
PREPARING ENVIRONMENTAL DOCUMENTS

GUIDELINES FOR APPLICANTS, CONTRACTORS, AND STAFF



Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Licensing

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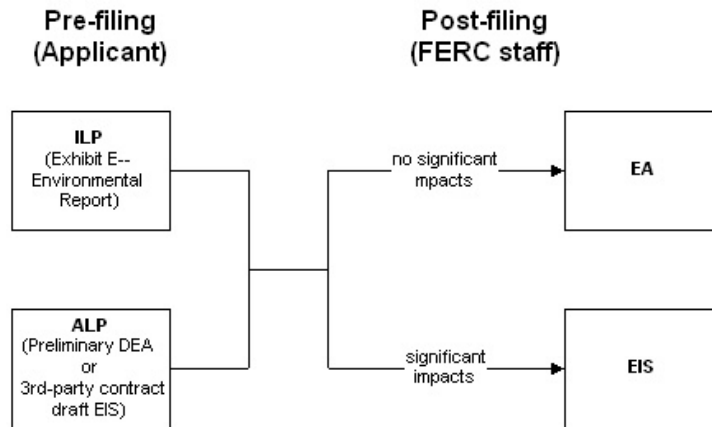
PREFACE

The preparation of quality environmental documents plays a critical role in the hydropower licensing process. These guidelines have been developed for the Federal Energy Regulatory Commission (Commission) staff as well as applicants who will be preparing the Exhibit E (Environmental Report) of a license application or intend to prepare and submit an environmental document as part of their application.

The Commission staff typically prepares an environmental assessment (EA) to support licensing decisions. An environmental impact statement (EIS), however, is required for those actions determined by Commission staff to be a major federal action significantly affecting the quality of the human environment.

Under the Commission's Integrated Licensing Process, the Exhibit E (Environmental Report) prepared as part of the license application must follow these guidelines as they may be updated from time-to-time [18 CFR, section 5.18(b)]. Further, the Commission's regulations give applicants for original, new, or subsequent hydropower licenses, exemptions, and certain license amendments the option of using an alternative licensing procedure (ALP) for conducting the prefiling consultation process (18 CFR, section 4.34). One of the main aspects of an ALP is the preparation (by the applicant or its contractor or consultant) of a preliminary draft EA (also known as an applicant-prepared EA or APEA), or of a preliminary draft EIS prepared by a consultant chosen

PREPARATION OF ENVIRONMENTAL DOCUMENTS



and directed by the Commission and funded by the applicant under a third-party contract.¹

These guidelines reflect current National Environmental Policy Act (NEPA) standards within the Office of Energy Projects. They do not set Commission policy or substitute for the Commission's regulations.²

Use of these guidelines should help expedite and streamline the post-filing application review process by improving the overall quality and consistency of content and formatting of environmental documents, and minimizing staff revisions to applicant- and contractor-prepared documents.

HOW TO USE THESE GUIDELINES

These are general guidelines that discuss all sections of a draft environmental document. The exact content of Commission NEPA documents, and how particular issues are addressed, continues to adapt to changes in legislation, case law, and policy. Therefore, there is limited discussion of how to analyze specific resource issues. The best sources for current policy on particular issues are recently-issued NEPA documents and orders, which can be accessed through the Commission's eLibrary.³

The guidelines are presented in the context of what an actual environmental document would look like, beginning with the table of contents. For each section, we:⁴ (1) provide a purpose for the section, (2) highlight what to include in the section, and (3) provide an example. The examples appear in shaded boxes separated by bold lines. Unless otherwise noted, the examples are fictitious.

Some sections include portions of NEPA or the Council on Environmental Quality's (CEQ) NEPA regulations that are found at 40 CFR, Parts 1500-1508. Specific guidance for resource discussions and general rules for text, graphics, and references, including suggested formats for heading and subheadings, are found in Attachment B, *General Guidance for Text, Graphics, and References*. The format for EAs is the same as for EISs with limited exceptions, as noted. We also note how the content of staff-prepared documents may differ from applicant-prepared documents.

¹ Although the requirements of Exhibit Es prepared under the traditional licensing process (TLP) are dictated by sections 4.41, 4.51, and 4.61 of the Commission's regulations, these guidelines also provide useful information in preparing the Exhibit E.

² This document replaces the March 14, 2001, publication entitled Preparing Environmental Assessments.

³ <http://www.ferc.gov/docs-filing/elibrary.asp>.

⁴ The pronouns "we" and "our" refer to the staff of the Commission's Office of Energy Projects (OEP).

UPDATING THESE GUIDELINES

Submit recommendations for changes or updates to alan.mitchnick@ferc.gov. As necessary, we'll review recommended changes and corrections and periodically post revised guidelines on the Commission's web page (<http://www.ferc.gov/industries/hydropower/gen-info/guidelines.asp>).

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COVER SHEET (EISs only)

A Cover Sheet is included in all EISs (40 CFR, section 1502.11) and is self-explanatory.

An example of a Cover Sheet (Source: Baker River Project FEIS, FERC No. 2150, April 2006):

COVER SHEET

- a. Title: Relicensing the Baker River Hydroelectric Project, FERC Project No. 2150-033
- b. Subject: Draft Environmental Impact Statement (DEIS)
- c. Lead Agency: Federal Energy Regulatory Commission
- d. Cooperating Agency: U.S. Corps of Engineers *[include, as appropriate]*
- e. Abstract
- On April 30, 2004, Puget Sound Energy, Inc. (Puget) filed an application to relicense the existing Baker River Hydroelectric Project, located on the Baker River in Whatcom and Skagit Counties, Washington. The project consists of two developments, Upper Baker and Lower Baker. The two developments adjoin one another over a distance of about 18 miles on the Baker River. The project has a current installed capacity of 170.03 megawatts (proposed installed capacity is 200.03 megawatts) and occupies 5,207 acres of lands within the Mt. Baker-Snoqualmie National Forest. Currently, the project is operated as a multi-purpose facility for hydropower generation, federal flood control storage, recreation, and fisheries.
- Puget proposes to relicense the project in accordance with a comprehensive Settlement Agreement that was developed under the Commission's alternative licensing procedures. The Settlement Agreement contains 50 proposed license articles containing various protection, mitigation, and enhancement measures.
- The staff's recommendation is to relicense the project as proposed, with certain modifications, and additional measures recommended by the agencies.
- e. Contact: *Commission staff contact*
Federal Energy Regulatory Commission
Office of Energy Projects
888 First Street, N.E.
Washington, D.C. 20426
(202) 502-XXXX

- f. Transmittal: This draft EIS to relicense the existing Baker River Project is being made available for public comment on or about April 26, 2006, as required by the National Environmental Policy Act of 1969¹ and the Commission's Regulations Implementing the National Environmental Policy Act (18 CFR, Part 380).

¹ National Environmental Policy Act of 1969, as amended (Pub. L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, and Pub. L. 97-258, §4(b), September 13, 1982).

FOREWORD (EISs only)

A Foreword is included in all EISs:

An example of a Foreword:

FOREWORD

The Federal Energy Regulatory Commission (Commission), pursuant to the Federal Power Act (FPA)¹ and the U.S. Department of Energy (DOE) Organization Act² is authorized to issue licenses for up to 50 years for the construction and operation of non-federal hydroelectric developments subject to its jurisdiction, on the necessary conditions:

That the project adopted . . . shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of waterpower development, for the adequate protection, mitigation, and enhancement of fish and wildlife (including related spawning grounds and habitat), and for other beneficial public uses, including irrigation, flood control, water supply, and recreational and other purposes referred to in Section 4(e) . . .³

The Commission may require such other conditions not inconsistent with the FPA as may be found necessary to provide for the various public interests to be served by the project.⁴

¹16 U.S.C. §§ 791(a)-825(r), as amended by the Electric Consumers Protection Act of 1986, Pub. L. 99-495 (1986), the Energy Policy Act of 1992, Pub. L. 102-486 (1992), and the Energy Policy Act of 2005, Pub. L. 109-58 (2005).

²Pub. L. 95-91, 91 Stat. 556 (1977).

³16 U.S.C. § 803(a).

⁴16 U.S.C. § 803(g).

TABLE OF CONTENTS

The CEQ recommends the basic content for EISs (see 40 CFR, section 1502.10 below). EAs generally follow the same format. Each federal agency, however, tailors its NEPA documents to its own set of statutes and regulations. Note that some sections will not apply to all projects or all documents, as noted in the outline. Also, keep in mind that this standard format may not apply in all cases, and it may be adapted to specific situations.

40 CFR, Section 1502.10--Recommended format.

Agencies shall use a format for environmental impact statements which will encourage good analysis and clear presentation of the alternatives including the proposed action. The following standard format for environmental impact statements should be followed unless the agency determines that there is a compelling reason to do otherwise:

- (a) Cover sheet.*
- (b) Summary.*
- (c) Table of contents.*
- (d) Purpose of and need for action.*
- (e) Alternatives including proposed action (sections 102(2)(C)(iii) and 102(2)(E) of the Act).*
- (f) Affected environment.*
- (g) Environmental consequences (especially sections 102(2)(C)(I), (ii), (iv), and (v) of the Act).*
- (h) List of preparers.*
- (i) List of Agencies, Organizations, and persons to whom copies of the statement are sent.*
- (j) Index.*
- (k) Appendices (if any).*

The suggested format for a table of contents for an EA and an EIS are similar, except as noted in bold text below. **Sections marked with an asterisk are not necessary for all projects.**

TABLE OF CONTENTS FORMAT FOR AN EA OR EIS

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

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1.0 INTRODUCTION

1.1 Application

1.2 Purpose of Action and Need for Power

1.3 Statutory and Regulatory Requirements

1.3.1 Federal Power Act

1.3.1.1 Section 18 Fishway Prescriptions

1.3.1.2 Section 4(e) Conditions*

1.3.1.3 Section 10(j) Recommendations

1.3.1.4 Section 30(c) Fish and Wildlife Conditions*

1.3.2 Clean Water Act

1.3.3 Endangered Species Act*

1.3.4 Coastal Zone Management Act*

1.3.5 National Historic Preservation Act*

1.3.6 Pacific Northwest Power Planning and Conservation Act*

1.3.7 Wild and Scenic Rivers Act*

1.3.8 Magnuson-Stevens Fishery Conservation and Management Act*

Other statutes as applicable*

1.4 Public Review and Comment

1.4.1 Scoping

1.4.2 Interventions

1.4.3 Comments on the Application

1.4.4 Comments on Draft EA or EIS (*final EA/EIS only*)*

2.0 PROPOSED ACTION AND ALTERNATIVES (*relicense applications*)*

2.1 No-action Alternative

2.1.1 Existing Project Facilities

2.1.2 Project Safety

2.1.3 Existing Project Operation

2.1.4 Existing Environmental Measures

2.2 Applicant's Proposal

2.2.1 Proposed Project Facilities

2.2.2 Proposed Project Operation

2.2.3 Proposed Environmental Measures

2.2.4 Modifications to Applicant's Proposal—Mandatory Conditions*

2.3 Staff Alternative

2.4 Staff Alternative with Mandatory Conditions*

2.5 Other Alternatives (as appropriate)*

2.6 Alternatives Considered but Eliminated from Detailed Study

2.6.1 Federal Government Takeover of the Project*

2.6.2 Issuing a Nonpower License*

2.6.3 Retiring the Project

2.0 PROPOSED ACTION AND ALTERNATIVES (*original license applications*)*

2.1 No-action Alternative

2.2 Proposed Action

2.2.1 Proposed Project Facilities

	2.2.2 Project Safety
	2.2.3 Proposed Project Operation
	2.2.4 Proposed Environmental Measures
	2.2.5 Modifications to Applicant’s Proposal—Mandatory Conditions*
	2.3 Staff Alternative
	2.4 Staff Alternative with Mandatory Conditions*
	2.5 Other Alternatives (as appropriate)*
	2.6. Alternatives Considered but Eliminated from Detailed Study
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	3.1 General Description of the River Basin
	3.2 Scope of Cumulative Effects Analysis
	3.2.1 Geographic Scope
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	3.3 Proposed Action and Action Alternatives
	3.3.1 Geologic and Soil Resources
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	3.3.4 Threatened and Endangered Species
	3.3.5 Recreation and Land Use
	3.3.6 Cultural Resources
	3.3.7 Aesthetic Resources
	3.3.8 Socioeconomics*
	3.4 No-action Alternative
4.0	DEVELOPMENTAL ANALYSIS
	4.1 Power and Economic Benefits of the Project
	4.2 Comparison of Alternatives
	4.3 Cost of Environmental Measures
	4.4 Air Quality (as needed)*
5.0	CONCLUSIONS AND RECOMMENDATIONS
	5.1 Comparison of Alternatives
	5.2 Comprehensive Development and Recommended Alternative
	5.3 Unavoidable Adverse Effects
	5.4 Recommendations of Fish and Wildlife Agencies
	5.5 Consistency with Comprehensive Plans
6.0	FINDING OF NO SIGNIFICANT IMPACT (OR OF SIGNIFICANT IMPACT) (EAs only)*
7.0	LITERATURE CITED
8.0	LIST OF PREPARERS
9.0	LIST OF RECIPIENTS (EISs only)*
10.0	CONSULTATION DOCUMENTATION (Exhibit Es only)*
APPENDICES*	
A--License Conditions Recommended by Staff*	
B--Response to Comments on the Draft Environmental Assessment*	

LIST OF FIGURES

Between the *Table of Contents* and *Executive Summary*, list all figures contained in the environmental document and the pages where they're found.

Example of a List of Figures:

List of Figures	
Figure 1. Location of the Lake Elsinore Hydroelectric Project, FERC No. 11858, California	2
Figure 2. Location of project features for the Big River Hydroelectric Project, FERC No. 602, Ohio	4
Figure 3. Description of the operation of the Lake Elsinore Hydroelectric Project, FERC No. 11858, California	6
Figure 4. Flow schematic for the North Georgia Project, FERC No. 2354, Georgia	8

At a minimum, include figures showing the location of the project in the river basin (figure 1) and the major project features (figure 2). A schematic can be helpful to understand complicated projects (figures 3 and 4). Other figures may be added as appropriate to support the text.

Use the following guidelines when creating figures: (1) keep figures simple and uncluttered—include only relevant information; (2) use text to introduce and highlight the figures; (3) figures should be able to stand alone; that is, the reader should not have to read the text to understand the figure; (4) the caption should thoroughly describe the material contained in the figure; and (5) the caption should include a citation for the source of the figure. For more information, see Attachment B, *General Guidance for Text, Graphics, and References*.

Do not include figures that show critical energy infrastructure information (CEII). CEII includes information about proposed or existing critical infrastructure that could be useful to a person in planning an attack on critical infrastructure and does not simply give the location of the critical infrastructure [18 CFR, section 388.113(c)(2)]. CEII includes general design drawings of the principal project works (e.g., plan, elevation, profile, and section of dam and powerplant), such as those found in Exhibit F; drawings showing technical details of a project, such as plans and specifications, supporting design reports, Part 12 independent consultant reports, facility details, electrical transmission systems, and communication and control center information; locations of critical or vulnerable components of the project; inundation information; and global positioning system (GPS) coordinates of any project features (precise surveyed or GPS coordinates at or above two decimal points of accuracy of equipment and structures).

Example of a project location figure (Source: Lake Elsinore Advanced Pumped Storage Project DEIS, FERC No. 11858, February 2006):

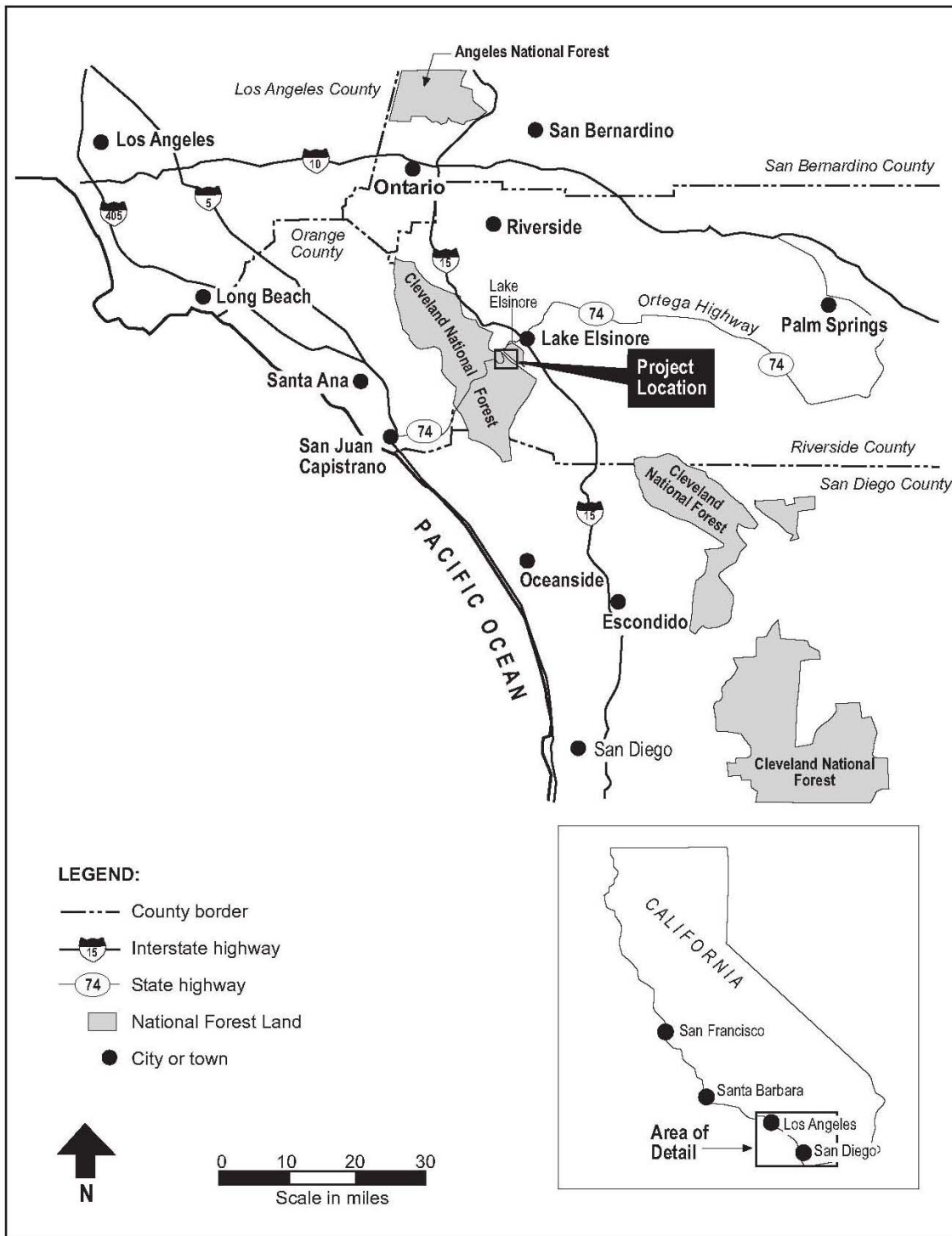


Figure 1. Location of the Lake Elsinore Hydroelectric Project, FERC No. 11858, California (Source: application, as modified by staff).

Example of a project features figure:

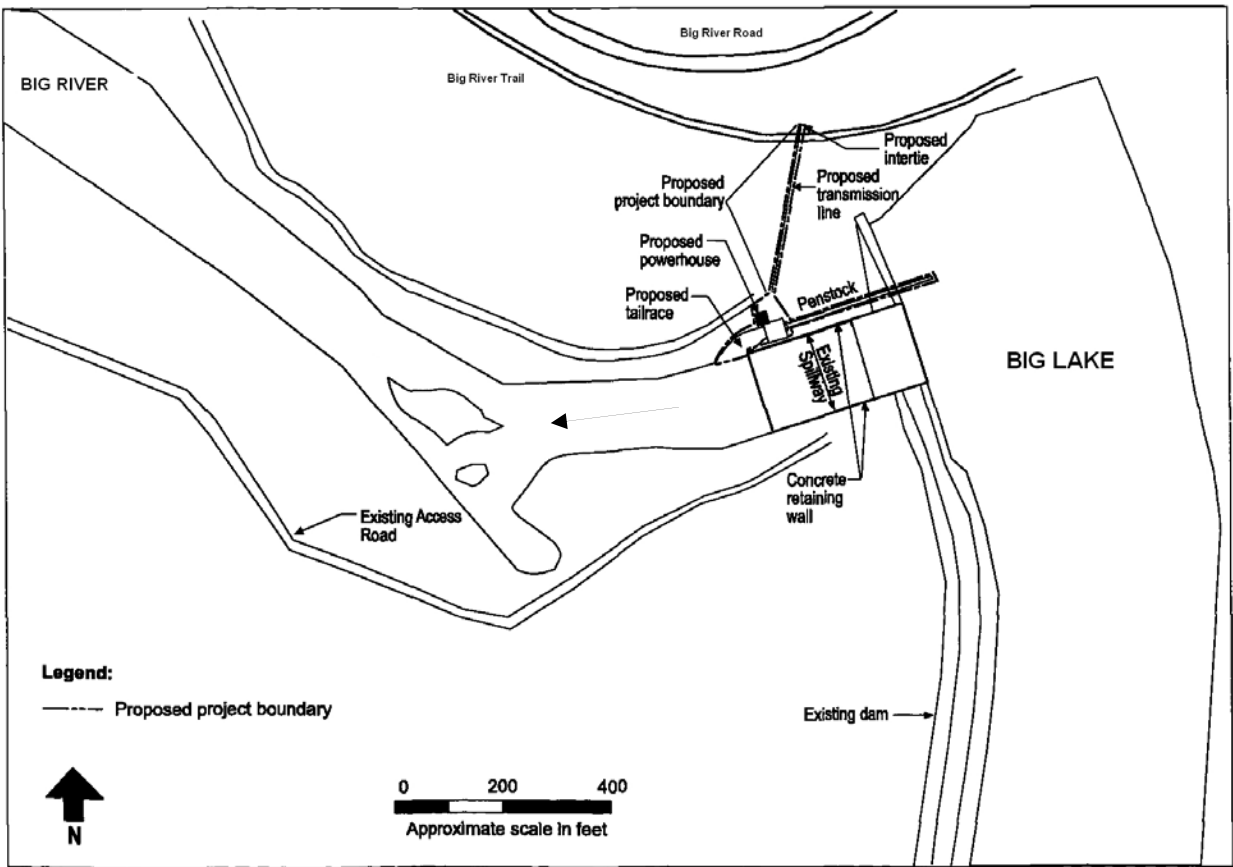


Figure 2. Location of project features for the Big River Hydroelectric Project, FERC No. 602, Ohio (Source: application, as modified by staff).

Example of a schematic drawing showing how a project operates (Source: Lake Elsinore Advanced Pumped Storage Project DEIS, FERC No. 11858, February 2006):

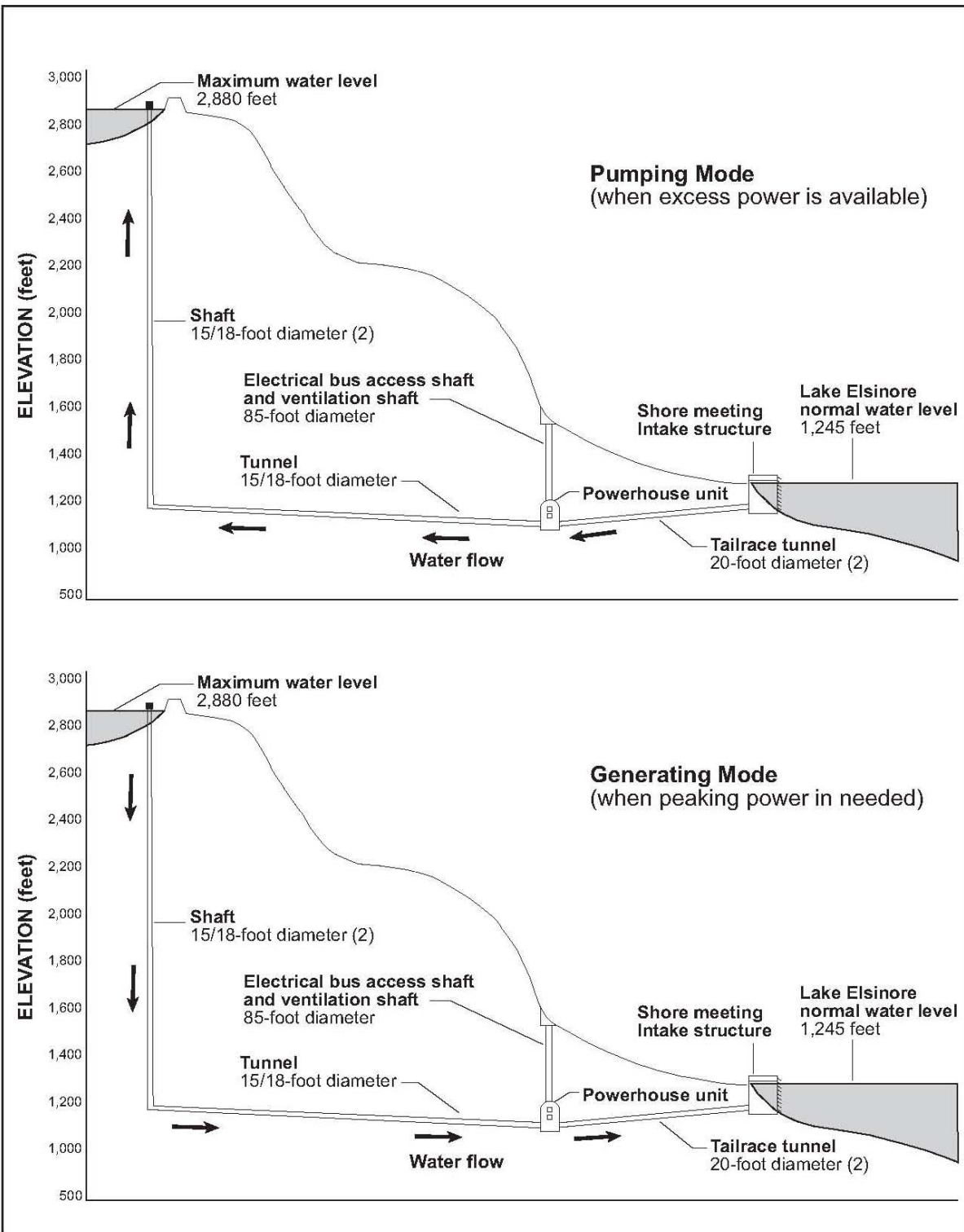


Figure 3. Description of the operation of the Lake Elsinore Hydroelectric Project, FERC No. 11858, California (Source: application, as modified by staff).

Example of a schematic showing the routing of flow through a multi-development Project (Source: North Georgia Project FEIS, FERC No. 2354, June 1996):

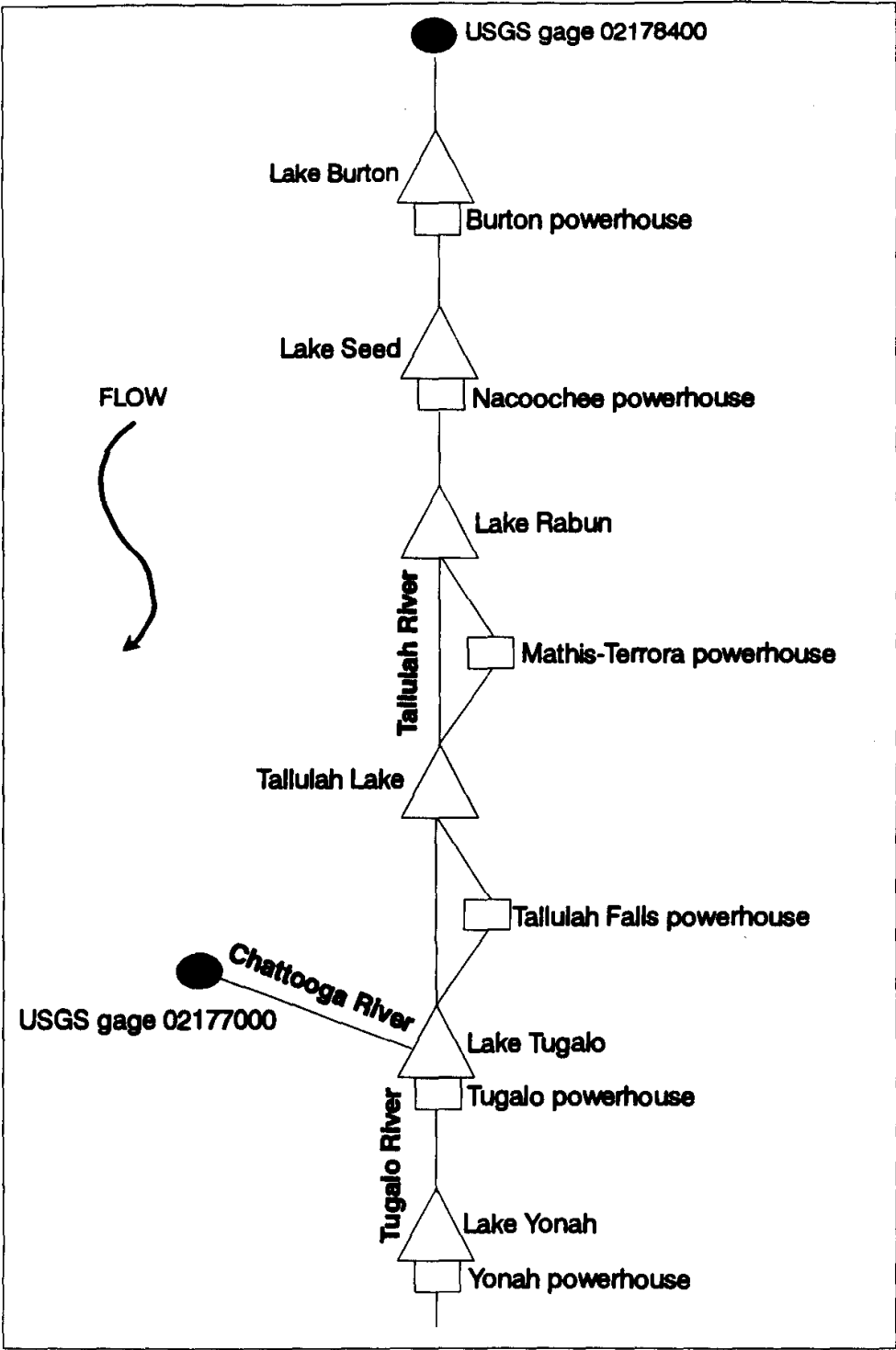


Figure 4.

Flow schematic for the North Georgia Project, FERC No. 2354, Georgia (Source: staff).

LIST OF TABLES

If you have tables, list them and the pages where they're located after the *List of Figures*.

Example of a List of Tables:

List of Tables	
Page 1. Existing and proposed hydroelectric developments in the Chugwater River Basin. 11	
Page 2. Fish species found in the Chugwater Project area.	16

Organize information in tables to illustrate data, findings, or other information to support the analysis in the environmental document.

Tables should be placed as soon as possible after the first mention in the text. The caption should thoroughly describe the material contained in the table. Cite the source of the table in the caption and indicate whether the information was modified by staff. Tables can include or exclude grid lines, but ensure consistently throughout document.

Example of a table used in the text of the environmental document:

Table 1. Temperature and dissolved oxygen levels recorded at various project locations (Source: Harris, 2005, as modified by staff).

Location	Temperature (degrees Celsius)	Dissolved oxygen (milligrams per liter)
Copper Creek above Chugwater Lake	0.5-20.2	8.5-10
Chugwater Lake (5 feet)	8.3-25.5	7.0-9.8
Chugwater Lake (10 feet)	6.7-11.0	3.2-9.4
Chugwater Lake (20 feet)	5.9-8.0	0.7-9.2
Copper Creek in project tailrace	0.2-21.0	8.1-10.2
Copper Creek 1 mile downstream of tailrace	1.0-21.9	7.5-11.3

ACRONYMS AND ABBREVIATIONS

For most environmental documents, it is helpful to have a list of acronyms and abbreviations. Define abbreviations and acronyms the first time they are used.

