

**APPENDIX B:**

**CATALOG OF DEL NORTE COUNTY CULVERTS LOCATED  
ON FISH-BEARING STREAM REACHES**

**NOTE:** This catalog contains two pages for each culvert included in the inventory. The first page consists of location information, site-specific data, habitat notes, and a map. The second page has inlet and outlet photographs, with the inlet photo on the left side (or top) and the outlet photo on either the right side or bottom. Generally, sites are ordered in their location within Del Norte county from north to south, and from lowermost to uppermost road/stream intersection within a watershed.

For proposal development purposes, 8.5" x 11" full-scale USGS 7.5 Series copies are available on request.

## **SITE-SPECIFIC CULVERT INFORMATION**

**Site #1:** Lopez Creek/Oceanview Drive; coastal watershed **Ranking: #8 = Moderate Priority**

**Location:** County Map # 1A24. T18N, R1W, Section 17 **Culvert Type:** Circular CSP.

**Dimensions:** 6.0' **Length:** 60.0' **Slope:** 5.32% **Modifications:** None **Fill Estimate:** 891 cubic yards

**Overall condition:** Good. **Sizing:** Undersized, inlet is topped on approximately a two-year storm.

**Barrier Status:** FishXing determined for juveniles (all age classes) = 100% barrier due to excessive velocities caused by steep slope. Adults (coastal cutthroat and steelhead) = 100% barrier due to excessive velocities. Culvert also lacks adequate depth on lower range of migration flows. Fish observed upstream of Oceanview Road may be resident trout, or progeny of steelhead able to negotiate this crossing.

**Additional Road Crossings:** Downstream, Highway 101 is a bridge. Upstream, no access, but none appear on available maps or aerial photos.

**Habitat:** No formal stream surveys were available. Quantity = 1,700' of potential fish-bearing habitat. Quality = fair, is better upstream of Oceanview Drive. Lower reach is through agricultural land, channelized with dense riparian of hardwoods and brush. Above county culvert, dense riparian of second-growth conifer and hardwoods, cool water temperatures, good amount of summer flow. Numerous juvenile trout observed in outlet pool (up to 10" in length); several young-of-year and 1+ trout observed above culvert.

**Preferred Treatment:** Properly-sized culvert or arch-culvert set at or below stream grade.





**Site #1: Lopez Creek/Oceanview Drive Photographs:**





**Site #2:** Ritmer Creek/Oceanview Drive; tributary to Smith River **Ranking:** #10 = **Moderate-Low Priority**

**Location:** County Map # 1A24. T18N, R1W, Section 22 **Culvert Type:** Circular SSP.

**Dimensions:** 8.5' **Length:** 100.0' **Slope:** 3.6% **Modifications:** None

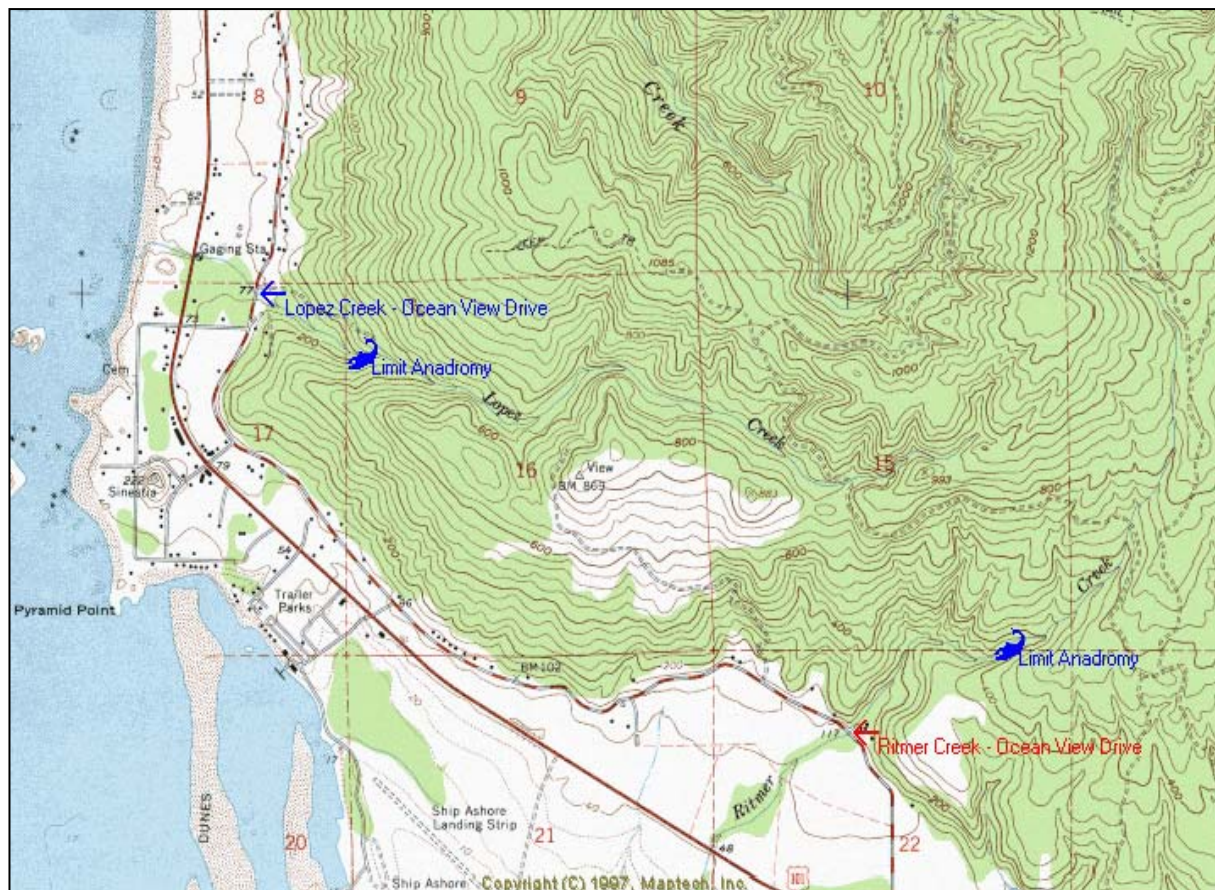
**Fill Estimate:** 3,975 cubic yards. **Overall condition:** Good. **Sizing:** Undersized, inlet is topped on approximately a 11.6 year storm flow.

**Barrier Status:** FishXing determined for juveniles (all age classes) = 0% passable due to excessive velocities caused by steep slope over a long distance. Adult coho and steelhead = 10% passable (near the upper range of migration flows); is a barrier at most flows due to lack of depth and excessive velocities. Adult coastal cutthroat trout = 0% passable due to excessive velocities over a long length of culvert.

**Additional Road Crossings:** Downstream, Highway 101, concrete box culvert at stream grade. Upstream, no access, but no additional crossings appear on available maps or aerial photos.

**Habitat:** Quantity = approximately 2,800' of potential fish-bearing habitat. Quality = good/fair, is better upstream of Oceanview Drive. Lower reach is through agricultural land, channelized with dense riparian of hardwoods and brush. Above county culvert, dense riparian of second-growth conifer and hardwoods, cool water temperatures, good amount of summer flow. Numerous young-of-year coastal rainbow/steelhead observed above and below Oceanview Drive culvert.

**Preferred Treatment:** Properly-sized culvert or arch-culvert set at or below stream grade.





**Site #2: Ritmer Creek/Oceanview Drive; tributary to Smith River**





**Site #3:** Peacock Creek/Tan Oak Drive; lower Smith River tributary. **Ranking:** #3 = **High Priority**

**Location:** County Map # 1A44. T17N, R1E, Section 21 **Culvert Type:** Circular SSP.

**Dimensions:** 7.5' **Length:** 54.5' **Slope:** 3.05% **Modifications:** Steel ramp baffles (damaged) and concrete outlet pool structure with rectangular low-flow notch.

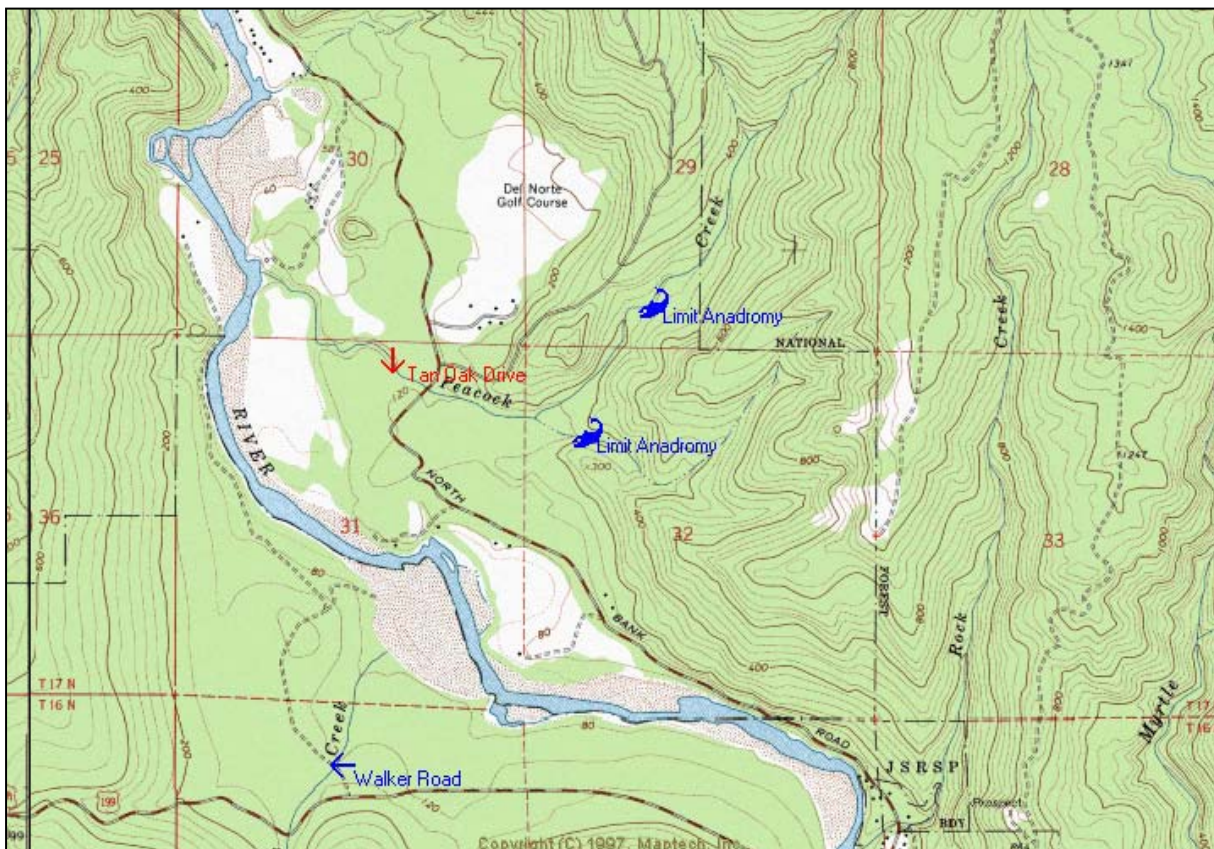
**Fill Estimate:** N/A, at least several thousand cubic yards. **Overall condition:** Fair, some signs of wear and abrasion. **Sizing:** Undersized, inlet is topped on approximately a 3.3-year storm flow.

**Barrier Status:** FishXing determined for adult coho salmon, steelhead, and coastal cutthroat = 0% passable; juveniles (all age classes) = 0% passable. Barrier is caused by too high of entry leap, lack of depth in pool below concrete weir, and excessive velocities within culvert. Direct observation confirmed during migration flows that water exits through notch in concrete weir at an excessive velocity. Turbulence also occurs at the inlet, where the creek enters inlet at nearly a 90° angle.

**Additional Road Crossings:** Downstream, none. Upstream, crossing at Highway 197 appears to provide passage.

**Habitat:** Quantity = 7,000' of potential fish-bearing habitat. Quality = Good. Below Tan Oak Drive creek is within State Park, dense riparian of redwoods and hardwoods, good pool formation with complexity. Above county culvert, similar riparian and channel conditions. Main concern is excessive summer water extraction for watering of Golf Course. Also, future landuse in upper watershed is residential development, unsure of potential impacts to creek regarding additional water extraction. Past surveys confirm presence of over-summering coastal cutthroat trout, juvenile coho and steelhead in upper watershed. Three adult chinook salmon carcasses observed in outlet pool on 12/5/01; appeared to have been poached below culvert.

**Preferred Treatment:** Properly-sized arch-culvert on footings or a bridge. County should also consider feasibility of removing the crossing since Tan Oak Drive is a short loop with alternate access.





Site #3: Peacock Creek/Tan Oak Drive; lower Smith River tributary





**Site #4:** Clark's Creek/Walker Road; lower Smith River tributary **Ranking:** #2 = **High-priority**

**Location:** County Map # 1A44. T17N, R1E, Section 21 **Culvert Type:** Rectangular box constructed of redwood planks, two bays.

**Dimensions:** each bay = 7.0'H x 9.0'W **Length:** 26.0' **Slope:** <0.5% **Modifications:** None when evaluated, as of 11/00 an outlet beam was installed on left bank bay and a beam on the inlet of the right bank bay. Funding for replacement with bridge recently awarded; construction will occur during fall of 2001.

