























Lessons Learned

- Surround your project with great people
- Design: be as creative as the goals + criteria allow
- Expect the project to grow in size, complexity, cost...
- Expect problems: redesigns, modifications, retrofits
- Permit construction early, modify as needed
- Contractors: trust, but verify – diligently
- Plan closely for inwater work, fish salvages, etc.
- Spend lots of time ON-SITE
- Transition to “normal operation” can take years

Experience it
from the
fishes'
view



New Facility Life Stages p1

- Conceptual Design (1-2 years)
 - Objectives, criteria, footprint, location
- Final Design (1-2 years)
 - 30%, 60%, 90% reviews, final agency approval
- Additional approvals / permitting (1+ yr)
 - FERC approval
 - DSL / ACOE fill-removal permits, WQ certification
 - USFS Authorization
- Construction plans / bids (2-6 mo)
 - How to build it?
- Build – inspect and monitor construction (daily)
- ...

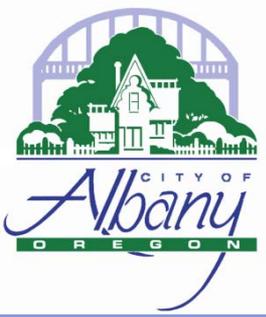
New Facility Life Stages p2

- After Building:
- Commission into use
- Train Operators on new facility - documentation
- Balance – hydraulic settings
- Evaluate
 - (hydraulic, biological)
- Operate – over many flow and weather conditions
- Identify problems, solutions
- Modify, retrofit, improve (inc. documentation)
- Evolve into routine operations...

Lessons Learned

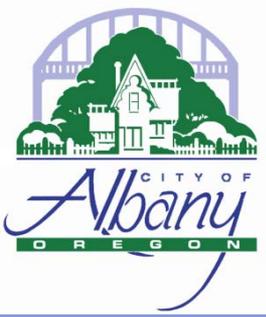
When Building Fish Facilities...

- Consult, consult, consult
 - agencies, biologists, engineers, operators, public
- Expect them to grow
 - Size, complexity, cost...
- Be as creative as the goals + criteria allow
- Expect problems!
 - Redesigns, modifications, retrofits, etc.
- Permit construction early, modify as needed
- Contractors: trust, but verify – diligently
- Inspectors: ditto
- Spend lots of time ON-SITE



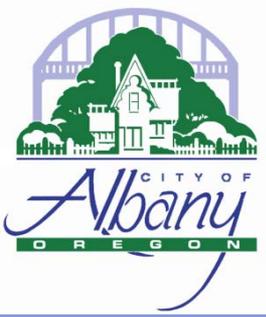
Albany Diversion Fish Passage Presentation September 21, 2011





Agenda

- Project Background
- Fish Passage conditions to be addressed
- Facilities constructed
- Current operation
- Lessons learned



Agenda

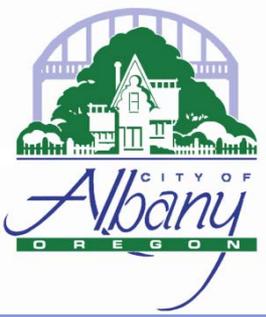
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Project Background

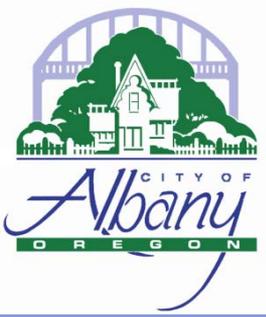
- The Albany Lebanon canal and diversion dam was originally constructed in the 1870
- Due to a steeper grades and fast moving water, transport was largely abandoned. Domestic water was then supplied to Lebanon, Albany and irrigators along the canal
- A timber crib diversion dam was replaced in the 1925 with a 6 foot high concrete dam that included a single, center fish ladder.
- Low head Hydropower was developed at both Albany and Lebanon. Lebanon abandoned theirs, Albany discontinued operation in 1991 pending issuance of a FERC license.
- FERC 50 year license issued in 1998





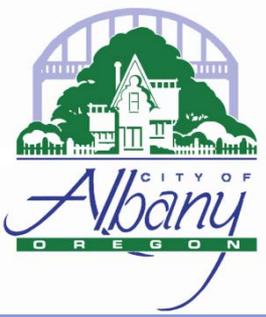
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Species targeted