Be sparing in use of acronyms to improve readability unless widely recognized. Use the organization's commonly used name. If none is available, create an easily understood and remembered name. "FWS" is standard for "Fish and Wildlife Service," "NMFS" for "National Marine Fisheries Service," and "EPA" for "Environmental Protection Agency." But observe the following uses:

- "Forest Service," not "FS"
- "Reclamation," not "BR"
- "Park Service," not "NPS"
- "Cal Fish and Game," not "CDFG"
- "Michigan DNR," not "MDNR"
- "Olympus," not OEC (for Olympus Energy Company)

Example of an Acronyms and Abbreviations section:

Acronyms and Abbreviations	
Advisory Council	Advisory Council on Historic Preservation
ALP	Alternative Licensing Process
APE	area of potential effect
APEA	applicant-prepared environmental assessment
BA	biological assessment
BLM	Bureau of Land Management
CEII	critical energy infrastructure information
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
Corps	Army Corps of Engineers
cfs	cubic feet per second
Commerce	Department of Commerce
Commission	Federal Energy Regulatory Commission
Council	Northwest Power and Conservation Council
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DFW	Department of Fish and Wildlife
DNR	Department of Natural Resources
DO	dissolved
DOE	Department of Energy
EA	environmental assessment
EFH	essential fish habitat
EIS	environmental impact statement
EPAAct	Energy Policy Act of 2005
ESA	Endangered Species Act

FERC	Federal Energy Regulatory Commission
Forest Service	U.S. Forest Service
FPL	Florida Power and Light Company
FONSI	finding of no significant impact
FPA	Federal Power Act
FWS	U.S. Fish and Wildlife Service
GPS	global positioning satellite
HPMP	historic properties management plan
IFIM	instream flow incremental methodology
ILP	Integrated Licensing Process
Interior	Department of the Interior
kW	kilowatt
kWh	kilowatt-hour
msl	mean sea level
MW	megawatt
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NGO	non-governmental organization
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OEP	Office of Energy Projects
PMWUA	percent maximum weighted usable area
PURPA	Public Utility Regulatory Policies Act
PA	programmatic agreement
Program	Columbia River Fish and Wildlife Program
TLP	traditional licensing process
USC	U.S. Code
WQC	water quality certification
WUA	weighted usable area

EXECUTIVE SUMMARY

The purpose of the *Executive Summary*⁵ is to give the reader a brief and basic understanding of the type of action being proposed, the alternatives to the proposed action, the main issues analyzed, and a comparison of effects of the different alternatives. It should be understandable, standing alone from the rest of the document. The summary should highlight economic, environmental, and other issues that were given special consideration, including cumulative effects. Follow this format:

- (1) Describe the project (indicate existing project works and any proposed for construction), including the location, acreage of federal lands involved, capacity, use of power, and the applicant's proposal.
- (2) Describe the other alternatives analyzed.
- (3) Briefly describe public involvement and the major issues analyzed.
- (4) Provide a comparison of environmental effects of the different alternatives on each resource (include table as appropriate).
- (5) Briefly discuss your conclusions, including a comparison of the net annual benefits of the different alternatives and the trade-offs made.

⁵ CEQ NEPA regulations require that: "Each environmental impact statement shall contain a summary which adequately and accurately summarizes the statement. The summary shall stress the major conclusions, areas of controversy (including issues raised by agencies and the public), and the issues to be resolved (including the choice among alternatives)" (40 CFR section 1502.12).

Example of an Executive Summary:

EXECUTIVE SUMMARY

Municipal Hydro Company (Municipal) proposes to continue to operate the existing 16.7-magawatt (MW) Angus Hydroelectric Project (project) located on Copper Creek, near the City of Chugwater in Southeastern Wyoming. This combined purpose project supplies part of the electricity needs of the City of Chugwater and all of its municipal water supply requirements. Parts of the project occupy 12.8 acres of federal lands administered by the U.S. Forest Service (Forest Service) and the Bureau of Land Management (BLM). The Forest Service lands are managed by the Swift Ranger District of the Saddle National Forest. This draft environmental assessment (EA) is a cooperative undertaking between the Forest Service and the Federal Energy Regulatory Commission (the Commission or FERC).

Proposed Action

The project consists of a 6-foot-high, 39-foot-long dam creating a 17-acre reservoir at full pond, a 2-mile-long penstock, and a powerhouse with three turbine-generators. The project is described in more detail in section 2.2. The project is operated in a run-of-river mode. Municipal proposes no capacity or operating changes, but does propose measures for the protection and enhancement of environmental resources: increased minimum instream flows of 200 cfs to protect fish in the 2.4-mile-long bypassed reach; cattle fencing along Chugwater Creek; a new boat ramp at the northern end of the reservoir; and landscaping in the vicinity of the powerhouse. These measures are described in detail in section 2.2.4.

Alternatives Considered

This draft EA analyzes the effects of continued project operation and recommends conditions for a new license for the project. In addition to Municipal's proposal, we consider two alternatives: (1) Municipal's proposal with staff modifications; and (2) no action—continued operation with no changes.

Under Municipal's proposal with staff modifications, the project would be operated as proposed by Municipal, but would include the following additional measures: monitoring flows and water temperature; minimum instream flows for fish of 300 cfs; setting limits on the rate project flows downstream of the project are changed under normal operating conditions (ramping rates); and measures to protect resources, including cultural resources and values, from damages caused by any operating or maintenance actions that may arise during the term of a new license. The recommended staff modifications include or are based in part on recommendations made by the federal and state resource agencies that have an interest in the resources that may be affected by continued project operation. We include all the section 4(e) measures specified by the Forest Service in the staff alternative.

Public Involvement and Areas of Concern

Before filing its license application, Municipal conducted a pre-filing consultation process under the traditional licensing process. The intent of the Commission's pre-filing process is to initiate public involvement early in the project planning process and to encourage citizens, governmental entities, tribes, and other interested parties to identify and resolve issues prior to an application being formally filed with the Commission. After the application was filed, we conducted scoping to determine what issues and alternatives should be addressed. A scoping document was distributed to interested parties on Jun 15, 2005. Scoping meetings were held in Portland, Oregon, on July 29, 2005, and in Troutdale, Oregon, on July 30, 2005. On January 3, 2006, we requested conditions and recommendations in response to the notice of ready for environmental analysis.

The primary issue associated with relicensing the project is the amount of flow necessary to protect rainbow trout in the 2-mile-long bypassed reach.

--example continued on next page--

Project Effects

Aquatic Resources—Under the applicant’s proposal, adult trout habitat would improve in the 2-mile-long bypassed reach. It would increase by 50 percent compared to existing conditions but would continue to be degraded by reduced flows. Substantial mortality from stranding would continue. Small numbers of fish would continue to be killed as they pass through the turbines. Slight increase in water temperature would also continue to occur.

With the staff’s modifications to the applicant’s proposal, adult trout habitat would be increased to near optimal conditions, a 100 percent increase compared to applicant’s proposal. Stranding, due to flow fluctuations, would be reduced to minimal levels.

Terrestrial Resources-- Fencing to exclude cattle from the riparian zone would substantially improve 12 acres of riparian vegetation benefiting local wildlife populations. Maintenance activities would continue to disturb nesting peregrine falcons.

Threatened and Endangered Species—The endangered southwestern willow flycatcher would benefit from the expected increase in riparian vegetation.

Recreation—Under the applicant’s proposal, fishing opportunities would be minimally improved as the result of increased flows in the bypassed area. Under the staff flow recommendation, fishing would be moderately improved. Boating on the reservoir, and associated reservoir fishing, would increase as a result of construction of a new boat ramp.

Cultural Resources—The project would not affect cultural resources. Under the staff alternative, however, any future effects would be addressed.

Visual Resources—Municipal’s proposed landscaping around the powerhouse would improve visual quality in an area used for picnicking.

Under the no-action alternative, environmental conditions would remain the same and no enhancement of environmental resources would occur.

Conclusions

Based on our analysis, we recommend licensing the project as proposed by Municipal with some staff modifications and additional measures, as described above under Alternatives Considered.

In section 4.1 of the EA, we estimate the annual net benefits of operating and maintaining the project under the three alternatives identified above. Our analysis shows that the annual net benefit would be \$32,700 for the proposed action; \$30,100 for the staff alternative; and \$35,200 for the no-action alternative.

On the basis of our independent analysis, we conclude that issuing a new license for the project, with the environmental measures that we recommend, would not be a major federal action significantly affecting the quality of the human environment. **[EAs only]**

We chose the staff alternative as the preferred alternative because: (1) the project would provide a dependable source of electrical energy for the region (200,000 megawatt-hours annually); (2) the 16.7 MW of electric energy generated from a renewable resource may offset the use of fossil-fueled, steam-electric generating plants, thereby conserving nonrenewable resources and reducing atmospheric pollution; (3) the recommended environmental measures proposed by municipal, as modified by staff, would adequately protect and enhance environmental resources affected by the project. The overall benefits of the staff alternative would be worth the cost of the proposed and recommended environmental measures.

SOME BASIC CONCEPTS FOR NEPA DOCUMENTS

The following are some basic NEPA concepts from the CEQ regulations that should guide your writing for all sections of EAs and EISs. Note the emphasis on being clear and concise.

40 CFR, Section 1500.1--Purpose.

(c) Ultimately, of course, it is not better documents but better decisions that count. NEPA's purpose is not to generate paperwork--even excellent paperwork--but to foster excellent action. The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment. These regulations provide the direction to achieve this purpose.

(b) Implement procedures to make the NEPA process more useful to decision makers and the public; to reduce paperwork and the accumulation of extraneous background data; and to emphasize real environmental issues and alternatives. Environmental impact statements shall be concise, clear, and to the point, and shall be supported by evidence that agencies have made the necessary environmental analyses.

Section 1500.4--Reducing paperwork.

Agencies shall reduce excessive paperwork by:

(a) Reducing the length of environmental impact statements [Sec. 1502.2(c)], by means such as setting appropriate page limits [Sects. 1501.7(b)(1) and 1502.7].

(b) Preparing analytic rather than encyclopedic environmental impact statements [Sec. 1502.2(a)].

(c) Discussing only briefly issues other than significant ones [Sec. 1502.2(b)].

(d) Writing environmental impact statements in plain language (Sec. 1502.8).

(e) Following a clear format for environmental impact statements (Sec. 1502.10).

(f) Emphasizing the portions of the environmental impact statement that are useful to decision makers and the public (Sects. 1502.14 and 1502.15) and reducing emphasis on background material (Sec. 1502.16).

STANDARD HEADING

DRAFT ENVIRONMENTAL ASSESSMENT [or DRAFT ENVIRONMENTAL IMPACT STATEMENT]

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Licensing
Washington, DC

List cooperating agencies, as appropriate.

**Samples Hydroelectric Project
FERC Project No. 22000-001--State**

1.0 INTRODUCTION

1.1 APPLICATION

This section explains what is being applied for and by whom. Include the following information:

- Date the application and any supplements or amendments were filed or are scheduled to be filed
- Applicant's name
- Type of license or exemption the applicant is seeking
- Project location (river, county, city if any, state)
- Size (capacity) of the project
- Energy benefits produced by the project (annual generation in kWh)
- Federal lands, if any, the project occupies. Include acreage and agency administering the lands--if none, say there are no federal lands involved
- Proposed new capacity and new construction—if none, so state

Include a project location map (see figure 1, *List of Figures*).

Example of an Application section:

1.1 APPLICATION

On November 13, 1991, Municipal Hydro Company (Municipal) filed an application for a new major license for the existing Angus Hydroelectric Project. The 1.2-megawatt (MW) project is located on Copper Creek at river mile 19.5 near the City of Chugwater, Wyoming (figure 1). The project does not occupy any federal lands. The project generates an average of about 10,758,000 kilowatthours (kWh) of energy annually. Municipal proposes no new capacity and no new construction.

1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

This section explains why the Commission requires a license for the project and, therefore, a NEPA analysis. It includes the alternatives that are assessed and a listing of the major issues that are addressed. This section explains that the proposed federal action is the Commission's decision whether to issue a license for the proposed project and, if so, what conditions should be placed in the license. The purpose of the proposed action is to determine whether to grant an application for the construction and operation, or continued operation, of hydroelectric and related facilities in compliance with FPA requirements and other laws. The following language should also be included in this section:

In deciding whether to issue a license for a hydroelectric project, the Commission must determine that the project will be best adapted to a comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which licenses are issued (e.g., flood control, irrigation and water supply), the Commission must give equal consideration to the purposes of energy conservation, the protection, mitigation of damage to, and enhancement of fish and wildlife (including related spawning grounds and habitat), the protection of recreational opportunities, and the preservation of other aspects of environmental quality.

In addition to this general description, include a brief description of the project-specific issues that will be addressed in the environmental document.

Example of a Purpose of Action section:**1.2.1 Purpose of Action**

The Commission must decide whether to issue a license to Municipal for the project and what conditions should be placed in any license issued. In deciding whether to issue a license for a hydroelectric project, the Commission must determine that the project will be best adapted to a comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which licenses are issued (e.g., flood control, irrigation and water supply), the Commission must give equal consideration to the purposes of energy conservation, the protection, mitigation of damage to, and enhancement of fish and wildlife (including related spawning grounds and habitat), the protection of recreational opportunities, and the preservation of other aspects of environmental quality.

Issuing a new license for the Angus Project would allow Municipal to generate electricity at the project for the term of a new license, making electric power from a renewable resource available to its customers.

This draft environmental assessment (EA) assesses the effects associated with operation of the project, alternatives to the proposed project, and makes recommendations to the Commission on whether to issue a new license, and if so, recommends terms and conditions to become a part of any license issued.

In this draft EA, we assess the environmental and economic effects of continuing to operate the project: (1) as proposed by Municipal; and (2) with our recommended measures. We also consider the effects of the no-action alternative. Important issues that are addressed include fish passage, minimum flows in the bypassed reach, and recreational access.

1.2.2 Need for Power

This section presents the need (both project-specific and regional)--for the power the project would generate, including total energy and capacity needs, and fossil fuel displacement, and shows why providing that energy is important. Cite any plans or reports used to project future power demand and explain how the project satisfies or would help satisfy these power demands. If the applicant is not a utility, discuss only the regional need for power, and include the amount of power to be sold and, if known, identify the purchasers.

Example of a Need for Power section:

1.2.2 Need for Power

The Green Creek Hydroelectric Project would provide hydroelectric generation to meet part of Indiana’s power requirements, resource diversity, and capacity needs. The project would have an installed capacity of 16.4 megawatts (MW) and generate approximately 65,000 megawatt-hours (MWh) per year.

The North American Electric Reliability Council (NERC) annually forecasts electrical supply and demand nationally and regionally for a 10-year period. The Green Creek Hydroelectric Project is located in the East Central Area Reliability Council (ECAR) of the NERC. According to NERC’s 2005 forecast, average annual demand requirements for the ECAR region are projected to grow at a rate of 1.9 percent from 2005 through 2014. NERC projects resource capacity margins (generating capacity in excess of demand) will range between 9 percent and 20 percent of firm peak demand during the 10-year forecast period, including estimated new capacity additions. Over the next 10 years, ECAR estimates that about 3,300 MW of additional capacity will be brought on line.

We conclude that power from the Green Creek Hydroelectric Project would help meet a need for power in the ECAR region in both the short and long-term. The project provides low-cost power that displaces non-renewable, fossil-fired generation and contributes to a diversified generation mix. Displacing the operation of fossil-fueled facilities may avoid some power plant emissions and creates an environmental benefit.

1.3 STATUTORY AND REGULATORY REQUIREMENTS

This section briefly describes the statutory and regulatory requirements that must be addressed as part of the licensing process. Include a table summarizing the major requirements. Only include specific requirements if they are relevant to the particular project. For example, a section on section 4(e) conditions is not necessary for projects not located on federal lands or Indian reservations.

Note: When referring to different recommendations and mandatory conditions throughout the document, use “recommends” for agency terms and conditions and recommendations made by other entities, use “specifies” for mandatory conditions, and use “prescribes” for fishway prescriptions. For example, FWS recommends a minimum flow of 200 cfs and the Forest Service, under section 4(e), specifies that two hiking trails be constructed in the vicinity of the dam.

Example of Statutory and Regulatory Requirements introduction and summary table:

1.3 STATUTORY AND REGULATORY REQUIREMENTS

A license for the Smith Project is subject to numerous requirements under the Federal Power Act and other applicable statutes. The major regulatory and statutory requirements are summarized in table 1 and described below.

Table 1. Major Statutory and Regulatory Requirements for the Granite Creek Project (Source: staff).

Requirement	Agency	Status
Section 18 of the FPA (fishway prescriptions)	FWS, NMFS	FWS and NMFS prescribed upstream fish passage facilities on December 1, 2006.
Section 4(e) of the FPA (land management conditions)	Forest Service	Forest Service provided preliminary conditions on December 5, 2006.
Section 10(j) of the FPA	Oregon DFW, FWS, NMFS	The agencies provided section 10(j) recommendations on November 30, December 1, and December 1, 2006, respectively.
Clean Water Act—water quality certification	Oregon DWR	Application for certification received on October 3, 2006; due by October 1, 2007.
Endangered Species Act Consultation	NMFS	Completed; biological opinion issued January 13, 2007.
Coastal Zone Management Act Consistency	Oregon Department of Land Conservation and Development	Consistency certification filed on July 16, 2006; action by Oregon Department of Land Conservation and Development due by February 4, 2007.
Wild and Scenic Rivers Act	National Park Service	National Park Service issued a preliminary consistency determination on December 15, 2006.

1.3.1 Federal Power Act

1.3.1.1 Section 18 Fishway Prescriptions

This section would generally not be included in an Exhibit E prepared under the ILP unless preliminary conditions were provided but would be included in an APEA prepared under the ALP.

Under section 18 of the FPA, the U.S. Fish and Wildlife Service and the National Marine Fisheries Service have the authority to prescribe fishways at projects. In this section, identify any fishway facilities prescribed by the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, or both. For applicant’s Exhibit Es and APEAs, these would be preliminary prescriptions. Further, indicate if no prescriptions were filed or if the agencies requested a reservation of authority to prescribe fishways in the future. List specific measures in section 2.2.5, *Modifications to Applicant’s Proposal—Mandatory Conditions*.

Example for a reservation of authority for fishways:

1.3.1.1 Section 18 Fishway Prescriptions

Section 18 of the Federal Power Act states that the Commission is to require construction, operation, and maintenance by a licensee of such fishways as may be prescribed by the Secretaries of Commerce or the Interior. Interior, by letter dated January 1, 2001, requests that a reservation of authority to prescribe fishways under section 18 be included in any license issued for the project.

Example for a fishway prescription:

1.3.1.1 Section 18 Fishway Prescriptions

Section 18 of the Federal Power Act states that the Commission is to require construction, operation, and maintenance by a licensee of such fishways as may be prescribed by the Secretary of Commerce or the Interior. On December 3, 2006, the U.S. Fish and Wildlife Service (FWS) timely filed a fishway prescription for the project. These conditions are described under section 2.2.5, *Modifications to Applicant’s Proposal—Mandatory Conditions*.

Alternative Section 18 Fishway Prescriptions under the Energy Policy Act of 2005

Under regulations developed by the Departments of Commerce, Interior, and Agriculture to implement section 241 of EPAct, any party to a Commission license proceeding may: (1) request a trial-type hearing on “disputed issues of material fact;” and (2) propose alternative fishway prescriptions that the Departments must accept unless inconsistent with certain energy and environmental criteria.

Identify any alternative conditions filed by the applicant or others and any requests for trial-type hearings under section 241 of EPAct, including the status or results of any hearings.

Example where applicant filed alternative fishway prescriptions:

Alternative Section 18 Fishway Prescriptions under the Energy Policy Act of 2005

The Energy Policy Act of 2005 (EPAct) provides parties to this licensing proceeding the opportunity to propose alternatives to preliminary prescriptions. In a February 2, 2005, filing in accordance with section 241 of EPAct, Municipal filed an alternative prescription under which Municipal would delay construction of fish passage facilities until after completion of basin-wide salmon restoration plans as opposed to within 2 years of licensing, as required by NMFS. This measure is discussed further in section 3.3.2, *Anadromous Fish Restoration*.

Example where applicant requested trial-type hearing and filed alternative fishway prescriptions:

Alternative Section 18 Fishway Prescriptions under the Energy Policy Act of 2005

The Energy Policy Act of 2005 (EPAct) provides parties to this licensing proceeding the opportunity to request trial-type hearings regarding issues of material fact that support the prescriptions developed under FPA section 18. EPAct also provides parties the opportunity to propose alternatives to preliminary prescriptions. In a February 2, 2005, filing in accordance with section 241 of EPAct, Municipal requested a hearing regarding issues of material fact pertaining to the preliminary fishway prescription. The primary issue raised by Municipal is that it is premature to require fish passage unless it can be shown that upstream habitats can support steelhead. An administrative law judge is scheduled to release finding following the hearing by August 17, 2005. Municipal also filed an alternative prescription under which Municipal would delay construction of fish passage facilities until after completion of basin-wide salmon restoration plans as opposed to within 2 years of licensing, as required by NMFS. This measure is discussed further in section 3.3.2, *Anadromous Fish Restoration*.

1.3.1.2 Section 4(e) Conditions

This section would generally not be included in an Exhibit E prepared under the ILP unless preliminary conditions were provided, but would be included in an APEA prepared under the ALP.

Identify whether any federal land management agencies submitted conditions pursuant to section 4(e) of the FPA to protect and ensure proper use of public lands (reservations) occupied by the project. Specific measures will be listed in section 2.2.5, *Modifications to Applicant’s Proposal—Mandatory Conditions*.

Example for listing 4(e) conditions:

1.3.1.2 Section 4(e) Conditions

Section 4(e) of the FPA provides that any license issued by the Commission for a project within a federal reservation shall be subject to and contain such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation. The Forest Service filed final conditions by letter dated January 23, 2002 (Appendix A) pursuant to section 4(e) of the Federal Power Act. These conditions are described under section 2.2.5, *Modifications to Applicant’s Proposal—Mandatory Conditions*.

Alternative Conditions under the Energy Policy Act of 2005

Under regulations developed by the Departments of Commerce, Interior, and Agriculture to implement section 241 of EPAct, any party to a Commission license proceeding may: (1) request a trial-type hearing on “disputed issues of material fact;” and (2) propose alternative land management conditions that the Departments must accept unless inconsistent with certain energy and environmental criteria.

Identify any alternative conditions filed by the applicant or others and any requests

for trial-type hearings under section 241 of EAct, including status of results of the hearings.

Example where applicant filed alternative conditions:

Alternative Section 4(e) Conditions under the Energy Policy Act of 2005

The Energy Policy Act of 2005 (EAct) provides parties to this licensing proceeding the opportunity to propose alternatives to preliminary conditions. On December 19, 2005, the Commission received a copy of Municipal's filing to the Forest Service proposing alternative 4(e) conditions in response to the Forest Service's final section 4(e) conditions. Municipal's alternative 4(e) conditions include a recommendation to eliminate Forest Service condition no. 7 (Noxious Weed Control Plan) or, in the alternative, limiting weed control to areas disturbed by project-related activities. Municipal also provides an alternative to condition no. 9 (Visual Quality Improvement Plan) that would restrict measures to lands within the project boundary. The two alternative conditions provided by Municipal are analyzed within the corresponding resource areas in section 3, *Environmental Analysis*, and section 5.2, *Comprehensive Development and Recommended Alternative*.

Example where applicant requested trial-type hearing and filed alternative conditions:

Alternative Section 4(e) Conditions under the Energy Policy Act of 2005

The Energy Policy Act of 2005 (EAct) provides parties to this licensing proceeding the opportunity to request trial-type hearings regarding issues of material fact that support the preliminary conditions developed under FPA section 4(e) and to propose alternatives to preliminary conditions. On December 19, 2005, the Commission received a copy of Municipal's filing to the Forest Service proposing alternative 4(e) conditions in response to the Forest Service's final 4(e) conditions and seeking a trial-type hearing to resolve disputed issues of material fact with respect to Forest Service 4(e) condition no. 7. Municipal contends that weed infestations are not caused by the project. An administrative law judge is scheduled to release findings following the hearing and no later than February 3, 2006. Municipal's alternatives to condition no. 7 includes a recommendation to eliminate Forest Service condition no. 7 (Noxious Weed Control Plan) or, in the alternative, limiting weed control to areas disturbed by project-related activities. Municipal also provides an alternative to condition no. 9 (Visual Quality Improvement Plan) that would restrict measures to lands within the project boundary. The two alternative conditions provided by Municipal, are analyzed within the corresponding resource areas in section 3, *Environmental Analysis*, and section 5.2, *Comprehensive Development and Recommended Alternative*.

1.3.1.3 Section 10(j) Recommendations

This section would generally not be included in Exhibit Es prepared under the ILP or APEAs prepared under the ALP unless preliminary conditions were provided, and is not applicable to exemption applications.

In this section, indicate which state and federal agencies filed recommendations pursuant to section 10(j) of the FPA and the date of their filings. Refer the reader to section 5.4.1, *Recommendations of Fish and Wildlife Agencies*, for a summary of the recommendations and a discussion of how we addressed the recommendations and complied with section 10(j).

An example of a 10(j) section:

1.3.1.3 Section 10(j) Recommendations

Under section 10(j) of the FPA, each hydroelectric license issued by the Commission must include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project. The Commission is required to include these conditions unless it determines that they are inconsistent with the purposes and requirements of the FPA or other applicable law. Before rejecting or modifying an agency recommendation, the Commission is required to attempt to resolve any such inconsistency with the agency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

NMFS and Oregon DFW timely filed, on November 10, 2004, recommendations under section 10(j), as summarized in table 4, in section 5.4.1, *Recommendations of Fish and Wildlife Agencies*. In section 5.4, we also discuss how we address the agency recommendations and comply with section 10(j).

1.3.1.4 Section 30(c) Fish and Wildlife Conditions

This section would generally not be included in an Exhibit E prepared under the ILP unless preliminary conditions were provided, but would be included in an APEA prepared under the ALP.

These conditions described in section 30(c) of the FPA pertain only if the applicant is seeking an exemption from licensing or seeking Public Utility Regulatory Policies Act (PURPA) benefits for constructing a new dam or diversion. If applicable, identify whether conditions were provided by federal and state fish and wildlife agencies for the protection of fish and wildlife resources. These conditions are described under section 2.2.5, *Modifications to Applicant's Proposal—Mandatory Conditions*.

Example for exemption conditions:

1.3.1.4 Section 30(c) Fish and Wildlife Conditions

Under section 30(c) of the FPA, where project applicants are seeking Public Utility Regulatory Policies Act (PURPA) benefits for constructing a new dam or diversion, the project is subject to mandatory conditions provided by federal and state fish and wildlife agencies for the protection of fish and wildlife resources. FWS timely filed, on October 2, 2005, terms and conditions under section 30(c) of the FPA. These conditions are described under section 2.2.5, *Modifications to Applicant's Proposal—Mandatory Conditions*.

1.3.2 Clean Water Act

Even though the filing of an application for a water quality certification is not required until after the license application is filed, Applicants should indicate the status or their schedule for filing the request for certification.

The applicant must file a request for a water quality certification (WQC), required by section 401 of the Clean Water Act, within 60 days of the Commission's notice requesting terms and conditions and recommendations.

In this section, include the date the certifying agency received the request for certification and the date or status of the certifying agency's action (denying, granting, or waiving the section 401 WQC, or the action may be pending). Describe the conditions of the water quality certification, if known.

Note: The section 401 WQC is waived if the certifying agency doesn't act within 1 year of receiving the applicant's request. Any conditions filed after the 1-year deadline has passed are evaluated as recommendations under section 10(a) of the FPA.

Example for when a section 401 WQC is waived:

1.3.2 Clean Water Act

Under section 401 of the Clean Water Act (CWA), a license applicant must obtain certification from the appropriate state pollution control agency verifying compliance with the CWA. On November 21, 2000, Municipal applied to the Wyoming Department of Natural Resources (Wyoming DNR) for 401 water quality certification (WQC) for the Angus Project. The Wyoming DNR received this request on November 24, 2000. Since Wyoming DNR has not acted on the request within 1 year from receipt of the request, the WQC is considered waived.

Example for a section 401 WQC with conditions:

1.3.2 Clean Water Act

Under section 401 of the Clean Water Act (CWA), a license applicant must obtain certification from the appropriate state pollution control agency verifying compliance with the CWA. On November 21, 2000, Municipal applied to the Wyoming Department of Natural Resources (Wyoming DNR) for 401 water quality certification (WQC) for the Angus Project. The Wyoming DNR received this request on November 24, 2000. The Wyoming DNR timely issued the section 401 WQC on December 6, 2000 (letter from E. Everett, Water Management Supervisor, Wyoming Department of Natural Resources, Locality, Wyoming, December 6, 2000). The conditions of the certification are described under section 2.2.5, *Modifications to Applicant's Proposal—Mandatory Conditions*.

Example for when a section 401 WQC has not yet been issued:

1.3.2 Clean Water Act

Under the section 401 of the Clean Water Act (CWA), a license applicant must obtain certification from the appropriate state pollution control agency verifying compliance with the CWA. On November 21, 2000, Municipal applied to the Wyoming Department of Natural Resources (Wyoming DNR) for 401 water quality certification (WQC) for the Angus Project. The Wyoming DNR received this request on November 24, 2000. The Wyoming DNR has not yet acted on the request. The WQC is due by November 24, 2001.

1.3.3 Endangered Species Act

For an Exhibit E prepared under the ILP, if the applicant is the Commission's non-federal designee for informal consultation under the ESA, a draft BA is required [18 CFR, section 5.18(b)(3)(ii)]. Guidance for preparing a BA is found in Attachment A, Specific Guidance for Resource Discussions, Threatened and Endangered Species section).

This section briefly describes the consultation process used to address project effects on federally listed or proposed species or critical habitat in the project vicinity, including whether the applicant was designated as a non-federal representative. Our findings are based on the Staff Alternative, unless there is a distinct Staff Alternative with Mandatory Conditions alternative.

Cite the most recent list of species received from FWS and/or NMFS. This section references the resource analysis and *Comprehensive Development and Recommended Alternative* sections of the environmental document, and documents the determinations of effect for each listed or proposed species or designated or proposed critical habitat (see table below).⁶ This section also includes a discussion of the status or results of informal or formal consultation under section 7 of the Endangered Species Act (ESA). If there are many species evaluated, include a summary table. Where a biological opinion has been issued, summarize the terms and conditions and conservation measures contained in the opinion and whether our recommendations are consistent with the opinion.

⁶ If some species on the list are not evaluated, explain why.

List of possible effect determinations:

Determinations of Effect	
Listed Species or Designated Critical Habitat	
no effect	<i>no direct or indirect effects</i>
not likely to adversely affect	<i>beneficial, insignificant (very small in scale and cannot be meaningfully measured, detected, or evaluated), or discountable (extremely unlikely to occur) effects</i>
likely to adversely affect	<i>measurable adverse effects or results in take</i>
Proposed Species	
no jeopardy	<i>jeopardy--an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species</i>
jeopardy	
Proposed Critical Habitat	
no adverse modification	<i>adverse modification--a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species.</i>
adverse modification	

An example of an ESA section:

1.3.3 Endangered Species Act

Section 7 of the Endangered Species Act (ESA) requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species. One federally listed species is known to occur in the Angus Project vicinity: the Copper mudpuppy (letter from R. Johnson, Field Supervisor, FWS, Long Beach, California, to K.D. Bose, Secretary, FERC, Washington, D.C., January 4, 2007). There is also critical habitat for the Copper mudpuppy in the project vicinity. Our analyses of project impacts on threatened and endangered species are presented in section 3.3.4, *Threatened and Endangered Species*, and our recommendations in section 5.2, *Comprehensive Development and Recommended Alternative*.

We conclude that relicensing of the Angus Project, as proposed with staff-recommended measures, is not likely to adversely affect the Copper mudpuppy because no construction would occur below the high water mark and recommended sedimentation control measures would ensure any potential effects are insignificant. We requested FWS concurrence with our conclusion by letter dated May 29, 2007. FWS concurred with our determination on June 27, 2007 (letter from R. Johnson, Field Supervisor, FWS, Long Beach, California, to K.D. Bose, Secretary, FERC, Washington, D.C.).

1.3.4 Coastal Zone Management Act

Section 307(c)(3) of the CZMA requires that all federally licensed and permitted activities be consistent with approved state Coastal Zone Management Programs. If the project is located within a designated state coastal zone or if a project would affect a resource located within the coastal zone, the applicant must certify that the project is consistent with the state Coastal Zone Management Program.

If the project is within or affects a resource within the coastal zone, provide the date the applicant sent the consistency certification information to the state coastal management agency, the date the state agency received the certification, and the date and action taken by the state agency (for example, the agency will either agree or disagree with the consistency statement, waive it, or ask for additional information). Describe any conditions placed on the state agency's concurrence, and assess the conditions in the appropriate section of the EA/EIS.

If the state agency doesn't respond within 6 months of receiving an adequate consistency certification from the applicant, we presume the state agency concurs.⁷ Its response could be to ask for additional information, which may extend beyond the 6 months from the certification filing.

If the project is not in or would not affect the coastal zone, state so and cite the coastal zone program office's concurrence.

Example for a coastal zone certification that was waived:

1.3.4 Coastal Zone Management Act

Under section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1456(3)(A), the Commission cannot issue a license for a project within or affecting a state's coastal zone unless the state CZMA agency concurs with the license applicant's certification of consistency with the state's CZMA program, or the agency's concurrence is conclusively presumed by its failure to act within 180 days of its receipt of the applicant's certification.

On September 10, 1993, Municipal requested that the Washington Department of Ecology (DOE) review the consistency certification for the Angus Project. DOE received the request on September 12, 1993, and waived its right to review by letter dated November 1, 1993.

⁷ The state agency has 30 days from the date the applicant files its certification with that agency to notify the applicant and the Commission that the certification was missing information or required the correction of information that has been provided. If such notice is given, the clock would start on the date the applicant filed the necessary data and information.

Example for a coastal zone certification that was granted, with conditions:

1.3.4 Coastal Zone Management Act

Under section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1456(3)(A), the Commission cannot issue a license for a project within or affecting a state's coastal zone unless the state CZMA agency concurs with the license applicant's certification of consistency with the state's CZMA program, or the agency's concurrence is conclusively presumed by its failure to act within 180 days of its receipt of the applicant's certification.

On September 10, 1992, Municipal submitted a consistency certificate to the Washington Department of Ecology (DOE) for compliance with the Coastal Zone Management Act

In Municipal 's submittal, it certified that the proposed activities for the Angus Project comply with the Washington approved coastal management program. Further, Municipal asked the DOE to confirm that the project would not affect the coastal zone.

DOE received the request on September 12, 2002. By letter dated October 13, 2002, DOE stated that the Angus Project has the potential to impact coastal resources. DOE, however, concluded that if the project is licensed and operated with the terms agreed upon in the negotiated Offer of Settlement, no adverse impacts to coastal resources are anticipated.

We recommend that the conditions of the settlement be part of the staff alternative. Therefore, we conclude that the Angus Project would be consistent with the Washington Coastal Management Program.