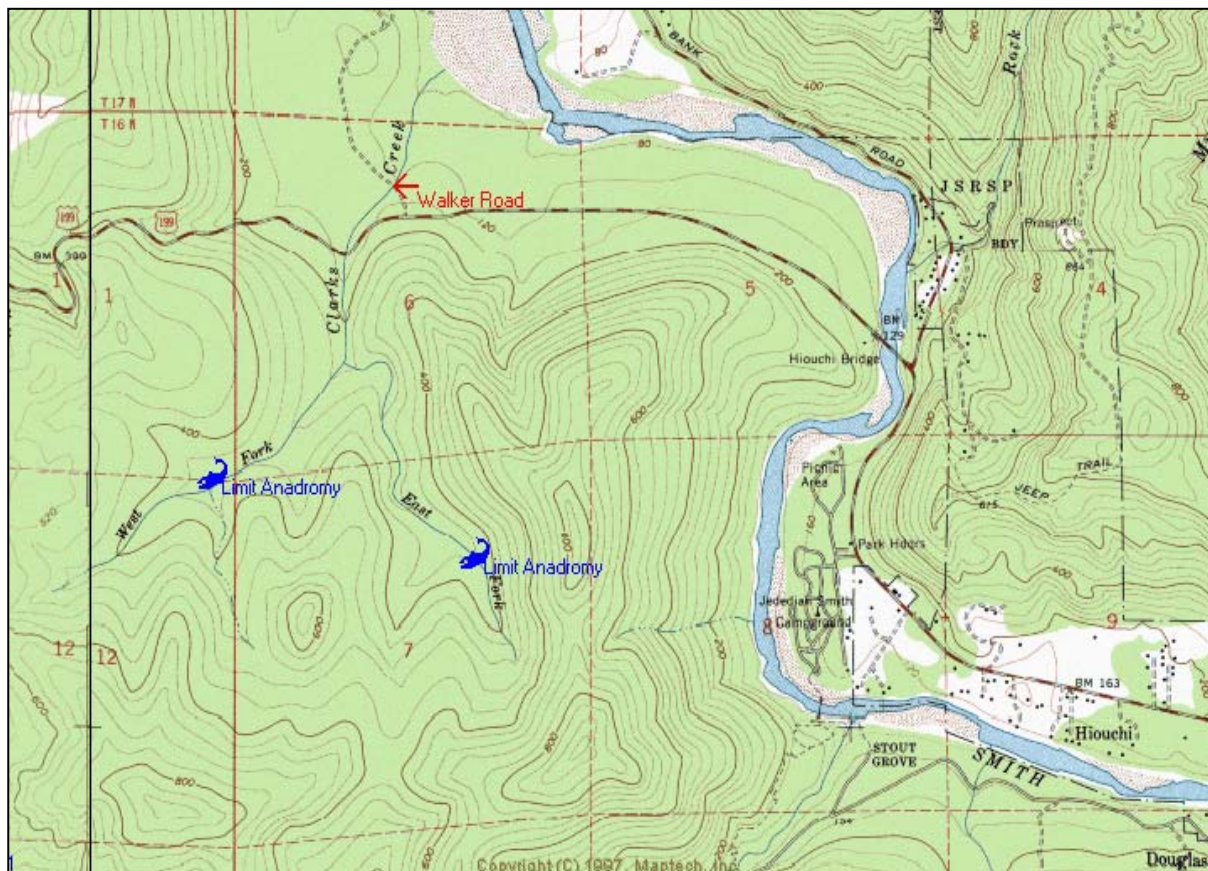
**Fill Estimate:** N/A; minimal fill on road <500 cubic yards. **Overall condition:** Fair/poor, noticeable wear occurring to planks with leakage. **Sizing:** Undersized, inlet is topped on approximately a six-year storm flow.

**Barrier Status:** FishXing determined the box culvert is 0% passable for all species and lifestages presumed present (coho salmon, steelhead, coastal cutthroat trout). Lack of depth in culvert was the major concern for adults, while the height of entry jump and velocity was more a concern for juveniles. Riprap at outlet may inhibit leap attempts. Three redds were observed upstream in winter of 1999/2000, so some passage does occur.

**Additional Road Crossings:** Downstream, none. Upstream 1,400' crossing under Highway 199 appears to provide at least partial passage, is a two-bay concrete box culvert with WA-style baffles in RB bay and a retaining wall in the LB to divert/concentrate lower flows into the RB bay. Juvenile coho and trout observed upstream of Highway 199. CalTrans will most likely assess passage at this crossing in 2001-2002.

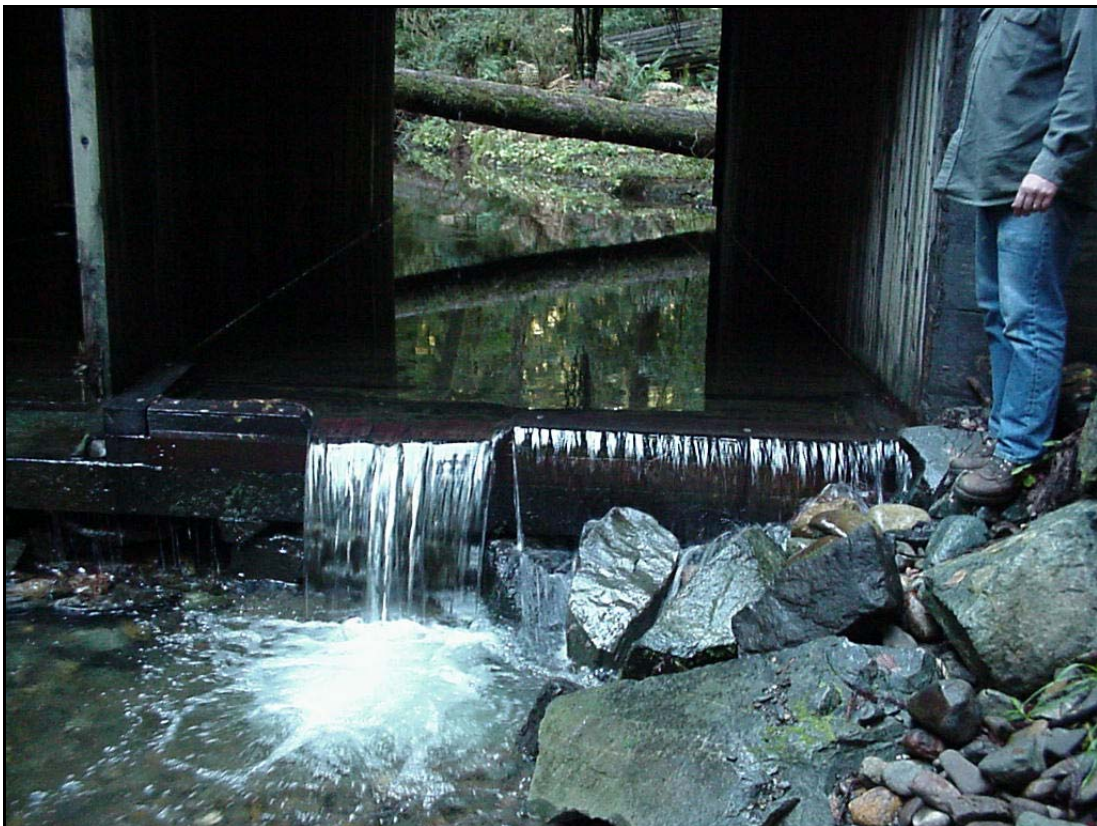
**Habitat:** Quantity = approximately 7,400' of potential fish-bearing habitat. Quality = Very Good, is within State Parks property, dense riparian of redwoods and hardwoods, good pool formation with LWD complexity. Pootails and riffles contain high-quality spawning gravels; redds observed above and below Walker Road.

**Preferred Treatment:** Long-term: properly-sized arch-culvert on footings or a doublewide flatcar bridge. Short-term: outlet beams to increase depth within both bays; downstream weirs to raise outlet pool elevation.





**Site #4: Clark's Creek/Walker Road Photographs (after 11/00 modifications)**





**Site #5:** Shelly Creek/Patrick's Creek Road; tributary to Patrick's Creek/Smith River

**Ranking:** #9 = **Moderate Priority** **Location:** County Map # 2A. T18N, R3E, Section 2

**Culvert Type:** Circular CSP. **Dimensions:** 6.6' **Length:** 61.0' **Slope:** 4.8% **Modifications:** None

**Fill Estimate:** 1,015 cubic yards. **Overall condition:** Fair, some noticeable wear/rusting of culvert floor.

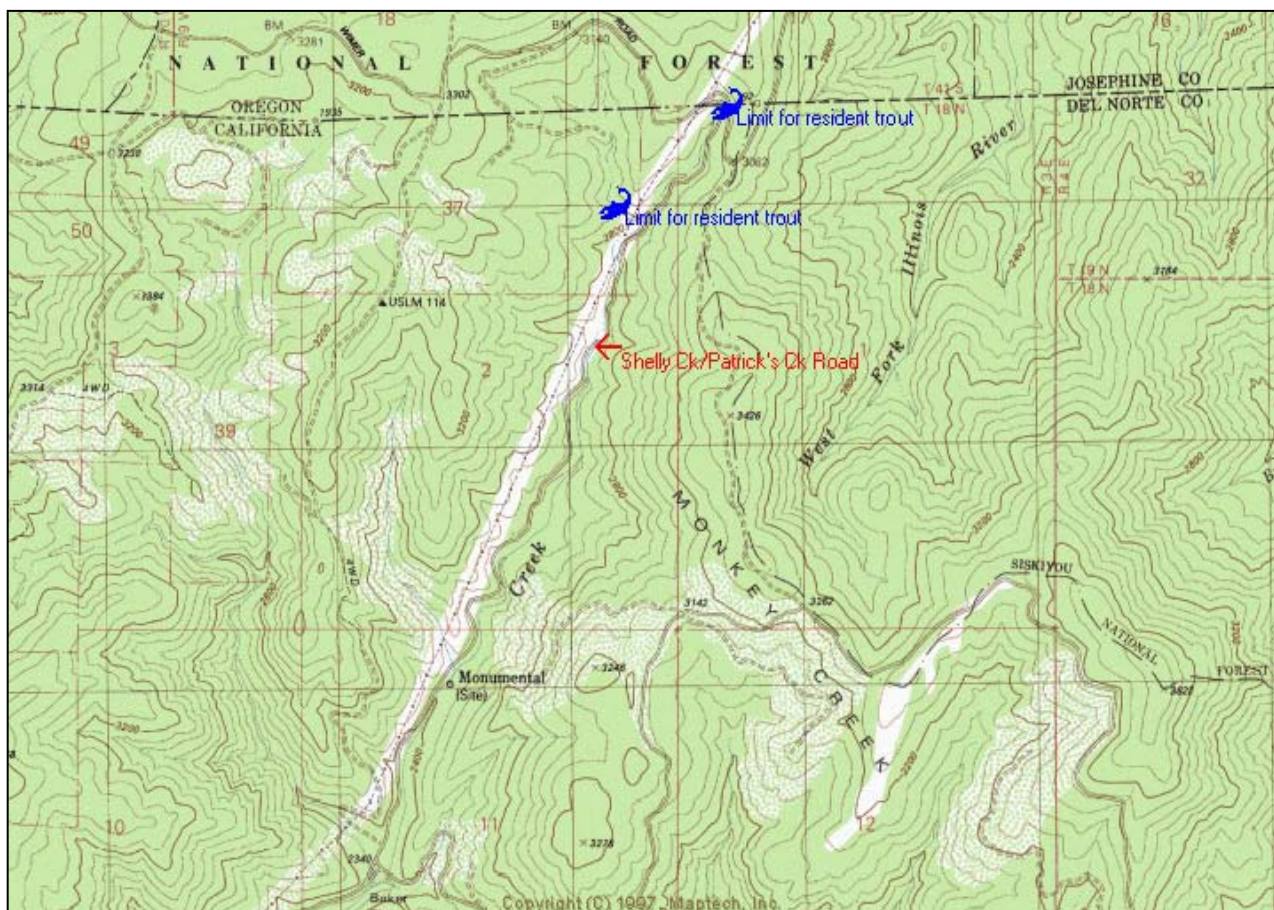
**Sizing:** Undersized, HW/D =1 on approximately a six-year storm flow. A diversion potential exists at this stream crossing – if culvert was to plug and fail, storm flow would be diverted down a remote, unpaved county road. Note: slope of road prism evident in the outlet photograph.

**Barrier Status:** Yes, FishXing determined a 100% barrier for all resident trout. However, compared to length of unimpeded habitat below County crossing (7.5 miles), potential upstream habitat gain is minimal.

**Additional Barriers:** Downstream, natural falls/bedrock chute located approximately 1.1 miles upstream of confluence with Patrick's Creek is a known barrier to anadromous salmonids. Upstream, channel steepens quickly.

