrtle Creek (775) | - | - | - |
| North Fork Coquille River (733) | - | - | - |
| Olalla Creek-Lookingglass Creek (745) | - | - | - |
| Rogue River-Shady Cove (818) | - | - | - |
| South Umpqua River (781) | - | - | - |
| Spencer Creek (865) | 4 | - | 2 |
| Trail Creek (804) | - | - | - |
| Upper Cow Creek (801) | - | - | - |

Data sources: Processed BLM and Forest Service GIS data, August 2, 2017; HUC5 Watershed layer, August 23, 2011
 Note: Number of sites in reserves may include sites that are only partially in reserves.



Analysis/Project Area Distribution

The analysis area contains seven sites of *G. kauffmanii*, and the project area contains six sites. The analysis area sites are on NFS lands (Rogue River-Siskiyou and Fremont-Winema National Forests) in two 5th-field watersheds (Little Butte Creek and Spencer Creek). Six of the sites are in LSRs and one is on land designated as Other (Matrix). The sites are relatively close to one another in the eastern portion of the analysis area. Some local sites are also present in the immediate vicinity of the analysis area (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in 27 total observations of the species in 26 locations in or near the project area during 2010 through 2014 (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). An estimated 26 of these recorded observations comprise the six sites in the analysis area; the other observations are in sites outside the analysis area. Within the project area, the six sites are between MPs 155.8 and 172.4.

Project Impacts

Analysis

The PCGP Project would affect seven out of the 99 sites on NFS lands in the region, representing approximately 7 percent of the sites, or seven out of 159 total sites on all lands in the NSO range. Table GOKA-6 provides an overview of the features of the PCGP Project that would affect the *G. kauffmanii* sites on NFS lands. The construction corridor and associated work and storage areas would affect approximately 12.8 acres within six sites (about 27 percent of all sites in the analysis area); the seventh site is outside the project corridor and may be indirectly affected by nearby PCGP Project activities. Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *G. kauffmanii* in and near the project area.

| Project Activity | Number of Sites Affected | Area of Disturbance within Sites |
|---|--------------------------|----------------------------------|
| Construction Corridor | 6 | 7.6 ac |
| Temporary Extra Work Area (TEWA) | 3 | 1.3 ac |
| Uncleared Storage Area (UCSA) | 5 | 3.6 ac |
| Roads (TMP) | 1 | 0.3 ac |
| Other Minimal Disturbance Activities | - | - |
| ac = acres | | |
| Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities. | | |

The following discussion provides an overview of the types of impacts that would be expected in the sites based on the features of the PCGP Project that could affect site persistence.

Vegetation removal and grading activities in the 95-foot wide construction corridor would disturb about 7.6 acres of vegetation and soil within six sites and could result in the removal of *G. kauffmanii* populations or individuals. Disturbance in the TEWAs would result in similar impacts on about 1.3 acres within three sites. The establishment of the corridor could modify microclimate conditions around populations or individuals adjacent to the corridor. The removal of forests and host trees and disturbance to soil could negatively affect *G. kauffmanii* in adjacent areas by removing its habitat, disturbing soil or duff around trees or roots of trees, and affecting its

mycorrhizal association with the trees, potentially affecting site persistence even if the entire site is not disturbed. In addition, modification of shading, moisture, and habitat conditions as a result of the corridor and TEWAs could make habitat within the sites no longer suitable for the species. Restored portions of the corridor and TEWAs would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A 30-foot wide portion of the corridor would be maintained in low-growing vegetation for pipeline maintenance and would not provide habitat for the species during the life of the project. Material storage within UCSAs would disturb about 3.6 acres of understory habitat in five sites, which could modify microhabitats near extant populations or individuals, potentially making the habitat no longer suitable for the species. Road improvements and establishment would disturb approximately 0.3 acre within one site and could remove habitat and extant populations or individuals of *G. kauffmanii*.

Across the project area, the PCGP Project would remove an estimated 1,232 acres of coniferous, mixed hardwood-coniferous, and hardwood forests, including 249 acres of LSOG forests. These impacts would result in a reduction of habitat that may be suitable for *G. kauffmanii*. Within this impact area, about 607 acres (about 49 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A 30-foot wide corridor would be maintained in low-growing vegetation across the project area, resulting in a loss of about 260 acres of forests. This loss of forests represents less than 1 percent of the total estimated area of all forests across the NSO range.

Discussion

Assuming site persistence cannot be maintained at the seven sites as a result of the PCGP Project, seven sites of *G. kauffmanii* would remain on NFS lands in the local area, including six in reserves, and eight sites would remain entirely in BLM reserves in the local area. A total of 92 sites, including 47 in reserves, would remain on NFS lands in the NSO range and 16 sites entirely in BLM reserves would remain in the NSO range. The remaining sites could be affected by natural hazards (e.g., fire, drought), but the NFS sites would be subject to the protections of the S&M Standards and Guidelines and applicable management recommendations with regard to agency-related actions. The 47 sites in NFS reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. While the sites on BLM lands are not subject to S&M Standards and Guidelines protections, the 16 sites entirely in reserves would likely receive some level of protection under BLM management. Based on these site counts, approximately 46 percent of the remaining *G. kauffmanii* sites on NFS and BLM lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states “instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision” (Standards and Guidelines, pg. 4). The Forest Service has embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *Gomphus kauffmanii* is a Category E (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category E species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. New information since the species was listed in the 2001 ROD indicates that the species appears to be more common than previously documented, as noted below:
 - *Gomphus kauffmanii* has a wide distribution across 11 physiographic provinces and three states in the region and a moderate-high number of overall sites (99 on NFS lands, 159 on all lands). The species appears to be well distributed in the western Cascade Range in Oregon and Washington and is fairly common and widespread outside this mountain range. The currently known number of sites on NFS and BLM lands is an increase of 79 sites since 2007, with most sites documented during the PCGP Project surveys.
 - An estimated 50 percent of the sites (69 sites) are in reserves, which is an increase of about 24 sites in reserves since 2006 per Molina (2008).
- Coniferous, mixed hardwood-coniferous, and hardwood forests (general habitat) are widely distributed across the region and encompass approximately 20.4 million acres on BLM and NFS lands with an estimated 60 percent in reserves. Most of the forests are found in the Cascade Range, where most sites are documented. The Klamath Mountains, Coast Range, and other areas also contain conifer, mixed, and hardwood forests, but sites are more scattered in these areas. A subcomponent of these forests likely provides habitat for *G. kauffmanii*.
- The PCGP Project would affect seven of 99 Forest Service-managed sites of *G. kauffmanii*, representing approximately 7 percent of the sites on NFS lands in the NSO range. Assuming site persistence cannot be maintained at the seven sites, a moderate-high number of sites (92) would continue to be documented on NFS lands in the region with a wide distribution across Washington, Oregon, and California. Some sites (seven sites) would remain on NFS lands in the local vicinity of the analysis area. Additionally, 16 sites would remain entirely in BLM reserves in the NSO range and eight sites would remain entirely in BLM reserves in the local area. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be similar to the currently documented distribution and range.
- The PCGP Project would affect site persistence at six sites in LSRs, but the percentage of sites in reserves would be about the same (51 percent). Of the remaining sites on NFS lands, 40 are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and seven are in Congressionally Reserved areas where management activities that may adversely affect *G. kauffmanii* are unlikely. An additional 16 sites would remain entirely in BLM reserves, including LSRs where management actions are restricted to those activities that benefit LSOG forests, Riparian Reserves where management actions are restricted to those activities that benefit the conservation of riparian areas and riparian-associated species, and District Designated Reserves where management activities that may adversely affect *G. kauffmanii* are unlikely.

- The PCGP Project would result in a permanent loss of an estimated 260 acres of coniferous, mixed hardwood-coniferous, and hardwood forests (less than 1 percent of the total regional acreage). An estimated 12.1 million acres (60 percent) of all forests and 4.1 million acres (66 percent) of LSOG forests would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *G. kauffmanii*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category E species for which its status is undetermined; therefore, pre-disturbance surveys are not applicable. It is reasonable to conclude that additional sites exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.17.4 Conclusions

If implemented as proposed, the PCGP Project would likely affect site persistence of *G. kauffmanii* at seven sites on NFS lands; however, the remaining sites in the NSO range would continue to provide a reasonable assurance of species persistence because:

- With project implementation, 92 sites would remain on NFS lands across the region, and seven sites would remain on NFS lands in the local area. An additional 16 sites would remain entirely in BLM reserves in the region, and eight sites would remain entirely in BLM reserves in the local area. Although the PCGP Project would affect site persistence of *G. kauffmanii* at seven sites, these sites are part of the many sites in the Cascade Range in Oregon where the species is well distributed. The species' distribution and range within the NSO range following project implementation would be similar to its currently known distribution and range. *Gomphus kauffmanii* would persist in the region without considering the seven sites as part of the population.
- The PCGP Project would remove approximately 1,232 acres of coniferous, mixed hardwood-coniferous, and hardwood forests and 249 acres of LSOG forests (a negligible amount of the forests). An estimated 49 percent of the forests would be restored to similar conditions or shrublands, but a 30-foot wide early-successional corridor would remain across the project area. An estimated 12.1 million acres (60 percent) of all forests and 4.1 million acres (66 percent) of LSOG forests would remain in reserves in the NSO range. Other sites may be located in unsurveyed areas where suitable habitat exists based on the increased number of sites documented with increased surveys since 1998.
- The remaining sites on NFS land are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Additionally, the remaining sites in BLM reserves are expected to receive some level of protection under the 2016 BLM RMPs. A single natural disturbance event or combination of events is unlikely to affect a significant portion of sites because the species is widely distributed.

The PCGP Project would not be able to avoid impacts to all *G. kauffmanii* sites in the analysis area, although some individuals or populations within the sites may persist following project implementation. Based on the above conclusions, avoidance of the seven *G. kauffmanii* sites is not necessary because the remaining sites in the NSO range would continue to provide a reasonable

assurance of species persistence. Amendments to the NFS land management plans that apply to the affected sites would waive implementation of Management Recommendations for *G. kauffmanii* sites affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the species and adjacent habitat near affected sites over the long term. The monitoring plan shall be approved by the Forest Service.

2.18 GYMNOMYCES ABIETIS

Gymnomyces abietis is a sequestrate mushroom species in the Russulaceae family and does not have a common name.