Example where project is not located within coastal zone:

1.3.4 Coastal Zone Management Act

Under section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1456(3)(A), the Commission cannot issue a license for a project within or affecting a state's coastal zone unless the state CZMA agency concurs with the license applicant's certification of consistency with the state's CZMA program, or the agency's concurrence is conclusively presumed by its failure to act within 180 days of its receipt of the applicant's certification.

The project is not located within the state-designated Coastal Management Zone, which extends inland to the crest of the Coast Mountain Range, and the project would not affect Oregon's coastal resources. Therefore, the project is not subject to Oregon coastal zone program review and no consistency certification is needed for the action. By letter dated June 16, 2004, the Oregon Department of Coastal Resources concurred.

1.3.5 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) requires the Commission to take into account the effect of licensing a hydropower project on historic properties, and to allow the Advisory Council on Historic Preservation (Advisory Council) a reasonable opportunity to comment on the proposed action. "Historic Properties" are defined as any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places (National Register).

This section documents any consultation with the Advisory Council, State Historic Preservation Officer, National Park Service, Tribal Historic Preservation Officer, members of the public, and affected Indian tribes, where applicable.

If a potential adverse effect on historic properties has been identified, Commission staff will develop a programmatic agreement (PA) to resolve such adverse effects. The PA, in turn, would direct the licensee to implement a historic properties management plan (HPMP) to resolve all identified adverse effects on historic properties for the term of a new license. The applicant may include an HPMP with its license application.

Example with PA required:

1.3.5 National Historic Preservation Act

Section 106 requires that every federal agency "take into account" how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register of Historic Places (National Register).

To meet the requirements of section 106, the Commission intends to execute a Programmatic Agreement (PA) for the protection of historic properties from the effects of the operation of the Buffalo Creek Project. The terms of the PA would ensure that the Buffalo Power addresses and treats all historic properties identified within the project's area of potential effects (APE) through the finalization of the existing draft Historic Properties Management Plan.

Example with no PA required:

1.3.5 National Historic Preservation Act

Section 106 requires that every federal agency "take into account" how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register of Historic Places (National Register).

In response to Municipal's April 23, 2004, request, the Commission designated Municipal as a non-federal representative for the purposes of conducting section 106 consultation under the NHPA on May 6, 2004. Pursuant to section 106, and as the Commission's designated non-federal representative, Municipal consulted with the SHPO and affected Indian tribes to locate, determine National Register eligibility, and assess potential adverse effects to historic properties associated with the project. On August 31, 2004, representatives of the Northern Tribe participated in an archeological site field trip at the project and commented that they have no specific concerns about the project's effect on such sites. The SHPO responded back in letters dated April 28, 2004, and December 14,

2004, concurring with Municipal's findings, and ultimately concluded that no historic properties would be affected by the federal licensing action. As a result of these findings made by Municipal and the Northern Tribe, and the SHPO's concurrence that no historic properties would be affected by the project, the drafting of a programmatic agreement to resolve adverse effects to historic properties will not be necessary.

1.3.6 Pacific Northwest Power Planning and Conservation Act

Under section 4(h) of the Pacific Northwest Power Planning and Conservation Act, the Northwest Power and Conservation Council (Council) developed the Columbia River Basin Fish and Wildlife Program to protect, mitigate, and enhance the fish and wildlife resources associated with development and operation of hydroelectric projects within the Columbia River Basin. Section 4(h) of the act states that responsible federal and state agencies should provide equitable treatment for fish and wildlife resources, in addition to other purposes for which hydropower is developed, and that these agencies shall take into account, to the fullest extent practicable, the program adopted under the act.

The program directs agencies to consult with federal and state fish and wildlife agencies, appropriate Indian tribes, and the Council during the study, design, construction, and operation of any hydroelectric development in the basin. Appendix B of the program outlines conditions that should be provided for in any original or new license. The program also designates certain river reaches in the Pacific Northwest as protected from development.

This section typically includes a brief description of how the act applies to the project, how the proposal would or would not be consistent with the program, and any consultation with the Council.

Example of a discussion under this section:

1.3.6 Pacific Northwest Power Planning and Conservation Act

Under section 4 (h) of the Pacific Northwest Power Planning and Conservation Act, the Northwest Power and Conservation Council developed the Columbia River Basin Fish and Wildlife Program to protect, mitigate, and enhance the operation of the hydroelectric projects within the Columbia River Basin. Section 4(h) states that responsible federal and state agencies should provide equitable treatment for fish and wildlife resources, in addition to other purposes for which hydropower is developed, and that these agencies shall take into account, to the fullest extent practicable, the program adopted under the Pacific Northwest Power Planning and Conservation Act.

The program directs agencies to consult with federal and state fish and wildlife agencies, appropriate Indian tribes, and the Council during the study, design, construction, and operation of any hydroelectric development in the basin. At the time the application was filed, our regulations required the applicant to consult with the appropriate federal and state fish and wildlife agencies and tribes before filing, and after filing, to provide these groups with opportunities to review and comment on the application. Municipal has followed this consultation process, and the relevant federal and state fish and wildlife agencies and tribes have reviewed and commented on the application.

To mitigate harm to fish and wildlife resources, the Council has adopted specific provisions to be

considered in the licensing or relicensing of non-federal hydropower projects (Appendix B of the Program). The specific provisions that apply to the proposed project call for: (1) specific plans for fish facilities prior to construction; (2) assurance that the project will not degrade fish habitat or reduce numbers of fish; (3) assurance all fish protection measures are fully operational at the time the project begins operation; (4) timing construction activities, insofar as practical, to reduce adverse effects on wintering grounds; and (5) replacing vegetation if natural vegetation is disturbed.

Our recommendations in this EA (section 3.3.2 and 3.3.3) are consistent with the applicable provisions of the program, listed above, with one exception discussed below. Further, a condition of any license issued would reserve to the Commission the authority to require future alterations in project structures and operations to take into account, to the fullest extent practicable, the applicable provisions of the program.

The project would not be consistent with the provision requiring that all fish protection measures be fully operational at the time the project begins operation. Staff recommends that construction of fish screens be delayed 3 years until completion of ongoing studies to determine the optimal location for the facilities.

As part of the Program, the Council has designated over 40,000 miles of river in the Pacific Northwest region as not being suitable for hydroelectric development ("protected area"). The project is not located within a protected area.

1.3.7 Wild and Scenic Rivers Act

Section 7(a) of the Wild and Scenic Rivers Act bars the Commission from licensing the construction of any dam, water conduit, or other project works on or directly affecting any river that is designated a component of the national Wild and Scenic Rivers System. This prohibition also applies to river segments designated by Congress as study rivers while the segment is under study. This does not, however, preclude licensing of developments below or above a wild, scenic, or recreational river or any stream tributary thereto that would not invade or unreasonably diminish the scenic, recreational, and fish and wildlife values present when the river was designated a component of the Wild And Scenic Rivers System. Under section 7(a), the administering Secretary makes determinations regarding consistency of a project with the provisions of the act.

In this section, we include a description of any areas within or in the vicinity of the proposed project that are included in, or have been designated for study for inclusion in, the National Wild and Scenic Rivers System; our assessment of the effects of the proposed action on the designated river reach; and any determinations regarding consistency by the agency administering the reach.

Example of a Wild and Scenic Rivers Act section:

1.3.7 Wild and Scenic Rivers Act

Section 7(a) of the Wild and Scenic Rivers Act requires federal agencies to make a determination as to whether the operation of the project under a new license would invade the area or unreasonably diminish the scenic, recreational, and fish and wildlife values present in the designated river corridor. Public Law 95-111 (November 10, 1978) designated the Elk River as a Wild and Scenic River, which extends from Elk dam downstream for a distance of 12 miles. The Elk Wild and Scenic River is managed by the Forest Service to protect and enhance the free-flowing condition, water quality and outstanding remarkable values for which the river was designated while providing for public recreation and resource uses that do not adversely affect or degrade those values.

In May 2005, the Forest Service submitted to the Commission a preliminary section 7(a) determination that the proposed project effects, as described in the Commission's April 2005 draft EIS, not only do not rise to the level of unreasonable diminishment, but would protect and enhance the recognized values of the Elk Wild and Scenic River System. The Forest Service will make a final determination under section 7(a) coincident with the timing of submittal of the final 4(e) terms and conditions.

1.3.8 Magnuson-Stevens Fishery Conservation and Management Act

The consultation requirements of §305(b)(2) of the Magnuson-Stevens Act provide that federal agencies must consult with the Secretary of Commerce on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect essential fish habitat (EFH). In this section, document any EFH that may be affected by the project and briefly discuss each managed species and life stage for which EFH has been designated.⁸

For projects that have undergone EFH consultation, describe EFH that may be affected by the project and provide a summary of the consultation process. Then, provide a listing of any Conservation Recommendations provided by the National Marine Fisheries Service (NMFS) or the applicable fishery management council and state our conclusions with respect to adoption of these measures. If the project would not adversely affect EFH, explain why.

⁸ For an Exhibit E prepared under the ILP, a draft EFH assessment is required if the project may affect EFH [18 CFR, section 5.18(b)(3)(iii)]--see *Aquatic Resources* section (Appendix A).

Example of a Magnuson-Stevens Conservation and Management Act section (no consultation required):

1.3.8 Magnuson-Stevens Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires federal agencies to consult with NOAA Fisheries on all actions that may adversely affect Essential Fish Habitat (EFH). EFH has been designated for Atlantic salmon in the Penobscot River and its tributaries (NEFMC, 1998).

On December 15, 2004, PPL Maine filed an EFH assessment with the Commission that was prepared in consultation with NMFS, FWS, the Salmon Commission, and the Penobscot Tribe. The purpose of the EFH assessment was to evaluate the effects of the Settlement on EFH for Atlantic salmon. PPL Maine's assessment indicates that the relicensing of the Orono Project and the requested modifications to the West Enfield, Stillwater, Medway, Milford, and Veazie Projects are part of an overall Penobscot River restoration project that would ultimately result in significant net and cumulative improvements to areas designated as Atlantic salmon EFH, as well as improve access for Atlantic salmon to areas containing EFH not directly involved with these projects. We have incorporated PPL Maine's assessment into this EA as it pertains to the Orono Project, and conclude that licensing the project, as proposed by PPL Maine, in accordance with the Settlement, would not adversely affect EFH. As such, no consultation is required with NMFS.

Example of an Magnuson-Stevens Conservation and Management Act section (consultation required):

1.3.8 Magnuson-Stevens Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to consult with NMFS on all actions that may adversely affect Essential Fish Habitat (EFH). In the case of the Green River Project, EFH consultation is required for chinook salmon.

We concluded in the draft EIS that the proposed project would have only minor, short-term impacts on Chinook salmon habitat and on migrating adult and juvenile salmonids. We also concluded that the recommended measures would improve habitat conditions overall and would provide a net benefit to chinook salmon. On July 5, 2005, we provided NMFS with our EFH assessment and requested that NMFS provide any EFH recommendations along with its biological opinion (BO).

NMFS filed its EFH consultation with the Commission, along with its BO on December 12, 2005. NMFS found that the proposed relicensing would adversely affect EFH for Chinook salmon and recommended that the terms and conditions of section 9 of the BO be adopted as EFH consultation measures. We discuss these measures in section 3.3.2, *Aquatic Resources*, of the EIS and make recommendations consistent with the measures in section 5.2, *Comprehensive Development and Recommended Alternative*.

1.3.9 Other Regulatory Requirements

Include sections on other statutes as appropriate (e.g., Marine Mammal Protection Act, Wilderness Act, Alaska National Interests Lands Conservation Act, Alaska Native Claims Settlement Act, Clean Air Act).

1.4 PUBLIC REVIEW AND CONSULTATION

This section shows the process the Commission used to consult with agencies, tribes, and the public on the proposed action and in complying with statutory requirements.

Example of the standard language introducing the Public Review and Consultation section of the environmental document:

1.4 PUBLIC REVIEW AND CONSULTATION

The Commission's regulations (18 CFR, sections 5.1–5.16*) require that applicants consult with appropriate resource agencies, tribes, and other entities before filing an application for a license. This consultation is the first step in complying with the Fish and Wildlife Coordination Act, the Endangered Species Act, the National Historic Preservation Act, and other federal statutes. Pre-filing consultation must be complete and documented according to the Commission's regulations.

** For projects using the TLP or ALP, replace with section 4.38 for original licenses and section 16.8 for relicenses.*

1.4.1 Scoping

This section briefly describes the scoping process used to identify issues and alternatives to be addressed in the draft environmental document.

Example of a Scoping section:

1.4.1 Scoping

Before preparing this draft EA, we conducted scoping to determine what issues and alternatives should be addressed. A scoping document (SD1) was distributed to interested agencies and others on September 27, 2000. It was noticed in the Federal Register on October 3, 2000. Two scoping meetings, both advertised in the Chugwater Times, were held on October 27, 2000, in Chugwater, Wyoming, to request oral comments on the project. A court reporter recorded all comments and statements made at the scoping meetings, and these are part of the Commission's public record for the project. In addition to comments provided at the scoping meetings, the following entities provided written comments:

<u>Commenting Entities</u>	<u>Date Filed</u>
State Department of Parks and Recreation	November 18, 2000
State Department of Fish and Game	November 22, 2000
Municipal Hydro Company	November 23, 2000
American Whitewater	November 24, 2000
Cowboy Paddlers	November 25, 2000
U.S. Fish and Wildlife Service	November 29, 2000

A revised Scoping Document (SD2), addressing these comments, was issued on April 5, 2001.

1.4.2 Interventions

While this section would not need to be included in an Exhibit E prepared under the ILP or an APEA, applicants may want to include the framework for the section.

This section is prepared by Commission staff after a final application is filed and a notice seeking interventions is issued. Indicate those interventions that are in opposition to the project. Also, indicate which interventions are filed late and whether the Commission has acted on these filings.

Example of an Interventions section:

1.4.2 Interventions

On July 19, 2004, the Commission issued a notice that Municipal had filed an application to relicense the Angus Project. This notice set September 29, 2000, as the deadline for filing protests and motions to intervene. In response to the notice, the following entities filed motions to intervene:

<u>Intervenors</u>	<u>Date Filed</u>
Chugwater Department of Parks and Recreation	August 24, 1994
Wyoming Trout, Inc.	September 16, 1994
U.S. Department of the Interior	September 22, 1994
Chugwater Chamber of Commerce	September 26, 1994*
Forest Service	October 6, 1994 **

On January 4, 1995, the Environmental Protection Agency filed a petition for late intervention. No action has been taken on that petition.

* Intervention in opposition.

** Late intervention granted on December 1, 1994.

1.4.3 Comments on the License Application

For an Exhibit E prepared under the ILP, the applicant should list comment letters received on the preliminary licensing proposal. For an APEA prepared under the ALP, the applicant should list comment letters received in response to the notice requesting preliminary recommendations and terms and conditions. Applicants should address any comments received, as appropriate, in section 3, Environmental Analysis, and more specifically in an appendix.

Identify comments and recommendations filed as a result of the notice of ready for environmental analysis (ILP and TLP) or notice requesting final terms and conditions and recommendations (ALP). Applicants should include a similar section for comments received on the notice seeking preliminary recommendations on the draft application or licensing proposal and draft APEA. Include the date the applicant or others filed reply comments.

Example of Comments on the License Application section:

1.4.3 Comments on the License Application

A notice requesting conditions and recommendations was issued on September 1, 2005. The following entities commented:

<u>Commenting agencies and other entities</u>	<u>Date filed</u>
State Department of Environmental Protection	November 10, 2005
Department of the Interior	November 10, 2005
State Department of Inland Fisheries and Wildlife	November 10, 2005
Department of the Army, Corps of Engineers	November 11, 2005
State Executive Department, State Planning Office	November 11, 2005
American Rivers	November 12, 2005

The applicant filed reply comments on December 12, 2005.

1.4.4 Comments on the Draft EA or EIS (for Final EA/Final EIS)

This section would not be included in an Exhibit E prepared under the ILP. For an APEA prepared under the ALP, include a list of comments received on the draft APEA.

This section provides the dates the draft EA or EIS was issued, when comments were due, and description of any public meetings. A list of commenters,⁹ a summary of their comments, and staff responses are provided in an appendix in the final EA or EIS (see *Responding to Comments on Draft EA/EIS* section). If few comments are received, the comments and responses can be addressed in this section.

Example of Comments on the Draft EA section:

1.4.4 Comments of the Draft EA

On December 14, 2006, we issued a draft EA for the White Creek Project. Comments on the draft EA were due by January 28, 2007. Written comments on the draft EA were filed by the following entities:

<u>Commenting Entity</u>	<u>Date Filed</u>
United States Geological Survey	January 18, 2007
Utah Water Resources Forest Service	January 25, 2007
FWS	January 26, 2007
River Associates	January 26, 2007
	January 29, 2007

Appendix E summarizes the comments that were filed, includes our responses to those comments, and indicates where we made modifications to the draft EA.

Example of Comments on the Draft EIS section:

1.4.4 Comments on the Draft EIS

The Commission sent the draft EIS to the U.S. Environmental Protection Agency (EPA) and made the draft EIS available to the public on September 17, 2004. The Commission requested that any written comments on the draft EIS be filed by November 16, 2004. Appendix A lists the commenters, summarizes the comments that were filed, and includes our responses to those comments, and indicates where we made modifications to the draft EIS. In addition, the Commission accepted oral testimony on the draft EIS at two public meetings: one held on October 19, 2004, in Chester, California, and one held on October 20, 2004, in Chico, California. The transcripts and notes from these meetings were filed in the administrative record for the project. We modified the text of the EIS in response to oral and written comments received, as appropriate.

⁹ If the list is short, it can be included in this section of the environmental document.

2.0 PROPOSED ACTION AND ALTERNATIVES

For an Exhibit E prepared under the ILP or an APEA prepared under the ALP, the alternatives typically include the proposed project and the no-action alternative.

The purpose of this section is to explain: (1) the proposed project--the facilities and how they will operate, including any proposed environmental measures; (2) action alternatives to the proposal; and (3) the no-action alternative. In the following pages, we discuss each section separately and provide examples. Most staff environmental documents will have, at a minimum, three alternatives; the applicant's proposal, a staff alternative, and a no-action alternative. In rare cases, there may be no staff alternative. If the staff alternative excludes significant mandatory conditions, include a fourth alternative, "Staff Alternative with Mandatory Conditions," as described below.

In addition to the applicant's proposal, staff alternative, and the no-action alternative, alternatives could also include, depending on the circumstances, an agency alternative or a project retirement alternative.

Note: The format of this section will differ for relicenses compared to original licenses. In separate sections below, we provide two different versions of how this section is written.

RELICENSES¹⁰

2.1 NO-ACTION ALTERNATIVE

The no-action alternative is the baseline from which to compare the proposed action and all action alternatives that are assessed in the environmental document. Under the no-action alternative, for relicenses, the project would continue to operate under the terms and conditions of the current license. For unlicensed, operating projects, the no-action alternative would be continuation of current operation. Thus the no-action alternative would include the existing facilities and current project operation.

2.1.1 Existing Project Facilities

Describe the existing project facilities and their dimensions. Provide a short history of the project's development and operation. It's very important that readers understand how the project operates, and the connection between the project and the effects discussed later. Otherwise, it will be very difficult to understand project-related effects.

Describe the following existing features (specify dimensions and type of building materials, where appropriate):

- Dams and spillways (including flashboards, if applicable)
- Reservoirs (surface area and capacity at full pond elevation)
- Conduits
- Trashracks
- Powerhouses (generating capacity)
- Reservoirs (surface area and capacity at normal full pond elevation)
- Transmission lines (voltage, length, right-of-way width)
- Bypassed reach (length, width, estimated flow in bypassed reach)
- Access roads
- Project lands and facilities within the project boundary

Clearly mark all features described in this section on the accompanying figure(s) (see figure 2, *List of Figures*).

¹⁰ This section will also largely apply to unlicensed, operating projects.

Also provide a description of the project boundary, noting whether or not all of the project features are enclosed within the boundary. This can be a separate subsection.

Example of an Existing Project Facilities section for a relicense:

2.1.1 Existing Project Facilities

The proposed project would consist of a 100-foot-long, 30-foot-high concrete gravity overflow-type dam that impounds the 6-acre Blue Lake reservoir. A 40-foot-long, 25-foot-high intake structure along the right bank of the river, which is equipped with a 2.5-inch clear bar spaced trashrack, leads to a 6-foot-diameter, 60-foot-long gated penstock, which in turn leads to a powerhouse below the dam containing a single generating unit with an installed capacity of 1,000 kilowatts (kW). The penstock and powerhouse bypass about a 100-foot-long reach of the Blue River. All these facilities are existing.

The project boundary includes about 16 acres of land. The project boundary generally follows the 636-foot msl elevation contour line, steps up to elevation 642 feet msl in the upper reaches of the reservoir, and expands to include lands around the project dam, powerhouse, switchyard, and recreational facilities (East picnic shelter and West boat launch). Municipal owns the lands downstream of the reservoir and a buffer zone around Lake Hudson up to elevation 622 feet msl, approximately 3 feet above the normal pool, all of which are within the project boundary. In addition, Municipal owns the lands associated with the aforementioned facilities. Other lands within the boundary are primarily privately owned, and Municipal owns flowage easements on these lands up to the project boundary. No federal or tribal lands are within the project boundary.

2.1.2 Project Safety

Example of Project Safety section for relicenses:

2.1.2 Project Safety

The project has been operating for more than __ years under the existing license and during this time, Commission staff has conducted operational inspections focusing on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance. **Add the following sentence for projects that currently have Part 12(D) requirements:** [In addition, the project has been inspected and evaluated every 5 years by an independent consultant and a consultant’s safety report has been submitted for Commission review.] As part of the relicensing process, the Commission staff would evaluate the continued adequacy of the proposed project facilities under a new license. Special articles would be included in any license issued, as appropriate. Commission staff would continue to inspect the project during the new license term to assure continued adherence to Commission-approved plans and specifications, special license articles relating to construction (if any), operation and maintenance, and accepted engineering practices and procedures.

Example of Project Safety section for constructed operating unlicensed projects:

2.1.2 Project Safety

As part of the licensing process, the Commission would prepare a Safety and Design Assessment (SD&A) covering the adequacy of the project facilities. Special articles would be included in any license issued, as appropriate. Operational inspections would focus on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance. **Add the following sentence for a development that has a dam: (a) that is more than 32.8 feet in height above streambed; (b) that impounds an impoundment with a gross storage capacity of more than 2,000 acre-feet; or**

(c) that has a high hazard potential rating. [In addition, any license issued would require an inspection and evaluation every 5 years by an independent consultant and submittal of the consultant's safety report for Commission review.]

2.1.3 Existing Project Operation

Describe how the project currently operates (seasonally, monthly, daily, hourly, etc., as appropriate) and the project's existing mode of operation (peaking, run-of-river, storage). The reader should be able to visualize how water flows through the project from upstream to downstream. Use figures as appropriate (see figures 3 and 4). If existing operation differs from operating conditions in the current license, explain the differences (e.g., licensee may be voluntarily releasing greater minimum flows than required by a license condition).

Example of an Existing Project Operation section for a relicense (Source: Cooper Lake EA, FERC No. 2170, November 17, 2006):

2.1.3 Existing Project Operation

Cooper Lake hydroelectric operations are managed by Chugach to maximize their value in an integrated generation network. The project is operated as a peaking facility. It is controlled and monitored remotely from Chugach's dispatch center in Anchorage, although a project operator is on site 8 hours a day and can control operations directly. The project currently diverts all flow from Cooper Lake through the tunnel/penstock to the project powerhouse; there is no minimum flow requirement for Cooper Creek. The project has an average annual generation of about 48,500 MWh and an average outflow through the powerhouse of about 100 cubic feet per second (cfs) (73,000-acre-feet/year). Powerhouse discharge ranges from 0 to 380 cfs into Kenai Lake, which is the source of the Kenai River.

Chugach conservatively operates the project to prevent spill and overtopping the dam by generally limiting the maximum reservoir level to 1,194 feet mean sea level (msl). Although the licensed maximum reservoir level is 1,210 feet, it has not exceeded 1,200 feet since 1965. The minimum reservoir level is generally maintained above 1,170 feet. Typically Cooper Lake is drawn down from late fall until early spring, then rapidly refilled during the late spring and early summer snow melt, runoff that continues until early fall. Lowest reservoir levels occur in April to May and are the highest in August to October. On average, the reservoir fluctuates about 15 feet throughout the year. Daily fluctuations in water surface elevation do not exceed 1 inch over 24 hours due to power withdrawals, and typically do not vary more than one to two feet within a month. Project operation is not guided by a rule curve; rather by reservoir inflow, Chugach's customer demands, and project safety.

2.1.4 Existing Environmental Measures

In this section, describe the environmental measures the applicant currently implements, such as:

- Fish passage facilities and screens
- Minimum flows
- Waterfowl nesting platforms

- Revegetation planting
- Recreational facilities, etc.

Note whether these are license requirements (include the license article numbers) or voluntary measures. Provide further detail and locate any facilities on maps in the individual resource sections.

Example of a Existing Environmental Measures section for a relicense:

2.1.4 Existing Environmental Measures

The project includes a Denil fishway along the right bank of the river, which is operated during the months of July and August (article 401). Municipal releases a minimum flow of 100 cfs in the bypassed reach from May 1 through October 31, to protect fishery resources and riparian vegetation (article 402).

The project includes the following recreational facilities: (1) the Eastside campground; (2) two picnic areas at the north end of the project reservoir; (3) a bicycle trail around the project reservoir; and (4) a tailrace fishing area.

2.2 APPLICANT’S PROPOSAL

This section describes proposed changes to the project, including changes in project facilities and operation, new environmental measures, and any proposed modifications to the project boundary.

2.2.1 Proposed Project Facilities

Describe any new facilities proposed or facilities proposed to be removed from the project. Also discuss any proposed changes to the project boundary. Include appropriate project safety language after last item of project description.

Example of Proposed Project Facilities section:

2.2.1 Proposed Project Facilities

Municipal proposes to add a third turbine to its South powerhouse. The turbine would have a capacity of 12 MW, increasing the total capacity to 78 MW.

Municipal proposes to amend the project boundary to remove lands surrounding the reservoir above elevation 334 feet msl. As a result, the project boundary would be reduced to 200 feet above the mean high water elevation and would enclose 12 acres of federal lands administered by the Bureau of Land Management.

2.2.2 Proposed Project Operation

Describe how operation of the project would change under the applicant's proposal. Use figures as appropriate (see figures 3 and 4).

Example of a Proposed Project Operation section:

2.2.2 Proposed Project Operation

The project would continue to be operated in a run-of-river mode from May 1 through September 30. Green Power, however, proposes to modify project operations during the rest of the year for power purposes; reservoir fluctuations would increase from the current 5 feet below the normal elevation of 1,042 feet above msl to 10 feet during low-flow years.

2.2.3 Proposed Environmental Measures

Describe the environmental measures that the applicant proposes. Subheadings help to group measures by similar activities such as construction and operation or by similar resources such as fishery, recreation, and terrestrial resources, or soils.

If there is a settlement agreement, analyze it as the proposed action.

Example where an applicant proposes new construction:

2.2.3 Proposed Environmental Measures

Construction

To control sediment and erosion during construction and operation, Municipal proposes to implement an Erosion and Sedimentation Control Plan. The plan includes guidelines for cofferdams used to de-water the excavation and construction sites, controlling erosion and sediment runoff during site access and project construction, disposing of excavated materials, and placing topsoil, seed, and mulch on all disturbed areas when construction is complete.

Operation

Municipal proposes to:

- Operate the project by releasing a minimum flow of 222 cubic feet per second (cfs), or inflow, whichever is less
- Maintain impoundment level fluctuations within 1 foot of full pond during normal operation;
- Monitor dissolved oxygen (DO), water temperature, and siltation at the project site;
- Provide downstream fish passage facilities at Angus dam (under certain provisions, as discussed in *Aquatic Resources*, section 3.3.2)

Example of grouping environmental measures together by resource:

2.2.3 Proposed Environmental Measures

Wildlife

Municipal proposes to:

- Upgrade existing transmission lines to current raptor protection standards
- Install three osprey nest platforms
- Monitor noxious weed species

Recreation

To enhance recreation opportunities at the Angus Project, Municipal proposes to:

- Improve the canoe portage
- Install a barrier-free fishing pier at the tailrace fishing access
- Construct a fish cleaning station at the impoundment access site

2.2.4 Modifications to Applicant’s Proposal--Mandatory Conditions

This section includes a description of mandatory conditions provided under sections 18, 4(e), or 30(c) of the FPA and under section 401 of the Clean Water Act. Attach the conditions as an appendix, as appropriate. For large sections, subdivide into subsections (e.g., 2.2.4.1, 2.2.4.2).

Example of a Modifications to Applicant’s Proposal--Mandatory Conditions section:

2.2.4 Modifications to Applicant’s Proposal--Mandatory Conditions

The following mandatory conditions have been provided and are evaluated as part of the Applicant’s proposal.

Section 18 Prescriptions

The U.S. Fish and Wildlife Service (FWS) section 18 prescription specifies: (1) construction of an upstream Denil fish ladder; (2) construction of downstream fish passage facilities, with guidance screen and a bypass sluice; and (3) development of a fish passage monitoring plan.

Section 4(e) Land Management Conditions

The conditions provided by the Forest Service under section 4(e) are as follows: conditions 1 through 4 are standard conditions that would involve obtaining Forest Service approval on final project design and project changes, and yearly consultation with the Forest Service to ensure the protection and development of natural resources; condition 5 requires a specific minimum flow regime and passive fish screening with downstream passage; and condition 6 requires Municipal to construct recreation facilities at the upper end of the reservoir (see appendix A).

--example continued on next page--

Water Quality Certification Conditions

The conditions of the WQC (appendix B) specify the following:

- The licensee must monitor dissolved oxygen and water temperature at three stations in Copper Creek (upstream of the impoundment, at three depths in the impoundment--surface, bottom, mid-depth--and downstream of the tailrace)
- Monitoring must occur once each month during a non-rain condition for a 3-day period during June, July, August, and September, and samples are to be collected between 6 a.m. and 8 a.m.
- Equipment calibration and quality control measures must be instituted to assure accurate reporting
- Monitoring must be conducted under as close to limiting water quality conditions as possible [i.e., water temperatures of 20 degrees centigrade (°C) or greater and river flows below 50 cfs]
- Water quality monitoring and quality assurance/quality control procedures must be reported on an annual basis and a yearly summary report must be submitted to the DES-Division of Water Supply and Pollution Control
- All existing water uses will be maintained and protected and at no time shall the project cause Class B water quality standards to be violated

2.3 STAFF ALTERNATIVE

This section would not be included in Exhibit Es prepared under the ILP or APEAs prepared under the ALP.

The other action alternative analyzed throughout the environmental document, with rare exceptions, is a staff alternative. This may include modifications to the applicant's proposal, along with additional measures that staff recommends, such as mandatory conditions under sections 4(e) or 18 of the FPA, fish and wildlife recommendations under section 10(j), and recommendations under section 10(a).

Example of a Staff Alternative section

2.3 STAFF ALTERNATIVE

Under the staff alternative, the project would include Municipal 's proposals for the following: (1) controlling erosion and sedimentation; (2) operating the reservoir within 1 foot of full pool; (3) protecting aquatic resources upstream and downstream from the project; (4) avoiding or mitigating adverse effects on threatened, endangered, and sensitive species; (5) mitigating the visual impacts of new project facilities; and (6) managing project lands and waters for recreation. Our alternative would not include Municipal's proposal to construct additional camping areas along the reservoir shoreline.

The staff alternative would also include all the preliminary section 4(e) conditions specified by the Bureau of Land Management.

In addition, this alternative would include the following measures: (1) monitoring water temperature and dissolved oxygen downstream of the project tailrace for a minimum of 3 consecutive years after license issuance; and

(2) monitoring bank erosion and channel instability upstream of the reservoir. Proposed and recommended measures are discussed under the appropriate resource sections and summarized in section 4 of the EA.

2.4 STAFF ALTERNATIVE WITH MANDATORY CONDITIONS

This section would not be included in an Exhibit E prepared under the ILP or an APEA prepared under the ALP.

The Staff Alternative may exclude some significant mandatory conditions based on our comprehensive analysis. Since the Commission must include all valid mandatory conditions in any license issued, we evaluate an alternative--Staff Alternative with Mandatory Conditions--that includes these excluded conditions, as well as any modifications that may be needed to staff-recommended measures.

Example of Staff Alternative with Mandatory Conditions alternative for relicenses:

2.4 STAFF ALTERNATIVE WITH MANDATORY CONDITIONS

We recognize that the Commission is required to include valid section 4(e) conditions in any license issued for the project. The Staff Alternative with Mandatory Conditions includes staff-recommended measures along with the mandatory conditions that we did not include in the Staff Alternative: (1) release of a minimum flow of 300 cfs from the Black Creek diversion; and (2) construction of a camp site at the north end of the reservoir.

Incorporation of these mandatory conditions into a new license would cause us to modify or eliminate some of the environmental measures that we include in the Staff Alternative. Our recommendation for habitat improvements in Black Creek would no longer be necessary given the Forest Service minimum flow conditions..

2.5 OTHER ALTERNATIVES

Typically, resource agency recommendations (e.g., minimum flow releases, wetland mitigation) are not analyzed as a discrete NEPA alternative, so you need to ensure that all effects of their recommendations are disclosed in all appropriate resource sections. On occasion, however, to improve clarity of the document we may look at an operational alternative (e.g., run-of-river operation) or alternative location of a project facility as a distinct alternative throughout the document.