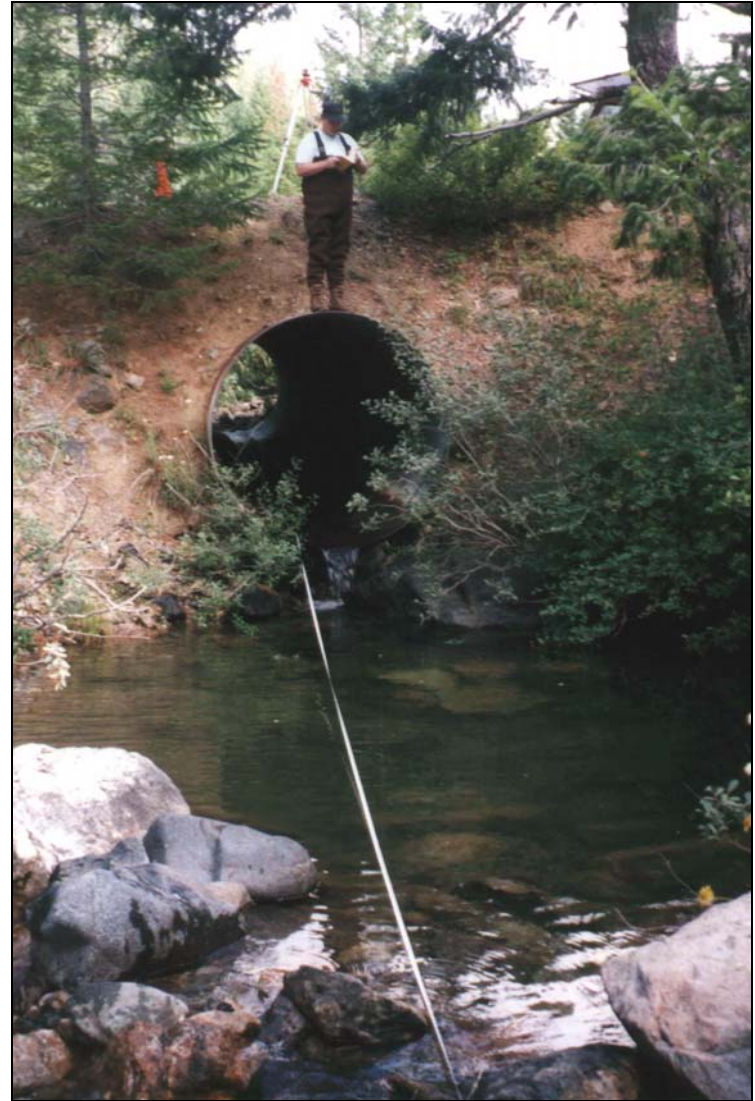
**Habitat:** Quantity = approximately 4,500' of potential fish-bearing habitat; with an average slope of 5.4%. Quality = Good/fair: dense riparian of second-growth conifers and hardwoods, good pool formation, mostly formed by boulders/bedrock; cool summer water temperatures. Juveniles 3-6" in length observed in outlet pool. Stream reach is occupied by only resident fish because of natural falls near Patrick's Creek. However, if the culvert plugged and failed, the diversion potential at this site could result in harm to downstream, high-quality, anadromous salmonid spawning habitat in Patrick's Creek.

**Preferred Treatment:** replace with properly-sized bridge and re-grade road to eliminate diversion potential.





Site #5: Shelly Creek/Patrick's Creek Road Photographs:



**Site #6:** Huffman Creek/Lower Lake Earl Drive; tributary to Lake Earl **Ranking:** #14 = **Moderate-low priority**

**Location:** County Map # 1A34. T17N, R1W, Section 21 **Culvert Type:** Circular CSP.

**Dimensions:** 4.1' **Length:** 74.6' **Slope:** 1.7% **Modifications:** None **Fill Estimate:** 1,130 cubic yards.

**Overall condition:** Fair, some noticeable wear/rusting of culvert floor. **Sizing:** Undersized; HW/D = 1 on about a one-year storm flow.

**Barrier Status:** FishXing determined that there is 100% barrier for species and lifestages due to length of culvert, shallow depths and/or excessive velocities. Juvenile trout were observed upstream of site.

**Additional Road Crossings:** Downstream, none flows into Lake Earl approximately 1,700' from Lower Lake Earl Drive. Upstream, culverts on two forks of creek underneath Lake Earl Drive Road. These sites were not included in inventory due to extremely small size of channels and limited upstream habitat.

**Habitat:** Quantity = approximately 9,000' of potential fish-bearing habitat. Quality = fair. Dense riparian zones of younger conifers and hardwoods, confined channel banks, relative lack of spawning gravels (mostly sand and silt).

**Preferred Treatment:** replace with a properly-sized arch-culvert on footings.



**NOTE:** Photos unavailable for Huffman Creek at Lower Lake Earl Drive.



**Site #7:** Yonker's Creek #1/Lake Earl Drive; tributary to Lake Earl **Ranking:** #18 = **Low priority**

**Location:** County Map # 1A44. T17N, R1W, Section 34 **Culvert Type:** Oval SSP (2 pipes).

**Dimensions:** 7.0'H x 6.0'W **Length:** 116.0' **Slope:** 0.8% **Modifications:** Coated with a black/tar-like substance – appears to minimize abrasion of culvert floor.

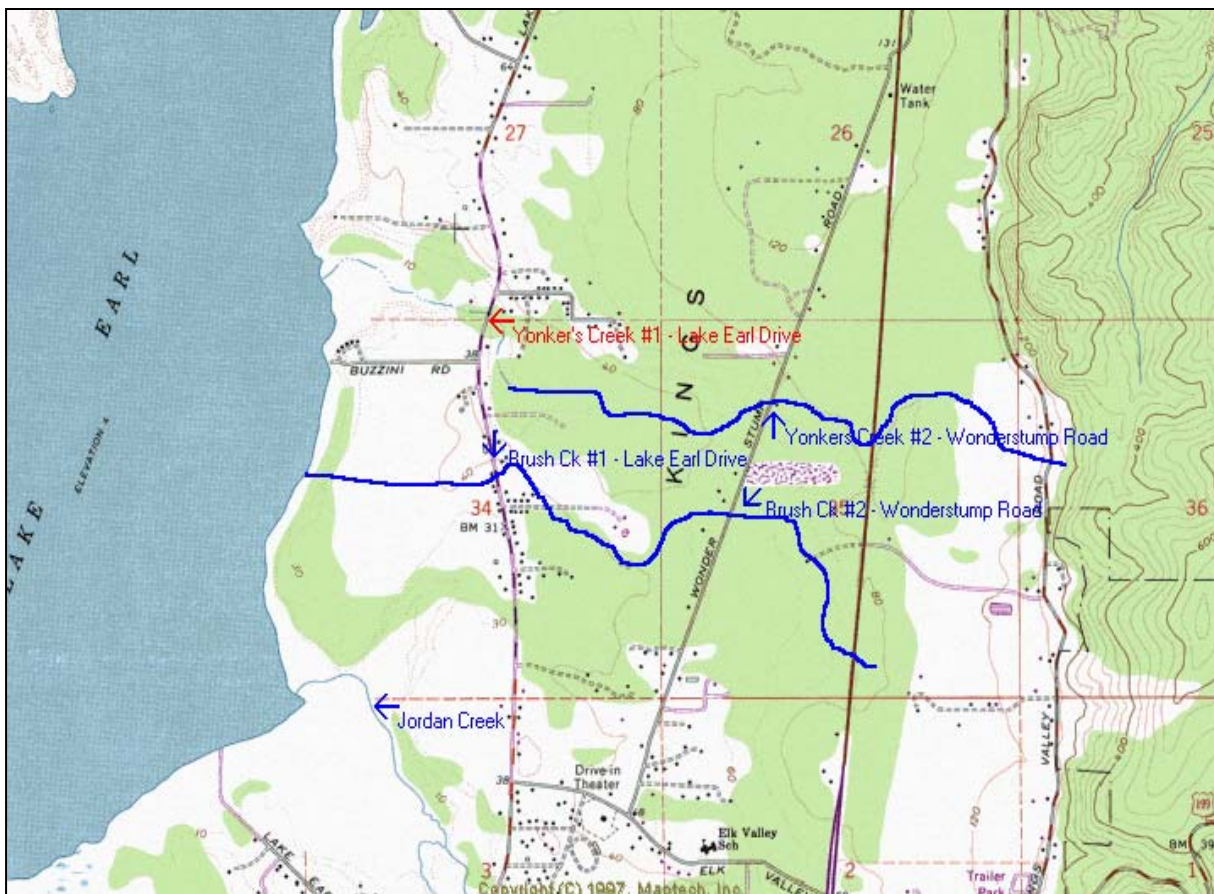
**Fill Estimate:** 3,973 cubic yards. **Overall condition:** Good. **Sizing:** Undersized, inlet is topped on a 15-year storm flow.

**Barrier Status:** FishXing determined 70% passable for adult coho and steelhead; 95% passable for adult cutthroat; 60% passable one-year old juveniles; and 10% passable for young-of-year. Annually, numerous coastal cutthroat and steelhead observed spawning in upper Yonker's Creek

**Additional Road Crossings:** Downstream, none – flows into Lake Earl approximately 2,900' below Lake Earl Drive. Upstream, culverts at Wonderstump Road (about 5,000' upstream) and culvert at Highway 101 ( about 1,600' above Wonderstump Road).

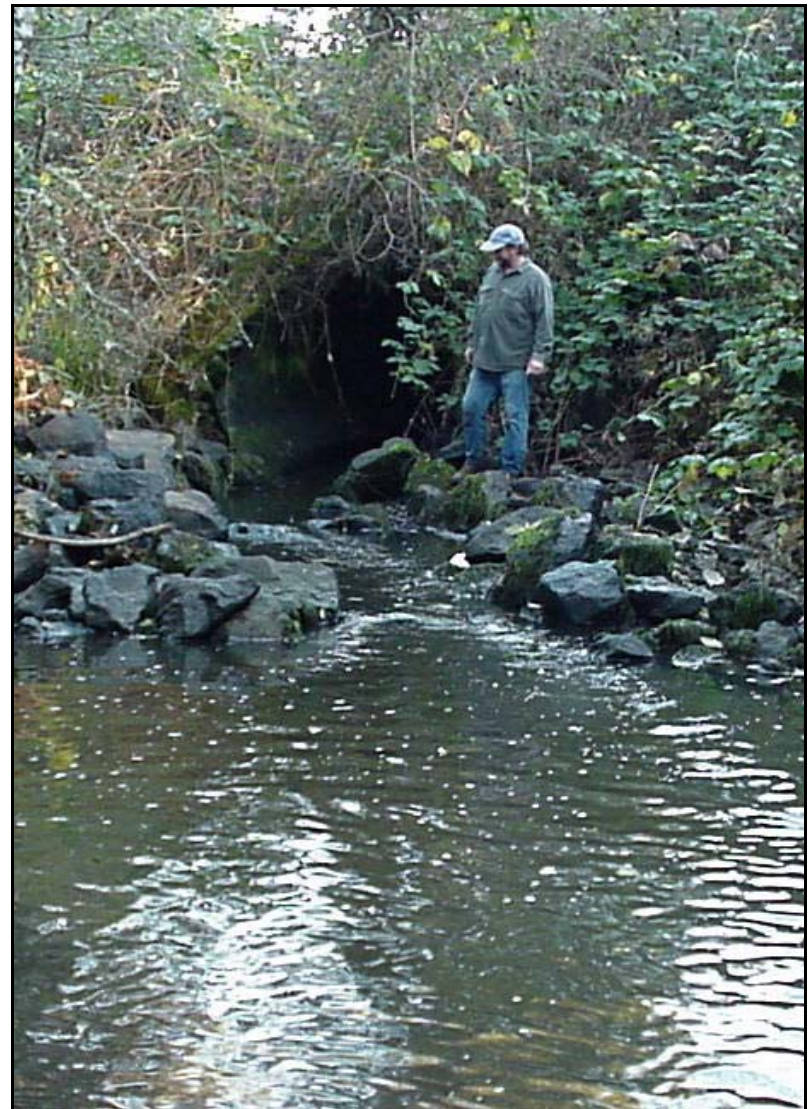
**Habitat:** Quantity = approximately 10,000' of potential fish-bearing habitat. Quality = fair for spawning, sites with suitable gravel limited, high percentage of fines. Good rearing habitat, deep pools, undercut banks, cool water temperatures during summer. Yonker's Creek is an important spawning tributary of Lake Earl. Little information exists regarding use of stream habitat for rearing by Lake Earl's salmonids.

**Preferred Treatment:** when culvert wears-out, replace with a properly-sized arch-culvert on footings or bridge. Periodically check culvert during migration flows to confirm continued presence of backwatering near outlet.





**Site #7: Yonker's Creek #1/Lake Earl Drive; tributary to Lake Earl**





**Site #8:** Yonker's Creek #2/Wonderstump Road; tributary to Lake Earl **Ranking:** #6 = **High-priority**

**Location:** County Map # 1A44. T17N, R1W, Section 35 **Culvert Type:** Oval SSP (2 pipes).

**Dimensions:** diameter 6.2' **Length:** 61.3' **Slope:** -0.55% **Modifications:** None

**Fill Estimate:** 873 cubic yards. **Overall condition:** Poor, rusted through culvert floor, seepage of flow apparent during summer and fall low flows.

