Section III

SPECIFIC PROJECT ACTIVITY

USE 8½" x 11" SINGLE-SIDED PAGES

☒ WATERSHED RESTORATION PROJECTS:

Please answer the following questions. **Please read the instructions for further clarification on what information is needed to respond to these questions.** If there are multiple locations, **be specific for each site**.

T1. Clearly describe the current conditions at the project site(s) and what is known about what caused the site(s) to degrade to its current condition.

The Calapooia Watershed is located in the Willamette River Valley in Western Oregon. The watershed encompasses 231,800 acres with 94% private ownership. The Calapooia River stretches over 72 miles from its headwaters at Tidbits Mountain in the Cascades to its mouth at Bryant and Monteith Parks in Albany. Brownsville Dam is at the center of the watershed at RM 36. Driving down main street in Brownsville is like slipping into the past. The town of 1,450 residents is a happily undeveloped part of the Willamette Valley where everyone knows one another and is proud of the town's pioneer history. Best known for being the town where "Stand by Me" was filmed, the city is surrounded by flat agricultural fields to the west and forested hills of the Cascades to the east that provide habitat for endangered salmon. *(See Figures 1 and 2)*

The Brownsville Dam, located 3 miles upstream from Brownsville was originally constructed as a wooden crib dam in the late 1880s. The diverted flow fed a three mile long canal that brought water to Brownsville woolen and timber mills. The wooden dam fell into disrepair and disuse by the 1940s when the mills closed and the structure blew out during a flood. The dam was rebuilt in 1967-68 with federal funds made available from the Community Beautification Act passed under the Johnson administration. The local Soil Conservation Service (now Linn SWCD) provided the engineering designs and local contractors built the structure. When it was re-built in 1967, the dam no longer served a compelling purpose or need. No commerce, flood control, or community water supply is provided by the dam. The dam's **sole** purpose is to divert water (~2.5 cfs total) into the three mile long Brownsville Canal. The City of Brownsville maintains a 1992 water right for 2 cubic feet per second (cfs) for aesthetics. There are several small (total less than .5 cfs total) water rights along the canal for irrigation or cattle watering. The Brownsville Canal flows through town and the backyards of many residents and is now a deeply held community feature. The dam and canal are owned and operated by the Brownsville Canal Company. The landowners have been seeking ways to address fish passage at the dam and support this proposal. *(See Figures 4-6, 9)*

The Brownsville dam is a concrete structure that is comprised of an abutment on each bank, connected by two vertical walls *(See Figure 4.)*. The walls are 8-inch thick, 5' tall, formed reinforced concrete. They are parallel, 14 feet apart, and 110 feet long. On top of the vertical walls is a 10-inch thick structural concrete slab that spans the 14' distance between the walls. The vertical walls were backfilled with sand or gravel. In cross-section, the dam looks like an inverted, flat-bottom trough, filled with sediment. The original design drawings show rock armor placed along the toe of the dam, abutment to abutment. It appears the original purpose for the rock armor was to dissipate energy of water spilling off the dam crest to prevent erosive undermining and thus avoid damage to the dam's foundation. At present, however, there is a gap in the 3-5 foot diameter rock where some has been removed at the recommendation of OR Department of Fish and Wildlife in order to improve fish passage. In this location, a cavity has formed that extends under the dam and behind the downstream vertical wall. The age and size of this cavity are unknown. Local residents claim people swim up under the dam from the downstream side. *(See Figure 5)*

The abutments are cast-in place concrete. The right (north) abutment is founded on bedrock, backfilled with gravel, and capped with a reinforced concrete slab *(See Figure 4)*. The left (south) abutment is built into the man-made levee located on the Calapooia's left bank *(See Figure 6)*. The left abutment consists of a formed concrete face and wing walls backfilled with soil. Two layers of steel reinforcement exist in all concrete walls and slabs. Equally spaced, inclined, slotted steel guides are attached to the crest of the dam to support wooden planks (i.e., flashboards) that are inserted and removed to raise or lower the level of the pool behind the dam. The flashboards are installed in late spring and removed in early fall. The flashboards are installed to raise the impoundment stage and divert water from the river into the Brownsville Canal. *(See Figures 11 and 12)*

The dam is a "run of-the-river" structure for nine months of the year and does not impound water. During the summer, less than 10 acre-feet of water is impounded behind several tiers of wooden flashboards that are seasonally installed (during low flow periods) to close the 110 foot gap between the dam's retaining walls located on each bank. The boards rest against the upstream side of the metal support beams that rise vertically from the dam sill. The boards raise the height of the dam by an additional 5 feet (for a total height of 10 ft). At this height water is able to be diverted into the Brownsville Canal and excess water is spilled over a bedrock chute on the north side of the river channel (the dam's fish chute).