2.18.1 Regulatory Status and Ranking

The 2001 ROD, including the 2003 ASR modifications to the S&M species list, identifies *G. abietis* as a Category B (rare) species. ORBIC evaluated *G. abietis* in its 2004 *Survey and Manage Assessment* for BLM and the Forest Service (ORBIC 2004), but it was not included in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2016). In 2004, the species was considered to be between at moderate risk of extinction due to a restricted range, relatively few populations, recent and widespread declines, or other factors; and uncommon but not rare with some cause for long-term concern due to declines or other factors, within its global range and in Oregon (G3G4, S3S4, respectively). The species is not currently on any ORBIC lists. It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.18.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to this analysis. Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are discussed below under Persistence Evaluation. The background information in this section is used to support the persistence evaluation in the following section, which is updated with more recent information (e.g., recent survey data) specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *G. abietis*. It is a mycorrhizal fungus that depends on host trees for nutrients (carbohydrates) and forms sporocarps beneath the soil surface (ORBIC 2004, Castellano et al. 1999). Although no specific information on its reproductive biology is known, it is presumed to be mostly dependent on mycophagy for dispersal of spores, similar to other sequestrate fungi (Castellano and O'Dell 1997). Mycophagy is the consumption of fungi by animals, which eat the sporocarp and transport and excrete the spores. One study confirms the consumption of *G. abietis* by flying squirrels; however, it was eaten far less than other truffle species (Waters et al. 2000). This may indicate the possibility of other vectors for *G. abietis* spore dispersal. The mushroom has been documented fruiting from July through October (Castellano et al. 1999).

Range

Gymnomyces abietis is endemic to the Pacific Northwest, where it was known only from Washington, Oregon, and California in 2004 (ORBIC 2004). In 2007, it was known from the Cascade Range in Oregon and Washington, the Coast Range in Oregon and California, and the

Klamath Mountains in California (Cushman and Huff 2007). The currently known range of the species within the NSO range based on 2017 data is discussed below under Species Distribution.

Although information on the species' historical range is not known, it may have been similar to the current range, with populations limited to the Pacific Northwest. It may have had more abundant local distributions across its range, but habitat modifications and other environmental factors, as discussed below under Threats, have likely reduced available habitat and may have further restricted the species' distribution.

Population Status

ORBIC (2004) reported *G. abietis* from an estimated 22 element occurrences within the Pacific Northwest in 2004. Most of these occurrences were in Oregon (11) and California (10), with only one reported in Washington (ORBIC 2004). In 2004, *G. abietis* was reported as being frequently collected in Oregon and California, but population trends across its range were unknown (ORBIC 2004). The species was not found during Random Multi-Species surveys across the NSO range between 2001 and 2004 (USDA and USDI 2007). Molina (2008) reported two new sites of *G. abietis* in the NSO range between 1998 and 2006, and 24 total sites were documented by 2006, including 19 in reserves or protected areas. These two new sites are likely the same two new sites reported between 2004 and 2006 in the 2007 FSEIS (USDA and USDI 2007), indicating that no new sites were recorded between 1998 and 2004. The 2007 Final SEIS reported 23 sites on NFS and BLM lands and 23 total sites on all lands in the NSO range (USDA and USDI 2007).

Pre-disturbance surveys are not practical for Category B species. Instead, equivalent-effort surveys were conducted during the fall and spring from 2010 to 2016 in old-growth stands in the PCGP Project area and within 100 feet of habitat removal to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). The equivalent-effort surveys targeted all Category B species, including *G. abietis*, and resulted in one new observation of the species in 2011 on the Rogue River National Forest. *Gymnomyces abietis* has not been found in high numbers during past survey efforts, although limited fungi surveys have been conducted across the NSO range, and more survey effort may locate additional populations of the species. The current estimated number of sites and distribution of the species based on 2017 data are presented below under the Species Distribution discussion.

Habitat

Gymnomyces abietis grows in association with the roots of conifer trees, including true fir, mountain hemlock, and possibly other species in the Pine family, primarily above 3,000 feet msl (Castellano and O'Dell 1997, Castellano et al. 1999). Specific habitat requirements are not known. The species was reported only from mature to old-growth coniferous stands in the *Results of Additional Species Analysis* in support of the NWFP ROD (Holthausen et al. 1994). It has also been found in recently burned areas (Trappe, pers. comm. 2013). *Gymnomyces abietis* may prefer specific microclimate conditions of LSOG coniferous forests, but it may not be restricted to these conditions.

Threats

Threats to *G. abietis* are those that affect its host tree and disturb the soil, such as road and trail construction, logging and fire management activities, and recreational activities (Castellano and

O'Dell 1997). For populations in or near recreation areas, trampling and other ground disturbance can affect the species (Holthausen et al. 1994). Fire is also a potential threat. Other specific threats to the species are not currently known.

Management Recommendations

For Category B S&M species, the direction under the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). This statement is no longer applicable on BLM lands under the 2016 BLM RMPs, although it is still valid on NFS lands within the range of the NSO. Management recommendations were developed for *G. abietis* with several other species (Group 3 of Castellano and O'Dell 1997). The primary guidance is to maintain habitat conditions at all known sites, which will maintain viable populations of the species until additional information on the effects of various management activities can be obtained and evaluated. Populations on federal land should be managed to maintain population viability. In order to maintain habitat conditions around known locations, impacts from soil disturbing activities should be minimized, and damage to or removal of host trees should be prevented. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *G. abietis*:

- As a mycorrhizal species, *G. abietis* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. To provide a reasonable assurance of the continued persistence of occupied sites consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.18.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new site information, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *G. abietis* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and the Forest Service (Oregon/Washington regional offices) and converted into sites in accordance with the methodology described in Chapter 1. Table GYAB-1 shows the total number of known sites in the regional (NSO range), local (18 5th-field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 23 observations from BLM and Forest Service geodatabases were converted into 21 sites in the NSO range (region). Table GYAB-2 shows the total number of sites on NFS land and other land ownerships across the regional, local, and analysis areas. Table GYAB-3 shows the total number of sites within each land use allocation defined in the 1994 ROD and 2016 RMPs across the regional, local, and analysis areas. Figure GYAB-1 displays the regional distribution of the species across NFS lands, Figure GYAB-2 displays the extent of known sites located in protected areas (NFS lands, NFS reserves, BLM reserves, and NPS lands), and Figure GYAB-3 displays the species'

regional distribution as well as the extent of coniferous and LSOG coniferous forests above 3,000 feet msl on BLM and NFS lands within the currently known range of the species.

| Number of <i>Gymnomycetes abietis</i> Sites (2017) | |
|--|-----------------|
| Location* | Number of Sites |
| Regional Area | 21 |
| Local Area | 1 |
| Analysis Area (Project Area) | 1(1) |

Data source: Processed BLM and Forest Service GIS data, August 2, 2017
 *Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

| Distribution of <i>Gymnomycetes abietis</i> across Federal, Private, and Other Lands | | | |
|--|----------------|-------------|---------------------|
| Land Ownership | Regional Sites | Local Sites | Analysis Area Sites |
| Forest Service | 18 | 1 | 1 |
| BLM | - | - | - |
| NPS | 3 | - | - |
| Fish and Wildlife Service | - | - | - |
| Other (Private, State, etc.) | - | - | - |

Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
 Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

| Distribution of <i>Gymnomycetes abietis</i> across 1994 ROD and 2016 RMPs Land Allocations | | | |
|--|----------------|-------------|---------------------|
| 1994 ROD Land Allocation (NFS) | Regional Sites | Local Sites | Analysis Area Sites |
| Adaptive Management Area (AMA) | 2 | - | - |
| Adaptive Management Reserves (AMR) | - | - | - |
| Administratively Withdrawn (AW) | 4 | - | - |
| Congressionally Reserved (CR) | 5 | - | - |
| Late Successional Reserve (LSR) | 5 | 1 | 1 |
| Marbled Murrelet Area (LSR3) | - | - | - |
| Northern Spotted Owl Activity Center (LSR4) a/ | - | - | - |
| Managed Late Successional Area (MLSA) | - | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | 2 | - | - |
| Riparian Reserve | - | - | - |
| 2016 RMPs Land Allocation (BLM) | Regional Sites | Local Sites | Analysis Area Sites |
| Administratively Withdrawn (AW) | - | - | - |
| Congressional Reserve | - | - | - |
| District Designated Reserve | - | - | - |
| Harvest Land Base | - | - | - |
| Late Successional Reserve | - | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | - | - | - |
| Riparian Reserve | - | - | - |

Data sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0; 2016 RMP land allocation data, August 2016.
 Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
 a/ Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center.

Regional Distribution

Gymnomycetes abietis is somewhat widely distributed across six physiographic provinces in Washington (Eastern Cascades), Oregon (Coast Range, Cascades East and West), and California

(Klamath and Cascades), despite a low overall number of sites (see Figure GYAB-1). Most sites are found along the Cascade Range, with scattered sites in the Coast Range and Klamath Mountains. Sites in the Oregon Cascade Range are relatively close to one another, but other sites appear to be isolated. The species appears to have a limited distribution outside the Oregon Cascade Range based on the lower number of sites and isolated nature of most sites. *Gymnomycetes abietis* does not appear to be well distributed within its range in the NSO range.

Three sites are on NPS lands within the Crater Lake National Park, and the remainder (18) are on NFS lands in the region (no sites are on BLM lands). Sites included on the National Forests that encompass the project area include one site on the Rogue River-Siskiyou National Forest (the only site in the local and analysis areas). Sites included on other National Forests include two sites on the Deschutes National Forest, one site on the Klamath National Forest, one site on the Mt. Hood National Forest, one site on the Okanogan-Wenatchee National Forest, three sites on the Siuslaw National Forest, one site on the Six Rivers National Forest, two sites on Shasta-Trinity National Forest, and six sites on the Willamette National Forest.