In rare situations, we may evaluate agency recommendations as a distinct alternative, but only if they comprise a complete package of measures addressing all affected resource areas. Providing a summary of these alternatives gives the reader some idea of the alternatives analyzed in the environmental document. To the extent possible, involved resource agencies should coordinate with each other on their recommendations and endeavor to minimize or eliminate inconsistencies among them to facilitate analysis. In limited cases, the agencies will submit to FERC a consistent set of recommendations, with

a request that they be analyzed as an alternative. If you determine that the set of recommendations are a complete, distinct alternative, analyze the recommendations as one of the action alternatives. Similarly, if a single agency requests that we evaluate their recommendations as a distinct alternative, include them in the NEPA document as part of a complete NEPA alternative if you determine that they provide the basis for a reasonable alternative.

Example of an additional alternative analyzed throughout the document:

2.5 RELICENSING THE PROJECTS WITH A REDUCED LEVEL OF ENVIRONMENTAL MEASURES

This alternative was recommended by the commenters at the public meeting conducted in Chugwater, Wyoming, on April 1, 2000. This option would include the modified operating regimes for the projects as proposed in the applicant's proposal, but would exclude most of the other environmental measures described in the applicant's proposal. Our analysis of this alternative is found in section 3.

Another example of an additional alternative analyzed throughout the document:

2.5 FISH PASSAGE ALTERNATIVE

Based on discussions with the FWS and NMFS during pre-filing consultation, Municipal analyzed the effects of a fish passage alternative on the project's environmental and economic resources.

The Fish Passage Alternative, which was discussed during pre-filing meetings as a potential alternative, includes the measures listed in Municipal's proposal (see sections 2.2.1 and 2.2.3) plus downstream fish passage facilities for resident fish at the project as follows:

- At the Angus No.1 Development, replace all existing trash racks with 1-inch racks; provide an attraction flow equal to 2 percent of turbine capacity (130 cfs) through the existing minimum flow gate for fish passage; provide a conveyance flow of at least 20 cfs through an open-channel chute; and create a plunge pool at the bottom of the chute appropriately sized to cushion the impact of downstream conveyance
- At the Angus No.2 Development, replace the existing trashracks with 1-inch racks; provide an attraction flow of 150 cfs (2 percent of turbine capacity) and a conveyance flow of 20 cfs through an open-channel chute on the spillway; and create a 20-foot-deep plunge pool

FWS recommends that the Angus No.1 impoundment be limited to a maximum of 1-foot drawdown year-round. These recommendations are discussed in the respective resource areas.

2.6 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

Before you begin your analysis of the resource issues, look at a wide range of alternatives to the proposal. It is possible that circumstances of a particular project make license denial and/or project retirement a reasonable alternative for purposes of NEPA, and, if so, include this analysis of license denial. Otherwise, briefly explain why license denial is being eliminated from further consideration.

Often, you'll look at these alternatives but decide not to give them detailed analysis for economic, environmental, or engineering reasons. In this section, document these alternatives, such as issuing a non-power license [section 15(f) of the FPA],¹¹ federal takeover (section 14 of the FPA),¹² or project retirement, to show the range of alternatives you considered in reviewing the project and why you don't think these alternatives warrant further analysis.

Example of a Alternative Considered but Eliminated from Further Analysis section (for relicenses):

2.6 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

We considered several alternatives to the applicant's proposal, but eliminated them from further analysis because they are not reasonable in the circumstances of this case. They are (list alternatives considered): (1) issuing a non-power license; and (2) Federal Government takeover of the project.

Example of language used for the non-power license alternative (for relicenses):

2.6.1 Issuing a Non-power License

A non-power license is a temporary license that the Commission will terminate when it determines that another governmental agency will assume regulatory authority and supervision over the lands and facilities covered by the non-power license. At this point, no agency has suggested a willingness or ability to do so. No party has sought a non-power license and we have no basis for concluding that the project should no longer be used to produce power. Thus, we do not consider issuing a non-power license a realistic alternative to relicensing in this circumstance.

¹¹ Issuing a non-power license is not applicable where section 15 of the FPA has been waived.

¹² Federal takeover is not applicable where section 14 of the FPA has been waived or the applicant is a state or municipal entity.

Example of language used to address federal takeover and operation of the project as an alternative (for relicenses):

2.6.2 Federal Government Takeover of the Project

We don't consider federal takeover to be a reasonable alternative. Federal takeover and operation of the project would require Congressional approval. While that fact alone wouldn't preclude further consideration of this alternative, there is no evidence to indicate that federal takeover should be recommended to Congress. No party has suggested federal takeover would be appropriate, and no federal agency has expressed an interest in operating the project.

The consideration of whether to include a detailed analysis of a project retirement alternative in a NEPA document should begin early in the process during the scoping stage. In addressing this issue, you should consider, where applicable, and where information is available, the beneficial or adverse effects of the project on a variety of resources or interests, including but not limited to: (1) listed threatened or endangered species; (2) economic viability of the project, including costs of resource protection measures; (3) whether the river is targeted for fish recovery; (4) feasibility of fish passage; (5) consistency with comprehensive plan(s); (6) protected river status (e.g., scenic river, wilderness area); (7) effectiveness of past mitigation measures and availability of future measures; (8) support by applicant or other party for project retirement; (9) Tribal lands, resources, or interests; (10) water quality issues, including presence of toxic sediments; (11) potential opportunities for recreation; (12) physical condition of project; (13) presence of existing project-dependent development (e.g., houses abutting reservoir); (14) other non-power project-related benefits (e.g., municipal water supply, flood control, irrigation); (15) project-dependent resource values (e.g., recreation, wetlands, wildlife, habitat); (16) need for power and ancillary services; and (17) historic properties. In comments on Scoping Document 1, or as early in the process as possible, resource agencies should provide information relating to these factors in their areas of expertise.

Example of language used to dismiss project retirement as an alternative (for relicenses):

2.6.3 Retiring the Project

Project retirement could be accomplished with or without dam removal. Either alternative would involve denial of the relicense application and surrender or termination of the existing license with appropriate conditions. No participant has suggested that dam removal would be appropriate in this case, and we have no basis for recommending it. [Explain why dam removal is considered unreasonable. For example, the reservoir may serve other important purposes, such as recreation, irrigation, municipal water supply, or flood control, regardless of whether power is produced.] Thus, dam removal is not a reasonable alternative to relicensing the project with appropriate protection, mitigation and enhancement measures.

The second project retirement alternative would involve retaining the dam and disabling or removing equipment used to generate power. Project works would remain in place and could be used for historic or other purposes. This would require us to identify another government agency with authority to assume regulatory control and supervision of the remaining facilities. No agency has stepped forward, and no participant has advocated this alternative. Nor have we any basis for recommending it. Because the power supplied by the project is needed, a source of replacement power would have to be identified. In these circumstances, we don't consider removal of the electric generating equipment to be a reasonable alternative.

ORIGINAL LICENSES

2.1 NO-ACTION ALTERNATIVE

For original licenses, the no-action alternative would be denial of the license.

Example of No-action Alternative section for an original license:

2.1 NO-ACTION ALTERNATIVE

The no-action alternative is license denial. Under the no-action alternative, the project would not be built and environmental resources in the project area would not be affected.

2.2 APPLICANT'S PROPOSAL

2.2.1 Project Facilities

Describe the proposed project facilities and their dimensions. It's very important that readers understand how the project would operate, and the connection between the project and the impacts discussed later. Otherwise, it will be very difficult to understand project-related impacts.

Describe the following features (specify dimensions and type of building materials, where appropriate), indicating which facilities are existing and which ones are proposed:

- Dams and spillways (including flashboards, if applicable)
- Reservoirs (surface area and capacity at full pond elevation)
- Conduits
- Trashracks
- Powerhouses (generating capacity)
- Reservoirs (surface area and capacity at normal full pond elevation)
- Transmission lines (voltage, length, right-of-way width)
- Bypassed reach (length, width, estimated flow in bypassed reach)

- Access roads
- Project lands and facilities within the project boundary

Clearly mark all features described in this section on the accompanying figure(s) (see figure 2, *List of Figures*).

Also provide a description of the proposed project boundary, noting whether or not all of the project features are enclosed within the boundary. This can be a separate subsection.

Example of a Project Facilities section for original license:

2.2.1 Project Facilities

The proposed project would consist of an existing 100-foot-long, 30-foot-high concrete gravity overflow-type dam that impounds the 6-acre Blue Lake reservoir. A new 40-foot-long, 25-foot-high intake structure would be constructed along the right bank of the river, and would be equipped with a 2.5-inch clear bar spaced trashrack, leading to a new 6-foot-diameter, 60-foot-long gated penstock, which in turn would lead to a new powerhouse below the dam containing a single generating unit with an installed capacity of 1,000 kilowatts (kW). A 2.2-mile-long, 69-kilovolt transmission line would be constructed. The penstock and powerhouse would bypass about a 100-foot-long reach of the Blue River.

The proposed project boundary encloses the project dam, powerhouse, intake structure, transmission line, and the project impoundment to a point about 0.5 mile upstream of the project dam. The impoundment is bordered upstream by the influence of the project dam (water surface elevation 501.4 feet msl), downstream by the lower apron of the project dam, and between these two points by the cut bank of the shoreline.

2.2.2 Project Safety

Example of Project Safety section for original, unconstructed licenses (including those utilizing existing privately or federally owned dams):

2.2.2 Project Safety

As part of the licensing process, the Commission would review the adequacy of the proposed project facilities. Special articles would be included in any license issued, as appropriate. Commission staff would inspect the licensed project both during and after construction. Inspection during construction would concentrate on adherence to Commission-approved plans and specifications, special license articles relating to construction, and accepted engineering practices and procedures. Operational inspections would focus on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance. **Add the following sentence for a development that has or will have a dam: (a) that is more than 32.8 feet in height above streambed; (b) that impounds an impoundment with a gross storage capacity of more than 2,000 acre-feet; or (c) that has a high hazard potential rating.**[In addition, any license issued would require an inspection and evaluation every 5 years by an independent consultant and submittal of the consultant’s safety report for Commission review.]

2.2.3 Project Operation

Describe how the project would operate (seasonally, monthly, daily, hourly, etc., as appropriate) and proposed mode of operation (peaking, run-of-river, storage). The reader should be able to visualize how water would flow through the project from upstream to downstream. Use figures as appropriate (see figures 3 and 4).

Example of Project Operation section for an original license:

2.2.3 Project Operation

The proposed project would operate run-of-river, and at all times provide water over the crest of the dam. The project would use up to 80 cfs (the maximum turbine capacity) of flows from the San Marcos River. The project has no bypassed reach, and the dam has no gates or water control features; therefore, the hydropower project is not expected to modify existing water surface elevations in the impoundment.

2.2.4 Environmental Measures

Describe the environmental measures that are proposed by the applicant. Subheadings help to group measures by similar activities such as construction and operation or by similar resources such as fishery, recreation, and terrestrial resources, or soils.

If there is a settlement agreement, analyze it as the proposed action.

Example of Environmental Measures section for original license:

2.2.4 Proposed Environmental Measures

Hydraco proposes to: (1) operate run-of-river, and at all times provide water over the crest of the dam; (2) repair an existing trash rack; (3) install and maintain a staff gage at the dam; (4) shut down generation at the project and pass all flows over the dam when flows in the San Marcos River, as measured at the San Marcos stream flow gage, are 100 cfs or less; (5) provide an annual report of weekly flows at the project; and (6) to improve project safety, provide signage to an existing boat portage around the project dam.

2.2.5 Modifications to Applicant's Proposal—Mandatory Conditions

This section includes a description of mandatory conditions provided under sections 18, 4(e), or 30(c) of the FPA and under section 401 of the Clean Water Act. Attach the conditions as an appendix, as appropriate. For large sections, subdivide into subsections (e.g., 2.2.5.1, 2.2.5.2, etc.). For an example, see section 2.2.4 for relicenses above.

2.3 STAFF ALTERNATIVE

This section would not be included in an Exhibit E prepared under the ILP or an APEA prepared under the ALP.

The other action alternative analyzed throughout the environmental document, with rare exceptions, is a staff alternative. This may include modifications to the applicant's proposal, along with additional measures that staff recommends, such as mandatory conditions under sections 4(e) or 18 of the FPA, fish and wildlife recommendations under section 10(j), and recommendations under section 10(a). For an example, see section 2.3 for relicenses above.

2.4 STAFF ALTERNATIVE WITH MANDATORY CONDITIONS

This section would not be included in an Exhibit E prepared under the ILP or an APEA prepared under the ALP.

The Staff Alternative may exclude some significant mandatory conditions based on our comprehensive analysis. Since the Commission must include all valid mandatory conditions in any license issued, we evaluate an alternative--Staff Alternative with Mandatory Conditions--that includes these excluded conditions as well as any modifications that may be needed to staff-recommended measures. For an example, see section 2.4 for relicenses above.

2.5 OTHER ALTERNATIVES

Typically, resource agency recommendations (e.g., minimum flow releases, wetland mitigation) are not analyzed as a discrete NEPA alternative, so you need to ensure that all effects of their recommendations are disclosed in all appropriate resource sections. On occasion, however, to improve clarity of the document we may look at an operational alternative (e.g., run-of-river operation) or alternative location of a project facility as a distinct alternative throughout the document.

In rare situations, we may evaluate agency recommendations as a distinct alternative, but only if they comprise a complete package of measures addressing all affected resource areas. Providing a summary of these alternatives gives the reader some idea of the alternatives analyzed in the environmental document. To the extent possible, involved resource agencies should coordinate with each other on their recommendations and endeavor to minimize or eliminate inconsistencies among them to facilitate analysis. In

limited cases, the agencies will submit to FERC a consistent set of recommendations, with a request that they be analyzed as an alternative. If you determine that the set of recommendations are a complete, distinct alternative, analyze the recommendations as one of the action alternatives. Similarly, if a single agency requests that we evaluate their recommendations as a distinct alternative, include them in the NEPA document as part of a complete NEPA alternative if you determine that they provide the basis for a reasonable alternative. For an example, see section 2.5 for relicenses above.

2.6 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

Before you begin your analysis of the resource issues, look at a wide range of alternatives to the proposal. Often, you'll look at these alternatives but decide not to give them detailed study for economic, environmental, or engineering reasons. In this section, document these alternatives to show the range of alternatives you considered in reviewing the project and why you don't think these alternatives warrant further analysis.

Examples of Alternatives Considered but Eliminated from Further Consideration sections (Source: Falls Creek Hydroelectric Project and Land Exchange FEIS, FERC No. 11659, June 2004):

2.6.1 Minimum Corridor Alternative

We considered an alternative that would include 42 acres of private land and transfer the absolute minimum amount of land (75 acres) to the state of Alaska in the form of a narrow corridor along the road, penstock and transmission line right-of-way, and small parcels of land around the powerhouse and diversion sites and in areas of materials extraction for construction. However, we eliminated this alternative because the narrow corridor would fail to provide an adequate buffer between project lands and GBNPP lands. This alternative would not be consistent with sound land management practices because the presence of project roads, traversing wilderness areas but not subject to park management and control and without any buffer lands surrounding them would create a high risk for unauthorized incursions into park land by hunters, recreationists, and others using motorized vehicles.

2.6.2 Components of Project Alternatives Considered and Dismissed

We considered a number of alternative project components that were ultimately judged not to be reasonable under the circumstances of this project. After this determination, we eliminated the components from detailed study.

Powerhouse Location

One alternative configuration was to locate the powerhouse on the beach between the George and Mills allotments. Although this location would be the most economical in terms of construction costs and would provide the most generation, it was eliminated because of substantial environmental effects. This would divert flow to an adjacent basin and alter streamflow throughout the reach of the Kahtaheena River that supports anadromous fish. Further, the tailrace might attract spawning salmon away from the Kahtaheena River and the location of the access road along the beach would affect shoreline habitat and aesthetics. Another alternative was to place the powerhouse in a shaft excavated from the ridge just west of the Lower Falls, but high costs made it uneconomical. Placement of the powerhouse in its proposed location, but without a tailrace pipeline discharging further upstream, was rejected due to the effects on streamflow in areas used by salmon.

3.0 ENVIRONMENTAL ANALYSIS

The analysis of issues and alternatives is the substance of the environmental document. The environmental analysis section is divided into general setting; the scope of environmental analysis, including the resources that are cumulatively affected; an analysis of the proposed action and other recommended environmental measures; other action alternatives, as appropriate; and the no-action alternative.

Below, we break down each part of the environmental analysis section, describe its purpose, and provide examples.

Example of introductory paragraph of the Environmental Analysis section:

In this section, we present: (1) a general description of the project vicinity; (2) an explanation of the scope of our cumulative effects analysis; and (3) our analysis of the proposed action and other recommended environmental measures. Sections are organized by resource area (aquatic, recreation, etc.). Under each resource area, historic and current conditions are first described. The existing condition is the baseline against which the environmental effects of the proposed action and alternatives are compared, including an assessment of the effects of proposed mitigation, protection, and enhancement measures, and any potential cumulative effects of the proposed action and alternatives. Staff conclusions and recommended measures are discussed in section 5.2, *Comprehensive Development and Recommended Alternative* of the EA [or EIS].¹

¹Unless noted otherwise, the sources of our information are the license application (Union Electric, 2004a) and additional information filed by Union Electric (2004b, and 2005).

3.1 GENERAL SETTING

In this section, briefly describe the general setting in which the project is located, or will be located.

- Describe the river system, including relevant tributaries
- Give measurements of the area of the basin and length of stream
- Identify the project's river mile designation or other reference point
- Describe the topography and climate
- Discuss major land uses and economic activities

Example of a General Setting section:**3.1 GENERAL SETTING**

The Copper River is formed by the confluence of the Suger and Swet Rivers near Foster, Wyoming. The river flows generally southeast for 30 miles into the Gulf of Mexico. The topography of the basin is characterized by mountainous areas in the western part, gradually changing to low, rounded hills, and level areas of unconsolidated soils in the eastern section. The total drainage area of the basin is about 10,060 miles. Water from the river is used by most of the cities, towns, and industries along the river for industrial uses (73 percent), public water supply (17 percent), and agricultural uses (10 percent). Annual precipitation for the basin is about 40 inches and average temperature is about 57 degrees Fahrenheit.

Drainage to the project's impoundment comes from the mountainous areas in the western part of the basin. The terrain of the project area is hilly with common changes in elevation from 200 to 600 feet. Immediately next to the project impoundment, rock formations are exposed, forming valley walls up to 200 feet high with very steep slopes.

At the project, located at river mile 11, the river drains about 3,257 square miles of land, representing about one-third of the total drainage area of the basin. The primary use of the project waters is for city water supply. The area upstream of the project is rural, with small farms. The city is located on the south side of the river downstream of the project. Within the city limits, there is a spillway dam called the city dam, located 3.75 miles downstream of the project. The headpool of the city dam backs up to the tailrace of the Angus Project; there is no hydroelectric facility at the city dam.

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

In this section, identify resources that will get a cumulative effects analysis based on the scoping meetings, site visit, and comments on the scoping documents; the license application; public interest in a particular resource; and consultation with the agencies and nongovernmental organizations (NGOs). With that information, determine the appropriate geographic and temporal scope of analysis for those resources. Below, we discuss: (1) how to determine which resources need a cumulative effects analysis; (2) the geographic scope of the cumulative analysis; and (3) the temporal scope of analysis.

(1) Selecting Resources for Cumulative Analysis:

CEQ defines cumulative effects as effects on the environment that result from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes the actions. [See generally, 40 CFR 1508.8.] Cumulative effects can result from individually minor, but collectively significant actions, taking place over a period of time.

Hydropower projects can contribute to cumulative effects when their effects overlap with those of other activities in space, or time, or both. Effects can be either direct or indirect. Direct effects are those that occur in the same place and at the same time and are a direct result of the proposed action. For example, water quality downstream of a project might be affected by reduced spillage at the dam in concert with irrigation

withdrawals. Indirect effects can occur at a distance from the proposed action, or the effects may appear some time after the proposed action occurs. For example, an upstream timber harvest area and upstream water sewage treatment plant may affect water quality, in addition to the effects on water quality from the proposed action.

Most cumulative effects analysis will identify varying levels of beneficial and adverse effects depending on the resource and the individual action.

Additional guidance on defining cumulative analysis resources can be found in *Considering Cumulative Effects under the National Environmental Policy Act* (Council on Environmental Quality, 1997).¹³

Example of a Cumulative Effects Analysis section with a resource selected:

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

According to the Council on Environmental Quality's regulations for implementing NEPA (40 CFR, section 1508.7), cumulative effect is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities.

Based on our review of the license application and agency and public comments, we have identified anadromous fish species and recreational boating as having potential to be cumulatively affected by the project in combination with other past, present, and future activities. Anadromous fish species were selected because irrigation, domestic water treatment, and hydroelectric developments and diversions along the waterway have affected the fishery and habitat by altering the flow regime, blocking or delaying fish movement, and entraining fish into diversion canals or penstocks. Recreational boating was selected because a series of dams in the vicinity have diminished canoeing and kayaking opportunities as a result of inundation of whitewater and reduced flows downstream of dams.

Example of a Cumulative Effects Analysis section with no resources selected:

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

According to the Council on Environmental Quality's regulations for implementing NEPA (40 CFR, section 1508.7), cumulative effect is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities. Through scoping, agency consultation, and our independent analysis we've identified no resources that would be cumulatively affected by continuing to operate the Angus Project. The project is located in a very small watershed with very little existing or planned future developmental activity other than the existing hydro project.

¹³ This document is available on the web at <http://ceq.eh.doe.gov/nepa/ccenepa/ccenepa.htm>.

(2) Geographic Scope of Cumulative Analysis

As the CEQ says, without spatial boundaries (geographic), a cumulative effects assessment would be global, and while this may be appropriate for some issues such as global warming, it's not appropriate for most other issues. The scoping process, consultation, site visits, and the license application will help you identify resources that are cumulatively affected. Here, briefly describe how those resources are cumulatively affected and explain your choice of the geographic scope of analysis. It's important to remember that not every resource will necessarily have the same geographic scope.

To determine spatial boundaries, consider the distance the effect can travel in the context of resource effects from other hydro and non-hydro activities that might affect a wide area. Specifically, determine the area(s) that will be affected by the proposed action (impact zone), list the cumulative effects resources within that area that could be affected by the proposed action, and determine the geographic area outside of the impact zone that is occupied by those resources. Finally, consider the management plans and jurisdictions of other agencies for the cumulatively affected resource.

For hydropower projects, the geographic scope may be the river basin or mainstem river for some resources such as anadromous fish, or the stream reach and surrounding lands for an endangered plant. Describe the geographic scope for each cumulatively affected resource.

When defining your geographic scope, discuss the location of other hydropower projects and other major developmental activities within the area (such as water withdrawals for irrigation or public water supply; a steam plant that discharges into the impoundment; a water sewage treatment plant located upstream of the project; or a paper mill located on the river that affects water quality). Include a schematic diagram of these developments and/or list them in a table. Briefly describe how your project interacts, affects, or is affected by, these other hydro and water resource developments. The length of discussion should reflect the significance of the interaction. Include details of the effects of these interactions in the *Environmental Effects* section.

Example of a Geographic Scope section:

3.2.1 Geographic Scope

The geographic scope of the analysis defines the physical limits or boundaries of the proposed action's effects on the resources. Because the proposed action would affect the resources differently, the geographic scope for each resource may vary.

There are about 44 other dams used for hydroelectric generation in the Copper River Basin. About half of these dams are located on the lower 80-mile-long part of the basin while the other half are located in the upper 70-mile-long part of the basin. An 80-mile-long segment of the river separates these two groupings of dams.

These dams have cumulatively affected the fishery (anadromous fish species) and recreation (canoeing and kayaking) on the Copper River. In the *Aquatic Resources* (section 3.3.2) and *Recreation and Land Use* (section 3.3.5) sections of this draft EA, we discuss the site-specific as well as the cumulative effects of relicensing the Angus Project on anadromous fish and recreational boating.

Since a series of dams in the lower reach of the Copper River block the access of several anadromous fish species, we limit our look at the cumulative fishery effects of the Angus Project to potential measures that would help restore fish populations in the basin.

To look at the cumulative impacts on recreational boating, we limit our analysis to the upper river--the 20-mile-long reach between Copper Falls and Copper City--where there are eight existing dams.

(3) Temporal Scope of Analysis

The temporal scope includes a brief discussion of past, present, and future actions, and their effects on resources based on the new license term (30-50 years).

Example of a Temporal Scope section:

3.2.2 Temporal Scope

The temporal scope of analysis includes a discussion of the past, present, and reasonably foreseeable future actions and their effects on water, fishery, and recreational resources. Based on the term of the proposed license, we will look 30 to 50 years into the future, concentrating on the effects on anadromous fish and recreational boating from reasonably foreseeable future actions. The historical discussion is limited, by necessity, to the amount of available information. We identified the present resource conditions based on the license application, agency comments, and comprehensive plans.

3.3 PROPOSED ACTION AND ACTION ALTERNATIVES

This is the section of the environmental document that explains the effects of the action alternatives on a variety of environmental resources. It begins with a brief description of how the section is organized, and includes a brief discussion of resources that wouldn't be affected by the proposed action, and, therefore, won't get a detailed analysis. Explain why those resources did not get the more detailed analysis.

Example of the Proposed Action and Action Alternatives introductory paragraph:

In this section, we discuss the effects of the project alternatives on environmental resources. For each resource, we first describe the affected environment, which is the existing condition and baseline against which we measure effects. We then discuss and analyze the specific cumulative and site-specific environmental issues.

Only the resources that would be affected, or about which comments have been received, are addressed in detail in this EA. Based on this, we have determined that water quality and quantity, aquatic, terrestrial, threatened and endangered species, recreation, cultural, and aesthetic resources may be affected by the proposed action and action alternatives. We have not identified any substantive issues related to geology and socioeconomics associated with the proposed action, and therefore, these resources are not assessed in the EA. Land use is addressed in the recreation and terrestrial sections. We present our recommendations in section 5.2, *Comprehensive Development and Recommended Alternative* section.

For all resources that will be addressed, describe, by resource:

- The affected environment
- Your analysis of the proposed action and any other recommended alternatives or measures (“*Our Analysis*”)

The amount of detail included in each section should be commensurate with the complexity of the action, importance of the resources, and potential for environmental effects. Specific guidance on preparing this section is found in Attachment A, *Specific Guidance for Resource Discussions*.

This section should only include an analysis of the effects of the action alternatives on environmental resources. Any staff-recommended alternatives or measures based on that analysis only appear only in section 5.2, *Comprehensive Development and Recommended Alternative*.

Affected Environment

40 CFR, Section 1502.15--Affected environment.

The environmental impact statement shall succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration. The descriptions shall be no longer than is necessary to understand the effects of the alternatives. Data and analyses in a statement shall be commensurate with the importance of the impact, with less important material summarized, consolidated, or simply referenced. Agencies shall avoid useless bulk in statements and shall concentrate effort and attention on important issues. Verbose descriptions of the affected environment are themselves no measure of the adequacy of an environmental impact statement.

The affected environment is the existing condition and the baseline against which to measure the effects of the proposed project and any alternative actions. For cumulatively affected resources, the affected environment is divided into two parts: a discussion of past actions and activities within the geographic scope of analysis, and the resource as it is today. First, discuss the effects of past activities/actions on the cumulatively affected

resource; the amount of available information will limit the length of this discussion (this doesn't require a detailed account of everything that has happened). Quantify the effects on a resource when information is available. Then discuss the existing environment--what currently exists and what's affected by the project and non-hydro activities. Finally, include information on the resource's status and expected future condition, based on trends and anticipated developmental activities in the basin.¹⁴

Some general tips for writing the affected environment section:

- **Provide only the background in the affected environment necessary to support the effects analysis that follows**
- Quantify information contained in descriptions, based on available information
- Indicate the biological, cultural, and social importance and uniqueness of the resources and, if appropriate, its economic importance to the region (e.g., regionally significant fishery resources, last remaining patch of old-growth)
- Cite supporting literature and letters
- Depict conditions and effects under the no-action alternative
- Ongoing project and non-project effects should be briefly discussed in the affected environment section to the extent they influence the current status, condition, or trends of a resource—however, if discussion of ongoing project effects is germane to the analysis of environmental effects (e.g., existing entrainment mortality), then the discussion should be included in the *Environmental Effects* section instead

Example of Affected Environment section with no cumulatively affected resources:

3.3.3 Terrestrial Resources

Affected Environment

The project is located in the foothills of the Wild River Range, just above Copper Valley. The landscape is characterized by high relief, with extremely steep side slopes, and a narrow valley. Photographs of the project area show a vegetative community dominated by mixed coniferous forest on the slopes above Copper Creek, interspersed with open areas in talus and grasses. Riparian areas are confined to narrow bands of vegetation along the reservoir and the banks of Copper Creek. A variety of wildlife species occupy the project area including elk, fox, mule deer, and mountain lion. However, the project does not include any crucial big game or bird habitats.

¹⁴ For Exhibit Es prepared for ILP projects, the applicant must provide “a detailed description of the affected environment or area(s) to be affected by the proposed project by each resource area. This description must include the information on the affected environment filed in the Pre-Application Document provided for in section 5.6, developed under the applicant's approved study plan, and otherwise developed or obtained by the applicant. This section must include a general description of socio-economic conditions in the vicinity of the project including general land use patterns (e.g., urban, agricultural, forested), population patterns, and sources of employment in the project vicinity” [section 5.18 (b)(5)(A)].

Example of an affected environment section with cumulative effects resource:

Riverine, Riffle, and Shoal Habitat

Affected Environment

Before the Angus Project was built, the Cooper River Basin included about 60 miles of riverine habitat that was characteristic of the southern Wild River Mountains and the Copper physiographic province. That is, riverine habitat that has high to moderate gradients, fast currents, high velocities, bedrock-boulder-cobble-gravel substrates, cool to warm water, and seasonal hydrologies with peak flows in the spring and low flows in the late summer.

Another characteristic of riverine habitat in this basin is the presence of riffle and shoal areas. These are relatively shallow and fast flowing areas that have surface turbulence often over a gravelly substrate. Some of the reasons riffle and shoal habitat are valuable to the continuation of a complete and healthy river ecosystem are that they provide spawning and rearing sites for fish and aquatic invertebrates, and water is aerated by the turbulence found in riffles preventing stagnation.

Riverine habitat supports aquatic organisms, in particular fish that are adapted to living and surviving in a flowing water environment. Many of the species that occupy the riverine environment in the project area, particularly Copper Gorge, are not game fish. Nevertheless, they are important because they help maintain a complete, healthy, and viable riverine ecosystem.

Since project construction in 1930, about 40 miles of riverine habitat in the Cooper River Basin has been replaced with still-water, lake habitat. Likewise, species specifically adapted to the river environment, such as some darters, stonerollers, and madtoms, have been displaced by lake-adapted species, such as largemouth bass and other sunfishes. Many of the newer inhabitants of the basin are game species, and as such, they have a high consumptive, tangible, and recreational value.

Throughout the Tugalo River Basin only about 20 miles of what might be classified as riverine habitat is present today. The remainder of the aquatic habitat present in the basin is characterized as flat-water, lake habitat (table 3-1). Moreover, much of the remaining riverine habitat probably does not represent river habitat uninfluenced by humans or even the river habitat that existed prior to project implementation. One reason is because flow regimes (that is, schedule, duration, and magnitude of flow) in the riverine stretches have been changed as a result of project operations. Thus, the amount of water, velocity of flow, width and depth of stream, and generally, the square footage of riverine habitat, have likewise been reduced relative to pre-project conditions.

Remember, only discuss past actions for those resources that would be cumulatively affected; however, you need to discuss the existing environment (including effects that would continue if not changed) and the effects of any proposed future actions/activities for all resources.

Environmental Effects

In this section, describe the beneficial and adverse effects (both direct and indirect) of the applicant's proposal, other recommended action alternatives, and environmental measures. Again, assess effects on the basis of changes from current conditions (baseline), as described in the *Affected Environment* section, but in the context of present and reasonably foreseeable development in the watershed. Within your analysis, describe any future actions that may affect the resources. Where appropriate, divide this section using subheadings that detail the impacts and agency and NGO recommendations associated

with a specific resource issue (for example, in the *Aquatic Resources* section, use subheadings to talk about minimum flows, fish passage, and ramping rates issues).

40 CFR, Section 1508.8--Effects

- (a) Direct effects, which are caused by the action and occur at the same time and place.
- (b) Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Begin by briefly describing or stating the issue (1 paragraph at most). Next, present the applicant's proposal for each resource area. Follow with any federal and state agency recommendations and any recommendations by NGOs or others. Include the applicant's response to the agencies' recommendations and finally, your analysis of the proposed action, recommended measures, and any other measures you wish to consider. Staff's recommendations (or Applicant's recommendation in case of Exhibit Es or APEAs) will be presented in the *Comprehensive Development and Recommended Alternative* section.¹⁵

Basic Format for Environmental Effects section:

- Define the issue
- Describe the applicant's proposed measures
- Describe agency, tribe, NGO, and other recommendations
- Describe applicant's responses to the recommendations
- Provide staff analysis of the effects of the measures ("Our Analysis")
- Analyze the proposed and recommended measures, alternative conditions, and staff-developed measures and disclose the effects of the proposed project and action alternatives--include discussion of cumulative effects as appropriate

For some issues, the analysis sections can be quite lengthy and it's easy to lose the reader by not providing some closure. Therefore, present your biological conclusions (i.e., a summary of the advantages and disadvantages of each option or measure considered) but not your recommended measures, when you finish analyzing each issue. Remember, measures under consideration may affect other non-developmental (environmental, cultural, or recreational) (e.g., construction of a campsite can degrade water quality and result in loss of wildlife habitat) and developmental (e.g., typically the measure involves a

¹⁵ For Exhibit Es prepared for ILP projects, the applicant must present "the results of its studies conducted under the approved study plan by resource area and use the data generated by the studies to evaluate the beneficial and adverse environmental effects of its proposed project. This section must also include, if applicable, a description of any anticipated continuing environmental impacts of continued operation of the project, and the incremental impact of proposed new development of project works or changes in project operation. This analysis must be based on the information filed in the Pre-Application Document provided for in §5.6, developed under the applicant's approved study plan, and other appropriate information, and otherwise developed or obtained by the applicant" [18 CFR, section 5.18 (b)(5)(B)].

cost that affects overall project economics; may also affect generation, dependable capacity, water supply, irrigation) resources.

