The dam would be demolished and removed to the elevation of the newly reconstructed channel. The concrete, rebar and other debris would be disposed of in accordance with local regulations. Recyclable and re-usable materials will be recovered and re-used as appropriate. (For example, some of the concrete could be crushed and used to create the parking area for the potential County Park at the site.) The abutments of the dam would remain to provide grade and seepage control. The new channel would extend upstream and downstream of the existing dam and would have an average thalweg slope of about 1.6 %. Because the slope of the new channel is steeper than the reach upstream, large rounded rock would be imported and used to construct several riffles to provide grade control to prevent a potential head cut and associated bank instability from impacting the river upstream of the existing dam. Further technical analysis of this approach would need to be undertaken prior to construction. OWEB funds will be used to bring the current 30% design to a 100% design.

The location and channel profile, shown on Sheet 1, would roughly balance volumes of materials to be excavated with those to be placed as fill. Pool and riffle features of there constructed channel would be refined during design. The channel bed would be constructed using a mix of rounded boulders sized to remain stable in a flood event (e.g. 100-year flood). The voids between boulders would be filled with a mix of sand, gravel, and cobble. These materials fill the voids and reduce potential for low summer flows to go subsurface within the riffles. Average January flow in the Calapooia River at the mouth is 2200 cfs and in August, flow averages only 34 cfs. For this reason, it is important that substrate gradations are carefully designed and installed. Before and after photographs of a similar solution for a project designed by Inter-Fluve, Inc. are shown on Sheet 3. The photograph of the reconstructed channel shows the natural appearance that is possible to achieve. The cross section of the placed substrate would slope gently towards the center of the channel to provide adequate flow depths during low flows for fish passage.

Once the dam is removed, pump system and vandal-proof housing to lift 2.5 cfs of water from the river into the Brownsville Canal would be installed. The intake would be one or more sections of perforated 10-inch diameter pipe buried beneath the constructed river bed to avoid the need for a fish screen. Maintaining flows and existing canal water rights is a necessity for this project. The Brownsville Canal Company, the City of Brownsville, and the local citizens of Brownsville support this project with the assurance that water will be maintained in the Brownsville Canal.

As part of this project, the roadside entrance to the dam would be enhanced to provide construction equipment access to the site. Some of the material from the dam removal would be recycled and used in construction of parking area for the future County Park. An information kiosk will be constructed at the park to provide information on this project and the recovery of steelhead and chinook salmon to the Calapooia River.

T4. What are the project objectives? Provide a bulleted list of measurable indicators.

Goal	Objective	Monitoring Parameter
Improve access to 28 miles of salmonid habitat along the Calapooia River and tributary streams.	1. Remove the Brownsville Dam 2. Engineer the streambed to minimize movement of impounded sediment following dam removal. 3. Re-establish the return of at least 100 spring chinook to the spawning areas above Brownsville Dam by 2012.	2a. Establish photo points and take pre/post project photos 2 times annually for 3 years (longer if Council continues to have staff). 2b. Establish benchmark cross sections above and below dam site prior to its removal. Take annual measurements for five years following dam removal.

	4. Re-establish the return of at least 700 winter steelhead to the spawning areas above Brownsville Dam by 2012. 5. Document changes to the Calapooia River following dam removal. 6. Establish a County Park at the former dam site.	3 & 4 a. Fish survey and redd counts for 1 season prior to dam removal and 3 seasons following dam removal (for winter steelhead and spring chinook). *Note:ODFW conducts annual fish surveys and redd counts in the basin and has these numbers going back several decades for the Calapooia River mainstem.*

T5. What will be the anticipated condition of the site(s) upon project completion, and in 10 years? Be site specific.

We expect that the river will have some turbidity during the first year following dam removal. The sediment behind the dam is made up of cobbles, gravels and fines that have accumulated over the years. The stretch of channel with the dam is a transport reach where sediment is being deposited and eroded continuously during the winter rainy months. A large sediment wedge has formed upstream of the dam on the inside bend, where one would expect to find a sediment deposit on a normal inside river bend. This section of river above and below the dam for several miles in either direction has many areas of gravel deposition and erosion unrelated to the dam.

All salmonid spawning and rearing habitat is upstream of the dam therefore any sediment that is released following dam removal will not be impairing any salmon spawning grounds. The Calapooia Watershed Council's watershed assessment gives a rough number for the amount of suspended sediment transported each year in the watershed as 44,500 tons. The relatively small amount of sediment trapped behind the Brownsville Dam is a fraction of that amount.