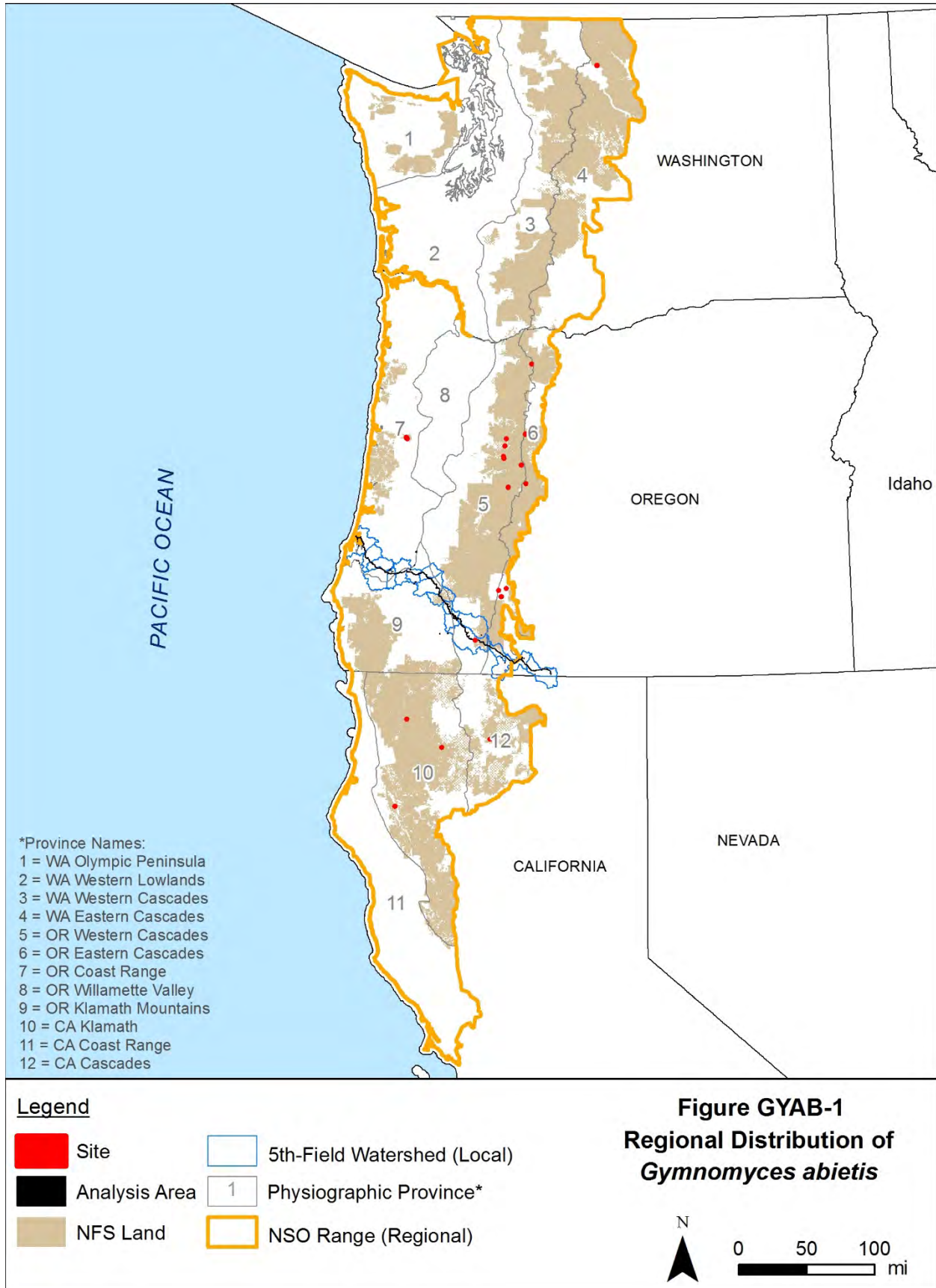
Across the NSO range, 10 sites are located in reserve lands managed by the Forest Service, including five sites entirely in LSRs and five sites entirely in Congressionally Reserved areas (see Figure GYAB-2). This represents 55 percent of the total NFS sites in the region. The remaining NFS sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. The three NPS sites, while not covered by the S&M Standards and Guidelines, likely receive some degree of protection based on National Park management.

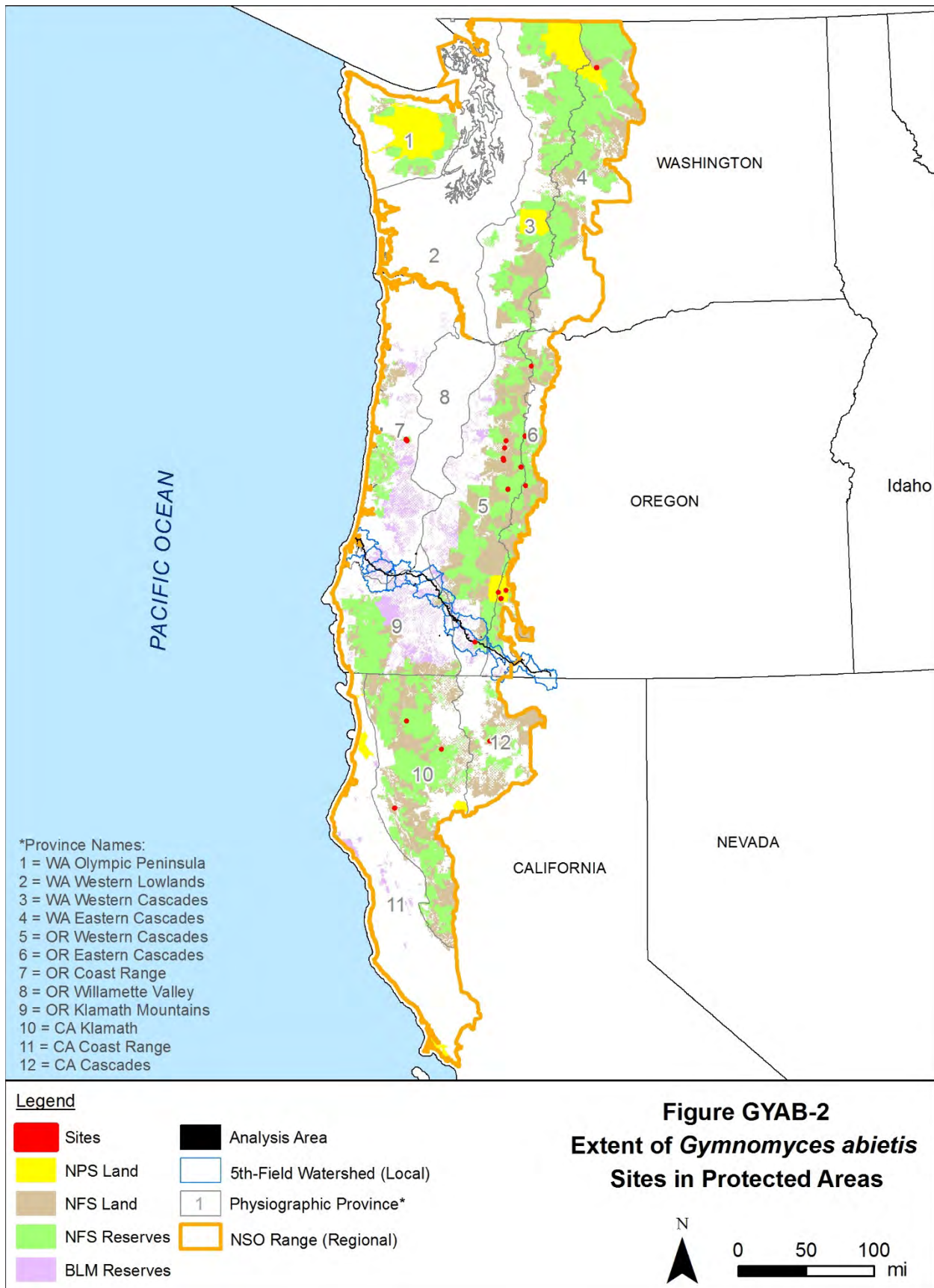
Gymnomycetes abietis is more commonly found in LSOG forests based on available data (13 of 21 total sites are in LSOG), but it has also been found in recently burned areas and may not be restricted to LSOG conditions. Based on current site locations, the species is found in coniferous forests above about 3,000 feet msl and has only been documented in part of the NSO range. Due to the extent of known sites, the amount of potential habitat on both NFS and BLM lands in the region, and the level of protection offered by NFS and BLM reserve land, both land ownerships are included in this potential habitat discussion. Coniferous forests above 3,000 feet msl across the NSO range could provide habitat for *G. abietis* and support additional sites. These forests encompass an estimated 11.9 million acres on BLM and NFS lands in the NSO range, including an estimated 7 million acres in reserve land allocations (59 percent of the forests; Table GYAB-4). Of this acreage, an estimated 3.2 million acres are LSOG (see Figure GYAB-2), including 2 million acres in reserve land allocations (63 percent of the forests). Although coniferous forests are widespread across the NSO range, LSOG coniferous forests above 3,000 feet are less common.

TABLE GYAB-4

| Extent of Forests That Could Provide Habitat for <i>Gymnomycetes abietis</i> on NFS and BLM Lands ^{a/} | | | | |
|---|-------------------------------------|-----------|-------------------------------|-----------|
| Location | Coniferous Forests above 3,000 feet | | LSOG Forests above 3,000 feet | |
| | Total | Reserves | Total | Reserves |
| Regional Area | 11,868,755 | 7,029,524 | 3,192,923 | 2,011,891 |
| Local Area | 232,484 | 109,346 | 69,528 | 38,262 |
| Project Area | 581 | 365 | 180 | 110 |

Data source: Gradient nearest neighbor vegetation data from Moeur et al. 2011
 Note: Areas are presented in acres.
^{a/} The area estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.







Legend

- Site
- Analysis Area
- LSOG Forests Above 3,000 ft
- Conifer Forests Above 3,000 ft
- 5th-Field Watershed (Local)
- Physiographic Province*
- NSO Range (Regional)

Figure GYAB-3
Potential Habitat For
Gymnomycetes abietis



Local Distribution

Within the local area, *G. abietis* is found in one 5th-field watershed (Little Butte Creek) that overlaps the project area (see Table GYAB-5 and Figure GYAB-4). The only site in the local area is in an LSR on the Rogue River-Siskiyou National Forest. This site is in the western Cascade Range and appears to be isolated from other sites in the region because the nearest site is more than 35 miles northeast in the Eastern Cascade Range. Limited connectivity is available between the local site and other sites in the region based on the distance between the sites, although animals could transport spores across suitable habitat within the local area.

Coniferous forests above 3,000 feet msl encompass approximately 232,484 acres on BLM and NFS lands in the local area, with 109,346 acres in reserve land allocations (47 percent of the forests). Of this acreage, an estimated 69,528 acres are LSOG, including 38,262 acres in reserve land allocations (55 percent of the forests). Other sites may be located in the Cascade Range in areas that have not been previously surveyed.