Some general tips for writing the environmental effects section:

- Make sure all issues that are listed in the scoping document are addressed in the effects section
- Address effects in proportion to their significance
- Analyze effects as long as they are reasonably foreseeable and not speculative
- Distinguish between short-term and long-term and continuing and new effects
- Quantify effects to the extent practicable
- Indicate timing of effects, if important
- Separately address the effects of different components of the alternatives (e.g., construction, operation, maintenance, mitigation measures)
- Understand that effects can extend beyond the project boundary or construction footprint (e.g., water quality effects may be detectable 5 miles downstream of powerhouse)

Note: Use conditional language (i.e., “would” instead of “will”) in describing the proposed action and alternatives and potential consequences.

Example of an analysis for minimum flows in a bypassed reach (Source: Bar Mills Project EA, FERC No. 2194, September 12, 2005):

Minimum Flows in the Bypassed Reach

Bar Mills Project powerhouse flows are discharged into the upper portion of the Skelton Project impoundment bypassing about 1,500 feet of the Saco River. Without the release of an additional minimum flow, only leakage flows ranging from 3 to 25 cfs and spill flows would provide habitat for aquatic resources in the bypassed reach. FPL Energy proposes to maintain a minimum flow of 25-cfs in the project's bypassed reach year-round.

Interior [10(j) recommendation 2] recommends a continuous minimum flow of 250 cfs or inflow, whichever is less, in the bypassed reach. NOAA Fisheries [10(j) recommendation 2] also recommends a minimum flow of 250 cfs for downstream passage of juveniles and adults, and to provide maximum year-round riverine habitat for salmonids and other aquatic resources. NOAA Fisheries indicates that the flow amount may need to be modified to accommodate the zone of passage for any fishway that is constructed. The Salmon Federation also recommends a year-round minimum flow of 250 cfs. Marine Resources [10(j) recommendation 4] recommends a minimum flow of at least 100 cfs to provide a zone of passage for diadromous fishes. Maine Fish and Wildlife (10(j) recommendation 3) recommends a minimum flow of no less than 100 cfs between April 1 and October 31 to maintain a marginal trout fishery.¹ The Salmon Commission recommends minimum flows in the bypassed reach of 100 cfs or greater to provide a zone of passage, habitat connectivity, and holding areas for adult Atlantic salmon. The Saco River Salmon Club Hatchery (Hatchery) recommends that year-round minimum flows in the bypassed reach are sufficient for attraction of adult salmon migrating upstream and for directing smolts and kelts² migrating downstream.

Our Analysis

We evaluated the benefits of providing a minimum flow in the bypassed reach to habitat for resident fish and stocked brown trout and as a zone of passage for migratory species.

¹ Maine Fish and Wildlife states that a seasonal minimum flow of 250 cfs is preferred to support the development of a significant fishery and would accept a lower minimum flow during the period from November 1 through March 31 since trout would have access to the downstream Skelton Project impoundment for overwintering. However, Maine Fish and Wildlife did not specify a winter minimum flow. Therefore, for purposes of our analysis we assume that Maine Fish and Wildlife recommends a year-round minimum flow of 100 cfs.

² A kelt is a post-spawn adult Atlantic salmon.

Habitat

FPL Energy based its minimum flow proposal on an Instream Flow Incremental Methodology (IFIM)³ study conducted on July 24 and 25, 2002. FPL Energy formed a study team composed of representatives of Maine Fish and Wildlife, the FWS, Maine DEP, and the Hatchery. The 1,500-foot-long bypassed reach was divided into 3 separate reaches based on habitat type and three transects were established representing each reach.⁴ The study evaluated flow versus habitat relationships for three fish species life stages--brown trout adults, smallmouth bass juveniles and smallmouth bass adults--and a macroinvertebrate, *Stenonema* (mayfly nymph), at five different flows ranging from leakage to 250 cfs (table 2 and figure 3).⁵

Table 2. Weighted usable area (WUA) and percent of maximum WUA (PMWUA) in parentheses for three fish species life stages and one macroinvertebrate at flows ranging from leakage to 250 cfs for transects 1 and 2 combined in the Bar Mills Project bypassed reach (bolded values indicate peak WUA values over the range of flows evaluated).

Species life stage	WUA (PMWUA)				
	3 cfs	25 cfs	50 cfs	100 cfs	250 cfs
Smallmouth bass adults (SMBA)	44 (0)	7,217 (51)	8,294 (59)	9,749 (69)	14,152 (100)
Smallmouth bass juveniles (SMBJ)	1,212 (3)	23,134 (64)	27,229 (75)	29,784 (82)	36,220 (100)
Brown trout adults (BRTA)	3,253 (9)	21,431 (57)	25,864 (69)	30,343 (81)	37,316 (100)
<i>Stenonema</i> (STEN)	487 (1)	23,556 (58)	30,510 (76)	32,947 (82)	40,382 (100)

³ The IFIM is a tool developed by the U.S. Fish and Wildlife Service (FWS) to evaluate the relationship between flow and habitat. Habitat suitable for a particular species life stage is often expressed in terms of weighted usable area (WUA). WUA is the wetted area of a stream weighted by its suitability for use by aquatic organisms or recreational activity. WUA is usually expressed in units of square feet or square meters of habitat per a specified length of stream.

⁴ Because hydraulics at transect 3 were influenced by backwater effects from the Skelton Project impoundment and the tailrace releases at Bar Mills, the habitat versus flow relationship was believed to be unreliable.

⁵ Leakage flow at the time of the IFIM study was estimated to be 3 cfs.

Over the range of flows evaluated, little to no habitat was available to fish or macroinvertebrates at a leakage flow of 3 cfs and WUA was greatest at the highest evaluation flow of 250 cfs for all species life stages. However, the greatest incremental increase in WUA for all of the species life stages over the range of evaluation flows occurs when releases increase from leakage to 25 cfs. At 25 cfs, PMWUA⁶ ranged between 51 to 64 percent for all species life stages. Above 25 cfs, another modest increase in the slope of the flow versus WUA curve occurs between 25 and 50 cfs for smallmouth bass juveniles, brown trout adults, and *Stenonema*. At 50 cfs, PMWUA increased to about 70 percent or higher for all species life stages except smallmouth bass adults; PMWUA for smallmouth bass adults increased only 8 percentage points and did not reach 70 percent until flows exceeded 100 cfs. Although WUA for all species life stages continued to increase above 50 cfs, the rate of increase of the WUA curve leveled off or declined at flows from 50 cfs to 250 cfs (figure 3).

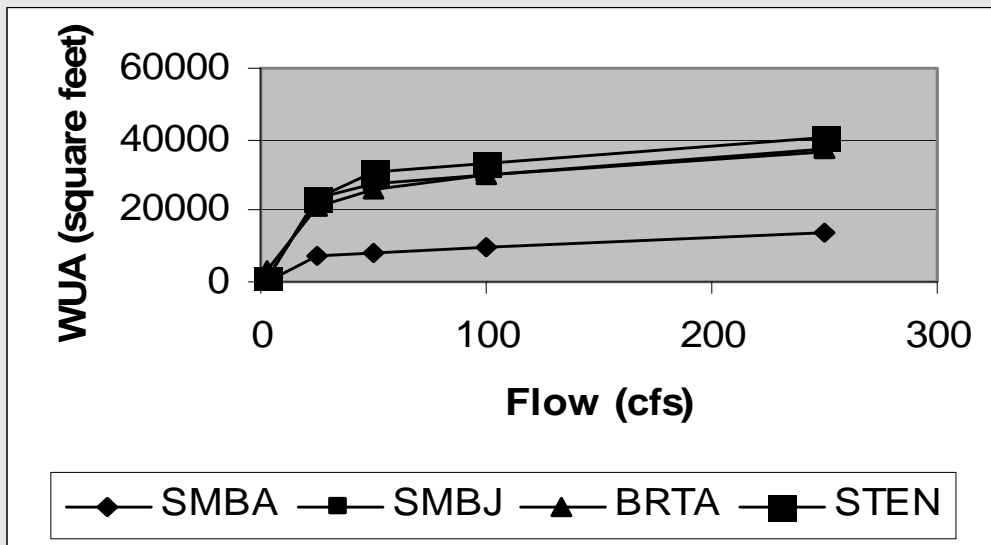


Figure 3. Habitat (WUA) for fish and macroinvertebrate species life stages evaluated at flows (cfs) ranging from 3 cfs (leakage) to 250 cfs for the Bar Mills bypassed reach instream flow study.

Maine Fish and Wildlife’s management goal for the bypassed reach is to provide a fishery for stocked brown trout in the bypassed reach from April 1 through October 31. Maine Fish and Wildlife anticipates that brown trout stocked in the bypassed reach that survive the summer months would be able to overwinter in downstream impoundments such as the Skelton impoundment. The IFIM results for brown trout indicate that while maximum habitat for adult brown trout would occur at flows of 250 cfs or higher, the greatest rate of increase in habitat with increases in flow occurs between leakage and 25 cfs and to a somewhat lesser extent from 25 to 50 cfs before leveling off at flows above 50 cfs. PMWUA for adult brown trout increases from 57 percent at 25 cfs to 69 percent at 50 cfs.

Macroinvertebrates, represented by *Stenonema* in the IFIM study, are an important food source for both trout and smallmouth bass. Improving macroinvertebrate habitat in the bypassed reach could enhance growth of stocked brown trout and smallmouth bass. The flow versus habitat relationship for *Stenonema* was similar to that of brown trout except that the rate of increase in habitat from 25 to 50 cfs was somewhat greater for *Stenonema*. As with brown trout adults, while total habitat continued to increase at flows above 50 cfs, the rate of increase leveled off.

⁶ PMWUA, as stated here, is based upon the maximum habitat value occurring over the range of flows evaluated. Because WUA for each species life stage was increasing over the range of flows evaluated, an actual maximum value is unknown.

Example of a terrestrial analysis (Source: Dorena Lake Dam Project, FERC No. 11945, September 2006):

Environmental Effects

Project construction would require the permanent loss of 0.127 acre of habitat, with more vegetation temporarily disturbed. Although much of this habitat has been previously disturbed and is inhabited primarily by noxious invasive species, wildlife could be displaced as a result of construction activities and loss of habitat. Additionally, noxious invasive species could proliferate because of soil disturbance.

Symbiotics proposes several measures to minimize the effects of project construction on wildlife habitat. These include: (1) re-seeding of all areas of disturbed soil with a native grass/forb mix; (2) completing construction in a timely manner to avoid prolonged disruption of wildlife in the area; (3) not leaving trenches or pits open overnight that might trap wildlife; (4) developing a weed management plan in consultation with the Corps that would include provisions to limit construction traffic to established roads and parking areas, and to re-seed all areas of disturbed soil with a native grass/forb mix; (5) developing a landscape plan in consultation with the Corps prior to ground disturbance that would provide for the use of appropriate native landscaping around the powerhouse; and (6) consulting with Oregon DFW to identify an area near the north abutment of the dam to restore 5,533 square feet of land where noxious weeds are abundant with appropriate native species.

Interior recommends that Symbiotics consult with FWS to identify onsite locations to mitigate for the permanent loss of terrestrial habitat associated with construction of the powerhouse, concrete tailrace channel, parking area, switchyard, and valve house. It also recommends that Symbiotics develop and implement a soil erosion control plan, which would include a management plan for the control of weeds and invasive species and the restoration of disturbed lands with native vegetation. Other aspects of soil erosion control are discussed in section V.C.1.b, *Geology and Soils Resources*.

Oregon DFW makes several recommendations regarding the effects of project construction on wildlife. It recommends that Symbiotics identify, in consultation with FWS and Oregon DFW, onsite locations to mitigate for the permanent loss of wildlife habitat associated with the construction of project facilities. Oregon DFW recommends Symbiotics remove invasive weeds and revegetate the mitigation site using similar practices to those it proposes to restore construction staging areas. Lastly, Oregon DFW recommends that Symbiotics implement its proposed soil erosion control plan, as discussed above in section V.C.1.b, *Geology and Soils Resources*.

Our Analysis

Construction of the proposed project would permanently remove approximately 5,520 square feet (0.127 acre) of vegetation. The proposed project facilities are all located within areas that are dominated by invasive noxious forbs or grasses; however, a minimum of three 60-foot-tall bigleaf maple and one black cottonwood would need to be removed. Additional vegetation would temporarily be disturbed or removed adjacent to the proposed facilities, at the base of the dam, and along the proposed transmission line corridor. During construction, large, mobile wildlife species, including osprey and great blue heron, would likely temporarily avoid the areas because of construction noise and habitat disturbance. Because the construction sites do not provide unique habitat in the area, these wildlife species are likely to use other habitats nearby. Some small and less-mobile species, such as small rodents and lizards that use these habitats could be affected more because of vegetation and riprap removal and construction traffic.

Symbiotics proposes and the agencies recommend measures that would reduce the potential for long-term effects on wildlife and wildlife habitat. Symbiotics proposes and FWS and Oregon DFW recommend that Symbiotics implement a soil erosion control plan that would provide for the revegetation and replanting of disturbed areas with native species and include a management plan for the control of noxious invasive species. Noxious invasive species thrive in areas of disturbed soils, especially when they are plentiful in nearby areas. Reseeding and replanting disturbed areas with native species, combined with an active invasive species management plan, would allow native species to become re-established in construction areas. Symbiotics proposes and FWS and Oregon DFW recommend that Symbiotics mitigate for the permanent loss of 0.127 acre of habitat. The permanently lost habitat has been previously disturbed and is inhabited by large amounts of invasive species. Symbiotics proposes to revegetate areas

that are disturbed by construction with native species, to control invasive species and restore an additional 5,533 square feet of land near the north abutment of the dam with native species. As part of its proposed landscape plan, Symbiotics also would plant big leaf maple and black cottonwood trees to replace those cut down during construction. These measures would mitigate for the small amount of habitat permanently lost by improving habitat conditions.

Example of Cumulative Effects section Source (Orono EA, FERC No. 2710, August 2005):

Cumulative Effects

The installation of downstream fish passage facilities at the Orono project would ensure that mortality of outmigrating fishes including Atlantic salmon and alewife is minimized. This, combined with the reduction in downstream mortality rates of outmigrating fishes at Veazie should Veazie be removed in the future, should contribute to significant positive benefits to anadromous fish within the Penobscot River Basin. The installation of upstream and downstream fish passage facilities for American eel at Orono dam together with other activities such as the removal of Veazie dam would also likely enhance eel stocks throughout the Penobscot River Basin. For resident species such as smallmouth bass and chain pickerel, the potential benefits of maintaining a minimum flow of 200 cfs in the Orono bypassed reach may be offset somewhat by the loss of impoundment habitat if and when the Veazie dam is removed. While smallmouth bass may benefit from maintaining minimum flows in the Orono bypassed reach and creating additional riverine habitat with the removal of Veazie dam, chain pickerel, a species that prefers slower moving waters, may be adversely affected by the removal of Veazie dam. However, the overall cumulative effects associated with the relicensing of the Orono Project together with the other planned activities under the Settlement would be beneficial to the restoration of anadromous and catadromous species (Atlantic salmon, American shad, alewife, American eel) to the Penobscot River Basin and to some resident species such as smallmouth bass.

3.4 NO-ACTION ALTERNATIVE

This section describes the effects of implementing the no-action alternative on the environment. Discuss the no-action alternative for your project. In relicensing cases, be sure to discuss any ongoing effects that would continue.

Example of the No-action Alternative for an original license:

3.4 NO-ACTION ALTERNATIVE

Under the no-action alternative, the Angus Project would not be constructed. There would be no changes to the physical, biological, or cultural resources of the area and electrical generation from the project would not occur. The power that would have been developed from a renewable resource would have to be replaced from nonrenewable fuels. The noise and air quality impacts of the existing diesel fuel-fired generation system would continue unabated or at increased levels as the local electrical demand increased. The risk of spills of diesel fuels would likewise continue at current or increasing levels. The financial benefits to the residents of Smithfield in the form of lower electrical rates and to Municipal in terms of project operating revenues would not be realized.

Example of the No-action Alternative for a new license (relicense):

3.4 NO-ACTION ALTERNATIVE

Under the no action alternative the project would continue to operate as it has in the past. None of the licensee's proposed measures or the resource agencies' recommendations and mandatory conditions would be required. The existing trout populations would not be enhanced as a result of increased minimum flows. Wetland habitat would not be created along the upper margins of the reservoir. Public access to project waters would continue to be very limited, and the benefits of the shoreline buffer zone and resource management plan would not be realized.

4.0 DEVELOPMENTAL ANALYSIS

For an Exhibit E prepared under the ILP or an APEA prepared under the ALP, this section would focus on the cost of constructing, operating, and maintaining the project, and should, include a table itemizing the cost of all applicant-proposed environmental measures, and, if filed, agency recommendations.¹⁶

This section describes the electric power benefits of the project; summarizes the cost, power value, and net benefit for each of the licensing decision alternatives; and provides the estimated cost for each of the environmental measures proposed or recommended for inclusion in a license. We use this information in the *Comprehensive Development and Recommended Alternative* section to support our recommendation for which alternative to recommend and which measures to recommend including in any license issued by the Commission.

This section typically has four major parts: (1) power and economic benefits; (2) comparison of alternatives; (3) cost of environmental measures; and (4) air emissions (as needed). If applicable, add a section discussing how the alternatives affect other developmental resources such as power generation (at other sites), water supply, irrigation, navigation, and flood control.

The basic sections of the developmental analysis chapter are as follows:

- 4.0 DEVELOPMENTAL ANALYSIS
- 4.1 POWER AND ECONOMIC BENEFITS OF THE PROJECT
- 4.2 COMPARISON OF ALTERNATIVES
 - 4.2.1 No-action Alternative
 - 4.2.2 Applicant's Proposal
 - 4.2.3 Staff Alternative
- 4.3 COST OF ENVIRONMENTAL MEASURES

¹⁶For ILPs, the economic analysis must include “annualized, current cost-based information. For a new or subsequent license, the applicant must include the cost of operating and maintaining the project under the existing license. For an original license, the applicant must estimate the cost of constructing, operating, and maintaining the proposed project. For either type of license, the applicant should estimate the cost of each proposed resource protection, mitigation, or enhancement measure and any specific measure filed with the Commission by agencies, Indian tribes, or members of the public when the application is filed. For an existing license, the applicant's economic analysis must estimate the value of developmental resources associated with the project under the current license and the applicant's proposal. For an original license, the applicant must estimate the value of the developmental resources for the proposed project. As applicable, these developmental resources may include power generation, water supply, irrigation, navigation, and flood control. Where possible, the value of developmental resources must be based on market prices. If a protection, mitigation, or enhancement measure reduces the amount or value of the project's developmental resources, the applicant must estimate the reduction” [18 CFR, section 5.18 (b)(5)(E)].

4.4 AIR QUALITY (as needed)

Note: Use additional topical headings as needed to add clarity to your analysis.

In the introduction to this section, explain the purpose of the section and the method of analysis.

Example of introduction to Developmental Analysis section:

4.0 DEVELOPMENTAL ANALYSIS

In this section, we look at the Wide River Project's use of the Wide River for hydropower purposes to see what effect various environmental measures would have on the project's costs and power benefits. Consistent with the Commission's approach to economic analysis, the power benefit of the project is determined by estimating the cost of obtaining the same amount of energy and capacity using the likely alternative generating resources available in the region. In keeping with Commission policy as described in *Mead*, our economic analysis is based on current electric power cost conditions and does not consider future escalation of fuel prices in valuing the hydropower project's power benefits.¹

Our analysis includes: (1) an estimate of the net power benefit of the project for each of the licensing alternatives; and (2) an estimate of the cost of individual measures considered in the final EIS for the protection, mitigation and enhancement of environmental resources affected by the project. To determine the net power benefit for each of the licensing alternatives, we compare project costs to the value of the power output as represented by the cost of a likely alternative source of power in the region. For any alternative, a positive net annual power benefit indicates that the project power costs less than the current cost of alternative generation resources and a negative net annual benefit indicates that project power costs more than the current cost of alternative generation resources. This estimate helps to support an informed decision concerning what is in the public interest with respect to a proposed license. However, project economics is only one of many public interest factors the Commission considers in determining whether, and under what conditions, to issue a license.

¹ See *Mead Corporation, Publishing Paper Division*, 72 FERC ¶ 61,027 (July 13, 1995). In most cases, electricity from hydropower would displace some form of fossil-fueled generation, in which fuel cost is the largest component of the cost of electricity production.

4.1 POWER AND ECONOMIC BENEFITS OF THE PROJECT

Things to cover:

- Capacity of project, dependable capacity (if applicable) and average annual generation
- Summary of current and proposed operation, including any new capacity alternatives
- Economic assumptions (Power value, interest rates, etc., are usually provided in a table with body text or table footnotes to provide source of information.)

Example of power and economic benefits section:

4.1 POWER AND ECONOMIC BENEFITS OF THE PROJECT

Table 4-1 summarizes the assumptions and economic information we use in our analysis. This information was provided by Hypowco in its license application. We find that the values provided by Hypowco are reasonable for the purposes of our analysis. Cost items common to all alternatives include: taxes and insurance costs; net investment (the total investment in power plant facilities remaining to be depreciated); estimated future capital investment required to maintain and extend the life of plant equipment and facilities; relicensing costs; normal operation and maintenance cost; and Commission fees.

--example continued on next page--

Table 4-1. Parameters for economic analysis of the Wide River Project (Source: Hypowco).

Parameter	Value	
Period of analysis (years)	30	
Taxes and insurance (%)		
Federal income tax rate	35	
Levy rate	66	
Assessment rate	1.48	
Insurance	0.07	
Net investment, \$ ^a	\$0	
Future major capital cost, \$ ^b	\$23,634,300	
Relicensing cost, \$ ^c	\$27,741,800	
Operation and maintenance, \$/year ^d	\$3,079,000	
Commission fees, \$/year ^e	\$689,000	
Energy value (\$/MWh)	Peak	Off-peak
January	39.16	34.96
February	37.31	33.91
March	33.61	30.85
April	33.41	30.61
May	29.89	25.35
June	27.98	25.39
July	39.00	33.66
August	47.92	39.13
September	52.64	44.24
October	46.92	42.95
November	47.83	43.21
December	50.93	44.24
Capacity value (\$/MW-year) ^f	63,500	
Interest rate ^g	6.10	
Discount rate ^h	6.10	

^a Net investment is the depreciated project investment allocated to power purposes.

^b Future major capital costs include major plant rehabilitation to maintain present-day capability scheduled between 2006 and 2035 and are expressed as a present value.

^c Relicensing costs include the administrative, legal/study, and other expenses to date.

^d Existing plant operation and maintenance includes operation and maintenance related to environmental measures associated with the current license.

^e Commission fees are based on statements of annual charges received from the Commission for federal lands and administrative charges based on authorized capacity.

^f Source: Application for New License, exhibit D, table D-6.

^g Based on Hypowco's weighted average cost of capital.

^h Assumed by staff to be same as interest rate.

As currently operated, the 155-MW Wide River Project generates an average of 651,000 MWh annually and has a dependable capacity of 135 MW. Table 4-1 includes monthly values for generation under high-load period (peak) and low-load period (off-peak) conditions. These values represent Hypowco's marginal cost of generation as determined by system load and generation resource simulation. They reflect the cost of a mixture of generation resources available to Hypowco. We use monthly variable peak and off-peak energy values for our analysis in order to estimate the cost (in lost energy value) of minimum flow and reservoir operating measures that are seasonal and/or constrain the hourly operation of the project for peaking.

The capacity value of \$63,500/MW-year (table 4-1) is based on the amortization and fixed operation and maintenance cost for a simple-cycle combustion turbine. Some of the measures that would require operational changes reduce the dependable capacity rating of the project. We discuss the effects of proposed operational changes on power benefits in section 4.2.2.

4.2 COMPARISON OF ALTERNATIVES

This section summarizes the overall economics for each of the licensing alternatives analyzed in the environmental document and describes each alternative in sufficient detail for the reader to understand the major causes for differences in project economics between the alternatives. The section begins with a summary table comparing the generation, capacity, production cost, power benefit, and net power benefit of each alternative. Following this, is a sub-section for each alternative which describes the major factors responsible for the differences in power benefits between the alternatives. Be sure to include:

- Capacity expansion or reduction
- Environmental measures that affect dependable capacity rating and average annual generation
- Environmental measures with large capital cost, such as fish passage facilities

Example of the Comparison of Alternatives section:

4.2 COMPARISON OF ALTERNATIVES

Table 4-2 summarizes the annual cost, power benefits, and annual net benefits for the four alternatives considered in this DEIS: no-action, Municipal's proposal, the staff alternative, and the staff alternative with mandatory conditions.

--example continued on next page--

Table 4-2. Summary of the annual cost, power benefits, and annual net benefits for three alternatives for the East River Project (Source: staff).

	No Action	Municipal's Proposal	Staff Alternative	Staff Alternative with Mandatory Conditions
Installed capacity (MW)	1,500	1,750	1,750	1,750
Annual generation (MWh)	6,330,769	7,280,000	7,280,000	6,800,000
Annual power value (\$/MWh and mills/kWh)	\$246,900,000 39.00	\$283,920,000 39.00	\$283,920,000 39.00	\$265,200,000 36.43
Annual cost (\$/MWh and mills/kWh)	\$58,400,000 9.20	\$97,552,000 13.40	\$99,775,000 13.70	\$99,775,000 13.70
Annual net benefit (\$/MWh and mills/kWh)	\$188,500 29.80	\$186,368,000 25.60	\$184,145,000 25.29	\$165,245,000 22.60

4.2.1 No-action Alternative

Under the no-action alternative, the project would continue to operate as it does now. The project generates an average of 6,330,769 MWh of electricity annually. The average annual power value of the project under the no-action alternative would be \$246.9 million (about \$39/MWh). The average annual cost of producing this power would be \$58.4 million (about \$9.2/MWh), resulting in an average annual net benefit of \$188.5 million (about \$29.8/MWh). In other words, the project produces energy at a cost that is less than that of currently available alternative generation by \$29.8/MWh.

4.2.2 Municipal's Proposal

Municipal proposes to add two new 15-MW turbines and replace the existing turbines at the Fast River development with new, more efficient turbines. Upon completion of the proposed new turbines and turbine upgrades, the Fast River Project installed capacity would increase to 1,750 MW, an increase of about 250 MW from the current installed capacity of 1,500 MW. The total cost of the Fast River turbine replacement is estimated at \$250,000,000. In addition, Municipal signed a Settlement Agreement that requires it to construct upstream fish passage facilities having a total capital cost of \$176,000,000. The proposed project would have a dependable capacity of 1,250 MW and an average annual generation of 7,280,000 MWh. As proposed by Municipal, the Fast River Project would have an average annual power value of \$283.9 million (\$39/MWh), an annual production cost (levelized over the 30-year period of our analysis) of \$97.6 million (\$13.4/MWh), and an annual net benefit of \$186.4 million (\$25.60/MWh). In other words, the project would produce energy at a cost that is less than that of currently available alternative generation by \$25.6/MWh.

4.2.3 Staff Alternative

The staff alternative includes the same developmental upgrades as Municipal's proposal and, therefore, would have the same capacity and energy attributes. Table 4-3 shows the staff recommended additions, deletions, and modifications to Municipal's proposed environmental protection and enhancement measures and the estimated cost of each. **[NOTE: USING A TABLE TO SHOW THE COST OF MEASURES STAFF RECOMMENDS ADDING OR DELETING FROM THE PROPOSED PROJECT IS OPTIONAL DEPENDING UPON THE NUMBER AND COMPLEXITY OF STAFF'S CHANGES.]**

Based on a total capacity of 1,750 MW, a dependable capacity of 1,250 MW and an average annual generation of 7,280,000 MWh, the Fast River Project would have an average annual power value of \$283.9 million (\$39.00/MWh), an annual production cost (levelized over the 30-year period of our analysis) of \$99.8 million (\$13.70/MWh), and an annual net benefit of \$184.1 million (\$25.29/MWh) under the staff alternative. The staff alternative would reduce the net annual project benefit by about \$2.5 million (\$0.31/MWh) compared to the project as proposed by Municipal.

4.2.4 Staff Alternative with Mandatory Conditions

This alternative is similar to the Staff Alternative with the exception of increased minimum flows. This alternative would have an average annual power value of \$265.2 million (\$36.43/MWh), an annual production cost (levelized over the 30-year period of our analysis) of \$99.8 million (\$13.70/MWh), and an annual net benefit of \$165.2 million (\$22.60/MWh). This alternative would reduce the net annual project benefit by about \$21.1 million (\$3.0/MWh) compared to the project as proposed by Municipal, and by about \$18.9 (\$3.31/MWh) compared to the Staff Alternative.

4.3 COST OF ENVIRONMENTAL MEASURES

The purpose of this section is to provide an itemized list and cost estimate for all of the environmental (protection, mitigation and enhancement) measures evaluated in the environmental document.¹⁷ This information is the source for economic information used in the Comprehensive Development section to support the choice of measures recommended by staff to include in the license. It is also used in the Fish and Wildlife Recommendations section for the 10(j) table. The cost table should be designed to show the following information for each measure:

- Brief description of the measure
- Entities recommending the measure, including staff
- Capital, or one-time cost of item
- Operation and Maintenance, or annual cost of item
- Effect on energy generation and/or dependable capacity
- Levelized annual cost of item
- Source of cost estimate

Depending upon the complexity and number of measures that need to be included in the table, some of the information listed above may be added by footnotes, discussion about the data, etc. Order the items in the table as they are introduced in the environmental analysis section of the document (geology and soils, aquatic resources,

¹⁷ Staff often recommends that the applicant develop various resource management and monitoring plans to address environmental issues, such as a land use, recreation, wildlife, water quality, or fisheries management plan. Two costs are associated with a resource plan: (1) the cost to develop the plan; and (2) the cost to implement the plan. Finding an exact cost of a plan, including your recommended components, may be difficult. Here are a few ways to estimate the cost of a recommended plan:

- Review other environmental documents where a resource agency, applicant, or staff has provided the cost of the plan
- Talk with staff who have worked with consulting firms that develop and implement such plans
- Ask for the cost information at a scoping session
- Ask applicants to provide costs and supporting documentation in an additional information request
- Ask a resource agency to provide costs with their recommendations

etc.). For added clarity, you may want to provide sub-headings in the table for each of the resource areas. For projects with a significant number of recommendations, summarize the costs by resource area in the table and include detailed information in an appendix.

Example of the Cost of Environmental Measures section:

4.3 COST OF ENVIRONMENTAL MEASURES

Table 4-3 gives the cost of each of the environmental enhancement measures considered in our analysis. We convert all costs to equal annual (levelized) values over a 30-year period of analysis to give a uniform basis for comparing the benefits of a measure to its cost.

Table 4-3. Cost of environmental mitigation and enhancement measures considered in assessing the environmental effects of continuing to operate the Slow River Hydroelectric Project (Source: HYPOWCO, 1998).

Enhancement/Mitigation Measure	Entity	Capital Cost	Annual Cost	Levelized Annual Cost
Provide minimum flows in the Slow River bypassed reach	HYPOWCO FWS NMFS Staff	Unknown	\$209,000 ^a	\$209,000
Operational compliance monitoring plan for reservoir water level fluctuation and bypassed reach flow	Staff NMFS FWS South Carolina DNR	\$30,000	\$6,000	\$10,900
New flow gage located on Slow River downstream from tailrace	South Carolina DNR	\$30,000	\$6,000	\$10,900
Slow River Fish Habitat Enhancement Fund	FWS South Carolina DNR	\$0	\$20,000 ^b	\$1,480
One upstream vertical slot or natural channel fishway designed to pass 250,000 American shad & 2,500,000 blueback herring ^c	HYPOWCO	\$1,500,000	\$15,000	\$242,000
One upstream fishway designed to pass 688,150 American shad & 3,430,000 blueback herring ^c	Interior Commerce	\$3,500,000	\$30,000	\$597,000
Phased approach to upstream fishway where Phase I would be designed to pass 250,000 American shad & 2,500,000 blueback herring and Phase II, designed for projected migrant numbers, could be added in the future ^c	Interior Commerce	\$1,500,000 ^d \$2,000,000 ^e	\$15,000 ^d \$15,000 ^e	\$372,000

Enhancement/Mitigation Measure	Entity	Capital Cost	Annual Cost	Levelized Annual Cost
Phase I vertical slot fishway designed to pass 250,000 American shad & 2,500,000 blueback herring as prescribed by Interior & Commerce	Staff	\$1,500,000	\$15,000	\$242,000
Downstream fish passage, without multi-level entrance tower and vent pipe	HYPOWCO	\$171,000	\$5,000	\$30,900
Downstream fish passage, with multi-level entrance tower and vent pipe	Interior Commerce	\$680,000	\$5,000	\$115,000
Upstream and downstream fishway effectiveness testing	Interior Commerce HYPOWCO Staff	\$750,000	\$5,000	\$126,000
RSSL display	HYPOWCO Staff	\$3,000	\$0	\$486
Recreation signage	HYPOWCO Staff	\$4,000	\$800	\$1,450
Trail sign	HYPOWCO Staff	\$1,000	\$200	\$362
Canoe portage	Interior South Carolina DNR Citizen	\$630,000	\$10,000	\$102,000
Tailrace angler access	Interior South Carolina DNR	\$166,000	\$10,000	\$26,900

^a Based on Hypowco's estimated average annual energy loss of 4,830 MWh at \$31/MWh, and \$57,000 annually for replacing lost firm capacity.