- Chinook Salmon
- Steelhead trout
- Pacific Lamprey



Passage Conditions to be addressed

- Downstream passage and canal screen:
 - spill over dam crest and flashboards
 - No screen on canal entrance

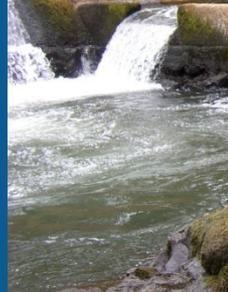




Passage Conditions to be addressed

■ Upstream Passage:

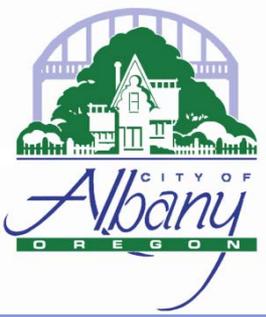
- Center fishway constructed with 1925 dam
- Left bank ladder constructed in later 1920's
- Right bank ladder constructed in the 1950's
- Additional left bank ladder constructed in 1972



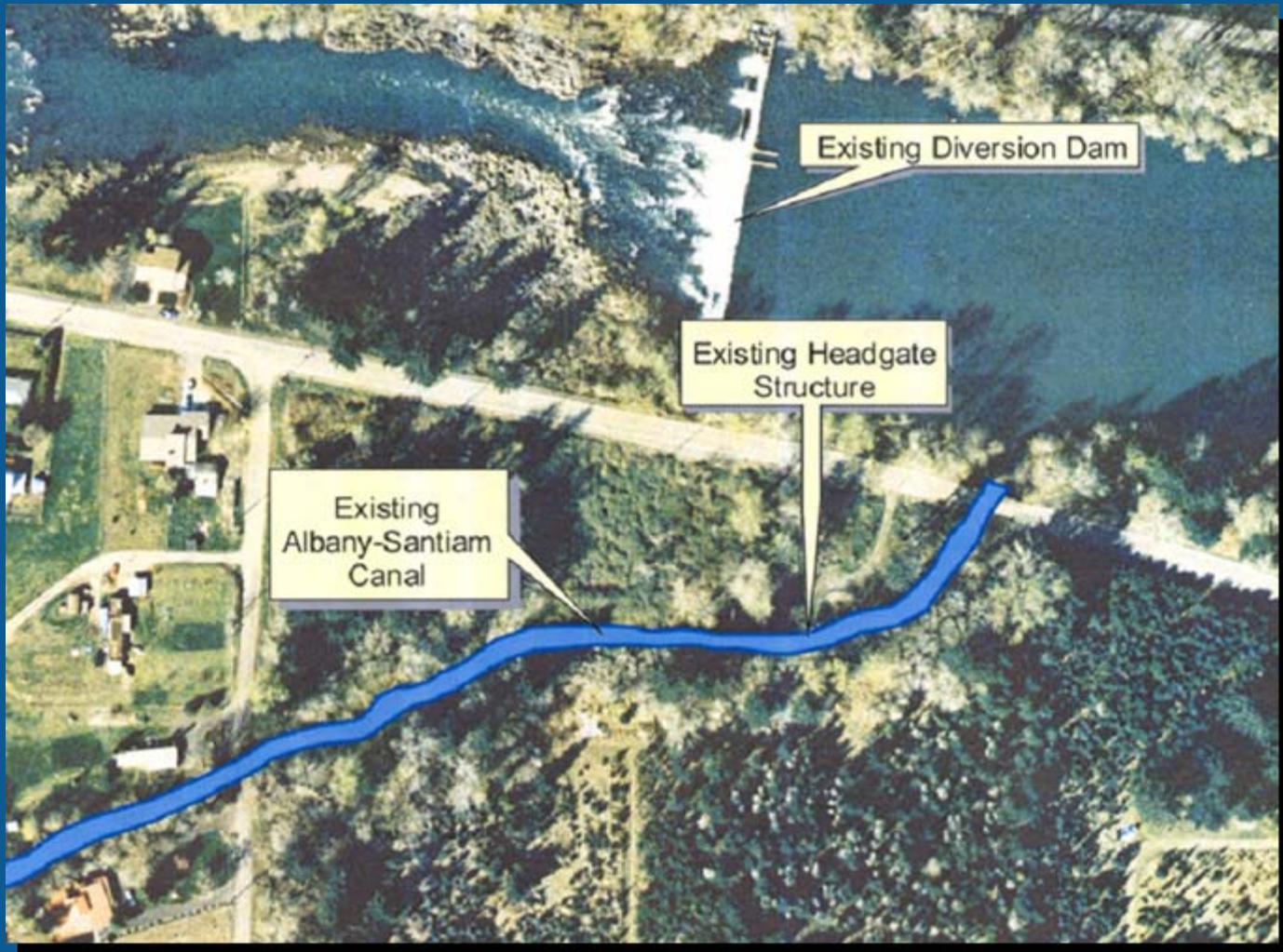


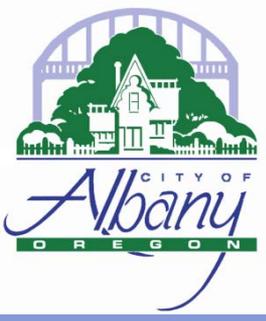
Specific FERC license requirements

- Article 406 Fish screen – construct new
- Article 407 Right bank fishway - improved
- Article 408 Left bank fishway – construct new
- Article 409 Center fishway closure
- Article 410 1972 fishway removal
- Article 412 Dam crest raise – construct new