There are no known significant sources of sediment contamination in the watershed, so we will not be releasing any toxins to the watershed. The Calapooia watershed above Brownsville Dam is a mixture of small, forested parcels managed for timber production, commercial timber production and small, rural residential parcels managed as pasture. There is no industry of any kind upstream of the dam. Two small, unincorporated communities are along the river upstream of the dam – Crawfordsville (population around 300) and Holley (population around 150).

The Brownsville Dam is a run-of-the-river structure for most of the year. It only impounds water during the summer months (June through September) when the flashboards are installed. The dam does not store water during the rainy season and is not impacting the flood regime; therefore we do not expect to have any changes to the flows experienced downstream during winter rain events. During the times of year when the flashboards are not installed, the river moves right over the top of the dam and when flows are at bankfull stage, the dam is not even visible. The impact of dam removal on the Calapooia River's flood regime is expected to be negligible.

Anticipated site conditions 10 years following removal of the dam is a channel that functions as a natural channel and that provides fish passage at all flows. We expect the site will look as though the dam were never there, except for the abutments left in place following dam removal. The channel will function as a natural channel.

We expect to improve conditions for passage that will increase the run size able to access the watershed's spawning and rearing habitat. The Calapooia River is home to two species listed as "threatened" under the federal Endangered Species Act: winter steelhead and spring Chinook. The Calapooia watershed steelhead represent the uppermost distribution of steelhead in the Willamette system. The steelhead population in the basin is native and has never been supplemented or augmented with hatchery stock. Oregon Department of Fish and Wildlife conducts annual redd surveys to determine the steelhead population and returns from 2001-2004 ranged from 410 to 494. The basin is believed to be capable of producing and supporting upwards of 1100 steelhead and in 10 years, we expect to be closer to that number.

Spring Chinook salmon are also native to the Calapooia basin. However due to fish passage blockages and timber harvesting in the upper watershed that resulted in mass erosion and land movements, spawning habitat was degraded throughout the 1940s into the 1970s. By the 1970s, natural production of spring Chinook in the basin was thought to be minimal or non-existent. Hatchery releases of pre-smolts, smolts and adults occurred during the 1970s. Oregon Department of Fish and Wildlife has a goal to re-establish a run of 650 spring Chinook salmon in the Calapooia basin. Currently, fewer than 100 fish return each year. In 10 years following dam removal we expect to be closer to 650 spring Chinook returning to the basin.

T6. Clearly explain how this project implements a watershed assessment/action plan, TMDL, agricultural water quality plan, or other strategic plan that assesses watershed health concerns and prioritizes actions to address them. Provide the name and date of this plan. Explain where and how this project is identified as a priority in the plan.

The Calapooia Watershed Council completed a watershed assessment in February 2004. The assessment follows the Oregon Watershed Enhancement Board protocol and includes an examination of current and historic conditions and evaluates opportunities for improvements in the watershed particularly for fish habitat. In addition to an emphasis on aquatic and riparian issues, the assessment summarizes information on wildlife populations and habitat and outlines social, economic and land use conditions.

The final chapter of the watershed assessment is "Restoration and protection opportunities". **The highest priority is: Improve upstream fish passage.** The top two projects for this goal are: 1. Continue to work with agencies and private partners for a solution to the passage of adult spring chinook salmon over the dams associated with the Thompson's Mills site. **2. Continue to work with the Brownsville Canal Company and ODFW to improve fish passage for chinook and steelhead at Brownsville Dam.**

The entire Calapooia River is identified as one of 27 "conservation opportunity areas" in the Willamette Ecoregion in Oregon Department of Fish and Wildlife's *Oregon Comprehensive Wildlife Strategy*. It notes the watershed's special features:

> "The corridor along the Calapooia River contains some of the best riparian forests remaining in the [Willamette] Valley, and the river supports small populations of native spring chinook salmon and summer steelhead. Studies of wintering shorebird use in the Willamette Valley found the Calapooia drainage to be extremely valuable habitat for killdeer and dunlin (pg 251)"

The Calapooia watershed is identified in other planning efforts including:

Pacific Coast Joint Venture Implementation Plan
The Nature Conservancy Ecoregional Assessment