^b First 3 years, or until fishways become operational; FWS recommends \$20,000/year and South Carolina DNR recommends \$19,318/year.

^c The fishway design includes provisions for two gated sections in the dam for minimum flow release.

^d Phase 1 costs begin in year 1 of new license.

^e Phase 2 costs begin in year 15 of new license.

4.4 AIR QUALITY

A section on air quality may be needed for projects that involve significant

construction activities, such as construction of a new dam and reservoir or when raised as an issue. The section should describe state and national ambient air quality standards, state and national area designations (attainment, non-attainment, unclassified, etc.), and local emissions and air quality regulations. The effects analysis should consider air emissions (carbon monoxide, volatile organic compounds, nitrogen dioxide, sulfur dioxide, ozone, particulate matter, etc.) from construction equipment, earth moving activities, construction worker commutes, material deliveries, earth hauling, and operation and maintenance.

If the information is extensive, this write-up can be included in section 3.

Examples of analyses of an Air Quality section can be found in the following EISs:

Lake Elsinore Advanced Pumped Storage Project (section 3.2.10)

<http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=11239487>

Upper American River Project (section 3.3.11)

<http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=11611184>

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 COMPARISON OF ALTERNATIVES

Include a comparison of the effects on developmental and non-developmental resources of each of the alternatives considered in the environmental document. This will help the reader see how the alternatives affect each resource. Quantify the effects, if possible (for example, acres of lost wetland habitat). A table could be helpful in organizing the information (see below).

Example of Comparison of Alternatives discussion:

5.1 COMPARISON OF ALTERNATIVES

In this section, we compare the developmental and non-developmental effects of Municipal's proposal, Municipal's proposal as modified by staff, and the no-action alternative.

We estimate the annual generation of the project under the three alternatives identified above. Our analysis shows that the annual generation would be 874,900 MWh for the proposed action; 838,600 MWh for the staff alternative; and 899,100 MWh for the no-action alternative.

We summarize the environmental effects of the different alternatives below.

Aquatic Resources—Under the applicant's proposal, adult trout habitat would increase in the 2-mile-long bypassed reach by 50 percent compared to existing conditions, but would continue to be degraded by reduced flows. Substantial mortality from stranding would continue. Small numbers of fish would continue to be killed as they pass through the turbines. Slight increase in water temperature would also continue to occur.

With the staff's modifications to the applicant's proposal, adult trout habitat would be increased to near optimal conditions, a 100 percent increase compared to the applicant's proposal. Stranding, due to flow fluctuations, would be reduced to minimal levels.

Terrestrial Resources-- Fencing to exclude cattle from the riparian zone would substantially improve 12 acres of riparian vegetation benefiting local wildlife populations. Maintenance activities would continue to disturb nesting peregrine falcons.

Threatened and Endangered Species—The endangered southwestern willow flycatcher would benefit from the expected increase in riparian vegetation.

Recreation—Under the applicant's proposal, fishing opportunities would be minimally improved as the result of increased flows in the bypassed area. Under the staff flow recommendation, fishing would be moderately improved. Boating on the reservoir, and associated reservoir fishing, would increase as a result of construction of a new boat ramp.

Visual Resources—Municipal's proposed landscaping around the powerhouse would improve visual quality in an area used for picnicking.

Under the no-action alternative, environmental conditions would remain the same and no enhancement of environmental resources would occur.

Example of a chart summarizing the effects of the alternatives:

Table 5-1. Comparison of Alternatives for the Green Creek Project (Source: staff).

Resource	No Action Alternative	Proposed Action	Staff Recommended Alternative	Agency Alternative
Generation	201,100 MWh	199,000 MWh	197,080 MWh	175,000 MWh
Fisheries	Continue to entrain fish at present rate of 100,000 annually	Estimated 60,000 entrained annually	Estimated 50,000 entrained annually	Estimated 35,000 entrained annually
Wetlands	No changes to wetlands	Reduce wetland habitat by 10% - loss of 100 acres	Loss of 50 acres of wetlands	Loss of 60 acres of wetlands
Threatened and Endangered Species	No existing Bald Eagle management Plan	Bald Eagle Management Plan that provides for annual nest surveys and restriction of harmful activities	Bald Eagle Management Plan with environmental education program	Bald Eagle Management Plan
Cultural Resources	Eligible sites protected under existing license	Historic Properties Management Plan that provides for protection measures in the event shoreline erosion threatens cultural sites	Programmatic agreement	Historic Properties Management Plan
Land Use	25-foot buffer zone around reservoir	50-foot buffer zone around reservoir	200-foot buffer zone plus land management plan	300-foot buffer zone plus land management plan
Recreational Access	One access point on the impoundment - estimated 300 user days	Two new facilities (impoundment, and tailwater)-- estimated 25% increase in visitor days	Three new facilities to increase access	One new facility at tailwaters

Example of a chart summarizing the resource effects of different reservoir alternatives (Source: Lake Elsinore

Advanced Pumped Storage Project FEIS, FERC No. 11858, January 2007, as modified):

Table 5-2. Summary of key differences in the potential effects of the co-applicants' proposal and the staff alternative (Source: staff).

Resource/Issue	Upper Reservoir Comparison	
	Morrell Canyon (Co-applicants)	Decker Canyon (Staff)
Area of effect	130-acre footprint; daily fluctuations of 40 feet and weekly fluctuations of 75 feet	120-acre footprint; daily and weekly fluctuations would be on the same order of magnitude as the upper reservoir at Morrell Canyon
Fill materials	2.6 million cubic yards of fill needed for dam	3.0 million cubic yards of fill needed for dam Less overburden at Decker Canyon would allow easier procurement of solid rock material for fill for dam and dike construction
Groundwater	Construction of tunnels for high pressure conduits could affect groundwater; design review of collection system for Lion Spring and effects on groundwater	Construction of tunnels for high pressure conduits could affect groundwater; no collection system would be required
Seismic hazards	Faults may control surface flows at the Morrell Canyon site	No faults have been identified at the Decker Canyon site and subsurface flow does not appear to be controlled by the presence of faults
Surface water	Upper reservoir would interrupt stream flow	Same
Wetland and riparian habitat	Would affect 6.5 acres of wetlands, including Lion Spring; loss of these wetlands and associated riparian habitat would affect plant diversity and wildlife species; effects on downstream areas would be minimized by the water conveyance system under the reservoir	Would affect 1.2 acres of wetlands; no effects on springs or seeps; smaller effects on downstream areas because drainage area is smaller
Oak woodland communities	Would convert about 20 acres of southern coast live oak forest (500 to 600 individual trees over 8 dbh) to project use; would need to plant 20 acres to mitigate	Would convert about 5 acres of southern coast live oak forest to project use so effects would be similar to Morrell Canyon but on a smaller scale; would only need 5 acres to mitigate
Special status wildlife	Would convert 80 acres of chamise chaparral and 20 acres of southern coastal live oak to project facilities.	Would convert 95 acres of chamise chaparral and 5 acres of southern coastal live oak to project facilities.
Mountain lion	Would remove 100 acres of suitable mountain lion habitat from Core B; project operation and maintenance would not likely increase disturbance or risk of interaction over levels that currently result from traffic on South Main Divide Road and use of Morgan Trail	Would remove 100 acres of suitable mountain lion habitat from Core B; project operation and maintenance would represent a very small increase in disturbance, because no trails currently provide for recreation at Decker Canyon site
Munz's onion	No suitable habitat at reservoir site; however, South Main Divide Road in vicinity passes through a soil type that is known to support occurrences of this species	Same
Developed recreation facilities	Footprint would not include Morgan Trail trailhead with minimal effect on users of the trailhead during construction but trail would	Morgan Trail would not have to be rerouted and because visitation is low, increased traffic on South Main Divide

	need to be re-routed either temporarily or permanently depending on final design	Road would have minimal effect on Morgan trailhead users
Dispersed recreation	<p>Would affect hang gliders using the 2 most suitable of the 9 launch sites and waterside setting offered at Lion Spring</p> <p>Would eliminate a natural looking canyon with oak woodland vegetation and replace it with a reservoir surrounded by a chain link fence; inconsistent with visual quality objectives (retention)</p>	<p>Would avoid effects on two most popular hang glider launch sites</p> <p>The existing aesthetic resources within Decker Canyon are subordinate to Morrell Canyon and construction effects associated with building a reservoir in this location would be less than those at the Morrell site; development of the alternative site would not build over a mature oak-woodland riparian area (Lion Spring)</p>
Traffic	Would achieve a balance of excavation to fill within the entire project site	Same

5.2 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Although this section is not directly applicable to an Exhibit E prepared under the ILP and an APEA prepared under the ALP, this section should be used by staff and applicants to compare costs and benefits of proposed environmental measures and discuss the applicant's basis for not adopting any agency recommendations.

This section--sometimes called the "balancing" section--comes from sections 4(e)¹⁸ and 10(a)¹⁹ of the FPA, which require the Commission to give equal consideration to all uses of the waterway on which a project is located. Your purpose in this section is to let the reader know which proposal you think provides the best use of developmental and non-developmental resources--and why.

This section should spell out how you decided between the action alternatives--the applicant's proposal, other action alternatives or measures you considered, such as agency recommendations, and the no-action alternative. You should base your conclusions for this section on the information provided in sections 3.0 (*Environmental Analysis*) and 4.0 (*Developmental Analysis*). Remember, in this section you should show the "bang for the buck"--that is, for the environmental measures you recommend, you should get an appropriate level of resource benefits for the economic cost.

This section is flexible based on the number of recommendations and issues and the importance and complexity of the issues. Applicants and contractors should work with FERC staff to determine the preferred format for a particular project. The length of the discussion should be commensurate with the importance of the resource and costs of the measures.

This section must address the following topics. Each component is discussed in detail below.

¹⁸ In deciding whether to issue a license, "the Commission, in addition to the power and development purposes for which licenses are issued, shall give equal consideration to the purposes of energy conservation, the protection, mitigation of damage to, and enhancement of, fish and wildlife (including related spawning grounds and habitat), the protection of recreational opportunities, and the preservation of other aspects of environmental quality." [16 U.S.C. § 797(e) (2000)]

¹⁹ Requires that a project as licensed be, in the judgment of the Commission, best adapted to a comprehensive plan for improving or developing a waterway for beneficial public purposes, including "the improvement and utilization of water power development, ... the adequate protection, mitigation, and enhancement of fish and wildlife (including related spawning grounds and habitat), and ... irrigation, flood control, water supply, and recreational and other purposes ..." [16 U.S.C. § 803(a)(1) (2000)]

- Introduction
- A summary of why we selected the action alternative and a listing of any mandatory conditions not included in staff alternative
- A listing of measures proposed by the applicant included in the staff alternative
- A listing of the staff-recommended modifications of the applicant’s proposal and additional staff-recommended measures
- A discussion of how we arrived at the key staff-recommended measures, including evaluation of recommendations of others
- A discussion of why we declined to adopt proposed or recommended measures or mandatory conditions
- Basis for selecting preferred alternative

- **Introduction**

Introductory paragraph for the Comprehensive Development and Recommended Alternative section:

Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to the power development purposes and to the purposes of energy conservation, the protection, mitigation of damage to, and enhancement of fish and wildlife, the protection of recreational opportunities, and the preservation of other aspects of environmental quality. Any license issued shall be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. This section contains the basis for, and a summary of, our recommendations for relicensing the _____ Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

- **A summary of why we selected the action alternative**

Here we provide a summary of our reasons for selecting the preferred alternative.

Example of summary:

Based on our independent review of agency and public comments filed on this project and our review of the environmental and economic effects of the proposed project and its alternatives, we selected the staff alternative as the preferred alternative. This alternative includes elements of the applicant’s proposal, section 4(e) conditions, resource agency recommendations, alternative conditions under EPAAct, and some additional measures. We recommend this alternative because: (1) issuance of a new hydropower license by the Commission would allow Municipal to operate the project as an economically beneficial and dependable source of electrical energy for its customers; (2) the 4.2 MW of electric energy generated from a renewable resource may offset the use of fossil-fueled, steam-electric generating plants, thereby conserving nonrenewable resources and reducing atmospheric pollution; (3) the public benefits of this alternative would exceed those of the no-action alternative; and (4) the recommended measures would protect and enhance fish and wildlife resources and would provide improved recreation opportunities at the project when the water supply protection restrictions are no longer required.

Finally, for the reasons outlined below, we recommend that certain conditions specified by the [*Forest Service, WQC agency, FWS, NMFS, etc.*] not be included in the staff alternative. The conditions we are not recommending include expansion of the Deer Creek recreation site and development of a traffic management plan. We recognize, however, that the Commission must include these conditions in any license due to their mandatory nature.

- **Measures proposed by the applicant included in the staff alternative**

Here we either provide a bulleted list or summary of the measures proposed by the license applicant that we recommend be included in the staff alternative. Refer to the applicant's proposal section if more details of the measures are provided in that section. Where we modify the applicant's proposed measures, indicate the changes in italics.

- **Additional staff-recommended measures**

Provide a list or summary of the additional measures staff recommends be included as part of the project, including any modifications to measures proposed by the applicant. Make sure the recommendations consist of sufficient detail to fully understand the measure, particularly for measures not discussed, or only briefly discussed, further in this section.

- **A discussion of how we arrived at the staff-recommended measures**

This is where balancing occurs. This section can be organized by issue or resource area and should discuss all of staff's recommendations or can focus on the key issues (measures that are expensive, conflict with other resource measures, involve significant resources, substantially affect project operation, etc.).

In the discussion of each issue, we should:

- Explain the issue
- Describe what the applicant proposes, if anything, and how it affects resource values
- Describe what others recommend, if anything, and how it affects resource values
- Summarize staff's independent analysis of the issue from section 3, *Environmental Analysis*
- Provide staff's recommendation, including a discussion of how staff's recommendation would best address competing values
- Provide specific details of any recommended plans or measures
- Explain why the expected benefits of staff recommended measures(s) would be worth the cost of implementing the measures

So how do we balance?²⁰

The general steps described below are not necessarily sequential, but could be

²⁰ Also, see *Evaluating Relicense Proposals at the Federal Energy Regulatory Commission*, DPR-2, April 1991.

integrative.

The detailed balancing discussion should focus on critical issues—those that are contentious or controversial, involve significant resources or impacts, can affect multiple resources, are expensive, involve substantial staff modifications, can have a substantial effect on operation of the project, etc. This section will provide our attempt to independently seek solutions that would best address the Commission’s balancing mandate.

Generally, we would look at a range of alternatives that addresses project effects and purposes, starting with the applicant’s proposal, any agency recommendations, and any other recommendations presented in the record. If these alternatives don’t cover the full range of alternatives, we should develop our own alternative.

The next step is to evaluate how each alternative affects the various resources. Here we look at the costs and benefits of each alternative along with any interaction with other resources.

In evaluating alternatives, first we need to understand how the value of each competing resource varies for each option we are considering. This could be based on quantitative or qualitative information. This could involve a relatively straightforward relationship, such as the relationship between quantity of adult fish habitat (weighted usable area) and power benefits. Or it could be more involved. For example, how does raising the instream flow to improve fish habitat in the bypassed reach affect riparian vegetation, swimming and boating, and the project’s power value or how does releasing more water to improve downstream water quality affect reservoir boating and fish habitat and amount of generation?

Once we understand this relationship, we can better understand the effects of applicant and agency alternatives and we can start developing more creative solutions. Here are the types of questions we should be asking. If a proposed boating flow only affects the power value during extreme dry years, can we reduce the proposed flows in those years? Can we come up with an alternative that would restructure the proposed instream flows to provide a better balance of fishery habitat at a lower cost? Can redesigning a proposed project have less environmental effects than the proposed design?

We next compare the various alternatives to baseline conditions—existing conditions. Since we can’t maximize all benefits, we must make tradeoffs. The effects of the different alternatives on competing values, illustrating the various tradeoffs, can be summarized in a table or figure.

The importance or significance of the resources involved must be factored into the

balancing discussion when weighing benefits and costs.

- Does the resource provide significant use, generating significant revenue for the local area?
- Are there significant regional or national programs to recover a species?
- Do the resources have particular legal standing, such as an endangered species or wild and scenic river?
- Is the resource of regional or national significance?
- Can the generation be easily replaced or would it require additional diesel generation?
- Is the resource unique (such as trophy trout fishery or old-growth forest), or common?

Choosing a Recommendation

The above information will provide sufficient information to achieve the best balance of competing resources. Describe the tradeoffs made and how the staff-recommended alternative would achieve the most public benefits. Are the expected benefits of staff recommended measures(s) worth the cost of implementing the measures?

- **A discussion of why we declined to adopt recommendations or conditions**

This discussion can be integrated into the above discussion. However, if these issues are unrelated to any of the previous discussion, they should be discussed here.

- **Basis for selecting preferred alternative**

Here we look at the development and non-developmental benefits of the compilation of all the staff-recommended measures.

For applicants preparing the environmental report or APEA, you should evaluate your proposal, the agencies' and others' alternatives (if they are a complete set of measures), and the no-action alternative at a minimum.

Below are two examples of a *Comprehensive Development and Recommended Alternative* section:

Example of Comprehensive Development and Recommended Alternative section:

5.2. COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a) of the FPA require the Commission to give equal consideration to all uses of the

waterway on which a project is located. When we review a hydropower project, we consider the water quality, fish and wildlife, recreation, cultural, and other non-developmental values of the involved waterway equally with its electric energy and other developmental values. In deciding whether, and under what conditions a hydropower project should be licensed, the Commission must weigh the various economic and environmental tradeoffs involved in that decision. This section contains the basis for, and a summary of, our recommendations for relicensing the Macomb Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review of agency and public comments filed on this project and our review of the environmental and economic effects of the proposed project and its alternatives, we selected the proposed project, with staff-recommended modifications, as the preferred option. We recommend this option because: (1) issuance of a new hydropower license by the Commission would allow Municipal to operate the project as an economically beneficial and dependable source of electrical energy for its customers; (2) the 4.2 MW of electric energy generated from a renewable resource may offset the use of fossil-fueled, steam-electric generating plants, thereby conserving nonrenewable resources and reducing atmospheric pollution; (3) the public benefits of this alternative would exceed those of the no-action alternative; and (4) the recommended measures would protect and enhance fish and wildlife resources, and would provide improved recreation opportunities at the project when the water supply protection restrictions are no longer required.

In the following section, we make recommendations as to which environmental measures proposed by Municipal or recommended by agencies and other entities should be included in any license issued for the project. In addition to Municipal's proposed environmental measures, we recommend additional staff-recommended environmental measures to be included in any license issued for the project. We also discuss which measures we do not recommend including in the license.

Measures Proposed by Municipal

Based on our environmental analysis of Municipal's proposal discussed in section 4 and the costs discussed in section 5, we recommend including the following environmental measures proposed by Municipal in any license issued for the project.

- Municipal would continue to operate and maintain the oily water separator installed in the powerhouse in 1997 to remove all oil from water before it is discharged into the project tailrace.
- Municipal would continue to manage the watershed to protect the water quality and would continue to operate Copper Lake to minimize turbidity to protect the water quality.
- Municipal would install remote water level monitoring equipment at Copper Lake to allow greater lead times for making flow ramping decisions that would in turn enable a decrease in ramping rates.
- Municipal would continue to provide 4.5-cfs flow to the Wild River Mountain Fish Hatchery.
- Use of the Wild River Mountain Trail within the Copper River watershed would continue.
- Municipal would install weirs below both the Copper Lakes dam and the Copper Basin diversion to monitor the seepage that currently occurs from the Copper Lakes dam and the Copper Basin diversion and, if future repairs would reduce seepage, commits to maintain through some other means an amount of flow equal to the amount of the seepage flows measured during the first 2 years of seepage monitoring.
- Municipal would conduct flow monitoring for 5 years just upstream of the tailrace to measure seasonal variability of flows in the bypassed reach of Copper Creek. The gaging would not be conducted to USGS specifications, but would obtain similar results. *We recommend that monitoring occur for 10 years.*
- If public recreation access is opened to Copper Lakes, Municipal would consult with Fish and Game about conducting fish studies in Copper Lakes. *We also recommend that consultation with Parks and Recreation*

occur.

- If Municipal constructs a water treatment facility, Municipal would consult with the Forest Service about reopening the Copper Lakes watershed to public recreation.

Additional Measures Recommended by Staff

- Conduct a water temperature modeling study to identify the effect of project operations and facilities on water temperatures in Copper Creek downstream of the project tailrace
- Maintain a continuous minimum flow through the project of 47 cfs, except in the event of a plant power trip or for the purpose of protecting the water supply purposes of the project, when the flow may be reduced to 35 cfs.
- Limit ramping rates to obtain the following maximum stage changes in Copper Creek downstream from the project tailrace:

February 16 to May 31 No ramping except that ramping up to 1 inch/hour would be permitted when needed to ensure adequate quantity and quality of water for domestic water supply; when flow ramping is needed for these purposes, Municipal would notify a designated fishery agency representative that a flow change is required to allow the agencies to investigate aquatic resource-related impacts;
2 inches per hour maximum at night

June 1 to September 15 1 inch per hour maximum

September 16 to February 15 2 inches per hour maximum

- Develop and implement a plan to monitor project flows and ramping rates, in consultation with NMFS, FWS, Forest Service, and Fish and Game.
- Develop and implement a fisheries habitat enhancement plan showing the detailed design and feasibility of: (1) removing the 5-foot barrier on Copper Creek, (2) improving access to (but not passage through) the Copper Creek culvert, (3) enhancing 2,000 square feet of salmonid rearing habitat, and (4) extending the existing fish ladder on Copper Creek. The plan shall be developed, in consultation with NMFS, FWS, Forest Service, and Fish and Game.
- Adopt appropriate measures if any cultural resources are disturbed during future project operation and maintenance activities.

The following is a discussion of the basis for the additional staff-recommended measures.

Minimum Flow

The staff-recommended minimum flow of 47 cfs in Copper Creek downstream from the project tailrace with a minimum of 35 cfs during plant outages or if needed to protect the water supply purposes of the project, is designed to ensure that the current minimum flow regime is maintained. Currently, Municipal tries to operate the project at a minimum flow of 47 cfs (even though the existing license only requires 35 cfs) because at lower flows the operating efficiency of the project turbines falls off. Allowing a minimum flow of 35 cfs during project outages and for the protection of water supply, would avoid the necessity of modifying the power plant's minimum flow turbine bypass system, and allow Municipal to reduce the flows, as they do now, when needed to ensure an adequate and high quality water supply. At the February 9, 2000, 10(j) meeting the agencies and staff agreed on this minimum flow recommendation.

Other than the cost of monitoring (see below) to check compliance with minimum flow and ramping rate limits, Municipal would incur no loss of power benefits nor would it be required to modify existing minimum flow bypass facilities or build costly water treatment facilities to comply with the new minimum flows. The new minimum flows would protect the fishery resources by ensuring that the minimum flows over the period of a new license remain at the normally higher level of 47 cfs and are not routinely reduced for long periods of time to the 35-cfs level allowed by the current license.

Ramping Rates

The staff-recommended ramping rates are the same as the ramping rates Fish and Game recommended before we issued the draft EA except for the February 16 through May 31 (day time) period, when Fish and Game recommends no ramping and we recommend allowing Municipal to ramp the flows up to a rate of 1 inch per hour, if needed for domestic water supply purposes.

Before the draft EA was issued, FWS recommended that downramping not exceed the rate of 30 cfs per hour, which is equivalent to an instream rate of about 1 inch per hour. The operating data Municipal provided indicates that most of the time the project operates within this criteria; however, we don't believe there is a biological need to restrict ramping rates to less than Fish and Game's recommended 2 inches per hour February 16 to May 31 (nights), and September 16 to February 15 (day and night). Our recommended ramping rates provide adequate protection for the critical periods when juvenile fish may be impacted.

Eliminating Municipal's ability to ramp project flows for municipal water supply quantity and quality control purposes could put Municipal in the position of having to choose between violating a license condition, risking public health or constructing a water filtration plant at a cost of about \$20,000,000. The ramping rate issue was discussed at the February 9, 2000, 10(j) meeting and the agencies agreed to adopt our recommended ramping rates, which sets the target of zero ramping for the critical daytime period between February 16 and May 31, but allows Municipal to ramp 1 inch per hour during this period, when needed to protect the water supply.

The staff-recommended ramping rates would not affect project generation or power value and would not require any new capital expenditures. Municipal plans to add lake level monitoring with remote readout at the Chum operations control center for an estimated cost of \$8,300. This capability would improve Municipal's ability to manage project flows to meet the required ramping rate limits. Limiting ramping rates to the recommended maximums would reduce the possibility of fish stranding, which has been reported to fishery agency representatives in the past. We conclude that any loss in operating flexibility caused by this measure would have minimal economic consequences and would provide valuable protection to the fishery resources over the term of a new license.

Monitoring Project Flows and Ramping Rates

In a June 10, 1999, letter commenting on agency recommendations for terms and conditions to include in a new license for the Copper Lakes Project, Municipal agreed to install a stream gaging station to USGS standards on Copper Creek downstream of the project tailrace and to monitor Copper Creek flows upstream of the tailrace for a period of 5 years. Municipal is currently monitoring seepage flows from Copper Lakes at several locations and has agreed to additional flow monitoring to establish a baseline for leakage from the Copper Creek diversion. The agencies' flow monitoring recommendations include specific requirements that may differ somewhat from what Municipal is proposing and other agencies are recommending. We are, therefore, recommending that Municipal develop a plan, in consultation with Fish and Game, Forest Service, FWS and NMFS, for monitoring project flows and reservoir water surface elevations for approval by the Commission prior to implementation. We estimate the plan would cost Municipal \$5,000 or, about \$500 per year over the 30-year period of analysis. The potential savings from a well designed monitoring plan is worth this cost.

Fisheries Habitat Enhancement

The staff recommends that Municipal consult with the agencies and develop a plan for implementing stream habitat enhancements. We recommend that Municipal include, at a minimum, the following measures in the plan: (1)

remove the 5-foot-high barrier on Copper Creek; (2) modify the existing fish ladder on Copper Creek; (3) improve 2,000 square feet of salmonid rearing habitat in Copper Creek below the tailrace; and (4) improve fish access to the culvert at the mouth of Copper Creek.

Municipal proposes to provide funding of \$15,000 for the agencies to implement whatever stream habitat enhancement measures they choose. Based on our economic analysis, these four measures would cost about \$45,000, however, the exact cost cannot be determined until Municipal develops final plans and feasibility studies. We recommend that Municipal prepare the plan, in consultation with Fish and Game, FWS, NMFS, and Forest Service, and give the resource agencies the opportunity to comment on the plan before filing it with the Commission for final approval. Our estimated cost for preparing the fish habitat improvement plan is \$10,000.

The total estimated cost, including implementation, for the staff-recommended fishery habitat enhancements is \$55,000 (equivalent to a levelized annual cost of about \$5,500 over the 30-year period of analysis). We believe the habitat enhancements created by this recommendation would substantially improve the existing conditions for the important Copper Creek anadromous fish population. Removing the 5-foot Copper Falls in the Copper Creek bypassed reach would open up 1,855 feet of stream with relatively good spawning and rearing habitat despite the reduced flows. Likewise, improving the access to Copper Creek, which was historically considered an important salmon spawning area, would allow more fish to access this tributary habitat. Improving 2,000 square feet of rearing habitat and extending the existing fish ladder at the cascade located where Copper Creek drops into the area of tidal influence near the mouth of the creek, may, also, contribute to improved conditions for the fishery, if these measures are found feasible by the staff-recommended study. The potential benefit of these measures would be worth the additional cost, which is \$40,000 more than Municipal proposed to contribute for these measures.

Cultural Resource Protection

Municipal is not proposing nor are we recommending any changes to project facilities. However, we recommend any new license contain provisions requiring Municipal to take appropriate measures should any cultural resources be discovered or disturbed during future operations and maintenance at the project.

In conclusion, from our evaluation of the environmental effects and public benefits of the project, we find that licensing the Angus Project with our recommended environmental protection measures would be best adapted to a comprehensive plan for the Copper River drainage basin.

Measures not Recommended by Staff

Staff finds that some of the measures recommended by other interested parties would not contribute to the best comprehensive use of the Copper River water resources, do not exhibit sufficient nexus to project environmental effects, or would not result in benefits to non-power resources that would be worth their cost. The following discusses the basis for staff's conclusion not to recommend such measures.

Fish Passage

We do not recommend that Municipal construct fishways or fish screens at the project as recommended by the Copper Coalition. We find that the trout population in the project area consists predominantly of rainbow trout less than 7 inches in length, and based on all of the available information, we find that most of these trout are non-migratory. We find no evidence of any mass trout movements in the project area or of any current adverse effects to the trout population due to existing passage conditions. We, therefore, conclude that the \$158,100 annual cost of constructing, operating, and maintaining fishways at the project would not be justified by the limited benefits.

Another example of Comprehensive Development and Recommended Alternative section (Source: Bar Mills Project EA, FERC No. 2194, September 12, 2005):

5.2.2 Comprehensive Development and Recommended Alternative

Sections 4(e) and 10(a) of the FPA require the Commission to give equal consideration to all uses of the waterway on which a project is located. When we review a hydropower project, we consider the water quality, fish and wildlife, recreation, cultural, and other non-developmental values of the involved waterway equally with its electric energy and other developmental values. In deciding whether, and under what conditions a hydropower project should be licensed, the Commission must determine that the project will be best adapted to a comprehensive plan for improving or developing the waterway.

This section contains the basis for, and a summary of, our recommendations for relicensing the Bar Mills Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

5.2.2.1 Recommended Alternative

Based on our independent review and evaluation of the environmental and economic effects of the proposed action, the proposed action with additional staff-recommended measures, the composite alternative, and no action, we recommend the proposed action with additional staff-recommended measures, as the preferred alternative.

We recommend this alternative because: (1) issuing a new license would allow FPL Energy to continue operating the project as a beneficial and dependable source of electric energy; (2) the 4.0 MW of electric energy generated from a renewable resource may offset the use of fossil-fueled, steam-electric generating plants, thereby conserving nonrenewable resources and reducing atmospheric pollution; and (3) the recommended environmental measures would protect water quality, enhance fish and wildlife resources, and improve public use of project recreation facilities and resources.

FPL Energy Proposal

FPL Energy proposes to continue to operate the project in a cycling mode with a daily 2-foot impoundment drawdown from the top of hinged flashboards, release flows from the powerhouse according to the Instream Flow Agreement, and release a 25-cfs minimum flow in the bypassed reach year-round. FPL Energy would address the need for fish passage according to the Fish Passage Agreement, and also proposes to implement a HPMP, and improve recreation facilities according to a recreation plan.

Staff's Evaluation of the Measures Considered

Our recommended alternative includes provisions of the proposed action with some additional staff-recommended measures including: maintaining a minimum flow of 50-cfs, or inflow if less, in the bypassed reach year-round; developing and implementing a flow and water level monitoring plan. We also recommend implementing FPL Energy's proposed recreation plan and HPMP. We discuss our rationale for the measures we are recommending or not recommending below.

Mode of Operation

Interior recommends that the project be operated in a run-of-river mode such that instantaneous outflow equals inflow and fluctuations in the project impoundment be kept at a minimum at all times. NOAA Fisheries also recommends run-of-river operation but states that the impoundment should be held within 6 inches of the normal crest elevation. Maine Fish and Wildlife recommend that, except in emergency situations, FPL Energy refrain from performing routine maintenance activities, which would require reservoir drawdowns, during May and June to protect the littoral zone spawning habitat for smallmouth and largemouth bass. FPL Energy proposes to continue operating the Bar Mills Project in a cycling mode with daily reservoir level fluctuations of up to 2 feet below the full pond elevation of 148.5 feet USGS datum.

Operating the project as recommended by the agencies would reduce the chances of disrupting any spawning activity that might occur within or nearby the existing fluctuation zone. However, we are unable at this time to recommend that the project be operated in a run-of-river mode. Current project operation provides a regime that supports the structure and function of riparian wetlands, and project operation does not significantly affect riparian

vegetation. Additionally, it is not clear that the existing operations are actually having an effect on spawning fishes. The abundance of the young-of-year age class of smallmouth bass and the presence of active nests beyond the influence of the daily drawdown zone indicates that successful spawning does occur in the impoundment under current operations. The apparent slow growth, lack of quality size smallmouth bass and largemouth bass, and the apparent presence of a poor year class indicate that the overall health of the bass population is less than optimal and would seem to point to other causative factors that may be indicative of the basin as a whole such as low primary productivity. Operating the project in a strict run-of-river mode at an annual cost of \$6,340 would not seem to provide the types of benefits that would improve the overall health of the fishery. We do recommend that maintenance drawdowns that exceed the normal 2-foot daily drawdown be avoided during the spring spawning period months of May and June in order to protect those nests that have already been established. We don't anticipate that limiting maintenance drawdowns to months outside of the May to June spawning season would entail any significant costs.