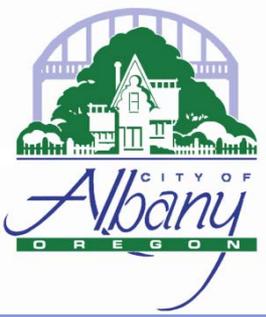
Project Improvements area





Agenda

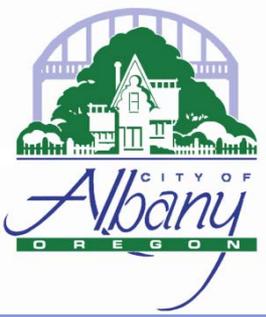
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Facilities constructed – Canal Screen

- License concept was for an on river screen
- Changed to canal vee screen with fish agency approval
 - better hydraulics
 - more reliable
 - less prone to river borne debris damage
 - less costly to construction and operate





Facilities constructed – Right Bank Ladder

- Added two additional steps and an attraction water system
- cut orifices into each step to facilitate lamprey passage

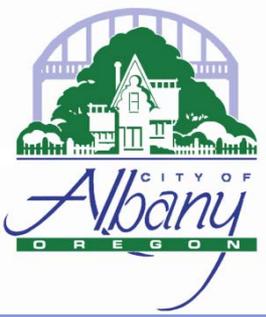




Facilities constructed – Left Bank Ladder

- new high volume pool and chute ladder, 600 to 8000 cfs range
- oriented to align with natural channel to entrance
- Screen bypass provides additional flow to entrance