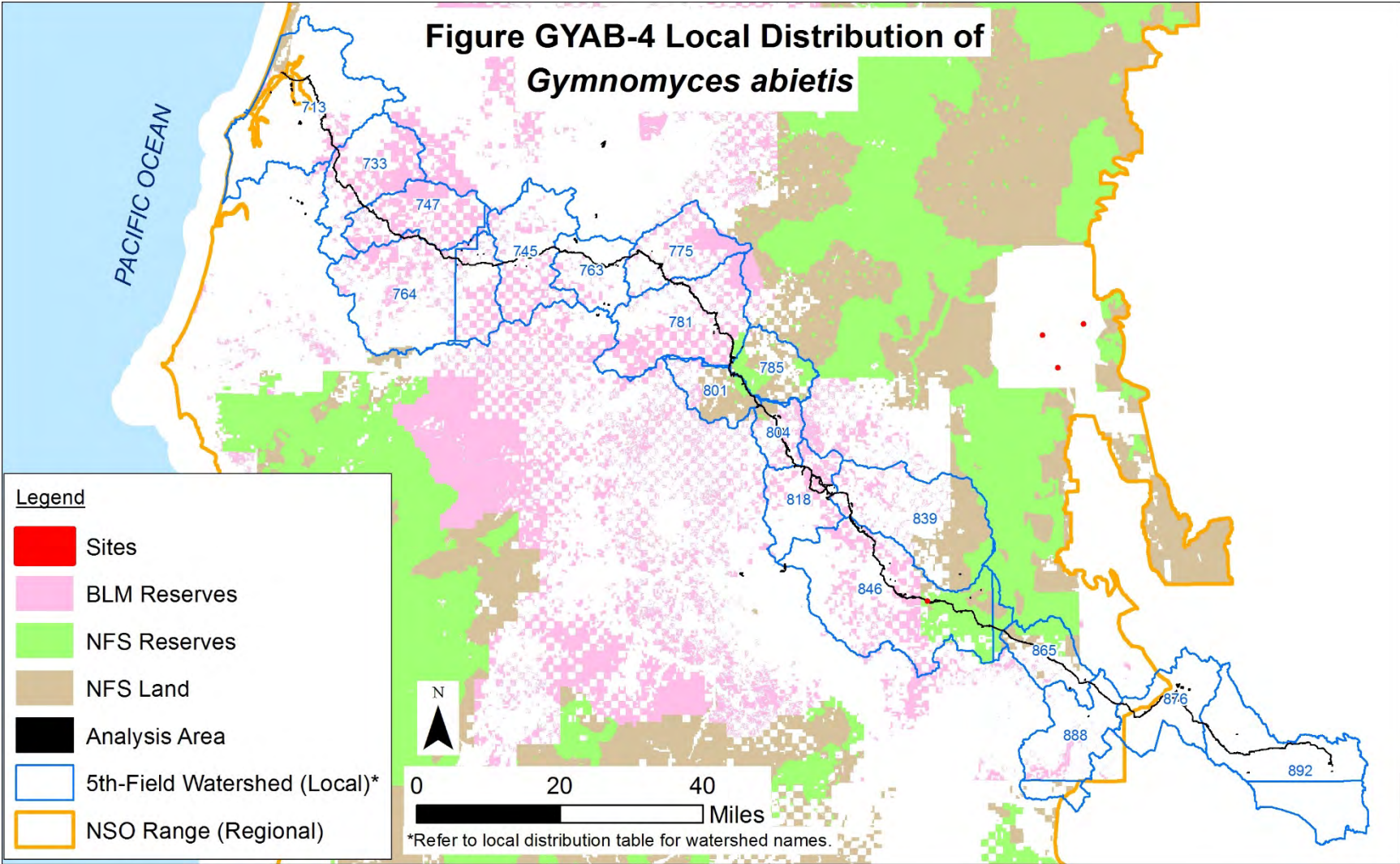
| Watershed (HUC5 ID) | Number of Sites | Number of Sites in NFS Reserve Lands | Number of Sites in BLM Reserve Lands |
|--|-----------------|--------------------------------------|--------------------------------------|
| Big Butte Creek (839) | - | - | - |
| Coos Bay Frontal (713) | - | - | - |
| East Fork Coquille River (747) | - | - | - |
| Elk Creek-South Umpqua (785) | - | - | - |
| Klamath River-John C Boyle Reservoir (888) | - | - | - |
| Lake Ewauna-Upper Klamath River (876) | - | - | - |
| Little Butte Creek (846) | 1 | 1 | - |
| Lower Lost River (892) | - | - | - |
| Middle Fork Coquille River (764) | - | - | - |
| Middle South Umpqua River (763) | - | - | - |
| Myrtle Creek (775) | - | - | - |
| North Fork Coquille River (733) | - | - | - |
| Olalla Creek-Lookingglass Creek (745) | - | - | - |
| Rogue River-Shady Cove (818) | - | - | - |
| South Umpqua River (781) | - | - | - |
| Spencer Creek (865) | - | - | - |
| Trail Creek (804) | - | - | - |
| Upper Cow Creek (801) | - | - | - |

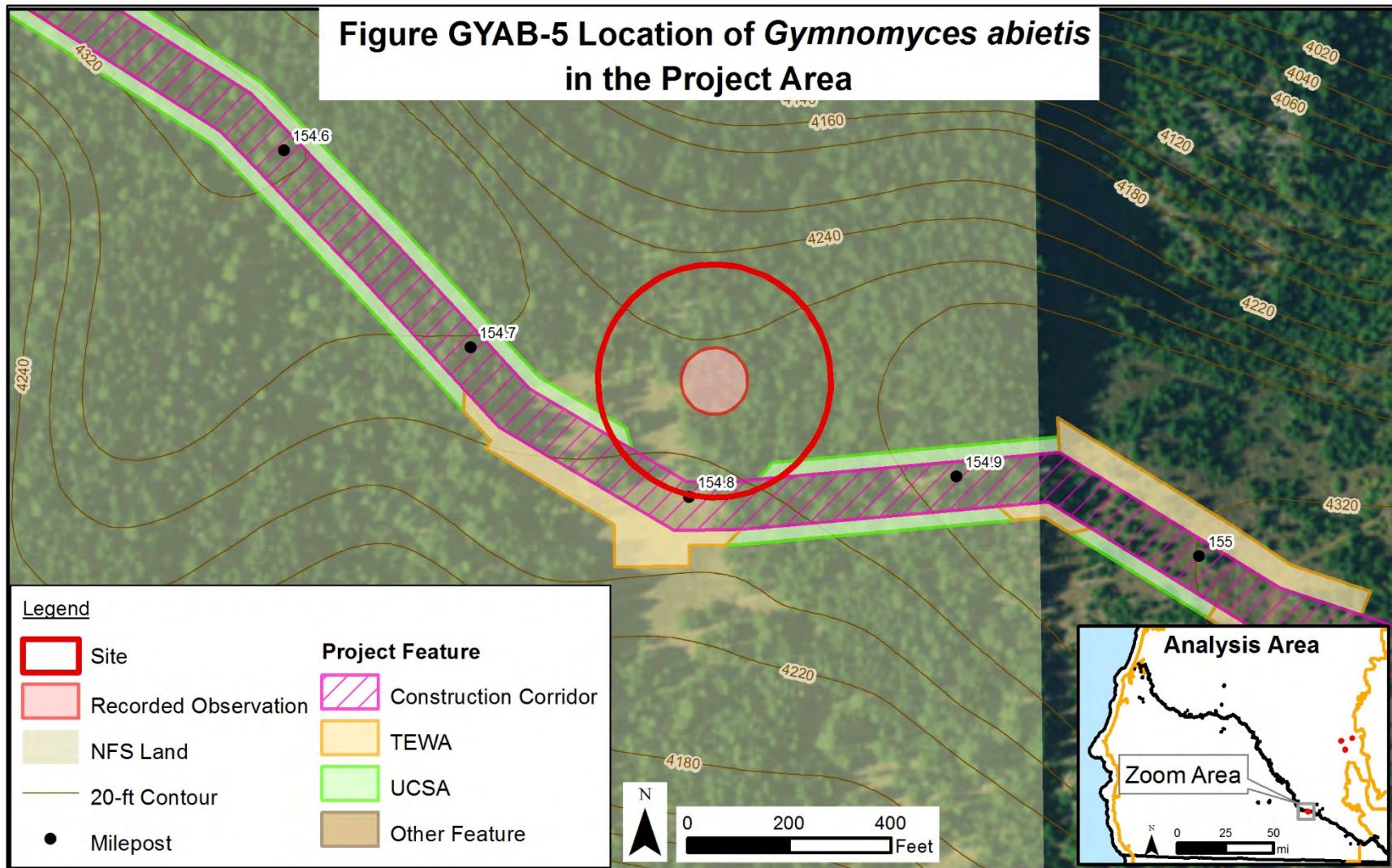
Data sources: Processed BLM and Forest Service GIS data, August 2, 2017; HUC5 Watershed layer, August 23, 2011

Analysis/Project Area Distribution

The analysis and project areas contain one site of *G. abietis*. This site is the same one as described in the Local Distribution discussion above.

Surveys for the PCGP Project resulted in one observation of *G. abietis* in the survey area during spring 2011 (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). This recorded observation was at MP 154.8 and comprises the single site in the analysis area.





Project Impacts

Analysis

The PCGP Project would affect one site out of the 18 sites on NFS lands in the region, representing approximately 6 percent of the sites (or one out of 21 total sites on all lands in the NSO range). Table GYAB-6 presents an overview of the features of the PCGP Project that would affect the *G. abietis* site. The construction corridor and associated work and storage areas would affect approximately 0.3 acre (8 percent) of the site (the site is approximately 3.8 acres), and the corridor would intersect the site at the southern edge of the site (see Figure GYAB-5). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *G. abietis* in and near the project area. Due to the scattered distribution of the species and few sites near the project area, the effects on one site could potentially alter the distribution of the species in the NSO range if site persistence is affected.