Minimum Flows in the Tailrace

FPL Energy proposes to continue releasing flows from the Bar Mills powerhouse in accordance with the Instream Flow Agreement. According to the Instream Flow Agreement, the flow requirements at Bar Mills are determined by the following flow releases made at the upstream Bonny Eagle Project: (1) run-of-river operation from April 1 through June 30, with the impoundment maintained within 1 foot of full pond elevation; (2) 400 cfs, or inflow, whichever is less, from July 1 through September 30; (3) 600 cfs, or inflow, whichever is less, from October 1 through November 15; and (4) 250 cfs, or inflow, whichever is less, from November 16 through March 31. Because DO levels in the project tailrace were found to meet state standards for Class A waters during low-flow, high temperature conditions, continuing to adhere to the conditions of the Flow Agreement would ensure that state water quality standards are met downstream of the powerhouse at no additional cost. Therefore, we recommend that the above flow releases become a condition of any license issued.

Minimum Flows in the Bypassed Reach

FPL Energy proposes to maintain a minimum flow of 25 cfs in the project's bypassed reach. Interior, NOAA Fisheries, and the Salmon Federation recommend that FPL Energy maintain at least 250 cfs in the bypassed reach year-round. Marine Resources, Maine Fish and Wildlife and the Salmon Commission recommend a minimum flow of at least 100 cfs.

Although habitat for smallmouth bass adults and juveniles, brown trout adults, and macroinvertebrates is greatest at a flow of 250 cfs, the rate of habitat improvement is greatest when flows are increased from leakage to 25 cfs. Another moderate increase in habitat occurs when flows are increased from 25 to 50 cfs for all species life stages except smallmouth bass adults. Based on our evaluation of potential benefits to habitat for resident fish, stocked brown trout, macroinvertebrates, and to the zone of passage for migratory species (if upstream fish passage is ultimately required), we recommend that FPL Energy maintain a minimum flow of 50 cfs in the bypassed reach year-round. A flow of 50 cfs would provide about 70 percent of the maximum habitat (for the range of flows evaluated) for three of the four species life stages and nearly 60 percent for smallmouth bass adults. The rate of habitat improvement above 50 cfs levels off with further increases in discharge. As a zone-of-passage flow, 50 cfs would provide 16-foot-wide and 13-foot-wide passage channels at transect 2 for the 1.5-foot-deep and 2-foot-deep criteria, respectively. At 50 cfs, about 14 percent of transect 2 would be passable assuming a depth criterion of 1.5 feet. Increasing minimum flows above 50 cfs would not provide incremental improvements to habitat and zone of passage conditions worth the cost of \$26,920 and \$66,570 annually in lost generation, for the 100-cfs and 250-cfs minimum flows, respectively. Maintaining a minimum flow of 50 cfs at an annual cost of \$7,970 in lost generation would provide most of the habitat provided by the higher 250-cfs flow and zone of passage conditions for migratory fishes similar to flows of 100 and 250 cfs depending on the depth criterion used.

Flow and Water Level Monitoring Plan

Interior, NOAA Fisheries, Marine Resources, Maine Fish and Wildlife, and the Salmon Commission recommend that FPL Energy develop a flow and water level monitoring plan. NOAA Fisheries also recommends

installing flow monitoring equipment in the project tailrace and bypassed reach to confirm minimum flow requirements. A plan to monitor impoundment levels and minimum flows (bypassed reach and tailrace) developed in consultation with the relevant agencies that describes contingencies for emergencies (such as providing downstream flows during project shutdown), scheduled maintenance drawdowns, droughts, as well as reporting criteria, would minimize misunderstandings about operational compliance and help ensure that aquatic resources at the project are protected during the term of a license. Therefore, we recommend that a plan for monitoring impoundment levels and minimum flows in the bypassed reach and tailrace be developed in consultation with the agencies at an annual cost of \$4,260.

Recreation

FPL Energy proposes a recreation plan that would enhance recreational facilities and access at the project by improving the existing canoe portage take-out and parking, improving access to the tailrace, monitor recreation use and capacity, stabilizing minor bank erosion near the canoe put-in, and providing additional recreation use and directional signs. The proposed enhancements would improve canoe passage around the project dam, access for fishing, swimming and informal recreational activities. We recommend approving and implementing the proposed recreation plan, monitoring recreational use, and filing a Commission's Form 80 report every six years. The estimated annual cost of this measure is \$4,540.

Historic Properties Management Plan

FPL Energy proposes to implement the HPMP and conduct annual monitoring of sites within the project area that are eligible for listing in the National Register of Historic Places. The HPMP includes procedures that include consultation with the SHPO to address effects when unanticipated historic properties are discovered during land-disturbing maintenance or repair at the project. We recommend approving and implementing the HPMP. The estimated annual cost of this measure is \$330.

Shoreline Management Plan

Interior recommends that a detailed SMP be prepared for licensee-owned lands abutting project waters within 330 feet of the high water elevation. The plan is to include buffer strips to protect riparian areas for wildlife and aesthetic resources and address the likelihood of increased development pressures in the watershed.

Staff notes that there are only 3 acres of land within the project boundary located in the vicinity of the dam (FPL Energy does not own land above the full pool elevation in the impoundment area). Also, there appears to be little to no developmental pressure along the shoreline.

Most of the project land and waters within the 3-acre dam area would be used for recreation access and activities. The proposed recreation plan would improve and assure protection of these lands for public recreation. We therefore, do not believe a SMP would provide a significant benefit above those that could be provided through the recreation plan. Further, any license issued for this project would include a standard land use article that requires consultation with federal and state fish and wildlife agencies prior to leasing or providing easements across project lands.

--example continued on next page--

5.2.2.2 Conclusion

Based on our review of the agency and public comments filed on the project and our independent analysis pursuant to sections 4(e), 10(a)(1), and 10(a)(2) of the FPA, we conclude that licensing the Bar Mills Project, as proposed by FPL Energy with the additional staff-recommended measures would be best adapted to a plan for improving or developing the Saco River waterway.

5.3 UNAVOIDABLE ADVERSE IMPACTS

This section should summarize "any adverse environmental effects that cannot be avoided should the proposal be implemented," as required by 40 CFR, section 1502.14, including effects of protection, mitigation, and enhancement measures. You should look at your assessment and determine if any adverse impacts would occur despite implementation of proposed and staff-recommended environmental measures. You should discuss any impacts to the resources--whether they are short or long-term, minor or major, cumulative or site-specific--that may occur. Use subheadings as appropriate.

Example of Unavoidable Adverse Impacts:

5.3 UNAVOIDABLE ADVERSE IMPACTS

Minor amounts of sediment would enter Green Creek as a result of construction of the project, even with implementation of erosion control measures, resulting in short-term impacts to resident fish. Some fish entrainment mortality would occur. This long-term impact is expected to be minor, given the existing condition of the fishery in the project area and in Green Creek upstream and downstream of the project. About 12 acres forested habitat would be permanently lost, including 2.2 acres of old-growth habitat; wildlife associated with the affected habitat would be lost. Protection of 6.6 acres of old-growth would minimize long-term impacts to wildlife. About 3 acres of second-growth forest would also be cleared but would be revegetated. The project would also result in minor increases in traffic, noise, and visual disturbance during construction and long-term aesthetic impacts during project operation. Two archeological sites could be affected by increased access, but trails would be designed to direct hikers away from the area.

5.4 SUMMARY OF SECTION 10(j) RECOMMENDATIONS AND 4(e) CONDITIONS

If no 4(e) conditions are provided, this section would only address fish and wildlife agency recommendations and would be labeled section 5.4, Recommendations of Fish and Wildlife Agencies.

Although this section is not directly applicable to an Exhibit E prepared under the ILP or an APEA prepared under the ALP, it should be developed by applicants to keep track of draft fish and wildlife agency and mandatory conditioning agency recommendations and the applicant's response.

5.4.1 Recommendations of Fish and Wildlife Agencies

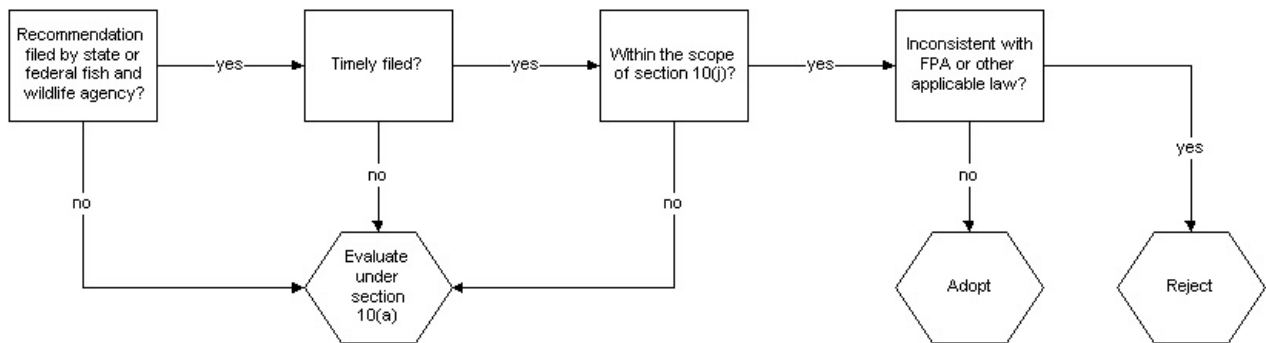
Section 10(j) of the FPA requires the Commission to:

- Include license conditions for protection, mitigation, and enhancement of fish and wildlife resources based on the recommendations²¹ received pursuant to the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) from the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, and state fish and wildlife agencies [subsection 10(j)(1)] unless the Commission determines that they are inconsistent with provisions of Part 1 of the FPA or other applicable law
- When the Commission believes any such recommendation is inconsistent with Part I of the Federal Power Act or other applicable law, attempt to resolve inconsistencies with the specified agencies giving due weight to the recommendations, expertise, and statutory responsibilities of the agencies [subsection 10(j)(2)]

Draft EA/EIS

We evaluate each recommendation according to the following process:

²¹ Fish and wildlife recommendation--"means any recommendation designed to protect, mitigate damages to, or enhance any wild member of the animal kingdom, including any migratory or nonmigratory mammal, fish, bird, amphibian, reptile, mollusk, crustacean, or other invertebrate, whether or not bred, hatched, or born in captivity, and includes any egg or offspring thereof, related breeding or spawning grounds, and habitat. A 'fish and wildlife recommendation' includes a request for a study which cannot be completed prior to licensing, but does not include a request that the proposed project not be constructed or operated, a request for additional pre-licensing studies or analysis or, as the term is used in sections 4.34(e)(2) and 4.34(f)(3), a recommendation for facilities, programs, or other measures to benefit recreation or tourism" [18 CFR, section 4.30(b)(9)(ii)].



We document our findings in this section of the NEPA document. Specifically, the draft EA/EIS should:

- Account for all recommendations filed under section 10(j)
- Indicate whether you think a fish and wildlife agency recommendation is a specific measure for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project [i.e., within the scope of 10(j)—see below], and if not, why not. All recommendations found to be outside the scope of section 10(j) are considered as recommendations under section 10(a).

Measures Considered Outside the Scope of Section 10(j)

- Late-filed recommendations
- Post-licensing studies that can be conducted before licensing (e.g., minimum flow study)
- Measures that are not specific (vague, general, or undefined future fish and wildlife measures)
- Non-fish and wildlife measures (e.g., recreation facility construction, public access, rare plant protective measures, administrative conditions)
- Measures with no nexus to proposed action

- Include your preliminary call on whether the recommendations that are within the scope of section 10(j) are or are not consistent with the FPA or other applicable law (see below) and should be adopted by the Commission, and discuss in detail the reason for not adopting the measure and the basis for your recommendation, including why the measures you recommend would protect the resource. Don't quibble over insignificant matters.

Bases for Findings of Inconsistencies

- Comprehensive development standard of section 10(a)(1) of the FPA, including equal consideration standard of section 4(e) (“balancing considerations”)
- Substantial evidence standard of section 313(b) of the FPA
- Other applicable law

- For recommendations that we find inconsistent with sections 10(a) and 4(e), we must show that the cost of the measure (i.e., negative impacts it would have) outweighs the benefits (i.e., positive impacts it would have on the affected natural resource or staff's recommendation).
 - For recommendations that we find inconsistent with the substantial evidence standard of section 313(b), summarize what the agency stated in support of the recommendation, and explain, in such detail as necessary, why the agency's evidence is not adequate to support its conclusion (e.g., agency does not explain why a measure is necessary or bases its recommendation on outdated information). If the agency provides no support for a recommendation, say so.
 - If staff finds a recommendation inconsistent with law other than the FPA (e.g., a recommendation that directly conflicts with a mandatory water quality certification condition under section 401 of the Clean Water Act), explain so.
- Include a summary table (described below)

If the discussion is involved, use subheadings.

An example of a 10(j) section is included below:

5.4 FISH AND WILDLIFE AGENCY RECOMMENDATIONS

Under the provisions of section 10(j) of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project.

Section 10(j) of the FPA states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other applicable law, the Commission and the agency shall attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency. In response to our REA notice, the following fish and wildlife agencies submitted recommendations for the project: Agency 1 (letter filed May 27, 2005), Agency 2 (letter filed May 26, 2005), and Agency 3 (letter filed May 26, 2005). Table 5-3 lists the federal and state recommendations filed subject to section 10(j), and whether the recommendations are adopted under the Staff Alternative. Environmental recommendations that we consider outside the scope of section 10(j) have been considered under section 10(a) of the FPA and are addressed in the specific resource sections of this document and the previous section.

The Commission staff makes a preliminary determination that three recommendations by Agency 1 and one recommendation by Agency 3 may be inconsistent with the purpose and requirements of the FPA or other applicable law.

We do not recommend adopting Agency 1's recommendation that Smith Electric maintain a daily flow fluctuation range of 10,000 cfs in Smith Creek during the fall Chinook salmon rearing period. Our analysis in section 3.3.2, suggests that Agency 1's 10-kcfs fluctuation limit would potentially result in less stranding and entrapment of fall Chinook salmon in Smith Creek than the operations proposed by Smith Electric, Agency 1, and Agency 3 in the settlement agreement. However, the 10 kcfs fluctuation limit would increase fluctuations within the project reservoirs

that could have adverse environmental effects on reservoir fisheries, recreation, shoreline erosion, or cultural resources. Additionally, the 10 kcfs fluctuation limit would substantially reduce the ability of the project to provide regional electrical system support and load following capability and would also reduce the ability of the project to serve other purposes such as flood control, navigation, agriculture, recreation, municipal and industrial use, or cultural resources. Lastly, implementation of the 10 kcfs limit would cost approximately \$136 million per year, or 32 times more than the estimated cost of implementing the agreement (i.e., \$4.3 million per year). Based on this information, we find that Agency 2's recommendation to reduce fall Chinook salmon stranding and entrapment in Smith Creek may be inconsistent with the comprehensive planning standard of section 10(a) and the equal consideration provision of section 4(e) of the FPA.

We do not recommend adopting Agency 1's recommendation that Smith Electric conduct annual surveys to estimate fall Chinook salmon fry entrapment and stranding losses from flow fluctuations in Smith Creek. As discussed in section 3.3.2, Smith Electric conducted stranding and entrapment surveys from 1997 to 2003 and demonstrated the benefits of the proposed agreement during two years (2002 and 2003) when Smith Electric voluntarily complied with the requirements of the agreement. Under the agreement, Smith Electric, Agency 1, and Agency 3 propose to conduct follow-up monitoring using similar methods in 2011, 2012, and 2013. Although Agency 1's recommendation to conduct annual surveys to estimate entrapment and stranding would provide information that could be used to track year-to-year conditions in Smith Creek, we believe that the follow-up monitoring proposed by the agreement signatories would provide sufficient information to judge the success of the measures. Additional monitoring could be required after review of the results of the proposed monitoring. Therefore, we conclude that the benefits of Agency 1's level of tracking would not be worth the additional cost of \$150,000. Based on this information, we find that Agency 1's recommendation to conduct annual fall Chinook salmon stranding and entrapment surveys in Smith Creek may be inconsistent with the comprehensive planning standard of section 10(a) and the equal consideration provision of section 4(e) of the FPA.

We do not recommend adopting Agency 2's and Agency 3's recommendation that Smith Electric develop and implement a bull trout management plan. Agency 2 and Agency 3 indicate that the plan should include a monitoring program to assess the project effects on upstream and downstream bull trout passage, assessment of juvenile rearing in the reservoirs, implementation of modifications to correct any passage problems that are identified, assessment of off-season passage counts, PIT-tagging of incidentally collected sub-adult fish, and participation in information exchange and regional monitoring efforts. However, our analysis in section 3.3.2 suggests that the occurrence of bull trout in the project area is extremely rare and there is no evidence that the project affects the few bull trout that may infrequently occur within the project area. Additionally, because of the low occurrence of this species in the project area, it would be essentially impossible to conduct the recommended studies with any level of statistical validity. The rare occurrence of bull trout in the project area and the lack of evidence demonstrating any adverse project effects on bull trout suggest that the recommended studies are unwarranted and unnecessary. Based on this information, we find that Agency 2's and Agency 3's recommendation to develop and implement a bull trout management plan may be inconsistent with the substantial evidence standard of section 313(b) of the FPA.

Summary Table

The summary table should include the following:

- A list of all fish and wildlife agency recommendations filed under section 10(j)—single recommendations can be divided into multiple recommendations for clarity and similar recommendations made by multiple agencies can be combined; recommendations can be numbered to more easily track discussion in the document or reference agency letters (e.g., FWS-1, NMFS-3a, etc.)
- Our conclusions as to whether the recommendations are within the scope of 10(j) and

why they are not within the scope of 10(j) (give clear reason in the table or as a footnote)

- The annual cost to implement the recommendations (be as specific as possible--in absence of dollar value use descriptive terms such as insignificant, minor, moderate, major, loss of timber value, etc.)
- Our conclusion (adopt or not adopt)
 - If we don't adopt a recommendation, briefly describe why
 - If a recommend is partially adopted, briefly describe how our recommendation differs from the agency recommendation

Number the recommendations if there are many.

For projects with many recommendations, it may be prudent to refer the reader to the comprehensive development section instead of summarizing the reasons we don't adopt valid 10(j) recommendation in this section. The preliminary findings of inconsistency would appear in the 10(j) summary table. This would avoid redundancy

Example of a summary table:

Table 5-X. Fish and wildlife agency recommendations for the Blue Creek Project (Source: staff).

Recommendation	Agency	Within the scope of section 10(j)	Annualized cost	Adopted?
Revegetation of unstable slopes to reduce sedimentation	FWS	Yes.	\$3,000	Adopted.
Improvements to fish screen to minimize impingement of small fish	Washington DFW	Yes.	\$7,000	Adopted.
Instream flow of 200 cfs in bypassed reach	FWS; Washington DFW	Yes.	\$35,000	Adopted.
Installation of stream gage	FWS, NMFS	Yes.	\$3,000	Adopted.
Develop and implement a bull trout management plan to address project-related impacts over the term of the new license	FWS; Washington DFW	Yes.	\$6,300	Not adopted--effects to bull trout are from upstream projects.
Monitoring of water temperature and stream discharge throughout the year	FWS, NMFS, Washington DFW	No. No nexus to project effects—project has no potential to affect temperature or flows.	\$15,000	Not adopted.
Raptor protection measures	FWS, Washington DFW	Yes.	\$1,500	Adopted.
Rare plant survey	FWS	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$2,000	Adopted.
Riparian vegetation monitoring	Washington DFW	Yes.	\$10,000	Adopted.
Acquisition and management of 350 acres of wildlife habitat	FWS	Yes.	\$9,300	Adopted
Noxious weed monitoring of all lands within project boundary	FWS	Yes.	\$5,000	Not adopted--recommending monitoring of areas disturbed by project-related activities.

Example of a Fish and Wildlife Agency Recommendations section without discussion of reasons for not adopting valid 10(j) recommendations and summary:

5.4 FISH AND WILDLIFE AGENCY RECOMMENDATIONS

Under the provisions of section 10(j) of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project. In response to our REA notice, the following fish and wildlife agencies submitted recommendations for the project: Interior (letter filed January 27, 2006) and Oregon DFW (letter filed January 25, 2006).

Section 10(j) of the FPA states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other applicable law, the Commission and the agency shall attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency. Table 5-4 lists the federal and state recommendations filed pursuant to section 10(j) and indicates whether the recommendations are included under the Staff Alternative. Environmental recommendations that we consider outside the scope of section 10(j) have been considered under section 10(a) of the FPA and are addressed in the specific resource sections of this document.

Of the 35 recommendations that we consider to be within the scope of section 10(j), we wholly include 25, include 5 in part, and do not include 2. We discuss the reasons for not including those recommendations in section 5.2, *Comprehensive Development and Recommended Alternative*. Table 5-4 indicates the basis for our preliminary determinations concerning measures that we consider inconsistent with section 10(j).

Table 5-4. Fish and wildlife agency recommendations for the Green River Project (Source: staff) (*just showing a few of recommendations*).

Recommendation	Agency	Within the scope of section 10(j)	Annualized cost	Adopted? and Basis for Preliminary Determination of Inconsistency
Establish anadromous fish hatchery goals, based on adult returns and societal use.	Interior	Yes.	\$66,700	Not adopted ^a (see section 5.2.2).
Ensure raptors are not subject to electrocution	Interior	Yes.	\$10,000	Yes
Acquire and manage 20,000 acres if initial target lands are unavailable.	Oregon DFW	Yes.	\$2,000,000	Not adopted ^b (see section 5.2.3).
Conduct rare plant survey	Oregon DFW	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$2,000	Yes.

^a Preliminary findings that recommendations found to be within the scope of section 10(j) are inconsistent with the substantial evidence standards of section 313(b) of the FPA are based on a lack of evidence to support the reasonableness of the recommendation or a lack of justification for the measure.

^b Preliminary findings that recommendations found to be within the scope of section 10(j) are inconsistent with the comprehensive planning standard of section 10(a) of the FPA, including the equal consideration provision of section 4(e) of the FPA, are based on staff's determination that the costs of the measures outweigh the expected benefits.

Final EA/EIS

The final EA/EIS will summarize any attempts to resolve the inconsistencies. The final environmental document should include:

- A revised table of agency recommendations showing the results of the 10(j) process
- A summary of inconsistencies
- The date of our 10(j) letter(s) and agency response(s)
- The date of any teleconference or meetings
- A discussion of how we attempted to resolve the preliminary inconsistencies and the conclusions
- If we do not resolve an inconsistency, a discussion of how the measures we recommend adequately and equitably protect, mitigate, or enhance fish and wildlife resources

Example of discussion summarizing the 10(j) meeting or teleconference:

To resolve the inconsistencies between the agencies' recommendations and the purposes and requirements of the FPA or other applicable law, Commission staff conducted a 10(j) meeting over the telephone with representatives from FWS on April 27, 2006. The recommendations discussed included: (1) operating the project strictly run-of river and maintaining reservoir levels in both reservoirs within 0.1-foot of full pond elevation; and (2) improving aquatic habitat in Smith Lake by installing woody debris, artificial fish structures, and planting aquatic vegetation in the reservoir.

Run-of-river Project Operations with Specific Reservoir Elevations – Because of the sensitivity and types of aquatic resources located downstream from the project dam, FWS was concerned that any unexpected project loss of power would cause a shut-down of the projects. FWS said that these unexpected project shut-downs could jeopardize the health and well being of aquatic resources by affecting the timing and availability of water released into the rivers immediately downstream from the dams.

Staff discussed the success of the use of the computerized operation at the project to maintain reservoir elevations within a very tight range. Municipal is concerned that without having some flexibility in maintaining reservoir elevations, the project would be in non-compliance with any license conditions that required the reservoir be maintained within 0.1-foot of full pond elevation at all times.

FWS ultimately agreed to some degree of flexibility in the reservoir operating regimes for both projects. The agreed-upon approach would set the lower limit for reservoir elevations at within 0.1-foot of full pond elevation, but would allow the pond level to decrease up to 0.3-foot of full pond elevation 1 percent or less of the time. The resource agencies agreed to develop the specifics of how the 1 percent criteria for determining the frequency and occurrence of the 0.3-foot elevation would be crafted and defined in the Lake Level and Flow Monitoring Plan to be developed by Municipal for both projects, in consultation with the resource agencies.

Improve Aquatic Habitat in Smith Lake – FWS withdrew their recommendation for aquatic habitat improvement for Smith Lake. Instead, the FWS requested more financial aid from Municipal for their proposed Community Fishing Program for Smith Lake. This new request is discussed below in section 5.2, *Comprehensive Development and Recommended Alternative*.

5.4.2 Land Management Agencies’ Section 4(e) Conditions

In this section, we provide a table summarizing the land management conditions and indicate whether they, or any alternative conditions, are included in the Staff Alternative.

Example of Land Management Agencies’ Section 4(e) Conditions section:

5.4.2 Forest Service’s Section 4(e) Conditions

In section 2.2.5, *Modifications to Applicant’s Proposal—Mandatory Conditions*, we list the preliminary 4(e) conditions submitted by the Forest Service, and note that section 4(e) of the FPA provides that any license issued by the Commission “for a project within a federal reservation shall be subject to and contain such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation.” Thus, any 4(e) condition that meets the requirements of the law must be included in any license issued by the Commission, regardless of whether we include the condition in our Staff Alternative.

Of the Forest Service’s sixteen preliminary conditions, we consider eight of the conditions (conditions 1 through 8) to be administrative or legal in nature and not specific environmental measures. We therefore, do not analyze these conditions in this EA. Table 5-1 summarizes our conclusions with respect to the eight preliminary 4(e) conditions that we consider to be environmental measures. We include in the Staff Alternative six conditions as specified by the agency, modify one condition to adjust the scope of the measure, and did not recommend one condition; the measures not adopted in total are discussed in more detail in section 5.2, *Comprehensive Development and Recommended Alternative*.

Table 5-1. Forest Service preliminary section 4(e) conditions for the Green Creek Project (Source: staff).

Condition	Annualized cost	Adopted?
No. 9: Transportation Plan	\$5,000	Yes.
No. 10: Campground construction	\$23,000	Yes.
No. 11: Minimum flows of 300 cfs	\$65,000	No, we adopt Green Hydro’s alternative condition for a minimum flow of 200 cfs and habitat enhancement.
No. 12: Noxious weed control plan	\$3,000	Yes.
No. 13: Trail maintenance	\$10,000	No, we do not adopt applicant funding of trail maintenance for the section of trail located outside the project boundary.
No. 14: Public access management plan	\$15,000	Yes.
No. 15: Emergency flow shutoff	\$25,000	Yes.
No 16: Erosion control plan	\$10,000	Yes.

5.5 CONSISTENCY WITH COMPREHENSIVE PLANS

Under 18 CFR, sections 4.38(e)(6) and 16.8(e)(6), you must identify relevant comprehensive plans and explain how and why the proposed project would, would not, or should not comply with such plans. Section 10(a)(2)(A) of the FPA requires the Commission, before licensing, to consider each proposed project's consistency with relevant federal or state comprehensive plans for developing or conserving a waterway. Some examples of those plans include federal watershed management plans prepared by the U.S. Army Corps of Engineers; plans to protect fishery resources, migratory waterfowl, or unique ecosystems by the FWS; and land and resource management plans prepared by the Forest Service, National Park Service, or Bureau of Land Management. State plans include: state comprehensive outdoor recreation plans, fish and wildlife plans, water quality improvement plans, and river basin plans.

While consulting with the agencies about your project, ask them about relevant federal and state plans. The updated list of plans that meet the requirements of 18 C.F.R. §2.19 can be found on the FERC web site (<http://www.ferc.gov/industries/hydropower/gen-info/licensing/complan.pdf>) so that you may discuss your project's consistency or inconsistency with relevant plans. If the project is inconsistent, you should evaluate measures to reduce the project's conflicts with the goals of the accepted plan. For inconsistencies that can't be adequately resolved, the Commission may recommend an alternative project design or deny the license.

There may be other plans, that although they do not qualify as comprehensive plans under section 10(a)(2)(A), may be relevant to our evaluation of the project. In that case, identify and consider those plans in comprehensive development analysis, pursuant to section 10(a)(1) of the FPA.

Example of a project that is consistent with Comprehensive Plans:

5.5 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) of the FPA, 16 U.S.C., § 803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. We reviewed six comprehensive plans that are applicable to the West River Project, located in Wisconsin.¹ No inconsistencies were found.

¹ List applicable plans here. [If list is very long, include in text or as an appendix.]

Example of a project that is inconsistent with a Comprehensive Plan:

5.5 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) of the FPA, 16 U.S.C., § 803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving waterways affected by the project. We identified six comprehensive plans that are applicable to the East River Project, located in Iowa.¹ We have determined that the project would be consistent with their provisions with the exception of the *East River Basin Watershed Inventory and Assessment*, as discussed below.

The *East River Basin Watershed Inventory and Assessment* identifies six goals for the East River Basin including:

- Protecting and improving water quantity and quality so that all streams are capable of supporting native aquatic communities
- Protecting and improving habitat conditions to meet the needs of native aquatic species while accommodating society's demands for water and agricultural production
- Maintaining the diversity and abundance of aquatic communities and improving the quality of the sport fishery
- Increasing public access
- Addressing informational and educational opportunities
- Managing databases to provide accurate and up-to-date data and compatibility with other regions, divisions, and agencies

In certain instances, this document cites the existence and operation of the East River Project as impediments to achieving some of these goals, and compares existing conditions to pre-project conditions. In particular, the document states that one objective under the first goal is to:

- Work with the Corps and other basin water regulators, during and following the FERC relicensing process, to improve aquatic habitat and recreational use by changing East River Project operation to natural run-of-river (non-peaking) operation, or obtain mitigation measures that will result in equivalent or more benefits to natural resources and recreation. (pp. 189)

The proposed action is inconsistent with this objective, because it would continue to operate the project as a peaking and load following facility. It is unlikely that other aspects of the proposed action would be considered equivalent benefits to that of natural run-of-river operation. Similarly, it is equally unlikely that other alternatives (including the no-action alternative) would result in benefits equivalent to that of natural run-of-river operation and would, therefore, also be considered inconsistent with this objective. Notwithstanding our finding, we note that the signed Settlement Agreement was developed between the applicant and natural resource agencies. We conclude that the agencies' signing of the Settlement Agreement indicates that the proposed action would adequately address resource issues on the East River, and would meet the substance of the aforementioned comprehensive plan's goals and objectives.

¹List applicable plans here. [If list is very long, include in text or as an appendix.]

6.0 FINDING OF NO SIGNIFICANT IMPACT (OR SIGNIFICANT IMPACT) (EAs only)

In this section you'll say whether, based on the environmental analysis, the action (licensing the project) constitutes a major federal action significantly affecting the human environment. Include a summary of any unavoidable adverse impacts. If you conclude that there wouldn't be a significant impact, then state a finding of no significant impact and incorporate the environmental assessment by reference.

Example of a Finding of No Significant Impact (FONSI):

6.0 FINDING OF NO SIGNIFICANT IMPACT

Continuing to operate the Angus Project, with our recommended measures, involves no land-disturbing or land-clearing activities. Our recommended measures would ensure state water quality standards, ensure natural flow patterns below the project, and prevent potential dewatering of the impoundment shoreline and tailwater areas. Restoration of the river channel below the spillway and improvements to the canoe portage would cause minor, short-term increases in soil erosion and sedimentation. Project operation and the associated fish entrained through the project's turbines would result in some minor, long-term effects on resident fish in the Copper River. Maintaining the existing trashracks would continue to minimize these effects.

On the basis of our independent analysis, we find that the issuance of a license for the Angus Project, with our recommended environmental measures, would not constitute a major federal action significantly affecting the quality of the human environment.

7.0 LITERATURE CITED

In this section, you should cite all materials referenced in the environmental document: including final study reports, journal articles, other books, agency plans, and local government plans. Generally, citations should include author, date, title of report, paper, or article, source (journal, book or other), volume, number and page reference (or total pages). For internet sources, include web page link and date accessed.

The publication information should be sufficient to locate the various types of literature listed; particularly important is information concerning the location and availability of reports, occasional publications, and unpublished materials.

- Citations are listed alphabetically by author. Multiple references by the same author are listed chronologically, with the most recent publication first.
- When citing several works by the same author, list the earliest work first. After the first citation, a line may be used in place of the author's name to avoid writing the same name each time.
- If the author and year are identical for two or more publications, list alphabetically by title and insert lowercase letters after the year to differentiate the references (e.g., FERC, 200a).
- Capitalize only the first word and proper names in the titles of articles and books. For clarity, spell out the names of serial publications.

More information on citing the application and citing letters and personal communications and references in the text is found in Attachment B, *General Guidance for Text, Graphics, and References*.

Example of Literature Cited section:

7.0 LITERATURE CITED

- Backus, P. 2006. Bald eagles soaring high over Montana. The Missoulian. January 3, 2006. Missoula, Montana. p. 3.
- Behnke, R.J. 1992. Native trout of western North America. American Fisheries Society Monograph 6. 275 pp.
- California Department of Fish and Game. 2005. State and federally listed endangered and threatened animals of California. April 2006. <<http://www.dfg.ca.gov/whdab/pdfs/TEAnimals.pdf>> Accessed May 3, 2006.
- Federal Energy Regulatory Commission (FERC). 2000. Environmental assessment for the Lake El Dorado Hydroelectric Project, FERC No. 184-065, California. FERC/FEIS 0157F. August 2003.
- _____. 1999. Final Environmental assessment for the Lockhart Hydroelectric Project, FERC No. 2620-005, South Carolina. August 1999. 56 pp.
- PPL Montana. 2006. Mystic Lake Hydroelectric Project 2301-022 filing of final license application (FLA) per the Commission's Integrated Licensing Process. PPL Montana, Butte, Montana.
- Prichard, D. J., Anderson, C. Correll, J. Fogg, K. Gebhart, R. Krapf, S. Leonard, B. Mitchell, and J. Staats. 1998. A user guide to assessing proper functioning condition and the supporting science for lotic areas. Technical Report 1737-15. U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado. 126 p.
- Schmetterling, D.A., and D.H. McEvoy. 2000. Abundance and diversity of fishes migrating to a hydroelectric dam in Montana. *North American Journal of Fisheries Management* 20:711-719.
- Squire, J.R. and R.T. Reynolds. 1997. Northern Goshawk (*Accipiter gentilis*). *Birds of North America*, No. 298 (A. Poole and F. Gill, eds). The Academy of Natural Scientists, Philadelphia, Pennsylvania, and the American Ornithologists' Union, Washington, D.C.
- Tennant, D.L. 1976. Instream flow regimens for fish, wildlife, recreation and related environmental resources. *Fisheries* 1(4): 6-10.
- U.S. Forest Service (Forest Service). 2003. Revised forest plan for the Wasatch-Cache National Forest. Intermountain Region, Ogden, Utah. February 2003.
- Utah Division of Parks and Recreation. 1987. Utah state comprehensive outdoor recreation plan. Salt Lake City, Utah. December 1987.