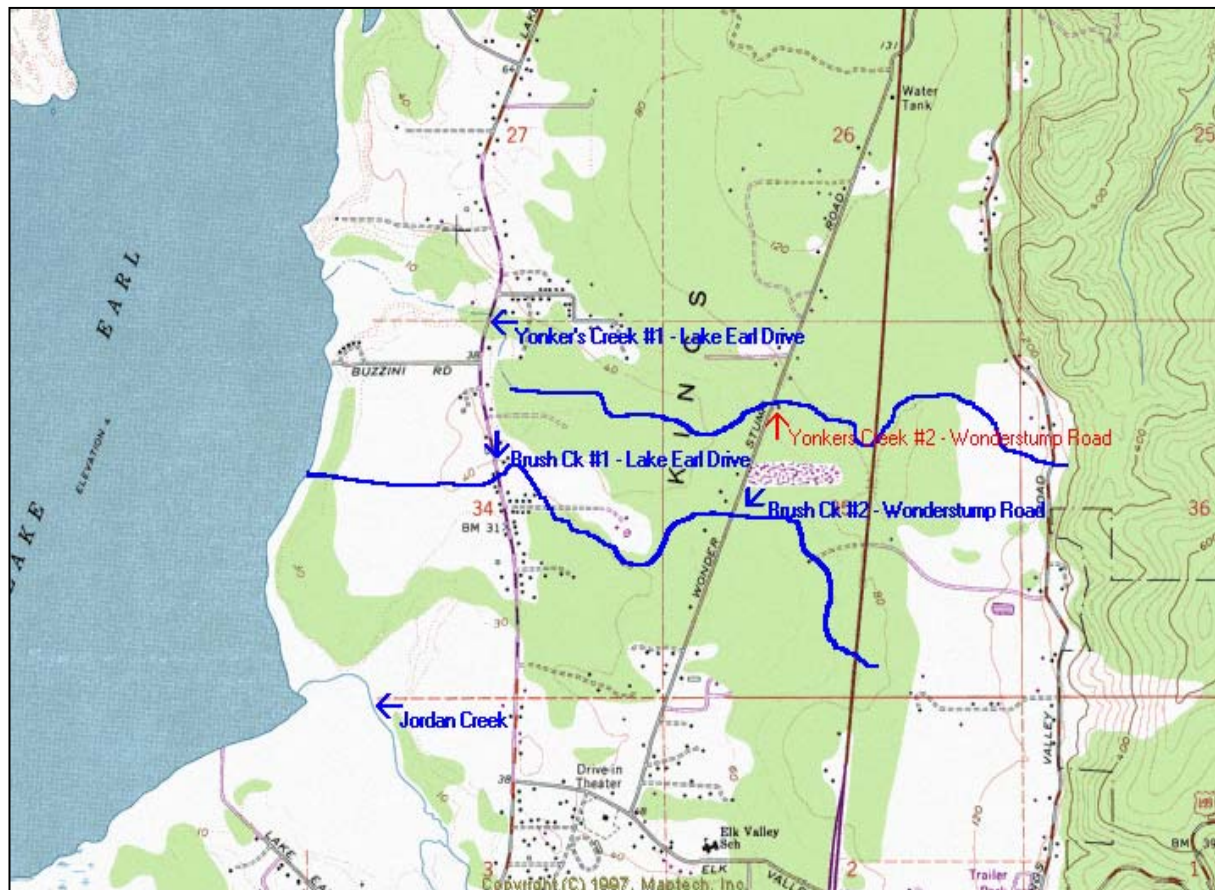
**Sizing:** Undersized; HW/D = 1 at approximately a 17-year storm flow.

**Barrier Status:** FishXing estimated this site to be 50% passable for adult steelhead and a complete barrier to adult coastal cutthroat trout and all juveniles due to excessive velocities. Winter site visits confirm high velocities within culvert and turbulent flow at outlet. Outlet pool and banks immediately below culvert have eroded (and been rip-rapped). However, annually numerous coastal cutthroat and steelhead observed spawning in upper Yonker's Creek

**Additional Road Crossings:** Downstream, Yonker's Creek #1/Lake Earl Drive approximately 5,000'. Upstream, culverts at culvert at Highway 101 (1,900' above Wonderstump Road). Note: most of Yonker's Creek channel missing from USGS topographic map.

**Habitat:** Quantity = approximately 4,800' of potential fish-bearing habitat. Quality = fair for spawning, sites with suitable gravel limited, high percentage of fines. Spawning occurs annually within reach where imported gravels were introduced (Schlotter, pers. com). Good rearing habitat, deep pools, undercut banks, cool water temperatures during summer. Yonker's Creek is an important spawning tributary of Lake Earl. Little information exists regarding use of stream habitat for rearing by Lake Earl's salmonids. Future land and watershed management would benefit from a mapping project of the Brush Creek channel.

**Preferred Treatment:** replace with a properly-sized arch-culvert on concrete footings or a bridge.





Site #8: Yonker's Creek #2/Wonderstump Road; tributary to Lake Earl





**Site #9:** Brush Creek #1/Lake Earl Drive; tributary to Lake Earl **Ranking:** #20 = **Low priority**

**Location:** County Map # 1A44. T17N, R1W, Section 34 **Culvert Type:** Circular CSP (2 pipes).

**Dimensions:** Diameter = 4.0' (each pipe) **Length:** 72.3' **Slope:** 0.5%

**Modifications:** Coated with a black/tar-like substance – appears to minimize abrasion of culvert floor.

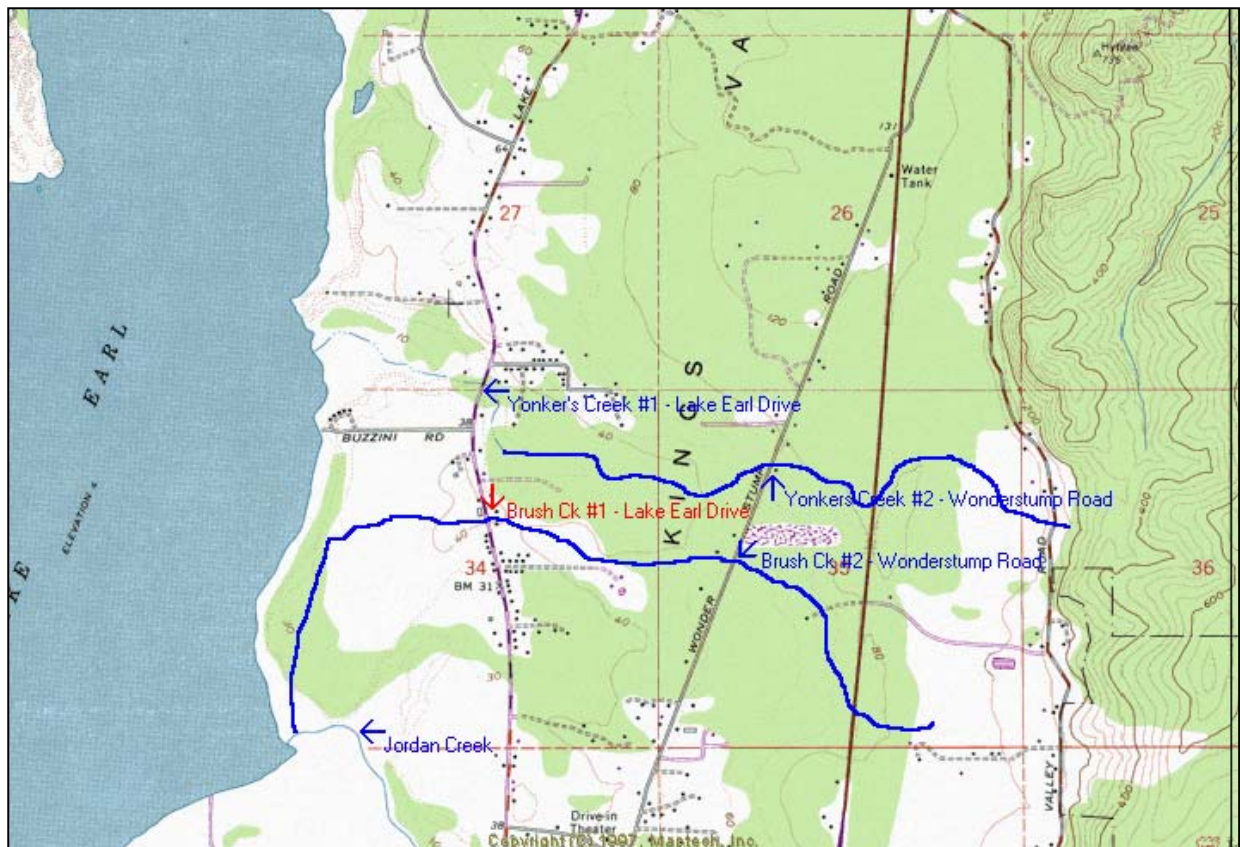
**Fill Estimate:** 473 cubic yards. **Overall condition:** Good. **Sizing:** Undersized; HW/D = 1 on approximately a one-year storm flow.

**Barrier Status:** FishXing predicted as 100% passable for adult steelhead, coho salmon, coastal cutthroat trout, and 1+ juveniles. Is only 30% passable for young-of-year fish. Both culverts are set at-grade, swim-throughs. Annually, numerous coastal cutthroat and steelhead observed spawning in upper Brush Creek (Burgess, Schlotter; pers. com.).

**Additional Road Crossings:** Downstream, none – flows into Lake Earl approximately 4,000' below Lake Earl Drive. Upstream, culverts at Brush Creek#2/Wonderstump Road (3,400' upstream) and culvert at Highway 101 (3,000' above Wonderstump Road). Note: creek channel absent on USGS topographic maps.

**Habitat:** Quantity = approximately 8,200' of potential fish-bearing habitat. Quality = fair for spawning, sites with suitable gravel limited, high percentage of fines. Good rearing habitat, deep pools, undercut banks, cool water temperatures during summer. Brush Creek is an important spawning tributary of Lake Earl. Little information exists regarding use of stream habitat for rearing by Lake Earl's salmonids. Future land and watershed management would benefit from a mapping project of the Brush Creek channel.

**Preferred Treatment:** when current culverts wear-out, replace with a properly-sized arch-culvert on concrete footings or a bridge.





**Site #9: Brush Creek #1/Lake Earl Drive; tributary to Lake Earl**





**Site #10:** Brush Creek #2/Wonderstump Road; tributary to Lake Earl **Ranking:** #15 = **Moderate-low priority**

**Location:** County Map # 1A44. T17N, R1W, Section 35 **Culvert Type:** Circular CSP (2 pipes).

**Dimensions:** Diameter 4.2' (each pipe) **Length:** 60.9' **Slope:** 0.7% **Modifications:** None.

**Fill Estimate:** 550 cubic yards. **Overall condition:** Poor, both culvert floors rusted through. Most of low flow seeps through and under culverts.

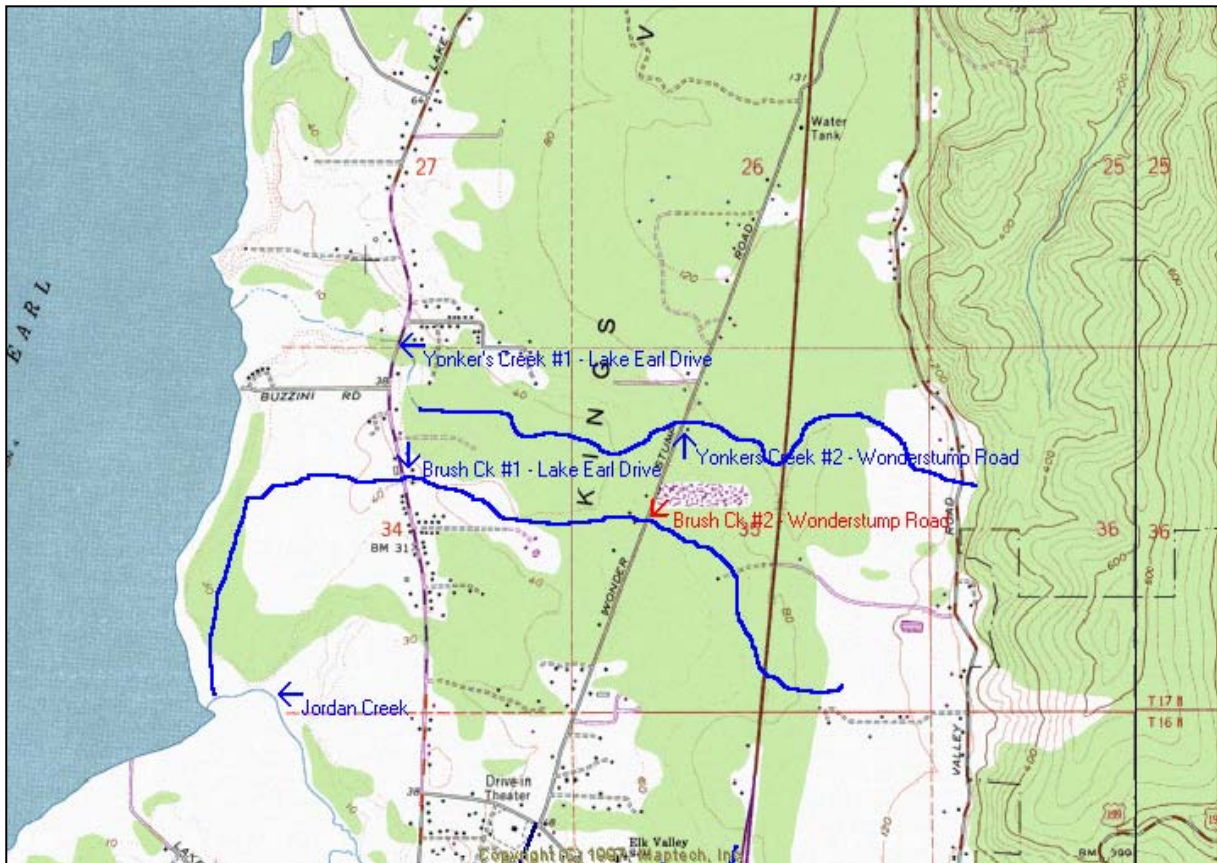
**Sizing:** Undersized; HW/D = 1 on approximately a two-year storm flow. Stream occasionally floods over Wonderstump Road. Note: partial blockage of RB culvert inlet by stream bank and riparian growth.