The following discussion provides an overview of the types of impacts that would be expected at the sites based on the features of the PCGP Project that could affect site persistence.

| .TABLE GYAB-6 | | |
|---|--------------------------|----------------------------------|
| Impacts to <i>Gymnomycetes abietis</i> Sites on NFS Lands in the Project Area | | |
| Project Activity | Number of Sites Affected | Area of Disturbance within Sites |
| Construction Corridor | 1 | 0.2 ac |
| Temporary Extra Work Area (TEWA) | - | - |
| Uncleared Storage Area (UCSA) | 1 | 0.07 ac |
| Roads (TMP) | - | - |
| Other Minimal Disturbance Activities | - | - |
| ac = acres | | |
| Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities. | | |

The PCGP Project would result in ground disturbance and vegetation removal at the southern end of the site near MP 154.8. The recorded observation of the species is located 200 feet north of the project area where direct effects would not occur and indirect effects are unlikely (see Figure GYAB-5).

Due to conclusions made in previous persistence analyses (North State Resources 2014), the PCGP Project alignment was moved approximately 150 feet south to avoid direct impacts to the single site in the analysis area. Establishment of the 95-foot wide construction corridor and associated storage areas would disturb vegetation and soils about 200 feet from the observation within the site. The *G. abietis* observation is in a wooded area, with an open area located southwest of the observation (see Figure GYAB-5). In the vicinity of the observation, the corridor would occur mainly through the open area and significant modifications to microclimate conditions are not anticipated, although the removal of trees directly south of the observation may still change microclimate conditions adjacent to the site. The removal of forests and host trees and disturbance to soil could negatively affect *G. abietis* by removing its habitat, disturbing the roots of host trees, and affecting its mycorrhizal association with the trees; however, due to the distance away from the project area, individuals within the site are expected to persist despite nearby changes to the species' habitat. Restored portions of the corridor would be dominated by early seral vegetation for approximately 30 years, which would result in long-term changes to habitat conditions. A 30-foot wide portion of the corridor would be maintained in low-growing vegetation for pipeline

maintenance and would not provide habitat for the species during the life of the project. Measures outlined in Chapter 1 would be implemented to minimize vegetation disturbance in and near the project area and restore areas following construction, which would minimize adverse impacts on *G. abietis* near the project area.

Based on this analysis, *G. abietis* is likely to persist at the site following project implementation. This site is the only site in the local area and is the southernmost site in Oregon. It may be important for dispersal of the species between other sites to the north in the Cascade Range and sites to the southwest in the Klamath Mountains in California. Despite impacts to habitat near the site, *G. abietis* would still be found in the Cascade Range in Oregon, and opportunities for dispersal into the southern portion of the NSO range would still be possible.

Across the project area, the PCGP Project would remove an estimated 476 acres of coniferous forests above 3,000 feet msl, including 143 acres of LSOG coniferous forests above 3,000 feet msl. These impacts would result in a reduction of habitat that may be suitable for *G. abietis*. Within this impact area, about 258 acres (54 percent) of the forests would be restored to forests or shrublands in portions of the corridor and in TEWAs, resulting in a long-term reduction in potential habitat, although some of the restored areas may provide habitat for the species during the life of the PCGP Project. A 30-foot wide corridor would be maintained in low-growing vegetation across the project area, resulting in a loss of about 114 acres of coniferous forests above 3,000 feet msl. This loss of forests represents less than 1 percent of the total estimated area of coniferous forests above 3,000 feet msl across the NSO range.

Discussion

Given site persistence would be maintained at the single site in the analysis area, one site of *G. abietis* would remain in LSRs on NFS lands in the local area, and 18 sites, including 10 in reserves, would remain on NFS lands in the NSO range. The sites could be affected by natural hazards (e.g., fire, drought), but they would be subject to the protections of the S&M Standards and Guidelines and management recommendations for the species with regard to agency-related actions. The 10 sites in reserves are assumed to have additional protections by the NWFP Standards and Guidelines in place for those land allocations. Based on these site counts, approximately 56 percent of the *G. abietis* sites on NFS lands in the NSO range would be protected in reserves.

Summary

The NWFP ROD and the 2001 ROD do not prescribe a well-defined process for evaluating impacts to species persistence or viability from a proposed activity. The 2001 ROD states “instead, common sense and agency expertise must be used in making determinations of compliance with the viability provision” (Standards and Guidelines, pg. 4). The Forest Service has embraced this approach for evaluating impacts of the PCGP Project on the persistence of affected S&M species in the NSO range. The preceding discussions present this evaluation, as summarized below:

- *Gymnomycetes abietis* is a Category B (rare) S&M species throughout the NSO range. Per the 2001 ROD, all known sites of Category B species are likely to be necessary to provide reasonable assurance of species persistence in the range of the NSO. Since the species was listed in the 2001 ROD, new information has become available on the species, as described below:

- Although *G. abietis* is somewhat widely distributed across six physiographic provinces and three states in the region, the total number of sites is low (18 on NFS lands, 21 on all lands). *Gymnomycetes abietis* does not appear to be well distributed in any part of its range because sites are scattered and its distribution is spotty. The currently known number of sites on NFS and BLM lands is a decrease in the number of sites recorded in 2007.
- An estimated 56 percent of the sites (10 sites) are in reserves, which is a decrease in the proportion of sites in reserves since 2006 per Molina (2008).
- Coniferous forests above 3,000 feet msl (general habitat for the species) are widely distributed across the NSO range and encompass approximately 11.9 million acres on BLM and NFS lands with an estimated 59 percent in reserves. Most of the forests are found in the Cascade Range, where most sites are documented, and in the Klamath Mountains, where two sites are documented. A subcomponent of these forests likely provides habitat for *G. abietis*.
- The PCGP Project would affect one of 18 Forest Service-managed sites of *G. abietis*, representing approximately 6 percent of the sites on NFS lands in the NSO range (no sites are on BLM lands). However, the species is expected to persist at the site based on this analysis. Previous to this analysis, the proposed project alignment was moved 150 feet south to avoid direct impacts to the site. The distribution of sites and extent of the species' range within the NSO range following implementation of the PCGP Project would be the same as the currently documented distribution and range.
- The PCGP Project would not affect any sites in reserves. A total of five sites are in LSRs where management actions are restricted to those activities that benefit LSOG forests, and five sites are in Congressionally Reserved areas where management activities that may adversely affect *G. abietis* are unlikely.
- The PCGP Project would result in a permanent loss of an estimated 114 acres of coniferous forests above 3,000 feet msl (less than 1 percent of the total acreage in the NSO range). An estimated 7 million acres (59 percent) of coniferous forests and 2 million acres (63 percent) of LSOG coniferous forests above 3,000 feet msl would remain in reserves in the NSO range.
- The remaining forests could support additional populations of *G. abietis*, although the potential for the habitat to be occupied varies based on the distribution of sites and the species' specific habitat requirements. This is a Category B species for which pre-disturbance surveys are not practical and have not been extensively conducted; however, it is reasonable to conclude that additional sites may exist in the range of the NSO that have not been discovered based on the increased number of sites documented during strategic and other surveys, including surveys associated with the PCGP Project.

2.18.4 Conclusions

If implemented as proposed, the PCGP Project would not likely affect site persistence of *G. abietis* at one site on NFS land in the analysis area. The remaining sites would provide a reasonable assurance of species persistence because:

- With project implementation, the number of sites across the region would not change. Although the PCGP Project may affect microhabitat conditions near one *G. abietis* site, site persistence is not expected to be affected. The species' distribution and range within the NSO range would be the same as its currently known distribution and range.
- The PCGP Project would remove approximately 476 acres of coniferous forests and 143 acres of LSOG coniferous forests above 3,000 feet msl (a negligible amount of the forests). An estimated 54 percent of the forests would be restored to similar conditions or shrublands, but a 30-foot wide early-successional corridor would remain across the project area. An estimated 7 million acres (59 percent) of coniferous forests and 2 million acres (63 percent) of LSOG forests above 3,000 feet msl would remain in reserves in the species range. Other sites may be located in unsurveyed areas where suitable habitat exists.
- The remaining sites on NFS lands are expected to continue to receive the protections of the S&M Standards and Guidelines under current land management plans for the foreseeable future. Although a single natural disturbance event or combination of events could affect a significant portion of sites in the Oregon Cascade Range, other sites are scattered across the region and are less likely to be collectively affected by a single event.
- The single site of *G. abietis* in the analysis area may incur indirect impacts as a result of habitat modification near the site; however, the site is expected to persist following project implementation. Previous to this analysis, the proposed project alignment was moved 150 feet south to avoid direct impacts to the site. Based on the above conclusions, *G. abietis* is sufficiently avoided by the PCGP project. Amendments to the NFS land management plan that applies to the affected site would waive implementation of Management Recommendations for the *G. abietis* site affected by the PCGP Project. The applicant shall prepare and implement a monitoring plan that describes specific protocols to monitor the site and adjacent habitat over the long term. The monitoring plan shall be approved by the Forest Service.

2.19 HYGROPHORUS CAERULEUS

Hygrophorus caeruleus is a gilled mushroom species in the Hygrophoraceae family and does not have a common name.

2.19.1 Regulatory Status and Ranking

The 2001 ROD, including the 2003 ASR modifications to the S&M species list, identifies *H. caeruleus* as a Category B (rare) species. ORBIC evaluated *H. caeruleus* in its 2004 *Survey and Manage Assessment* for BLM and the Forest Service (ORBIC 2004) and in the 2010 *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2010). It was not included in the most recent update of *Rare, Threatened, and Endangered Species of Oregon* (ORBIC 2016). In 2010, the species was considered to be at moderate to high risk of extinction due to a restricted range, few populations, steep declines, or other factors within its global range (G2G3) and was considered to be at high risk of extinction due to very restricted range, very few populations, steep declines, or other factors in Oregon (S2). It is not considered a BLM or Forest Service Sensitive or Strategic species in Oregon.

2.19.2 Background Information

This section presents background information on the species based on published documents and other relevant sources and includes information available prior to this analysis. Site counts, for example, are presented in this section using previously published estimates, and current site counts, which are used for the analysis, are discussed below under Persistence Evaluation. The background information in this section is used to support the persistence evaluation in the following section, which is updated with more recent information (e.g., recent survey data) specifically used for the persistence evaluation.

Life History

Little is known about the autecology or reproductive biology of *H. caeruleus*. It grows in small groups or solitary (The Fungi of California 2010) and is likely mycorrhizal with conifer trees (ORBIC 2004). Individuals are found in conifer duff (The Fungi of California 2010) and are associated with moist soil conditions, particularly near melting snowbanks or where snow has recently melted and the ground remains moist (ORBIC 2004). Fruiting has been documented in the spring, from May through July, and occasionally into fall (Castellano et al. 1999, Cushman and Huff 2007). As with other gilled mushrooms, *H. caeruleus* is presumed to be dependent on wind for the dispersal of spores (Castellano and O'Dell 1997).