8.0 LIST OF PREPARERS

This section does not have to be included in an Exhibit E prepared under the ILP or an APEA prepared under the ALP.

Provide the name of each person (FERC and contractor staff) who worked on the environmental document, including: the section they prepared, current position, highest educational degree received, and field in which the degree was received.

Example of List of Preparers section:

8.0 LIST OF PREPARERS
Name -- EA Coordinator, Recreation and Land Use (Environmental Protection Specialist; M.S., Parks and Recreation).
Name -- Cultural Resources (Archeologist; B.A., Anthropology, Master of Public Administration).
Name -- Aquatic Resources (Fisheries Biologist; PhD, Fisheries Ecology).
Name -- Terrestrial Resources, Threatened and Endangered Species (Ecologist; M.S., Marine Estuarine Biology-Environmental Science).
Name -- Purpose and Need for Power, Developmental Resources (Electrical Engineer; B.S., Electrical Engineering).

9.0 LIST OF RECIPIENTS (EISs only)

This section does not have to be included in an Exhibit E prepared under the ILP or an APEA prepared under the ALP.

The list of recipients would typically include all entities on the Commission's mailing and service lists. In addition, the list should be supplemented to include other involved and interested entities but on the mailing and service lists. The names could also be listed in columns using an address label format (name, agency, street address, city, state, zip code).

Suggested format for List of Recipients section:

9.0 LIST OF RECIPIENTS
Federal Government Agencies Forest Service, Robert Blake, Reno, Nevada National Marine Fisheries Service, FERC Coordinator, Santa Rosa, California U.S. Fish and Wildlife Service, Field Director, Sacramento, California U.S. Fish and Wildlife Service, Susan Hines, Fish and Wildlife Biologist, Sacramento, California
Native American Groups Burns Paiute Tribe, Burns, Idaho Nez Perce Tribe, Richard Williams, Cultural Resource Specialist, Lewiston, Idaho
Federal Representatives and Senators U.S. Congress, Honorable Chris John, Washington, D.C. U.S. Senate, Honorable John Breaux, Washington, D.C.
State Legislators Molly Johnson, Maine State Legislature, Augusta, Maine
State Government Agencies Maine Department of Environmental Protection, Steve Williams, Bangor, Maine
County and Municipal Government Agencies City of Woodland, Washington, Jim Cox, Mayor
Non-governmental Organizations National Wildlife Federation, James Hardy, Charleston, South Carolina Wilderness Society, Robert Black, Atlanta, Georgia
Individuals Jim Jones, Charleston, North Carolina John Smith, Atlanta, Georgia

10.0 CONSULTATION DOCUMENTATION

This section is only included in an Exhibit E prepared by an applicant under the ILP.

This section must include a list containing the name and address of every federal, state, and interstate resource agency, Indian tribe, or member of the public with which the applicant consulted in preparation of the environmental document [18 CFR, section 5.18(b)(5)(ii)(G)].

APPENDICES

Appendices may include information too large to include in the text of the document, such as mandatory conditions provided by agencies, settlement agreements, response to comments on the draft EA or EIS, etc. Limit appendices to information that is essential to the document and supports discussions in the main body.

40 CFR, Section 1502.18--Appendix.

If an agency prepares an appendix to an environmental impact statement the appendix shall:

(a) Consist of material prepared in connection with an environmental impact statement (as distinct from material which is not so prepared and which is incorporated by reference [Sec. 1502.21]).

(b) Normally consist of material which substantiates any analysis fundamental to the impact statement.

(c) Normally be analytic and relevant to the decision to be made.

(d) Be circulated with the environmental impact statement or be readily available on request.

Ensure that information in the main body of the environmental document is consistent with any relevant appendix. If information is not directly related to the preparation of the document, it should be briefly described in the main text and incorporated by reference. Two typical appendices, *License Conditions Recommended by Staff* (for ILPs) and *Staff Responses to Comments on the Draft EA or EIS*, are described below.

APPENDIX A—LICENSE CONDITIONS RECOMMENDED BY STAFF

For ILPs, draft environmental documents prepared by Commission staff will indicate: (1) mandatory conditions recommended by staff; (2) modifications to mandatory conditions recommended by staff; and (3) additional license articles recommended by Staff [18 CFR section 5.25(b)]. This information should be included as an appendix.

Where we have preliminary or draft mandatory conditions, assume for the purpose of this appendix that these measures would be included in the license.

Example of a License Conditions Recommended by Staff Appendix:

APPENDIX A

LICENSE CONDITIONS RECOMMENDED BY STAFF

On January 3, 2007, the California Department of Water Resources (Cal Water Resources) filed a section 401 water quality certification containing 6 conditions (Appendix X). On January 12, 2007, the U.S. Forest Service filed preliminary 4(e) conditions containing 10 conditions (Appendix X).

I. MANDATORY CONDITIONS RECOMMENDED BY COMMISSION STAFF

We recommend including the following mandatory conditions in any license issued for the project:

Cal Water Resources Condition Nos. 1, 2, 4, 5, 6
Forest Service Condition Nos. 1, 2, 3, 4, 5, 6, 7, 8, 10

Although we do not recommend Forest Service condition No. 3 for a Public Access Management Plan, we recognize that any valid mandatory conditions must be included in any license issued for the project.

II. MODIFICATIONS TO MANDATORY CONDITIONS RECOMMENDED BY COMMISSION STAFF

We recommend certain modifications to the remaining mandatory conditions issued by Cal Water Resources and the Forest Service:

Cal Water Resources Condition No. 3: This condition would require Hydro Industries to develop a Water Quality Monitoring Plan to continue monitoring temperature, water chemistry, and aquatic biology parameters in Gold Lake and Silver Lake. We do not recommend this condition because the project does not have significant adverse effects on water quality within the project area and our analysis indicates that none are expected from Hydro Industries' proposed action. See section 3.3.2 of the EA.

Forest Service Condition No. 9: This condition would require Hydro Industries to prepare a Scenery Management Plan to minimize the visual effects of any physical modifications to project features. We do not recommend this condition because Hydro Industries does not propose any modifications that would significantly affect the visual characteristics of the project area and none are expected from Hydro Industries proposed action. See section 3.3.8 of the EA.

III. ADDITIONAL LICENSE ARTICLES RECOMMENDED BY COMMISSION STAFF

We recommend including the following license articles in any license issued for the project:

[List draft license articles following the format below.]

Draft Article 001. Administrative Annual Charges. The licensee shall pay the United States annual charges, effective the first day of the month in which the license is issued, and as determined in accordance with provisions of the Commission's regulations in effect from time to time, for the purposes of:

- (1) reimbursing the United States for the cost of administration of Part I of the Federal Power Act. The authorized installed capacity for that purpose is 11,250 kilowatts;
- (2) recompensing the United States for the use, occupancy, and enjoyment of 588.70 acres of its land (other than for transmission line right-of-way);
- (3) recompensing the United States for the use, occupancy, and enjoyment of 84.84 acres of its land for transmission line right-of-way.

APPENDIX B--RESPONDING TO COMMENTS ON DRAFT EAs AND EISs

CEQ's regulations require that, in preparing a final EIS, agencies "assess and consider comments [received on a draft EIS] both individually and collectively" and respond to comments by modifying alternatives; developing and evaluating alternatives not previously given serious consideration; supplementing, improving, or modifying analyses; making factual corrections; or explaining why comments do not warrant further agency response [40 CFR, section 1503.4(a)].

The appendix included in a final EA or EIS responding to comments on the draft document, both written and those provided at public meetings, should include the following:

- A table of contents and list of acronyms, as necessary, for long appendices
- A list of the commenters and the dates the comments were filed
- A summary of the comments (address similar comments together)
- A point by point response to substantive issues raised, including descriptions of any changes made to document and in what sections of the document those changes may be found.

Respond to comments commensurate with their substance. Avoid the use of phrases such as "comment noted" or "no response needed." You don't need to respond to editorial changes. For identical or similar comments received in high volume (e.g., multiple postcards), indicate the number of individuals who filed the comment (list names where practicable) and provide one response.

Example of a Response to Comments appendix (Source: Eel Weir Project FEA, Project No. 2984, November 2005):

APPENDIX B

STAFF RESPONSES TO COMMENTS ON THE DRAFT ENVIRONMENTAL ASSESSMENT

The Commission staff issued its draft environmental assessment (EA) for the proposed relicensing of the Eel Weir Project on July 11, 2005. Staff requested comments on the draft EA be filed within 45 days from the issuance date, or by August 25, 2005, which was subsequently extended until September 9, 2005. The following entities and individuals filed comments pertaining to the draft EA.

<u>Commenting Entity</u>	<u>Date Filed</u>
Carol L. Steiman	August 22, 2005
Portland Water District	August 24, 2005
S.D. Warren Company (S.D. Warren)	August 25, 2005
Conservation Law Foundation (Conservation Law)	August 25, 2005
Sebago Lake Marina (Sebago Marina)	August 25, 2005
Sebago Pines Property Owners Association (Sebago Pines)	August 26, 2005

Below, we summarize the substantive comments, provide responses to those comments, and explain how we modified the text of the draft EA, as appropriate, to address the comments. Changes addressing editorial comments were made to the final EA, but are not described below. The comments are grouped by topic for convenience.

Hydrology, Lake Level Management, Flood Control, and Associated Issues

Comment: Maine Geology points out a contradiction in the analysis on page 35 of the draft EA, under the subsection 'increase water levels.' Maine Geology states that the summary statement contradicts earlier statements that periodic lowering of the lake shows no benefit to beach profiles.

Response: We have revised the final EA to correct this apparent discrepancy.

Comment: Thirty-six property owners filed comments stating that lake levels have exceeded the flowage easements, causing flooding and increased erosion. The property owners contend that staff's recommended target for full pond on May 1 would raise lake levels 20 inches higher than the historical average for this date. The property owners argue that allowing lake elevations at or near full pond for 8 weeks, and raising lake levels by as much as 20 inches above the historical average in May and up to 15 inches in the summer would flood beaches and accelerate the historic rate of erosion. In addition, the property owners argue that, if the LLMP is not amended to mimic the historical average, they should be compensated for (1) the lost use of the beaches, (2) accelerated shoreline erosion, and (3) the cost of stabilizing beaches.

Response: Based on the many comments received on the LLMP, we now recommend a full pond target elevation of 266.15 feet \pm 0.5 foot, and moving the earliest date for reaching that target to May 15. We also recommend that water be spilled should lake levels exceed the crest elevation of 266.65 feet. Our recommended changes should substantially reduce shoreline erosion around Sebago Lake, as well as the risk of flooding. In regards to compensation for damages, the FPA does not authorize the Commission to impose liquidated damages, or otherwise include a damages provision in a project license. Any actions for damages resulting from trespasses of flowage easement are matters left for review by state courts.

Fishery and Aquatic Resources

Comment: FWS does not agree with staff's rationale for not recommending the agencies' higher minimum flows. First, FWS states that the resource agencies have not identified any need to reduce flows to discourage smallmouth bass in the bypassed reach, as stated in the draft EA. Second, FWS states that higher flows would (a) expand habitat for trout and salmon in the bypassed reach, (b) result in more and healthier fish, and (c) provide additional fishing opportunities. This is inconsistent with staff's "radical departure" logic. Third, FWS supports temperature monitoring in the coldwater refugia as a way to address the effects of higher minimum flows on this habitat. Finally, FWS contends that staff's economic analysis does not account for the cumulative effects of hydro development on the coldwater riverine resources in the Presumpscot River.

Response: We revised our minimum flow analysis based on discussions at the section 10(j) meeting and FWS's comments on the draft EA. In addition, because we recommend flows that could affect the coldwater refugia, we now recommend temperature monitoring in that important coldwater habitat. Finally, FWS's comment regarding our economic analysis appears to suggest that the Commission should mitigate for past hydropower development on the Presumpscot River. The Commission is not required to mitigate for past effects. Our recommended flows represent an appropriate balance among competing uses and are in the public interest.

ATTACHMENT A--SPECIFIC GUIDANCE FOR RESOURCE DISCUSSIONS

For each of the following resource sections, we provide information on what to include in the *Affected Environment* section within the individual resource sections, and examples of typical issues discussed in the *Environmental Effects* section.

3.3.1 Geological and Soil Resources

a. Affected Environment: Briefly describe the following:

- Soil types and characteristics
- Site characteristics (slope, vegetation, drainage, topography)
- Location of existing and potential geological and soil hazards , including erodible areas, seepage, slope instability, and landslides
- Existing and potential river bank and shoreline erosion
- Accumulated sediment and sediment transport in reservoirs and/or downstream
- Existing erosion control measures
- Seismology, including proximity to known active faults or fault zones

b. Environmental Effects: Include, as appropriate, these issues:

- Effects of land-disturbing activities associated with construction of project facilities and/or construction of project-related facilities (such as recreation facilities, fishways), including extent of erosion, slope alteration, vegetation removal, and changes in drainage patterns
- Effects of sediment accumulation and transport
- Effects of sediment and hazardous waste removal and disposal
- Effects of project operation on soil erosion (reservoir fluctuations, project releases)
- Effects of potential penstock rupture
- Description of proposed and recommended protection, mitigation, and enhancement measures (e.g., best management practices, soil erosion and sedimentation control measures, spoil and disposal measures)

3.3.2 Aquatic Resources

The *Aquatic Resources* section can be divided into two separate sections (e.g., *Water Resources* and *Fishery Resources*) for complex projects.

a. Affected Environment: Briefly discuss the following:

Water Resources

- Water quantity (high, mean, low flows)
- Annual runoff patterns
- Any storage and release of project's inflow
- Description of current flow regime (including those of outside users) on reservoir, downstream reach, and bypassed reach
- Flows released for specific purposes, if applicable
- Flows released at special times (for example, annual boat races, water supply, ski season-snow making)
- Description of water rights, if any
- Non-power uses of project waters, such as irrigation, industrial, and municipal uses
- Water quality in the project reservoir and downstream
- Existing state water quality standards and use classifications of water bodies (for example, drinking water, non-contact recreation)
- Source and type of any pollutants associated with the project

Fishery Resources

- Species in the project area, including rare and sensitive species, threatened and endangered species
- Description of aquatic habitats (i.e., riffles, pools), types of substrates, etc.
- Recreational or commercial value of fishery (refer to angler use, catch rate, or other means of estimating value, if available and relevant)
- State management objectives for fishery or fish habitat (describe applicable state and federal resource management plans) and essential fish habitats (EFH)
- For each managed species and life stage for which EFH was designated, a description of abundance, distribution, available habitat, and habitat use by these managed species
- Sport fishery maintenance (that is, naturally reproducing, self-sustaining, or stocked)
- Quantity and size of fish stocked and frequency of stocking
- Characteristics of the fishery (growth, recruitment, condition, etc.)

Limit the use of scientific names. Include for rare species, where needed to avoid confusion or ambiguity, or where a species is only known by its scientific name.

b. Environmental Effects: Issues addressed in this section may include, as appropriate:

Water Resources

- Requirements of the section 401 water quality certification
- Effects of proposed and recommended project operation on streamflow, dissolved oxygen and nitrogen supersaturation, water temperature, and sediment flushing
- Flow gaging and plans for monitoring water quality
- Effects of proposed, mandatory, and recommended environmental measures
- Changes in minimum flow to protect water quality

Fishery Resources

- Fish habitat affected by project operation (type of habitat, such as spawning, rearing, juvenile; quantity and quality)
- Impacts associated with impoundment fluctuation
- Fish entrainment and mortality, mortality rates
- Instream flows in the bypassed reach and downstream of a peaking/pulsing project, and amount of habitat versus flow
- Ramping rates
- Effect of proposed and recommended environmental measures (for example, fish passage facilities, fish screens, habitat improvement structures)
- Effects on state management goals and essential fish habitat

3.3.3 Terrestrial Resources

a. Affected Environment: Briefly discuss the following (use range or habitat maps as needed):

- Dominant cover types and plant species
- Seasonal abundance and distribution of key wildlife species in the vicinity of the project
- Existence of noxious weeds and invasive species
- Recreational or commercial value of terrestrial resources
- Special status wildlife or plants
- Quality and quantity of habitats with recognized special botanical or wildlife value (for example, wetlands, old growth forests, deer wintering area, migratory corridor)
- Agency management goals for important wildlife species

Limit the use of scientific names. Include for rare species, where needed to avoid confusion or ambiguity, or where a species is only known by its scientific name.

b. Environmental Effects: Issues addressed in this section may include, as appropriate:

- Amount and type of habitats that would be permanently removed or temporarily cleared and revegetated for construction of project-related facilities
- Fragmentation of habitat
- Effects on wetlands and riparian habitats and other habitats (e.g., old growth habitat) with recognized special value to wildlife
- Effects on special status species
- Effects on wildlife feeding, reproduction, and migration requirements
- Effects of project operation on reservoir and downstream habitats and populations
- Effects of maintenance activities on plants and wildlife
- Potential for mortality from transmission line electrocution and collision and canal entrapment
- Potential for wildlife disturbance from construction, maintenance, and recreational activities
- Potential for the spread of invasive species and need for control measures
- Effects on agency management goals and guidelines (e.g., National Bald Eagle Management Guidelines)
- Effects of proposed and recommended terrestrial protection, mitigation, or enhancement measures

3.3.4 Threatened and Endangered Species²²

The environmental document serves as a biological assessment (BA) to facilitate the consultation under the Endangered Species Act (see section 1.3.3, *Endangered Species Act*).²³ Include information on federally listed or proposed threatened and endangered species, candidate species, and designated and proposed critical habitats present in the proposed action area in this section, as supplemented by other sections of the document.

a. Affected Environment: Briefly discuss the following:

This section describes the biology of the species, listed by FWS or NMFS, which

²² For more information, see *Hydropower Licensing and Endangered Species*, December 2001, for detailed instructions on preparing this section. This document is available on the FERC web site (http://www.ferc.gov/industries/hydropower/gen-info/guidelines/esa_guide.pdf).

²³ Where Exhibit Es prepared under the ILP include preparation of a BA, the information can be included in this section or summarized here and included as a stand-alone appendix.

could potentially be affected by the project. If species are included on the list of species provided by FWS and NMFS, but are not considered further in this section, explain why (e.g., no suitable habitat, etc.). Include scientific names, along with subspecies or variety name, as appropriate.

Species background and requirements

Provide a background of the biology that is relevant to potential effects of the project, including aspects of biology that relate to the proposed action (e.g., periods when a species may be most sensitive to disturbance). Include general distribution of species and species status (trends in habitat and population numbers, historical occurrence in project vicinity, amount of habitat remaining).

Species occurrence in area potentially affected by the project

Describe the abundance and distribution of evaluation species in the project area, level of use, and timing of use. Summarize results of surveys, including timing and method of the surveys and indicate whether the surveys met existing protocols.

Habitat description and use

Describe the habitat for the evaluation species, including amount, quality, and suitability. Describe how the evaluation species use the habitat in the area affected by the project. For example, for wildlife, describe use for nesting, perching, roosting, migration, rearing, feeding, etc. For fish, describe use for migrating, spawning, rearing, overwintering, etc. Include seasonal use patterns.

Critical habitat

Describe any critical habitat that has been designated or proposed that could potentially be affected by the project. Identify specific habitat unit(s). Describe the geographical extent of designated and proposed critical habitat, and the essential elements of the habitat (e.g., cover or shelter; sites for breeding, reproduction, and rearing; etc.). Include the primary constituent elements identified in the final rule and any activities that have been identified as having the potential for altering the primary constituent elements.

Recovery plans

Identify the existence of recovery plans for the listed species considered. Describe the relationship between the proposed action and any recovery units, describe any recovery actions that may be applicable to the proposed action, and describe any recovery plan tasks that apply to the project or the project vicinity.

b. Environmental Effects: Briefly describe the following (also see sections on *Fishery Resources* and *Terrestrial Resources* above):

Listed, proposed, and candidate species and critical habitat

- Describe any direct, indirect, and cumulative impacts, beneficial effects, and effects of interrelated and interdependent actions (see table below). If no effects, say so and document. The analysis should address effects on individuals as well as populations. Where possible, quantify the effects. Generally, determination of impact will depend on four factors: (1) which biological resource is present; (2) the type of action; (3) the distance between the action and the resource; and (4) the time of year.
- Describe the areal extent, timing, intensity, direction and duration of disturbance. If possible, quantify the disturbance (e.g., number of acres; decibel level at a given distance, degrees increase in water temperature). Distinguish between long-term and short-term effects. Factor in the species sensitivity to change, resilience, and recovery rate.
- Put the effects into perspective. Describe the relative impact on the resources of concern (e.g., the proportion of the local population impacted).
- Don't forget to address all the different phases of a project--construction or modification of facilities, project operation or changes in project operation, maintenance activities (such as road maintenance, right-of-way management, pesticide use), and recreational and other land uses (such as boating or grazing on project lands). Be specific—describe types of construction activities and equipment used, timing, and frequency, etc.
- Discuss the effect of the proposed project on critical habitat, including effects on constituent elements.
- Provide an analysis of cumulative impacts. Describe ongoing actions along with future actions, other than future federal actions, that are reasonably expected to occur in the project area. Describe measures that would avoid impacts or would benefit species in addition to the proposed measures. Be specific as possible. Discuss the potential effectiveness of the measures. If impacts can't be avoided, describe measures that would minimize or mitigate impacts.

List of types of effects addressed for endangered species:

Description of Effects		
Type of Effect	Definition	Example
direct effects	direct or immediate effects; effects directly attributable to the proposed action	blockage of migration corridors; turbine mortality; elevated dissolved gas levels; erosion resulting from construction activities; loss of old-growth habitat
indirect effects	effects to individuals or habitat that would result later in time and are reasonably certain to occur	increased exposure to predation and competition; erosion resulting from reservoir fluctuations
cumulative effects	effects of unrelated future state or private activities, not including federal activities, that are reasonably certain to occur in the project area	loss of old-growth habitat resulting from timber cutting on private and state-owned lands; planned basin-wide water diversions for irrigation and water supply
beneficial effects	wholly positive effects	implementation of tributary protections; improved habitat resulting from increased minimum flow releases
effects of interrelated actions	actions that are part of the primary action and dependent on the primary action for their justification	irrigation diversions from a proposed project reservoir
effects of interdependent action	actions that have no independent utility apart from the primary action	single home development along a proposed project reservoir

- Discuss recommendations made by the FWS and NMFS or other entities, and terms and conditions, alternatives, and conservation recommendations included in a biological opinion.
- Discuss alternatives considered (such as alternative penstock routes, minimum flow releases, rights-of-way widths, etc.).
- Describe the need for monitoring--compliance monitoring or effectiveness monitoring and adaptive management. Discuss monitoring methods, schedule, contingency measures, reporting, etc.

Recovery plans

- Discuss consistency with any draft or final species recovery plans or other applicable plans.

Determination of effect

- The determination of effect for each listed and proposed species and designated and proposed critical habitat for the staff alternative will appear in section 1.3.3, *Endangered Species Act*.

3.3.5 Recreation and Land Use

If you have many recreation issues, land use issues, or both, we suggest dividing these resources into two sections: (1) *Recreation*, (2) *Land Use*.

a. Affected Environment: Briefly discuss the following:

- Existing recreational uses of project lands and waters, including the estimated annual use in user days, visitor days, etc. (by activity if possible)
- Formal and informal public access areas at the project, including the reservoir, bypassed reach, and tailwaters; include the type, number, and location of existing recreational facilities as well as who owns, operates, and manages each facility, and identify which facilities are project facilities, and whether the facilities are located within the project boundary
- Whitewater boating resources at or affected by the project
- Importance of recreational opportunities and facilities to the public
- Recreational opportunities and facilities outside, but in the immediate vicinity of, the area affected by the project (if appropriate)
- Specially designated areas at or near the proposed project and the administering agency for the designation (for example, National Wild and Scenic Rivers, state protected rivers, national trails, wilderness areas, Land and Water Conservation Fund Act lands)
- Existing uses of land within and adjacent to the project, such as residential, farming, forestry, grazing, and commercial use and existing land use plans for the area
- Any current shoreline management plan or shoreline permitting process
- For relicenses, note any measures specifically required in the current license, whether there is a project recreation plan, and when it was last revised

b. Environmental Effects: Issues addressed in this section may include, as appropriate:

- Effects of constructing or operating the project and any alternatives to the proposed project on existing recreational opportunities and facilities
- Effects of proposed and recommended environmental measures (such as, recreational access, facilities, flows, safety measures, future recreational development or monitoring plans) on recreation resources

- Proposed and recommended measures to provide for the recreational needs at the project
- Effects of constructing or operating the project on land use patterns and compatibility of the project with existing land use plans or designations

3.3.6 Cultural Resources

Section 106 of the National Historic Preservation Act requires the Commission to take into account the effect of licensing a hydropower project on any historic properties, and allow the Advisory Council on Historic Preservation (Advisory Council) a reasonable opportunity to comment on the proposed action. "Historic properties" are defined as any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places (National Register). If there would be an adverse effect on historic properties, the applicant must develop a historic properties management plan (HPMP) to seek to avoid, reduce, or mitigate the effects. During development of the HPMP, the applicant should consult with the Commission, the Advisory Council, the State Historic Preservation Office (SHPO), Indian tribes, appropriate land-management agencies, and any other consulting party that may be involved with the licensing process. In most cases, the HPMP would be implemented by execution of a Programmatic Agreement that would be signed by the Commission, Advisory Council, SHPO, and other consulting parties.

Other federal laws, such as the American Indian Religious Freedom Act or the Native American Graves Protection and Repatriation Act, may also apply when sacred areas or burial sites of Indian tribes have been identified. These and other cultural resources that possess religious or cultural significance to an Indian tribe, if eligible, can be considered as historic properties and treated through the section 106 process. Such historic properties are called traditional cultural properties.

a. Affected Environment: Briefly discuss the following:

- Definition and description of the area of potential affect (APE)²⁴
- Properties located within the APE that are listed or eligible for listing in the National Register of Historic Places (cite a SHPO letter that documents the National Register status of any properties)
- Results of applicant's archaeological, historical, and traditional cultural resource surveys
- Any special study arrangements made between the applicant and Indian tribes affected by the project to ensure confidentiality of privileged information or to restrict distribution of study results

²⁴ The area of potential effect includes the project boundary as well as areas outside the project boundary where the project might have an effect to historic properties.

b. Environmental Effects: Issues addressed in this section may include, as appropriate:

- Effects of constructing or operating the project on historic properties, including traditional cultural properties
- Effects of proposed and recommended environmental measures (such as the measures outlined in an HPMP, programmatic agreement, or measures for recreational resources) on cultural resources
- Proposed measures to be taken if archeological sites or related human remains are discovered during project operation

3.3.7 Aesthetic Resources

a. Affected Environment: Briefly discuss the following:

- Visual and aesthetic character and quality of the project area (provide detail about the features that may be affected by constructing or operating the proposed project)
- Public's vantage point(s) for viewing natural features (for example, waterfalls, cascades) and project structures and the quality of this view
- Federal land management restrictions on development, if applicable (for example, standards outlined in Forest Service plans)
- Significance of aesthetic resources to surrounding communities (quantify public use if possible)

b. Environmental Effects: Issues addressed in this section may include, as appropriate:

- Visual and auditory effects of project-related construction and operation on aesthetic resources evaluated at key viewing areas
- Effects of proposed and recommended environmental measures (such as minimum flows over a scenic waterfall or spillway) on aesthetic resources

3.3.8 Socioeconomics

This section is generally only included when there is new construction or if socioeconomic issues have been raised.

a. Affected Environment: Briefly discuss the following:

- Existing social and economics conditions in the project vicinity
- Population and demographics, regional employment and income, revenues and expenditures, governmental finances, public services, and social conditions

b. Environmental Effects: Issues addressed in this section may include, as appropriate:

- Law enforcement and public safety, fire protection, emergency services/response, property values, real estate/property tax base, tourism, traffic, etc.
- For large unconstructed projects, the effects of new employment and wages, in-migration, population changes, demand for housing and public services, local tax revenues, effects on local governments, and traffic congestion

Environmental Justice

In all EISs, and in EAs, when raised—discuss the project’s potential to cause disproportionately high adverse human health or environmental effects on minority and low-income populations, including Indian tribes.

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ATTACHMENT B--GENERAL GUIDANCE FOR TEXT, GRAPHICS, AND REFERENCES

TEXT

- Use active voice.
- Minimize use of technical language; define technical terms in plain English.
- Microsoft Word is the standard word processing software. Documents should be created in Word, not converted from other software. The Commission's current font standard is Times New Roman 13 point, but smaller fonts may be used for very long documents and tables.
- Set margins at 1 inch. Use left justification only. Do not use full justification (this includes footnotes). Do not use hard returns, except at the end of paragraphs.
- Use the tab key instead of the space bar for paragraph indentation and tabular material. Use indent when multiple lines are to be indented.
- Two spaces follow colons and periods. One space follows a semicolon or comma.
- Word default for the footnote number is bolded superscript and first line indented (do not use the _). The rest of the footnote is not indented.
- To prevent single lines at the top and bottom of document pages, set the widow/orphan option as the default. Avoid using block protect because it can affect macros used by the Secretary's office to issue the final document.
- EIS page numbers are generally by section (i, ii, 1-1, 1-2, 1-3,...) while EAs are generally numbered consecutively (i, ii, 1, 2, 3, ...).
- For larger documents (EISs), number tables by section (e.g., table 1-1, 1-2); for smaller documents (EAs), number consecutively (e.g., table 1, 2).
- Do not rely solely on the spell check function to check for spelling errors.
- Remove all tracked changes and comments from the document before electronic or print issuance.

- Use units of measurements consistently throughout the document; use English measurements.
- Suggested formats for headings and subheading:

Heading Level	Appearance
Heading 1:	3.0 ENVIRONMENTAL ANALYSIS (CAPS, BOLD, 13 POINT, CENTERED)
Heading 2:	3.3 PROPOSED ACTION AND ACTION ALTERNATIVES (CAPS, BOLD, 13 POINT, ALIGNED ON LEFT)
Heading 3:	3.3.3 Terrestrial Resources (Title case, Bold, 13 point, Aligned on Left)
Heading 4:	3.3.3.1 (optional) Special Status Wildlife Species (Title Case, Bold, 13 Point, Indented)
Heading 5:	Bird Species (Indented, No Numbering, Title Case, Bold, 13 Point)
Heading 6:	<i>Common Loon</i>
Heading 7:	<i>Cumulative Effects—Body text</i>
Heading 8:	<u>Habitat Requirements.</u> Body text

GRAPHICS

- Graphics should be digitized and embedded within the document file.
- Graphics should immediately follow the text they support--on the same page, if possible.
- Be sure to explain the most important feature(s) of the graphic in the accompanying text.
- Keep graphics simple. Use additional graphics or appendices to display large amounts of information.
- Make sure figures and charts are readable and understandable when reproduced in black and white (for example use distinct patterns instead of colors in bar charts)
- Make all project features, project boundaries, and land marks clearly visible on maps. To illustrate complex projects, use a schematic diagram.
- Make maps and figures large enough that they are legible. Text within graphics should not be less than 10 point. Make sure color figures reproduce well in black and white.
- Be sure to include a north arrow in all maps, and indicate the direction of flow, if possible.
- Include reference scale lines on maps. Measurement conversions (1 inch = 2,000 feet) won't remain accurate if maps are reduced.
- Identify on your map all project and related features mentioned in the text of the environmental document.
- For larger documents (EISs), number figures by section (e.g., figure 1-1, 1-2); for smaller documents (EAs), number consecutively (e.g., figure 1, 2)

REFERENCES

Citing the Application

If much of the information in the environmental analysis section is from the license application, include the following footnote at the beginning of the analysis:

¹ Unless otherwise indicated, our information is taken from the application for new license for this project (Power Engineering, 2007).

Letters and Personal Communications

Note that citations for letters and personal communications are included in the text of the document according to the following general format:

- (letter from R. Johnson, Regional Administrator, NMFS, Long Beach, California, to Kimberly Bose, Secretary, FERC, Washington, D.C., July 16, 2006)
- (personal communication between A. Jones, Fishery Biologist, NMFS, Long Beach, California, and B. Smith, Fishery Biologist, FERC, Washington, D.C., July 16, 2006)

Citing Literature in Text

Text citations include author and year:

- (Smith, 2007) or Smith (2007) found...—single author
- (Smith and Jones, 2007)—two authors
- (Smith et al., 1999)—more than two authors
- (Jones, 1999; Smith et al., 1999)—multiple references
- (Smith, 2004, as cited by Jones, 2007)—cited from another source

Alternatively, you can also exclude the comma between author and year—but be consistent throughout.