**Barrier Status:** FishXing predicted crossing was 80% passable for adult steelhead and coho; 95% passable for adult coastal cutthroat; 60% passable for 1+ juveniles; and 20% passable for young-of-year fish. Annually, numerous coastal cutthroat and steelhead observed spawning in upper Brush Creek

**Additional Road Crossings:** Downstream, culvert at Brush Creek#1/Lake Earl Drive (3,400' downstream). Upstream, culvert at Highway 101 (3,000' above Wonderstump Road). Note: creek channel absent on USGS topographic maps.

**Habitat:** Quantity = approximately 4,300' of potential fish-bearing habitat. Quality = fair for spawning, sites with suitable gravel limited, high percentage of fines. Good rearing habitat, deep pools, undercut banks, cool water temperatures during summer. Brush Creek is an important spawning tributary of Lake Earl. Little information exists regarding use of stream habitat for rearing by Lake Earl's salmonids. Future land and watershed management would benefit from a mapping project of the Brush Creek channel.

**Preferred Treatment:** replace with a properly-sized arch-culvert set on concrete footings.





**Site #10: Brush Creek #2/Wonderstump Road; tributary to Lake Earl**





**Site #11:** Jordan Creek #1/Parkway Drive; tributary to Lake Earl **Ranking:** #1 = **Top priority**

**Location:** County Map # 1A44. T16N, R1W, Section 11 **Culvert Type:** Rectangular concrete box.

**Dimensions:** 5.0'H x 8.0'W **Length:** 92.0' **Slope:** 1.0% **Modifications:** None.

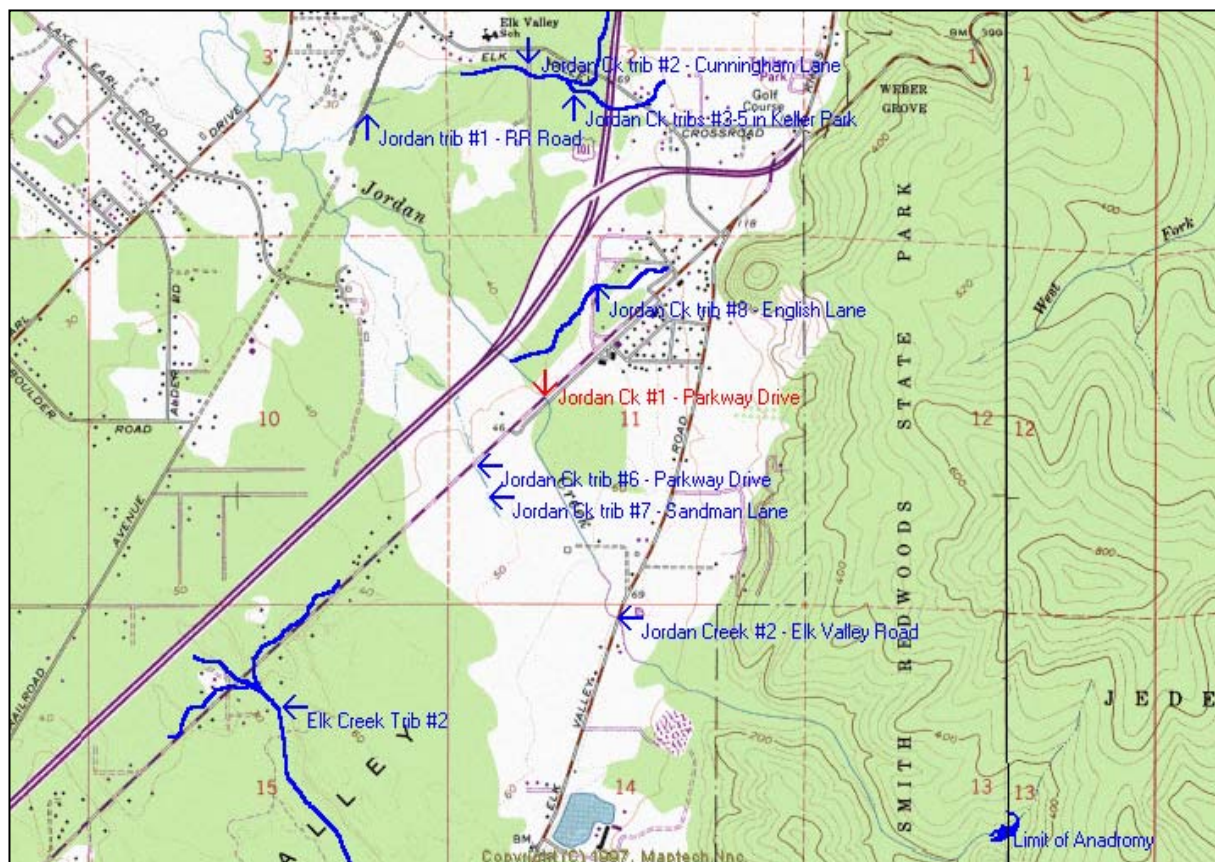
**Fill Estimate:** 1,122 cubic yards. **Overall condition:** Fair. **Sizing:** Undersized, HW/D = 1 on approximately a two-year storm flow.

**Barrier Status:** Yes, FishXing determined to be a barrier to all species and lifestages over the range of expected migration flows. Perched outlet makes for difficult entry jump. Depending on amount of flow, the smooth concrete floor creates both a lack-of-depth and velocity barriers. Annually, numerous coastal cutthroat and steelhead observed jumping at the culvert outlet. This site has a long history of poaching during the spawning migrations of coastal cutthroat trout, steelhead, and coho salmon from Lake Earl.

**Additional Road Crossings:** Downstream, Highway 101 (concrete box culvert) ; and two crossings at Lake Earl Drive, a bridge and an at-grade culvert. Upstream, private crossing approximately 2,300' from Parkway Drive on Ferguson Dairy (two concrete pipes) and a county culvert at Jordan Creek#2/Elk Valley Road (1,300' upstream of Ferguson Dairy crossing).

**Habitat:** Quantity = approximately 13,500' of potential fish-bearing habitat above Parkway Drive. Quality = Fair to good, improves above Elk Valley Road (upper 1.1 miles is within Jedediah Smith State Park). Between Lake Earl and State Park boundary landuse is primarily residential and limited agriculture. This channel reach is entrenched and has a dense riparian of mostly hardwoods. Channel reach within State Park has conditions typical of pristine, coastal, redwood forests. Jordan Creek is the largest spawning tributary of Lake Earl. Little information exists regarding use of stream habitat for rearing by Lake Earl's salmonids.

**Note:** Photographs are a before/after sequence of the Jordan Creek/Parkway Drive outlet. Treatment (15'9" W x 8' H aluminum arch set on concrete footings) was completed in September-October, 2000.





Site #11: Jordan Creek #1/Parkway Drive; tributary to Lake Earl





**Site #12:** Jordan Creek #2/Elk Valley Road; tributary to Lake Earl **Ranking:** #4 = **High-priority**

**Location:** County Map # 1A44. T16N, R1W, Section 14 **Culvert Type:** Rectangular concrete box.

**Dimensions:** 4.0'H x 8.0'W **Length:** 28.0' **Slope:** 0.95% **Modifications:** None.

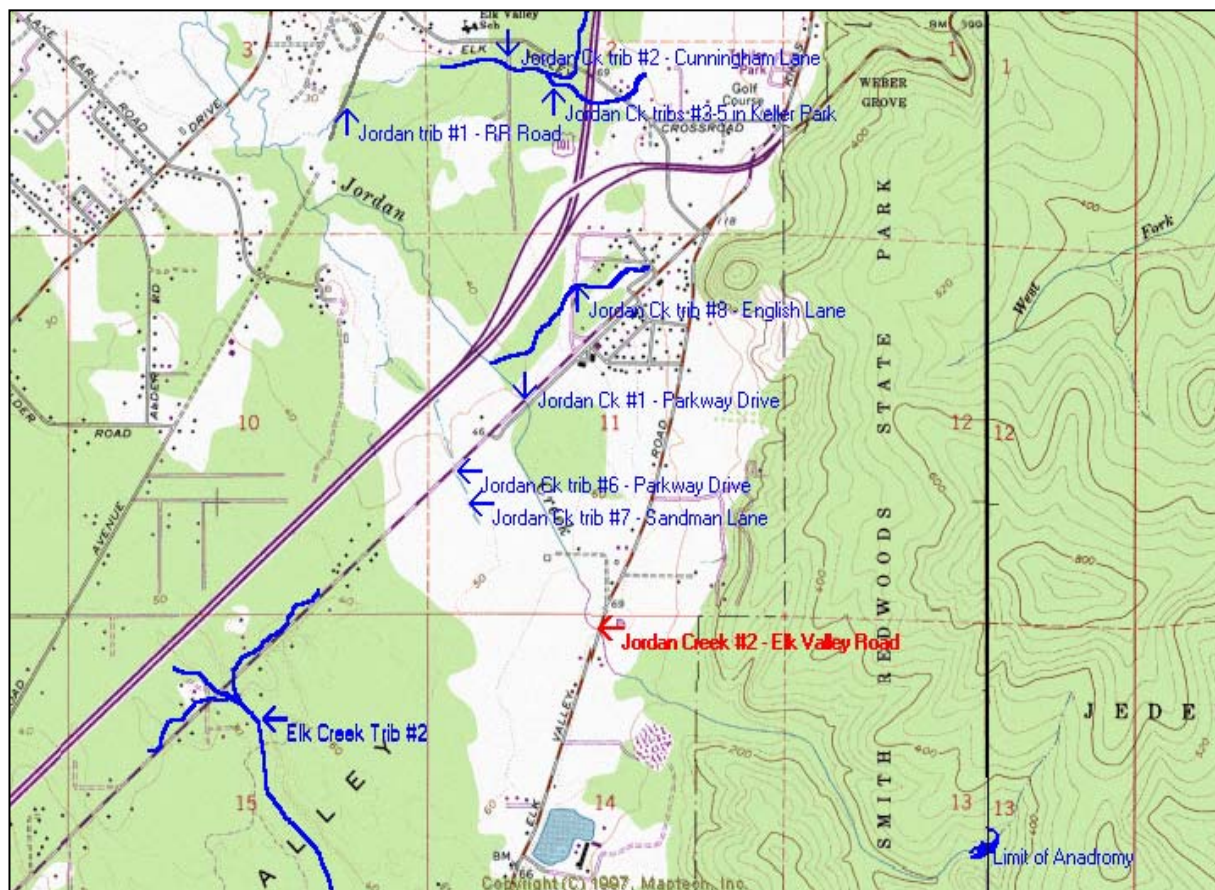
**Fill Estimate:** 202 cubic yards. **Overall condition:** Good. **Sizing:** Undersized, HW/D = 1 on approximately a two-year storm flow.

**Barrier Status:** Yes, FishXing determined to be a barrier to all species and lifestages over the range of expected migration flows. Perched outlet makes for difficult entry jump. Depending on amount of flow, the smooth concrete floor creates both a lack-of-depth and velocity barriers.

**Additional Road Crossings:** Downstream, box culvert at Jordan Creek#1/Parkway Drive; Ferguson Dairy crossing and Highway 101 (concrete box culvert). Upstream, none.

**Habitat:** Quantity = approximately 9,300' of potential fish-bearing habitat above Elk Valley Road. Quality = Good, improves above Elk Valley Road (upper 1.1 miles is within Jedediah Smith State Park). Channel reach within State Park has conditions typical of pristine, coastal, redwood forests. Jordan Creek is the largest spawning tributary of Lake Earl. Little information exists regarding use of stream habitat for rearing by Lake Earl's salmonids. Due to the severity of both county road crossings and past poaching at Parkway Drive; it is unlikely that many adults from Lake Earl have spawned in Jordan Creek's headwaters in the past 30 years.

