**T3. What are you proposing to do? Supply specific and sufficient detail to match the project's complexity and technical difficulty so that its viability can be evaluated. Include who will do the project design, and whether other alternatives were considered and why this particular methodology was selected from among the alternatives considered.**

The Calapooia Watershed Council worked with engineering firm Inter-fluve, Inc. during 2004 and 2005 to develop fish passage alternatives for Brownsville Dam. With OWEB funding from a Technical Assistance Grant, Inter-fluve prepared a study, "Fish Passage Alternatives for Brownsville Dam". *(Copies of the study available from the Calapooia Watershed Council upon request – OWEB also has a copy).* Four alternatives were examined for their benefits and concerns.

*Table 1. Brownsville Dam Fish Passage Alternatives*

| Alternative | Benefits and Concerns |
|---|---|
| **1. No action.** | Benefits:<br>a. Community keeps a well-loved structure.<br><br>Concerns:<br>a. Salmon continue to struggle past the dam to upstream spawning areas.<br>b. Potential for a citizen lawsuit against dam owners under ESA.<br>c. Potential for fisheries agencies seek enforcement action against dam owners.<br>d. Lack of local interest in continued financial support of the dam results in lapse in insurance policy for the dam. Potentially all residents along Brownsville Canal held responsible for safety and fish passage issues at the dam.<br>e. Existing safety concerns and dam deteriorating condition not addressed. |
| **2. Construct conventional fish ladder.** | a. Construction costs for the site range from $1 million and up due to the huge seasonal flow variation. Calapooia River levels fluctuate from less than 20 cfs in summer months to over 2,000 cfs in winter months. Site requires the construction of two ladders – one for winter high flows and one for summer low flows, making it costly. This alternative was not pursued further. |
| **3. Construct rock ramp and repair dam.**<br><br>Use large boulders to build a new, steep channel similar to the step-pool configuration of mountain streams.<br><br>The rock-ramp would be constructed immediately below the dam with imported boulders. Sand, gravel, and cobble would be used to fill void space in the boulders. Along the center line, the ramp | Benefits:<br>a. Next best alternative to restore fish passage if complete dam removal not feasible.<br>b. Does not require the removal of the dam or elimination of the impoundment.<br>c. Unlike construction of a conventional fish ladder, this solution contributes to the stability of the existing dam.<br>d. Unlike a conventional fish ladder, this solution reduces potential for accidents involving the public and the associated potential liability.<br>e. Fish passage would be achieved over a wide range of flows.<br>f. All fish could pass downstream over the sill of the dam and down the rock ramp without harm (eliminates riprap at toe of dam).<br>g. Reduced potential for poaching and harassment of fish.<br>h. Maintains the sight and sound of "rushing" water that appeals to many people who visit the existing dam.<br>i. Allows continued diversion of water from the river into the canal when flashboards are installed on the dam.<br>j. Does not require costs associated with pumping water into canal.<br><br>Concerns:<br>a. If design and construction of the new transition channel are not well executed, there is risk that the low summer flows would go subsurface beneath the surface of the rock ramp. A dry rock ramp would be a migration barrier. |

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|---|---|
| would have a slope of 5%. | b. The rock ramp may be difficult for fish to pass upstream under most flow conditions.<br>c. May still be considered a dam by the state and require special design and maintenance planning according to the rules of the state dam safety program.<br>d. Will require an engineering study to evaluate and design dam repairs. Study estimated costs: $20,000.<br>e. The rock ramp would require periodic maintenance to remove debris and replace boulders that become dislodged.<br>f. Not a permanent solution. |
| **4. Dam removal and channel reconstruction.**<br>**PREFERRED ALTERNATIVE** | Benefits:<br>a. Removing the dam is a final solution with no future cost required to maintain an aging structure.<br>b. Any dam is a safety hazard. Removing the dam eliminates potential for accidents and liability associated with dam ownership.<br>c. Fish passage would be achieved over a wide range of flows.<br>d. Juvenile fish can migrate along the boundary layer as they would along a natural channel.<br>e. All fish could pass downstream without going over the crest of the dam and potentially impacting the placed riprap.<br>f. Reduced potential for poaching and harassment of fish.<br>g. The new channel slope (~ 1.6%) is appropriate for creating pool and riffle habitat.<br>h. Removing the dam may improve the delivery of gravel to lower reaches of the Calapooia.<br>i. No structure is exposed to flow to collect debris.<br>j. Maintenance of a package pump system would be safer than current practices used to install and remove the flashboards.<br><br>Concerns:<br>a. If design and construction of the new channel are not well executed, there is risk that low summer flows will go subsurface beneath the river bed. A dry river bed would be a migration barrier.<br>b. Estimated maintenance for the package pump system would average about $500/year.<br>c. Estimated cost of power to operate the package pump system would average about $10/day during the irrigation season. |

January 11th, 2006 at a public meeting attended by over 40 local residents and canal company members, the Brownsville Canal Company Board unanimously voted **to support dam removal** and installation of a pump package to provide water to the Brownsville Canal. Dam removal will address all of the problems identified in T2. It is the best, long-term solution for improving fish passage at this site.

The information the Council has on how this dam removal would be implemented is limited to a 30% design prepared by Inter-fluve during 2005. A greater level of detail is needed prior to construction and all plans must be approved by the permitting and natural resource agencies concerned with fish passage. NOAA Fisheries and ODFW have been involved with this project from the beginning.

This project proposes to:

1. Remove the existing dam.
2. Reconstruct the river bed using rounded rock substrate to provide passage and grade control. Conceptual drawings of this scenario are attached and are labeled Sheets 2 and 3.
3. Install a package pump system to lift water from the river into the Brownsville Canal.
4. Establish native vegetation at the site.