During high flow conditions the bedrock chute has very high velocities that delay fish while at lower flows the water depths may not be adequate for adult fish passage or have adequate flow to attract the fish.

The upstream spawning migration of fluvial cutthroat trout and winter steelhead occurs during the late winter and early spring, when the dam boards are not yet installed and water does not flow down the bedrock chute. The fish must then negotiate passage over the dam itself. These conditions create delays for the fish migrating upstream. During moderate or low flows, an additional challenge to fish passage is posed by the drop at the downstream end of the sill. This drop can be somewhat mitigated by higher flows, yet the velocity problem created by the 14 feet of smooth concrete atop the dam remains.

The Brownsville Canal Company, which operates the dam, installs the flashboards in late spring, prior to the irrigation season. Beginning in spring and continuing through much of the summer, adult spring chinook are trying to migrate past the dam to spawning locations in the upper watershed. With the dam boards in place, partial passage is provided for adult spring chinook through the 8-foot wide and approximately 70 foot long cascading chute on the north side of the channel. The flashboards are removed in the fall before the fall rains, usually in mid-October. Except for very high winter flows, this chute does not carry water unless the dam boards are in place. While some spring chinook do pass through the chute, it does not meet ODFW or NMFS standards for adult passage. It is not documented how many fish are delayed or unable to migrate above the dam. In addition, the upstream end of this channel as it joins the river above the dam is extremely shallow, (less than one foot) and exposed. During the low flow periods in late spring and summer, adult spring chinook below and above the dam are vulnerable to harassment and poaching. *(See Figures 7 and 8)*

All of the spawning and rearing habitat for salmonids is **above** this dam. Steelhead and chinook must negotiate this dam in order to reach the cool pools and spawning gravels in the upper watershed. This dam has been a known fish passage problem for decades, but the community had not previously supported its removal. Over the past 4 years, the watershed council has built the relationships and done the outreach necessary to obtain Brownsville Canal Company support for removal of Brownsville dam.

T2. What is the specific problem (cause, not symptom) you are proposing to address at the site(s)? Clearly describe what known watershed function problem(s) or limiting factor(s) exists at the site(s) that needs to be addressed and why.

The Calapooia River is home to two species listed as "threatened" under the federal Endangered Species Act: winter steelhead and spring chinook. 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. Returns from 2001-2004 ranged from 410 to 494. The basin is believed to be capable of producing and supporting upwards of 1100 steelhead.

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. It is not believed that the outplanted chinook took to the basin. When ODFW conducts snorkel surveys, the chinook holding in the pools in the Calapooia River are not adipose clipped, but intact fish indicating they are not of hatchery origin. 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.

Cutthroat trout are native to the basin. No fish surveys document their population. The Brownsville Dam is an impediment to cutthroat freely moving through the watershed and under certain flow conditions, prevents their access to the cooler waters upstream of the dam.

Pacific and brook lamprey are both present in the watershed. No work has been done to estimate the population of either species. Large numbers of pacific lamprey (estimates of several hundred) have been seen when the Brownsville Dam flashboards are removed.

Watershed problems to be addressed by removing the Brownsville Dam:

- Inadequate passage for adult winter steelhead and spring chinook contributes to depressed numbers of salmonids in the watershed.
- Dam interrupts the distribution of gravels through the system by trapping sediment. This impact is not well understood other than the dam has approximately 8 feet of gravel built up behind it for an undetermined distance upstream.
- Unsafe dam that is not part of the Oregon Water Resources Department Dam Database due to its small size (less than 15 feet high and impounds less than 10-acre feet of water) and therefore is not regularly inspected for safety.
- Dam is showing signs of aging and is unsafe. Rebar is exposed on the south side of the top of the dam and a cavity that is large enough for swimmers to access has formed beneath the dam on the downstream side. The dam is reaching the end of its' design life (age 40) and is failing.
- Water temperature in the Calapooia River can potentially be improved by removing the dam. The Calapooia River violates the state temperature standard from river mile 42 to the mouth. (The Dam is at river mile 33).