**Preferred Treatment:** replace with a properly-sized arch-culvert on concrete footings or a bridge.





**Site #12: Jordan Creek #2/Elk Valley Road; tributary to Lake Earl**





**Site #13:** Jordan Creek Tributary #1/Railroad Avenue; tributary to Lake Earl **Ranking:** #19 = **Low-priority**

**Location:** County Map # 1A44. T16N, R1W, Section 11 **Culvert Type:** Circular CSP.

**Dimensions:** Diameter = 4.0' **Length:** 30.0' **Slope:** -1.86% **Modifications:** None.

**Fill Estimate:** 120 cubic yards. **Overall condition:** Fair, some signs of wear, but not yet rusted through.

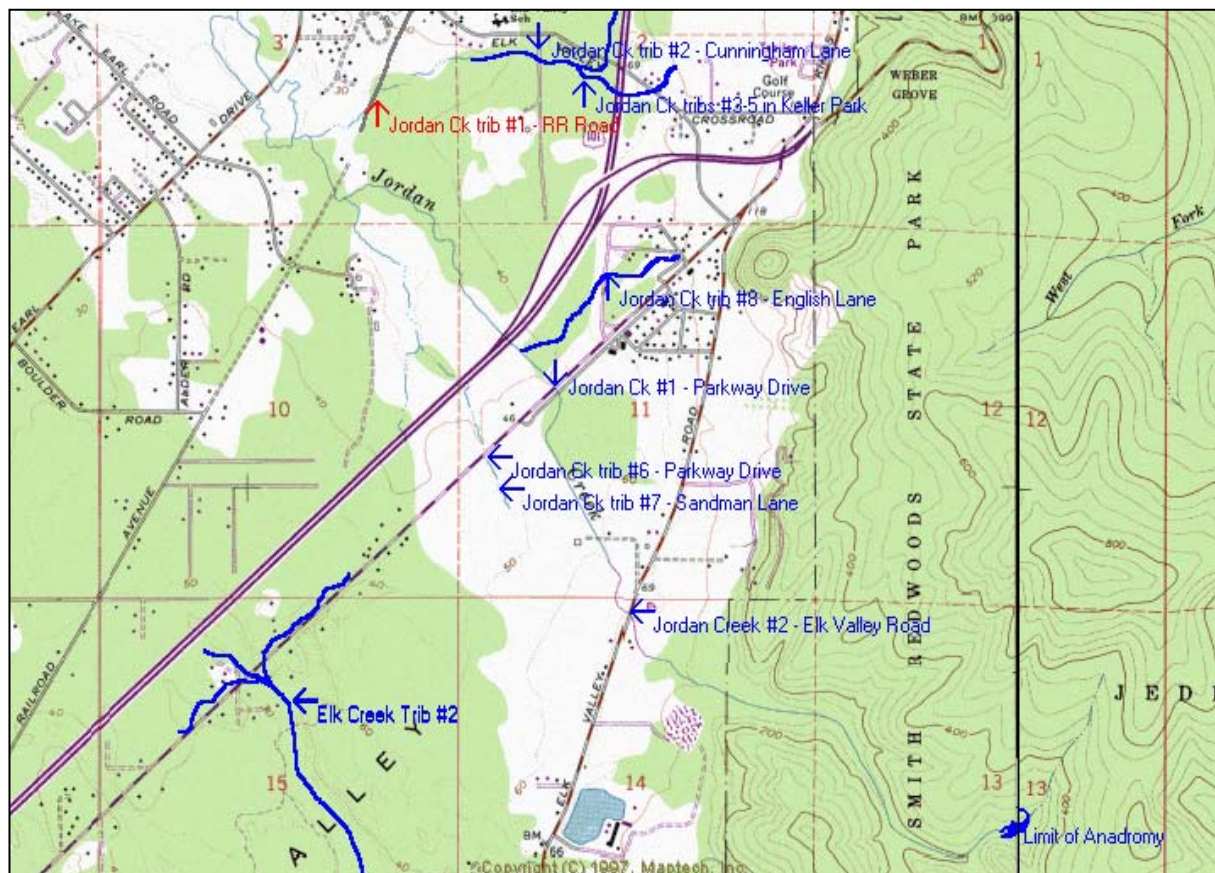
**Sizing:** Extremely undersized; HW/D = 1 on approximately a one-year storm flow.

**Barrier Status:** FishXing predicted this crossing is 100% passable for adult steelhead, 60% passable for adult coastal cutthroat trout, and 40% passable for 1+ and young-of-year juveniles. Annually, numerous coastal cutthroat observed spawning in this tributary within Florence Keller County Park.

**Additional Road Crossings:** Downstream, none. Upstream, County culverts at Cunningham Lane (2,600' upstream), Keller Park Campground Loop ( 800' upstream from Cunningham Lane), and Highway 101 (400' upstream of Keller Park Campground Loop). Note: most of channel absent on USGS topographic maps.

**Habitat:** Quantity = approximately 5,800' of potential fish-bearing habitat above Railroad Avenue. Quality = Fair, improves above Cunningham Lane within Keller Park boundary. Between Lake Earl and County Park, land-use is primarily residential. This channel reach is entrenched and has a dense riparian of mostly hardwoods. Channel reach within County Park has an entrenched channel lined with second-growth redwoods, with cool summer flow. However, spawning habitat is limited and channel is highly aggraded with fine sediment and silts from sources above County Park. Most spawning occurs in Keller Park (between Jordan Creek tributary #3/Keller Park Loop and Highway 101) at installed weirs where substrate is periodically introduced.

**Preferred Treatment:** when culvert wears-out, replace with a properly-sized arch-culvert on concrete footings or pipe-arch set below stream grade.





**Site #13:** Jordan Creek Tributary #1/Railroad Avenue; tributary to Lake Earl





**Site #14:** Jordan Creek Tributary #2/Cunningham Lane; tributary to Lake Earl

**Rank:** #13 = **Moderate-low priority** **Location:** County Map # 1A44. T16N, R1W, Section 2

**Culvert Type:** Circular concrete pipe. **Dimensions:** Diameter 4.5' **Length:** 65.7'

**Slope:** 1.25% **Modifications:** None. **Fill Estimate:** 278 cubic yards. **Overall condition:** Good.

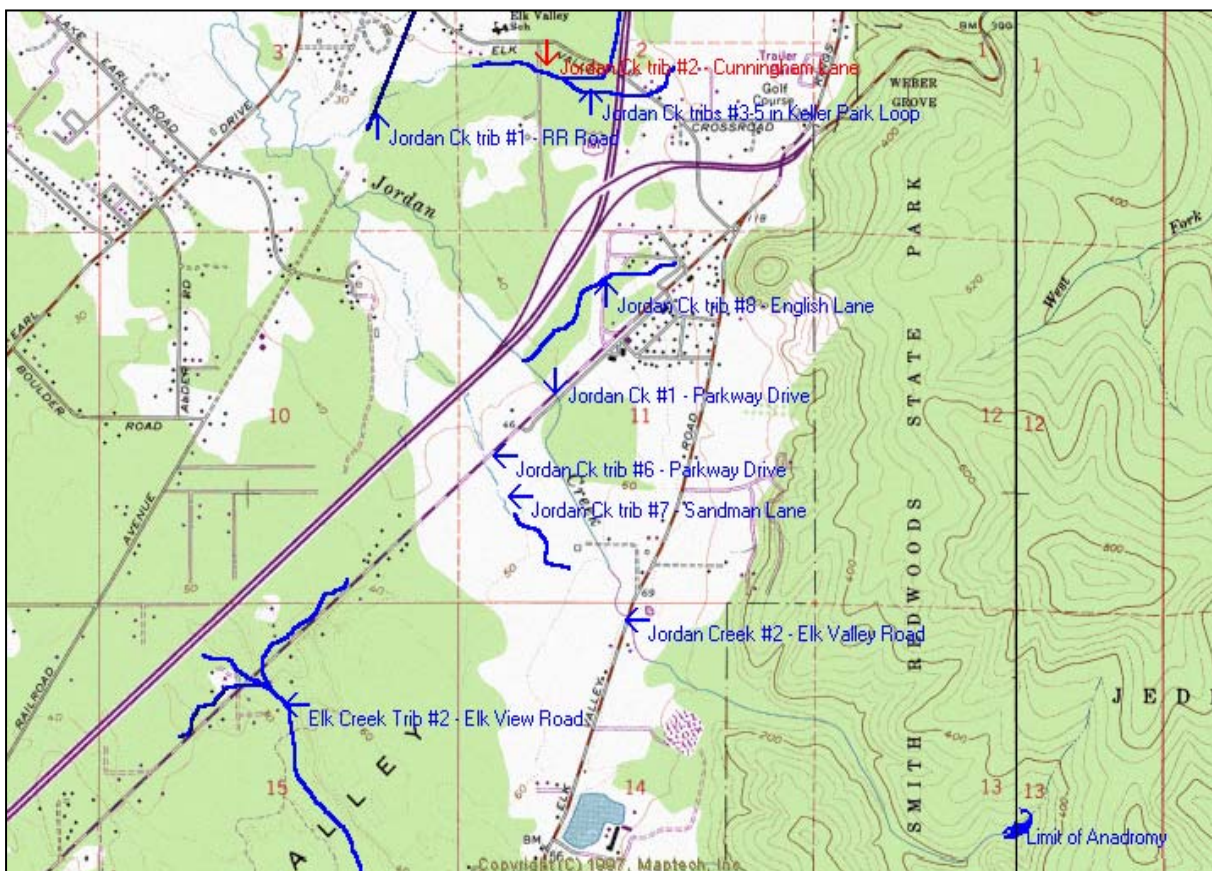
**Sizing:** Extremely undersized; HW/D = 1 on approximately a two-year storm flow.

**Barrier Status:** FishXing determined is 40% passable for adult steelhead, 20% passable for adult coastal cutthroat, and 13% passable for 1+ and young-of-year juveniles. However, crossing is at-grade and numerous winter site visits documented slow velocities and adequate depths at a wide range of flows. Annually, numerous coastal cutthroat observed spawning in this tributary within Florence Keller County Park.

**Additional Road Crossings:** Downstream approximately 2,600' culvert at Jordan Creek tributary#1/Railroad Avenue. Upstream, County culvert at Jordan Creek tributary #3/Campground Loop (800' upstream), Jordan Creek tributary #4/Campground Loop (800' upstream), and Highway 101 (500' upstream ).

**Habitat:** Quantity = approximately 1,700' of potential fish-bearing habitat above Cunningham Lane. Quality = Fair, improves above Cunningham Lane within Keller Park. Between Lake Earl and County Park, landuse is primarily residential. This channel reach is entrenched and has a dense riparian of mostly hardwoods. Channel reach within County Park has an entrenched channel lined with second-growth redwoods, with good summer flow. However, spawning habitat is limited and channel is highly aggraded with fines from sources above County Park. Most spawning occurs in Keller Park at installed weirs where substrate is periodically introduced.

**Preferred Treatment:** when culvert wears-out, replace with a properly-sized arch-culvert on concrete footings or pipe-arch set below stream grade. Adjust crossing alignment to channel direction on downstream side.





**Site #14: Jordan Creek Tributary #2/Cunningham Lane; tributary to Lake Earl**





**Site #15:** Jordan Creek Tributary #3/Keller Park Campground Loop; tributary to Lake Earl

**Ranking:** #12 = **Moderate-low priority** **Location:** County Map # 1A44. T16N, R1W, Section 2

**Culvert Type:** CSP arch. **Dimensions:** Diameter = 3.0' H' x 4.0' W **Length:** 36.5' **Slope:** 1.53%

**Modifications:** None. **Fill Estimate:** <150 cubic yards.

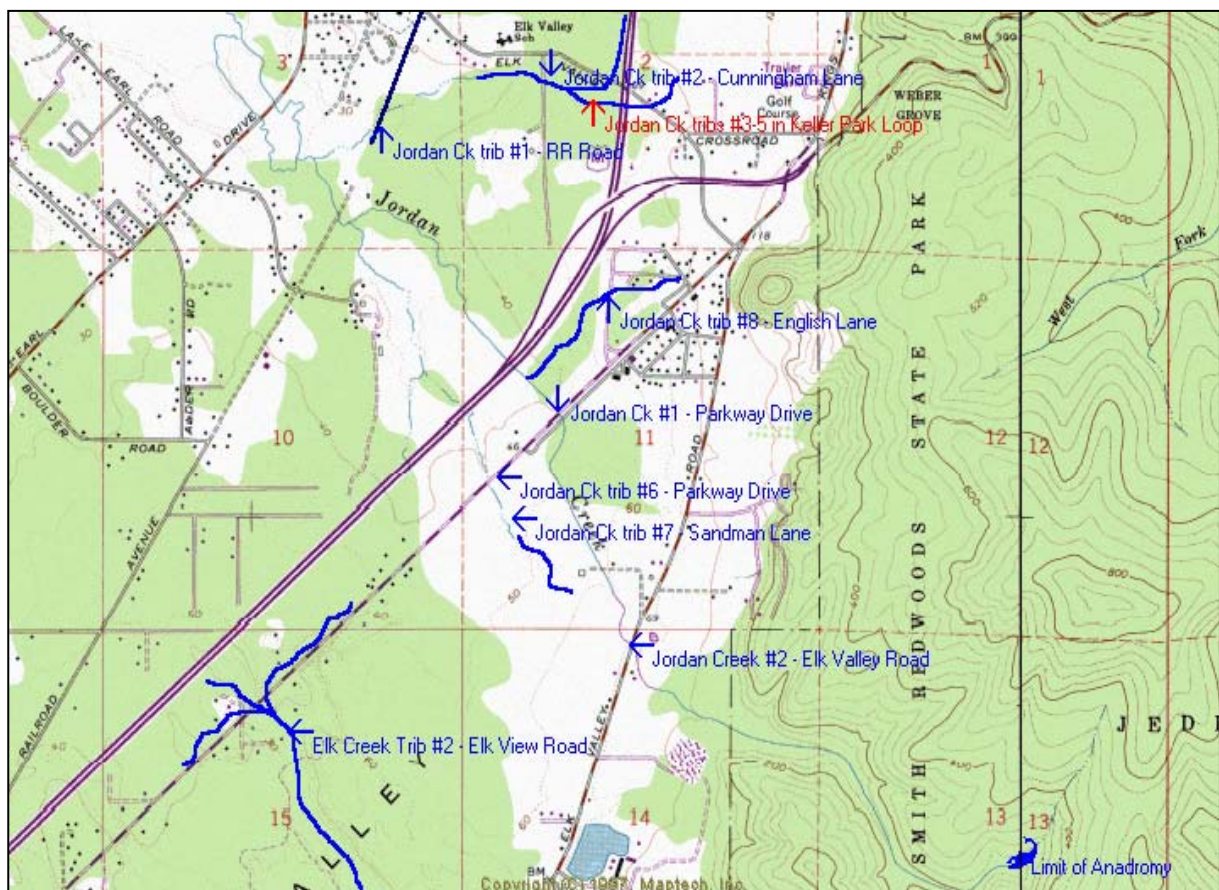
**Overall condition:** Fair, some wear, not yet rusted through. **Sizing:** Undersized, HW/D = 1 on approximately a one-year storm flow

**Barrier Status:** FishXing predicted to be a 100% for adult and juvenile coastal cutthroat trout. Has perched outlet (1.6' at low flow) however, annually, numerous coastal cutthroat observed spawning upstream of this culvert.