Range

Hygrophorus caeruleus is known only from western North America where it occurs in mountainous regions near the northern portion of the Great Basin (ORBIC 2004). It has been found from the Sierra Nevada in California north into Washington and east to Idaho (ORBIC 2004, Trappe, pers. comm. 2013). The currently known range of the species within the NSO range based on 2017 data is discussed below under Species Distribution.

Although information on the species' historical range is not known, Holthausen et al. (1994) indicated that the species' range may be more restricted than it was historically. This restriction may be a result of habitat modifications and other environmental factors, as discussed below under Threats.

Population Status

ORBIC (2004) reported *H. caeruleus* from about nine element occurrences in the Pacific Northwest in 2004. Most of these occurrences were in Oregon (5), with fewer in Washington (2), California (1), and Idaho (1) (ORBIC 2004). ORBIC estimated that three of the element occurrences were in protected areas in the NSO range in 2004. This species was believed to be endemic to Washington and Oregon prior to 1999 (Castellano et al. 1999), but occurrences have more recently been reported in Idaho and California (ORBIC 2004). In 2004, *H. caeruleus* had a narrow range and limited distribution within its range (ORBIC 2004). The species was not found during Random Multi-Species surveys across the NSO range between 2001 and 2004 (USDA and USDI 2007). Molina (2008) documented five new sites of *H. caeruleus* in the NSO range between 1998 and 2006, and seven total sites were documented by 2006, including four in reserves or protected areas. The 2007 Final SEIS reported six sites on NFS and BLM lands and seven total sites on all lands in the NSO range (USDA and USDI 2007).

Pre-disturbance surveys are not practical for Category B species. Instead, equivalent-effort surveys were conducted during the fall and spring from 2010 to 2016 in old-growth stands in the PCGP Project area and within 100 feet of habitat removal to comply with the Standards and Guidelines for Category B species where strategic surveys are not complete (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). The equivalent-effort surveys targeted all Category B species, including *H. caeruleus*, and resulted in nine new observations of individuals or populations of *H. caeruleus*. These observations have increased the number of sites documented in BLM and Forest Service records by more than two-fold. Based on the increased number of sites since 1998 as a result of the increased number of surveys, more survey effort may locate additional populations within the NSO range. The current estimated number of sites and distribution of the species based on 2017 data are provided below under Species Distribution.

Habitat

Hygrophorus caeruleus is found at mid-elevations in montane coniferous forests, typically in conifer duff (Castellano and O'Dell 1997, The Fungi of California 2010). It occurs near melting snowbanks in soil in association with roots of conifer trees (Castellano et al. 1999) and may be restricted to true firs (Castellano and O'Dell 1997). Many of the known populations have been found where wildfires are frequent on a historical basis (ORBIC 2004). *Hygrophorus caeruleus* may prefer specific microclimate conditions of LSOG forests, although it is also found in younger open forests (Trappe, pers. comm. 2013), and it may not be restricted to LSOG conditions.

Threats

Threats to *H. caeruleus* include logging, development, mining, fires, road and trail construction, and recreational activities (Castellano and O'Dell 1997, ORBIC 2004). These activities can remove host trees and disturb soil. Drastic changes to its habitat from logging and development are major threats to the species (ORBIC 2004). This species has been found in open forests, which suggests that populations may not be sensitive to edge effects (Trappe, pers. comm. 2013).

Management Recommendations

As a Category B S&M species, the direction under the 2001 ROD is to manage all known sites and reduce the inadvertent loss of undiscovered sites (USDA and USDI 2001). This statement is no longer applicable on BLM lands under the 2016 BLM RMPs, although it is still valid on NFS lands within the range of the NSO. Management recommendations were developed for *H. caeruleus* with one other species (Group 11 of Castellano and O'Dell 1997). The primary guidance is to maintain habitat conditions at all known sites by retaining old-growth forest structure and soil conditions, including coarse woody debris, and avoid disturbance at or around known sites, such as from removal of host trees or modification of canopy. The known locations of the species on federal land should be managed to include an area that is large enough to maintain the habitat and associated microclimate of the population. The 2007 Conservation Assessment for Fungi (Cushman and Huff 2007) provides the following management considerations for *H. caeruleus*:

- As a mycorrhizal species, *H. caeruleus* forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. To provide a reasonable assurance of the continued persistence of occupied sites, consider incorporation of patch retention areas (as described in Standards and Guidelines 1994, C-41) with occupied sites wherever possible.

2.19.3 Persistence Evaluation

This section presents the persistence evaluation for the species, which includes a discussion of the species' currently known distribution within the NSO range based on new site information, an evaluation of the impacts of the PCGP Project on sites and habitat, a discussion of sites remaining in the NSO range following project implementation, and a summary of the factors considered in the persistence evaluation to support the conclusions in the following section.

Species Distribution

The distribution of *H. caeruleus* across the NSO range and in and near the project area is discussed below. This discussion is based on the recorded observations of the species stored in geodatabases maintained by BLM and the Forest Service (Oregon/Washington regional offices) and converted into sites in accordance with the methodology described in Chapter 1. Table HYCA-1 shows the total number of known sites in the regional (NSO range), local (18 5th-field watersheds that encompass the project area), analysis (50-meter spatial buffer around the project area), and project areas (PCGP Project corridor, associated work areas, and roads). An estimated 85 observations from BLM and Forest Service geodatabases were converted into 56 sites in the NSO range (region). Table HYCA-2 shows the total number of sites on NFS land and other land ownerships across the regional, local, and analysis areas. Table HYCA-3 shows the total number of sites within each land use allocation defined in the 1994 ROD and 2016 RMPs across the regional, local, and analysis areas. Figure HYCA-1 displays the regional distribution of the species across NFS lands, Figure HYCA-2 displays the extent of the known sites located in protected areas (NFS lands, NFS reserves, BLM reserves, and NPS lands), and Figure HYCA-3 displays the species' regional distribution as well as the extent of coniferous and LSOG coniferous forests between 2,000 and 7,000 feet msl on BLM and NFS lands within the currently known range of the species.

| Number of <i>Hygrophorus caeruleus</i> Sites (2017) | |
|---|-----------------|
| Location* | Number of Sites |
| Regional Area | 56 |
| Local Area | 18 |
| Analysis Area (Project Area) | 6 (4) |

Data source: Processed BLM and Forest Service GIS data, August 2, 2017
 *Definitions of regional, local, analysis, and project areas are provided in Chapter 1.

| Distribution of <i>Hygrophorus caeruleus</i> across Federal, Private, and Other Lands | | | |
|---|----------------|-------------|---------------------|
| Land Ownership | Regional Sites | Local Sites | Analysis Area Sites |
| Forest Service | 47 | 14 | 6 |
| BLM | 9 | 5 | - |
| NPS | - | - | - |
| Fish and Wildlife Service | - | - | - |
| Other (Private, State, etc.) | 4 | 2 | - |

Data source: Merged land ownership data for CA, WA, and OR in NSO range, October 2011
 Notes: Columns are not additive because some sites occur on lands in multiple ownerships.

| National Forest Service | Regional Sites | Local Sites | Analysis Area Sites |
|--|----------------|-------------|---------------------|
| Adaptive Management Area (AMA) | - | - | - |
| Adaptive Management Reserves (AMR) | - | - | - |
| Administratively Withdrawn (AW) | 9 | - | - |
| Congressionally Reserved (CR) | 3 | - | - |
| Late Successional Reserve (LSR) | 10 | 5 | 1 |
| Marbled Murrelet Area (LSR3) | - | - | - |
| Northern Spotted Owl Activity Center (LSR4) ^{a/} | 1 | - | - |
| Managed Late Successional Area (MLSA) | 2 | - | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | 23 | 9 | 5 |
| Riparian Reserve | - | - | - |
| Bureau of Land Management | Regional Sites | Local Sites | Analysis Area Sites |
| Administratively Withdrawn (AW) | - | - | - |
| Congressional Reserve | - | - | - |
| District Designated Reserve | 4 | 2 | - |
| Harvest Land Base | 9 | 5 | - |
| Late Successional Reserve | 2 | 2 | - |
| Not Designated (ND) | - | - | - |
| Other (Matrix, Other) | - | - | - |
| Riparian Reserve | - | - | - |

Data sources: 1994 ROD land allocation data, December 2002; U.S. Geological Survey National Hydrography Dataset, v. 2.1.0; 2016 RMP land allocation data, August 2016.
 Notes: Columns are not additive because of overlap between some allocations, some sites may occur in multiple allocations, and the allocations only apply to BLM and NFS lands. **Bolded** allocations are designated reserve areas.
^{a/} Northern Spotted Owl Activity Center is currently referred to as Known Owl Activity Center.

Regional Distribution

Hygrophorus caeruleus has a somewhat limited distribution across four physiographic provinces in Washington (Eastern Cascades), Oregon (Cascades East and West), and California (Cascades) (see Figure HYCA-1). All sites are found along the Cascade Range, with most sites located on the eastern side. Clusters of sites are located in the Oregon Cascade Range, where the species appears to be locally abundant; however, sites in Washington and California appear to be scattered and somewhat isolated from the other sites in the region. The species is not found outside the Cascade Range and appears to have a scattered distribution across the mountain range. *Hygrophorus caeruleus* does not appear to be well distributed within its range in the NSO range.

Four of 56 known sites are at least partially located on private or state lands, 47 sites are at least partially on NFS lands, and nine sites at least partially located on BLM lands across the region. Sites included on the National Forests that encompass the project area include three sites on the Rogue River-Siskiyou National Forest and 32 sites on the Fremont-Winema National Forest. Sites on other National Forests include three sites on the Deschutes, one site on the Gifford Pinchot, five sites on the Mt. Hood, one site on the Wenatchee, and two sites on the Shasta-Trinity National Forest.

Across the NSO range, 14 sites are at least partially located in reserve lands managed by the Forest Service, including 10 sites in LSRs, three sites in Congressionally Reserved areas, and one site in a Known Owl Activity Center (see Figure HYCA-2). This represents 30 percent of the total NFS-managed sites in the region. The remaining NFS-managed sites on other land allocations receive some level of protection through the S&M Standards and Guidelines and other land management plan components. While several sites are partially located in BLM reserves, all sites on BLM

lands in the region are at least partially located on Harvest Land Base and are not expected to be protected under BLM management.