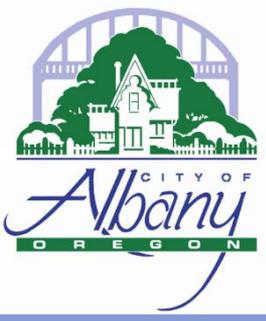




Facilities constructed – 1972 Ladder removal

- Rehabilitation of the dam and apron allowed for complete removal

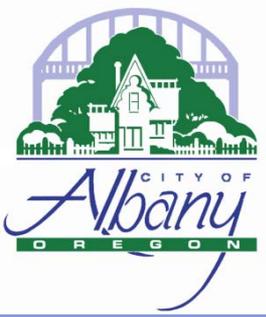




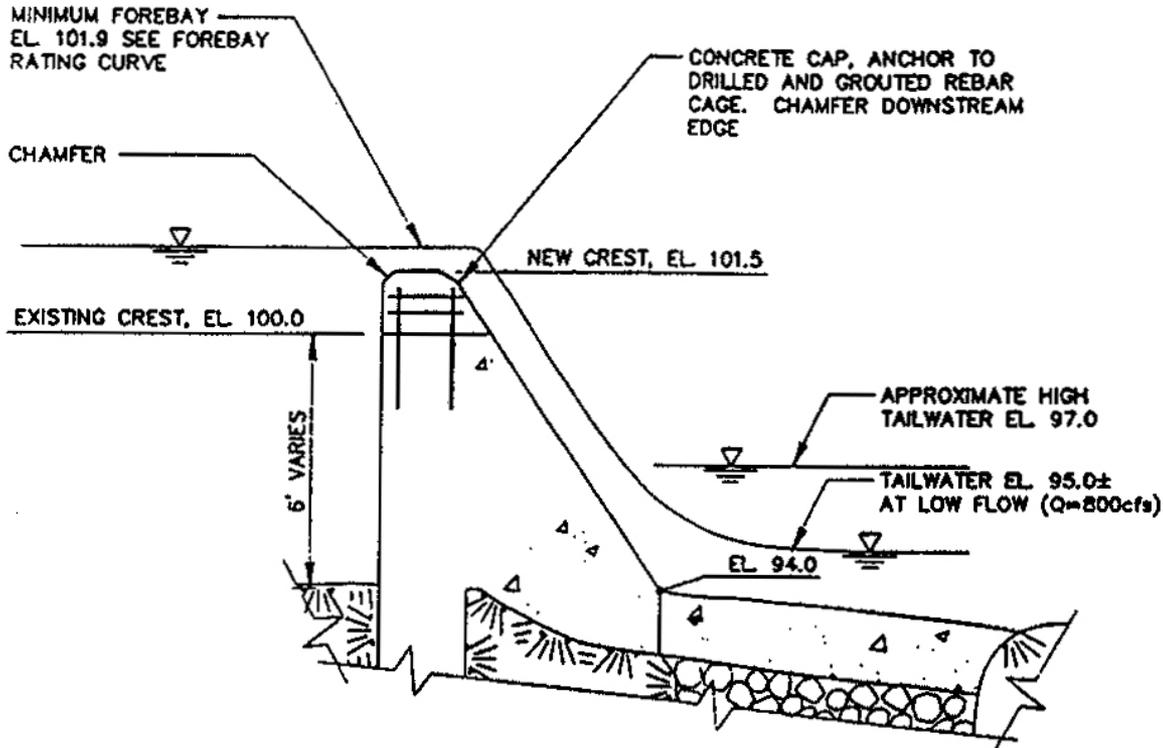
Facilities constructed – Center Ladder

- Rehabilitation of the dam allowed for complete removal in lieu of closure only



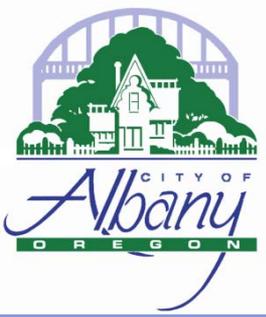


Facilities constructed – Dam Crest gate

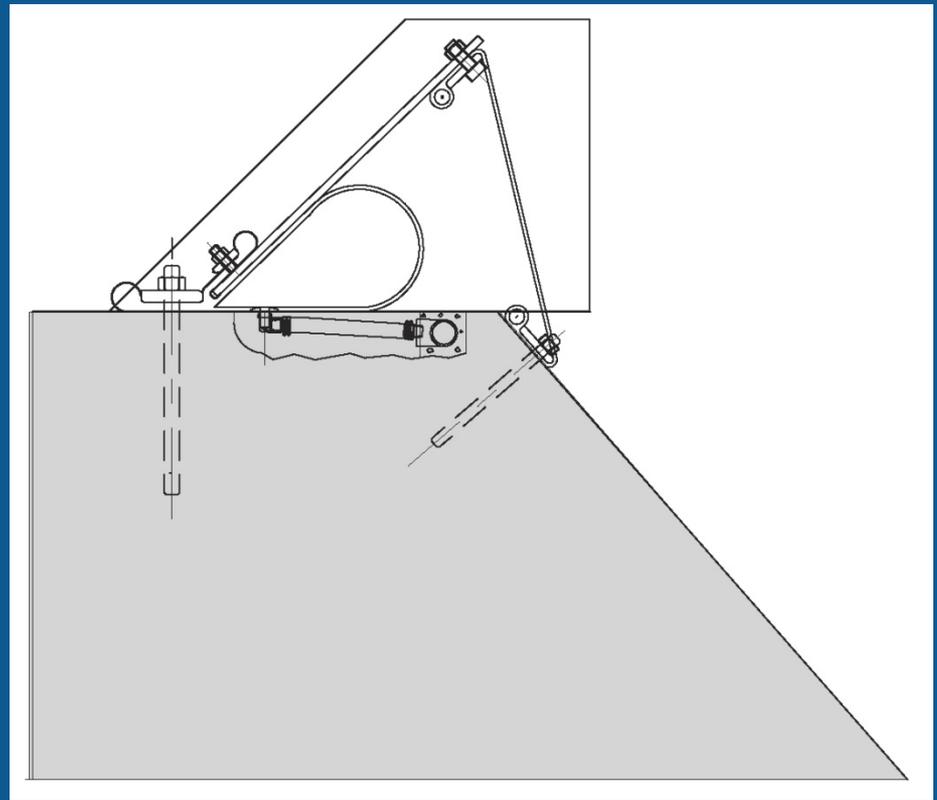
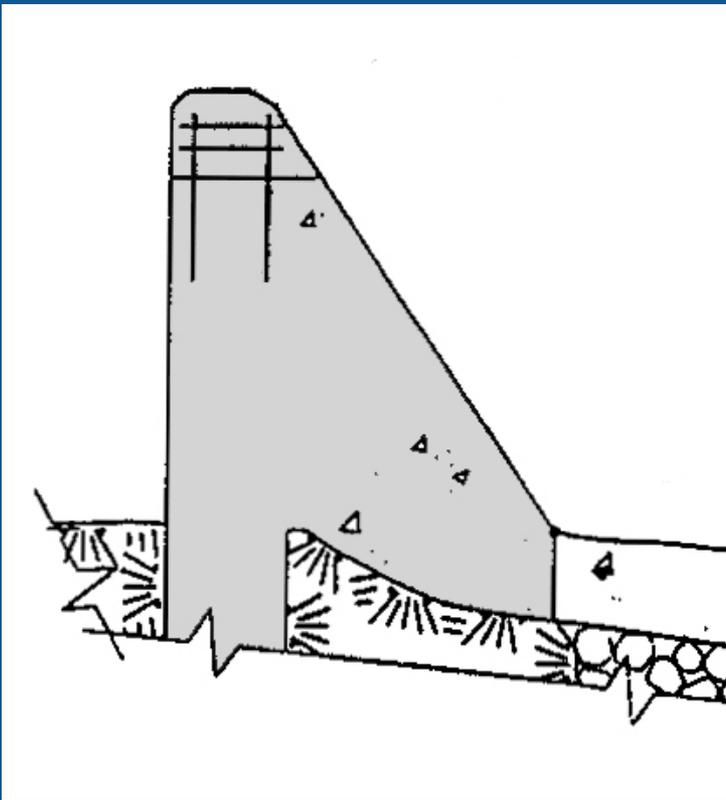


TYPICAL FIXED CREST SECTION (C)





Facilities Constructed – Dam Crest gate





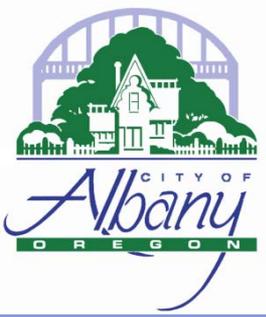
Facilities Constructed – Dam Crest gate





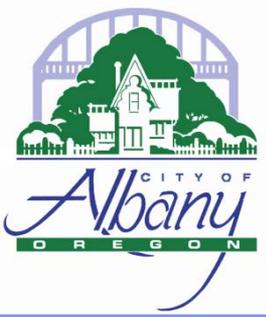
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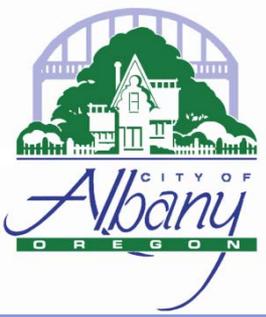
Operations

- Operating facilities in conjunction with fish agencies
- Crest gates automatically adjust for needed diversion flows
- Boat barrier added upstream of dam
- Routine maintenance, some additional maintenance during leaf fall
- Clean screens twice a year
- Added a cutoff structure in front of screen to facilitate cleaning
- Once a year adjustment of pool and chute ladder weirs



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How not to construct a coffer dam in a river





How to construct a coffer dam in a river