**Additional Road Crossings:** Downstream, County culverts at Cunningham Lane (800' downstream) and Railroad Avenue (3,400' downstream). Upstream, Highway 101 (500' Upstream).

**Habitat:** Quantity = approximately 900' of potential fish-bearing habitat above Keller Park Campground Loop. Quality = Good/fair within Keller Park boundary. Between Lake Earl and County Park, landuse is primarily residential. Channel reach within County Park has an entrenched channel lined with second-growth redwoods, good summer flow. However, spawning habitat is limited and channel is highly aggraded with fines from sources above County Park. Most spawning occurs is Keller Park at installed weirs where substrate is periodically introduced. Above Highway 101, stream dissipates into numerous smaller channels and road ditches with limited habitat value for salmonids.

**Preferred Treatment:** when culvert wears-out, replace with a properly-sized arch-culvert on concrete footings or pipe-arch set below stream grade. Adjust crossing alignment to channel direction on upstream side.





Site #15: Jordan Creek Tributary #3/Keller Park Campground Loop.





**Site #16:** Jordan Creek Tributary #4/Keller Park Campground Loop; tributary to Lake Earl

**Ranking:** #16 = **Low-priority** **Location:** County Map # 1A44. T16N, R1W, Section 2

**Culvert Type:** CSP arch. **Dimensions:** Diameter = 3.0' H x 4.0' W **Length:** 33.0' **Slope:** 1.50%

**Modifications:** None. **Fill Estimate:** <200 cubic yards. **Overall condition:** Fair, signs of wear, not rusted through.

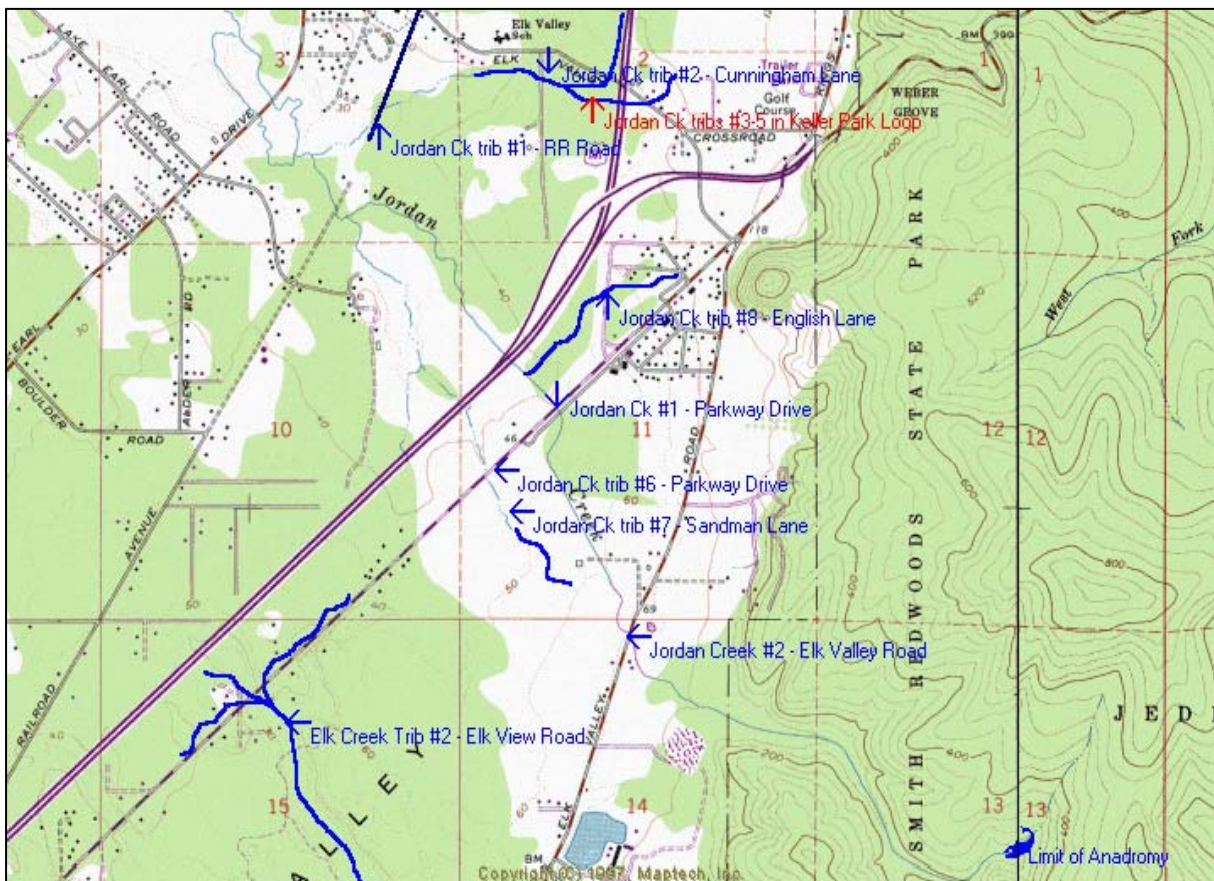
**Sizing:** Undersized, HW/D = 1 on approximately a three-year storm flow.

**Barrier Status:** Not evaluated with FishXing because of the limited length of upstream habitat. Has perched outlet (1.5' at low flow). Three (15"-18") coastal cutthroat observed spawning upstream of this culvert on 11/18/99. Two more redds observed in reach above culvert on 1/13/00.

**Additional Road Crossings:** Downstream, County culverts at Cunningham Lane (800' downstream) and Railroad Avenue (3,400' downstream). Upstream, Elk Valley Cross Road (200' upstream).

**Habitat:** Quantity = approximately 350' of potential fish-bearing habitat above Keller Park Campground Loop. Quality = Fair, very small channel and lack of pools makes this reach of minimal importance to Jordan Creek's anadromous fisheries.

**Preferred Treatment:** when culvert wears-out, replace with a properly-sized arch-culvert on concrete footings or pipe-arch set below stream grade.





Site #16: Jordan Creek Tributary #4/Keller Park Campground Loop





**Site #17:** Jordan Creek Tributary #5/Elk Valley X-Road; tributary to Lake Earl **Ranking:** #17 = **Low priority**

**Location:** County Map # 1A44. T16N, R1W, Section 2 **Culvert Type:** Steel arch, smooth bottom.

**Dimensions:** Diameter = 2.8' H x 3.6' W **Length:** 66.0' **Slope:** 3.70% **Modifications:** None.

**Fill Estimate:** 302 cubic yards. **Overall condition:** Poor, floor rusted through in numerous places.

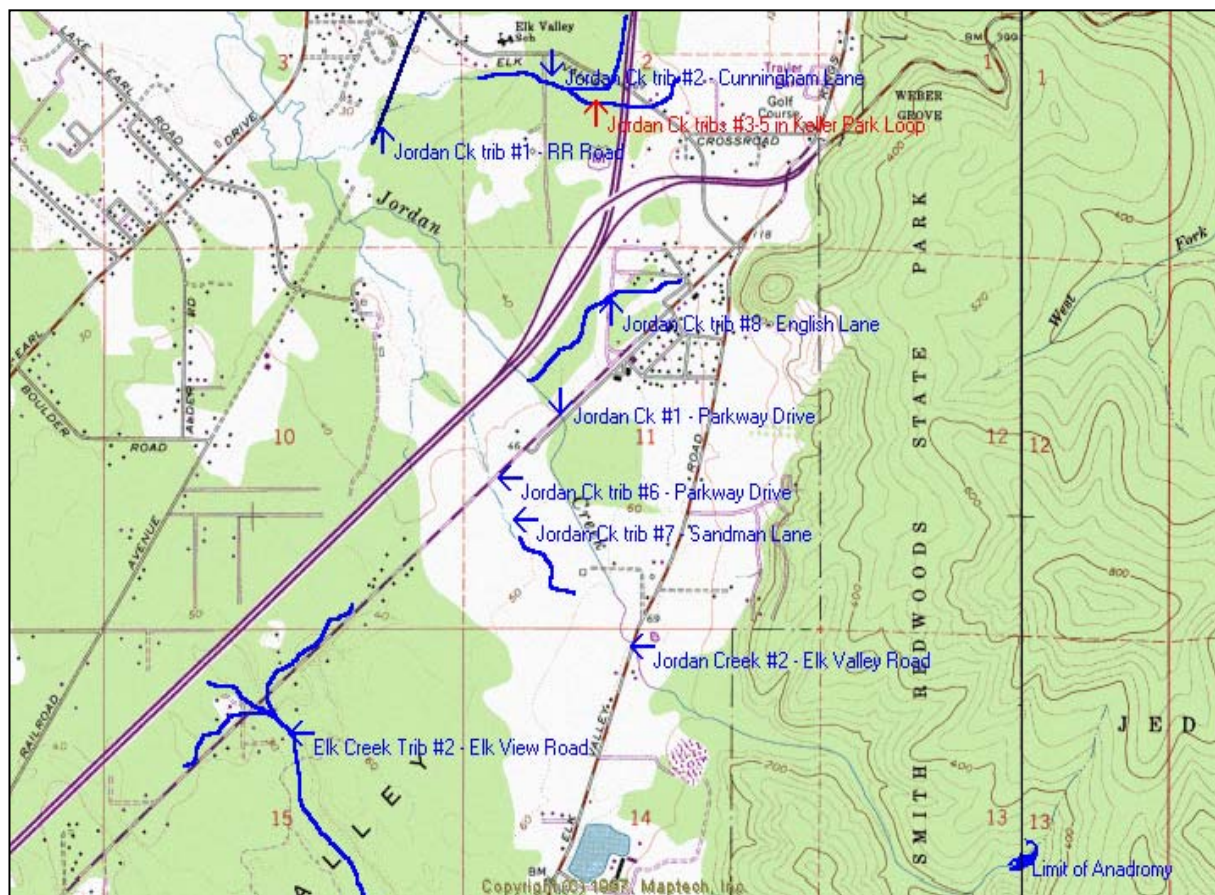
**Sizing:** Undersized, HW/D = 1 at approximately a two-year storm flow.

**Barrier Status:** Not evaluated with FishXing because of limited length of upstream habitat. Is most likely a complete barrier due to perched outlet (1.3' at low flow) and steep slope.

**Additional Road Crossings:** Downstream, County culverts at Keller Campground Loop (200' downstream), Cunningham Lane (1,000' downstream) and Railroad Avenue (3,600' downstream). Upstream, Highway 101 (150' upstream).

**Habitat:** Quantity = approximately 150' of potential fish-bearing habitat above Keller Park Campground Loop. Quality = Fair/poor; very limited fisheries value to Jordan Creek. Channel above culvert is within a swampy area full of skunk cabbage that basically drains off of Highway 101. No pools and sand/silt substrate.

**Preferred Treatment:** when culvert wears-out, replace with a properly-sized arch-culvert on concrete footings or pipe-arch set below stream grade.