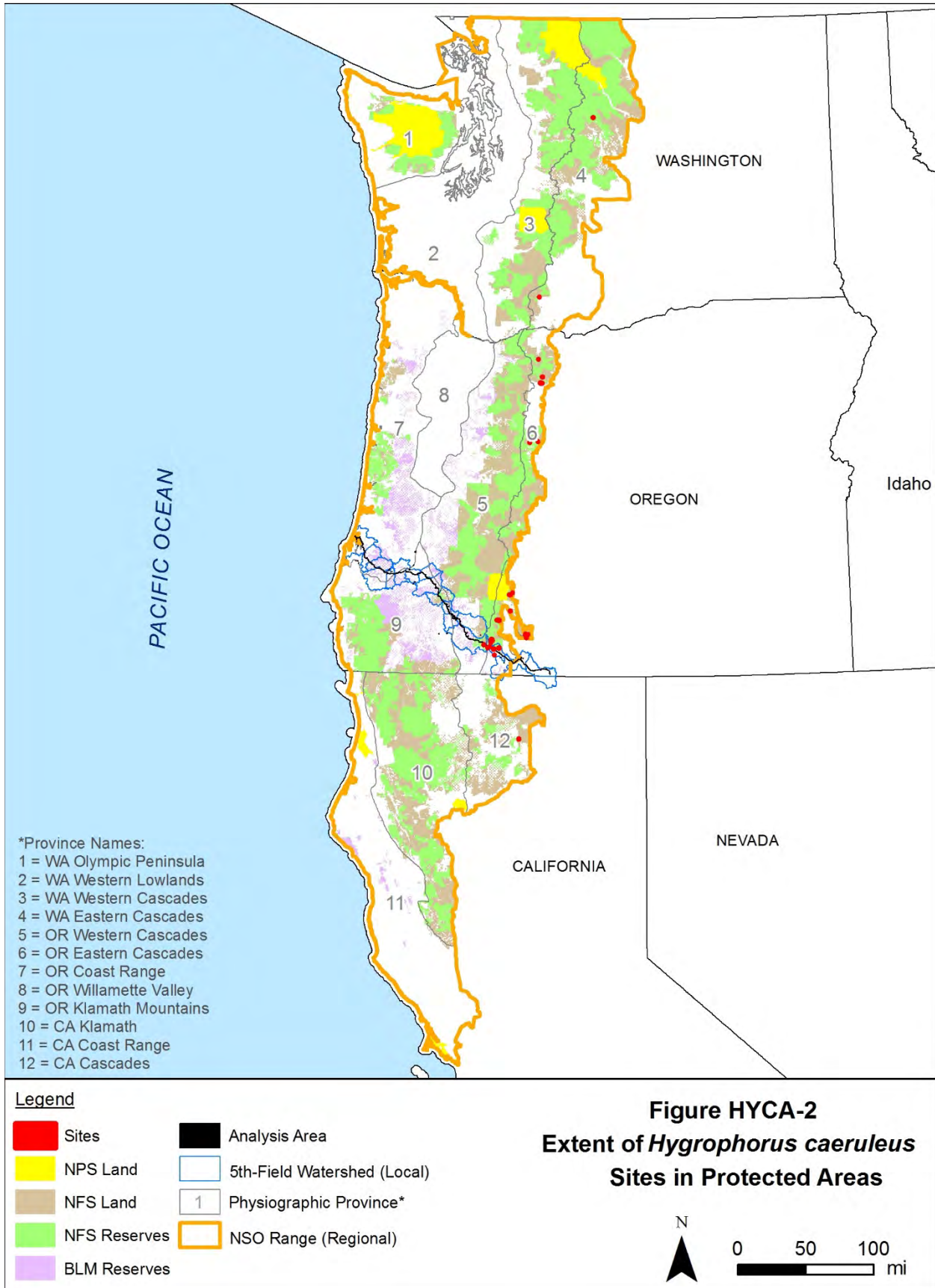
Hygrophorus caeruleus is more commonly found in LSOG forests (40 of 56 total sites are in LSOG), but it is also somewhat common in non-LSOG forests and has been found in younger coniferous forests. Based on current site locations, the species has been found in coniferous forests between about 2,000–7,000 feet msl and has only been documented in parts of Oregon and Washington. Due to the extent of known sites, the amount of potential habitat on both NFS and BLM lands in the region, and the level of protection offered by NFS and BLM reserve land, both land ownerships are included in this potential habitat discussion. Coniferous forests, including the LSOG component of these forests, between 2,000–7,000 feet msl across the NSO range could provide habitat for *H. caeruleus* and support additional sites. These forests encompass an estimated 14 million acres on BLM and NFS lands in the NSO range, including an estimated 8.3 million acres in reserve land allocations (59 percent of the forests; Table HYCA-4). Of this acreage, an estimated 4 million acres are LSOG (see Figure HYCA-3), including 2.6 million acres in reserve land allocations (64 percent of the forests). Although coniferous forests are widespread across the mountain ranges in the NSO range, LSOG coniferous forests are less common.

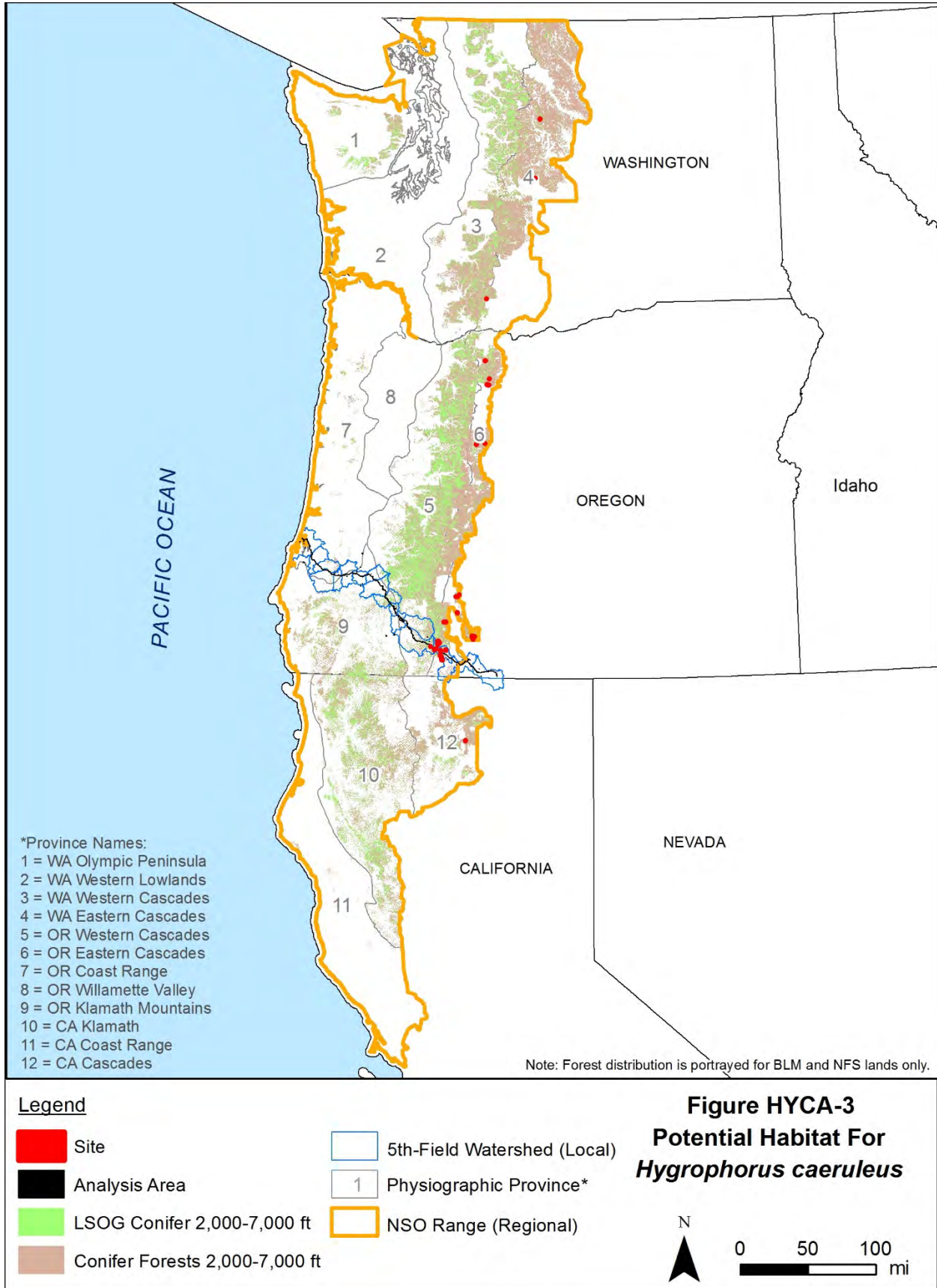
TABLE HYCA-4

| Extent of Forests That Could Provide Habitat for <i>Hygrophorus caeruleus</i> on NFS and BLM Lands a/ | | | | |
|--|---|-----------|-------------------------------------|-----------|
| Location | Coniferous Forests between 2,000-7,000 feet | | LSOG Forests below 2,000-7,000 feet | |
| | Total | Reserves | Total | Reserves |
| Regional Area | 13,968,404 | 8,257,684 | 4,020,181 | 2,563,746 |
| Local Area | 328,613 | 178,814 | 104,916 | 65,073 |
| Project Area | 789 | 518 | 225 | 152 |

Data source: Gradient nearest neighbor vegetation data from Moeur et al. 2011
 Note: Areas are presented in acres.
 a/ The area estimates are based on available data for forest types that have been mapped across the NSO range. The species' specific habitat requirements are narrower than the general forest types, and potential habitat is actually a subcomponent of the forests and is much smaller.







Local Distribution

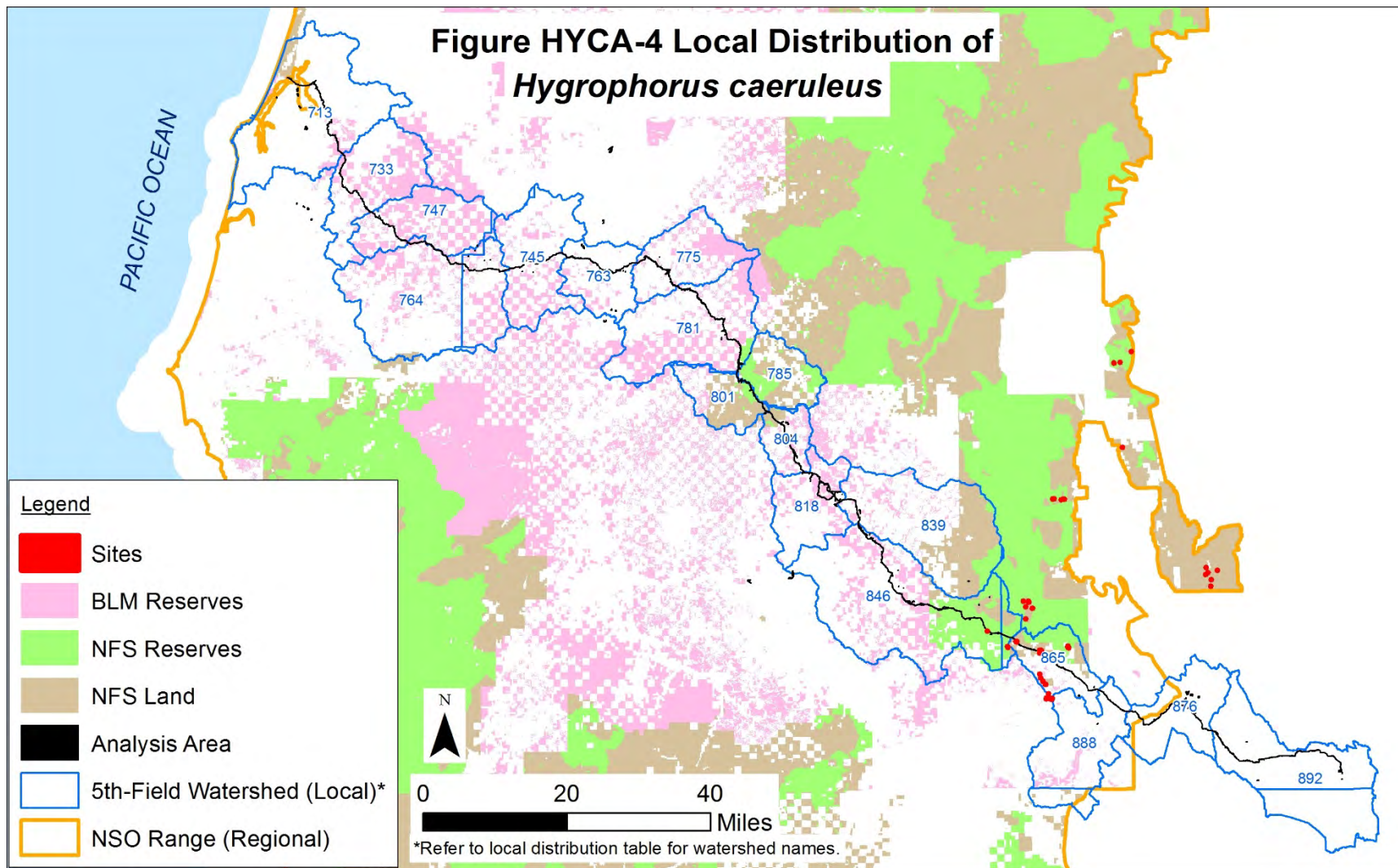
Within the local area, *H. caeruleus* is found in two 5th-field watersheds (Little Butte Creek and Spencer Creek) that overlap the project area (see Table HYCA-5 and Figure HYCA-4). The sites are clustered and near one another in the Cascade Range in the eastern portion of the local area. Within the Cascade Range, multiple avenues of connectivity appear to be available between sites based on the extent of coniferous forests and abundance of sites in the mountain range, and opportunities for dispersal exist within the local area and to nearby regional areas. Many regional sites are located on NFS lands within 20 miles to the north in the Cascade Range.

Fourteen of the 18 sites in the local area are at least partially on NFS lands (Rogue River-Siskiyou and Fremont-Winema National Forests), with two of these sites also partially on private lands. Five sites are in LSRs, and nine sites are on lands designated as Other (Matrix). The five sites in LSRs represent 36 percent of the sites on NFS lands in the local area. All of the sites in the Little Butte Creek watershed and two sites in the Spencer Creek watershed are in reserves.

Coniferous forests between 2,000–7,000 feet msl encompass approximately 328,613 acres on BLM and NFS lands in the local area, with 178,814 acres in reserve land allocations (54 percent of the forests). Of this acreage, an estimated 104,916 acres are LSOG, including 65,073 acres in reserve land allocations (62 percent of the forests). Other sites may be located in the Cascade Range in areas that have not been previously surveyed based on the number of sites and extent of forests that may provide suitable habitat in the mountain range.

| Watershed (HUC5 ID) | Number of Sites | Number of Sites in NFS Reserve Lands | Number of Sites in BLM Reserve Lands |
|--|-----------------|--------------------------------------|--------------------------------------|
| Big Butte Creek (839) | - | - | - |
| Coos Bay Frontal (713) | - | - | - |
| East Fork Coquille River (747) | - | - | - |
| Elk Creek-South Umpqua (785) | - | - | - |
| Klamath River-John C Boyle Reservoir (888) | - | - | - |
| Lake Ewauna-Upper Klamath River (876) | - | - | - |
| Little Butte Creek (846) | 3 | 3 | - |
| Lower Lost River (892) | - | - | - |
| Middle Fork Coquille River (764) | - | - | - |
| Middle South Umpqua River (763) | - | - | - |
| Myrtle Creek (775) | - | - | - |
| North Fork Coquille River (733) | - | - | - |
| Olalla Creek-Lookingglass Creek (745) | - | - | - |
| Rogue River-Shady Cove (818) | - | - | - |
| South Umpqua River (781) | - | - | - |
| Spencer Creek (865) | 15 | 2 | 2 |
| Trail Creek (804) | - | - | - |
| Upper Cow Creek (801) | - | - | - |

Data sources: Processed BLM and Forest Service GIS data, August 2, 2017; HUC5 Watershed layer, August 23, 2011
 Note: Number of sites in reserves may include sites that are only partially in reserves.



Analysis/Project Area Distribution

The analysis area contains six sites of *H. caeruleus*, and the project area contains four sites. All of the analysis area sites are on NFS lands (Rogue River-Siskiyou and Fremont-Winema National Forests). Five sites are on land designated as Other (Matrix) and one site is in an LSR. The analysis area sites are found in two 5th field watersheds (Little Butte Creek and Spencer Creek). The sites are restricted to a small portion of the eastern side of the analysis area and are clustered near each other. Several sites are located within the immediate vicinity of the analysis area (see Local Distribution discussion above).

Surveys for the PCGP Project resulted in 26 total observations of the species in nine locations in or near the project area during 2010, 2012, and 2014 (Siskiyou BioSurvey LLC 2012a, 2016a [unpublished data]). Twenty-one of these recorded observations comprise the six sites in the analysis area; the other observations are in sites outside the analysis area. Within the project area, one site is between MPs 164.2 and 164.3, two sites are near MP 168.8, and three sites are near MP 172.5.

Project Impacts

Analysis

The PCGP Project would affect six out of the 47 sites on NFS lands in the region, representing approximately 13 percent of the sites (or six out of 56 total sites on all lands in the NSO range). Table HYCA-6 provides an overview of the features of the PCGP Project that would affect the *H. caeruleus* sites. The construction corridor and associated work and storage areas would affect approximately 3.5 acres (nine percent) of the sites (the sites encompass approximately 35.8 acres), with some sites experiencing greater impacts than others (see Figures HYCA-5, HYCA-6, and HYAC-7). Measures outlined in Chapter 1 would be implemented to minimize soil and vegetation disturbance in the project area and restore areas following construction, which could minimize adverse impacts on *H. caeruleus* in and near the project area. Due to the somewhat limited distribution of the species and proportion of sites affected, the effects on six sites could potentially alter the distribution of the species in the NSO range.

The following discussion provides an overview of the types of impacts that would be expected at the sites based on the features of the PCGP Project that could affect site persistence.

| Project Activity | Number of Sites Affected | Area of Disturbance within Sites |
|--------------------------------------|--------------------------|----------------------------------|
| Construction Corridor | 4 | 2.6 ac |
| Temporary Extra Work Area (TEWA) | 2 | 0.3 ac |
| Uncleared Storage Area (UCSA) | 3 | 0.6 ac |
| Roads (TMP) | - | - |
| Other Minimal Disturbance Activities | - | - |

ac = acres
Note: Site counts are not additive because some sites would be subject to impacts from multiple project activities.

The PCGP Project would result in ground disturbance and vegetation removal in four out of the six sites in the analysis area (Table HYCA-7). The only recorded observation at site at MP 164.3 is within the project area, and would likely be removed during activities within the corridor (see

Figure HYCA-5). Three sites are large, multi-observation sites (MP 168.8, MP 172.4 (north), and MP 172.5-172.7) (Figures HYCA-6 and HYCA-7). The majority of the observations within these sites are a sufficient distance away from the project area to avoid direct or indirect effects. The remaining two sites at MP 172.4 (south) and MP 168.7 are not within the project area and would not likely be removed. For all of the sites, including the two sites outside the project area, individuals outside the corridor and TEWAs may also be subject to indirect effects associated with the PCGP Project based on the proximity of project activities to the sites, as discussed below. No direct impacts are anticipated in the two sites outside the project area.

| Site Location | Source of Impacts | Area of Disturbance | Individuals Likely to Persist? |
|-------------------------------------|-------------------|---------------------|--------------------------------|
| MP 164.3 | Corridor | 1.0 ac | No |
| | TEWA | 0.1 ac | |
| | UCSA | 0.2 ac | |
| MP 168.7 | n/a | n/a | Yes |
| MP 168.8 | Corridor | 0.7 ac | Yes |
| | TEWA | 0.1 ac | |
| | UCSA | 0.2 ac | |
| MP 172.4 (south of project area) | n/a | n/a | Yes |
| | | | |
| MP 172.4 (north of project area) | Corridor | 0.5 ac | Yes |
| | UCSA | 0.2 ac | |
| MP 172.5-172.7 | Corridor | 0.4 ac | Yes |

Notes: MP = milepost; ac = acres

Figure HYCA-5 Location of *Hygrophorus caeruleus* in the Project Area (MP 164.3)