**Site #17:** Jordan Creek Tributary #5/Elk Valley Crossroad; tributary to Lake Earl





**Site #18:** Jordan Creek Tributary #6/Parkway Drive; tributary to Lake Earl **Ranking:** #28 = **Low priority**

**Location:** County Map # 1A44. T16N, R1W, Section 2 **Culvert Type:** CSP pipes (2).

**Dimensions:** Diameter = 4.0' **Length:** 65.0' **Slope:** both pipes = 0.18% **Modifications:** None.

**Fill Estimate:** <200 cubic yards. **Overall condition:** Fair, some signs of wear, but not yet rusted through.

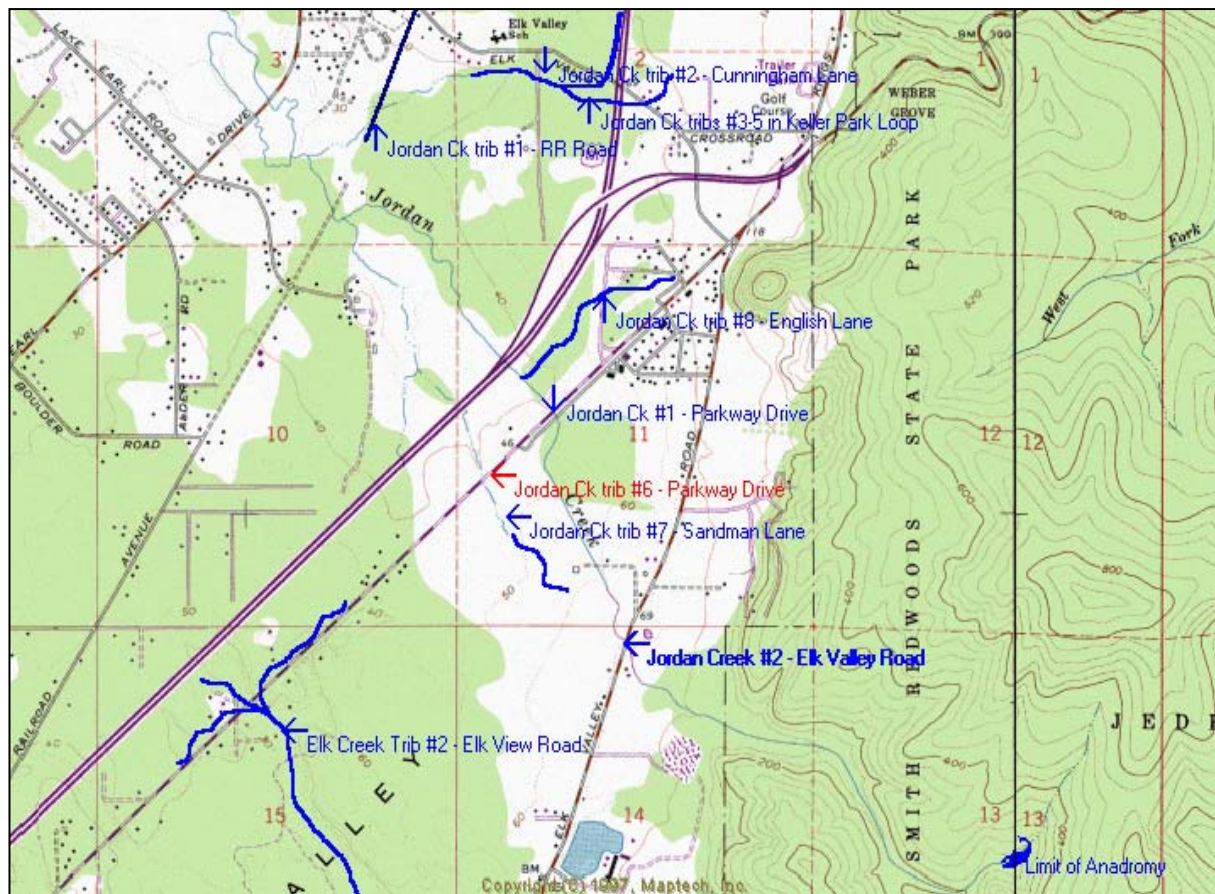
**Sizing:** Adequately sized, HW/D = 1 on approximately a 50-year storm flow.

**Barrier Status:** FishXing determined as 84% passable for adult cutthroat; 92% passable for 1+ juveniles; and 95% passable for young-of-year fish.

**Additional Road Crossings:** Downstream (700'), Highway 101 box culvert. Upstream (600'), Jordan Creek trib. #7/Sandman Lane; possible private crossings in residential area.

**Habitat:** Quantity = approximately 1,400' of potential fish-bearing habitat above Parkway Drive. Quality = Fair/Poor; has year-round flow and riparian canopy of hardwoods, blackberries, and some conifer. Suitable spawning habitat is limited. Upstream channel flows through private property; mostly residential or grazing (unfenced adjacent to county road crossing).

**Preferred Treatment:** when culvert wears-out, replace with a properly-sized arch-culvert on concrete footings or pipe-arch set below stream grade.





**Site #18:** Jordan Creek Tributary #6/Parkway Drive; tributary to Lake Earl





**Site #19:** Jordan Creek Tributary #7/Sandman Lane; tributary to Lake Earl **Ranking:** #26 = **Low-priority**

**Location:** County Map # 1A44. T16N, R1W, Section 2 **Culvert Type:** Circular concrete pipes (2).

**Dimensions:** Diameter = 3.0' (each pipe) **Length:** 52.3'

**Slope:** Right Bank pipe=1.01%; Left Bank pipe=0.77% **Modifications:** None.

**Fill Estimate:** <250 cubic yards. **Overall condition:** Good.

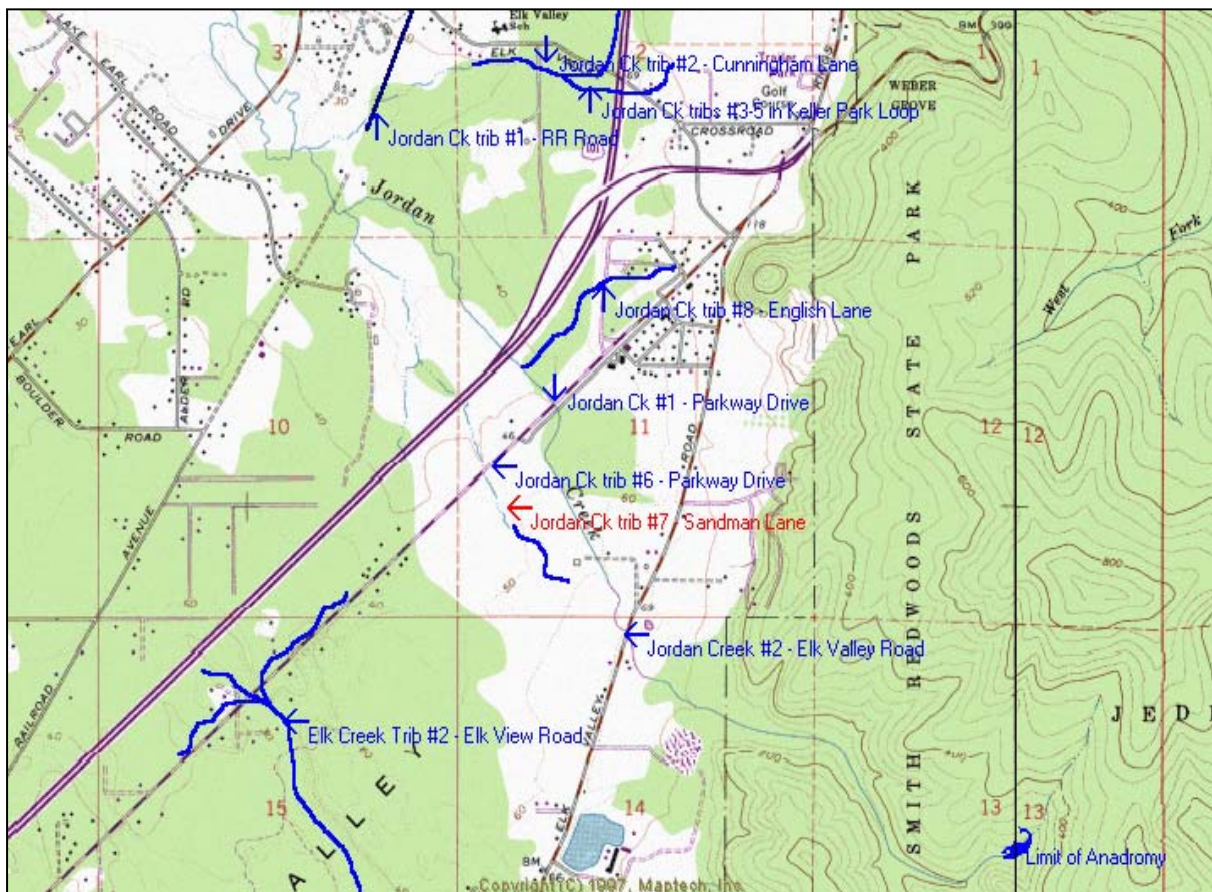
**Sizing:** Undersized, HW/D = 1 on approximately a five-year storm flow.

**Barrier Status:** FishXing determined as 84% passable for adult coastal cutthroat trout; 88% passable for 1+ juveniles; and 76% passable for young-of-year fish.

**Additional Road Crossings:** Downstream, County culvert at Parkway Drive (600') and Highway 101 (1,300'). Upstream, possible private crossings in residential area.

**Habitat:** Quantity = approximately 800' of potential fish-bearing habitat above Sandman Lane. Quality = Fair/Poor; has year-round flow and riparian canopy of hardwoods, blackberries, and some conifer. Suitable spawning habitat is limited, as well as rearing areas. Upstream channel flows through private property; mostly residential houses or grazing (unfenced adjacent to county road crossing).

**Preferred Treatment:** when culvert wears-out, replace with a properly-sized arch-culvert on concrete footings or pipe-arch set below stream grade.





**Site #19: Jordan Creek Tributary #7/Sandman Lane; tributary to Lake Earl**





**Site #20:** Jordan Creek Tributary #8/English Lane; tributary to Lake Earl **Ranking:** #27 = **Low-priority**

**Location:** County Map # 1A44. T16N, R1W, Section 2 **Culvert Type:** Circular concrete pipe.

**Dimensions:** Diameter = 4.0 **Length:** 116.0' **Slope:** 0.47% **Modifications:** None.

**Fill Estimate:** 3,031 cubic yards. **Overall condition:** Fair, some signs of wear, but not yet rusted through.

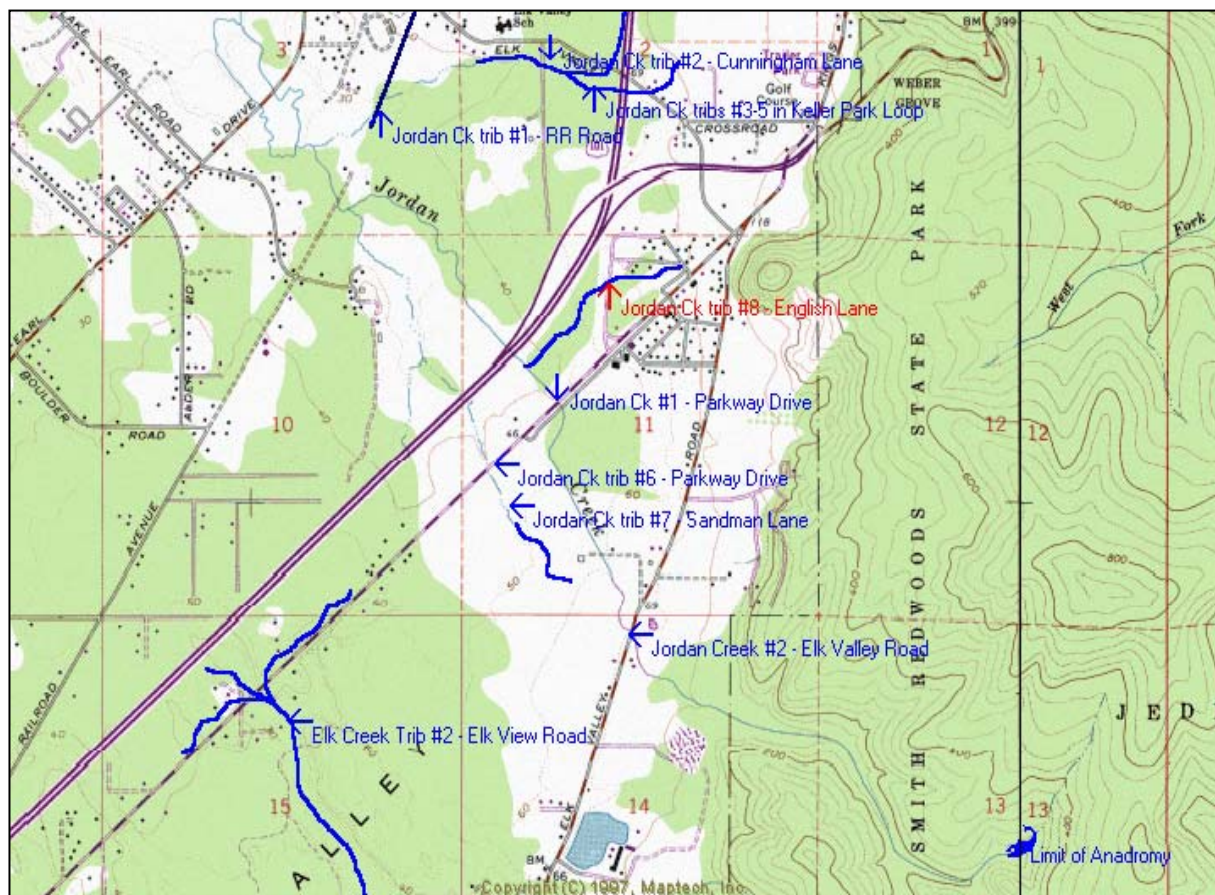
**Sizing:** Undersized, HW/D = 1 on approximately a 26-year storm flow.

**Barrier Status:** FishXing determined site was 70% passable for adult steelhead; 82% passable for adult coastal cutthroat; 85% passable for 1+ juveniles; and 88% passable for young-of-year fish.

**Additional Road Crossings:** Downstream (1,900' ) Highway 101 at Jordan Creek. Upstream (within 500') channel divides into numerous channels within a residential area that may have private road crossings.

**Habitat:** Quantity = approximately 800' of potential fish-bearing habitat above English Lane. Quality = Fair/poor: has year-round flow and riparian canopy of hardwoods, blackberries, and some conifer. Suitable spawning and rearing habitat is limited by the size of the channel. Upstream channel flows through private property; mostly residential houses.

**Preferred Treatment:** when culvert wears-out, replace with a properly-sized arch-culvert on concrete footings or pipe-arch set below stream grade. Reduce length of crossing by reducing road-width (old section of Highway 101).





Site #20: Jordan Creek Trib. #8/English Lane; tributary to Lake Earl





**Site #21:** Elk Creek Tributary #1/Elk Valley Road; trib. to Elk Creek **Ranking:** #11 = **Moderate-priority**

**Location:** County Map # 1A44. T16N, R1W, Section 22 **Culvert Type:** Circular concrete pipe.

**Dimensions:** Diameter = 4.0' **Length:** 55.0' **Slope:** 0.27% **Modifications:** None.

**Fill Estimate:** 175 cubic yards. **Overall condition:** Good, no apparent wear or damage.

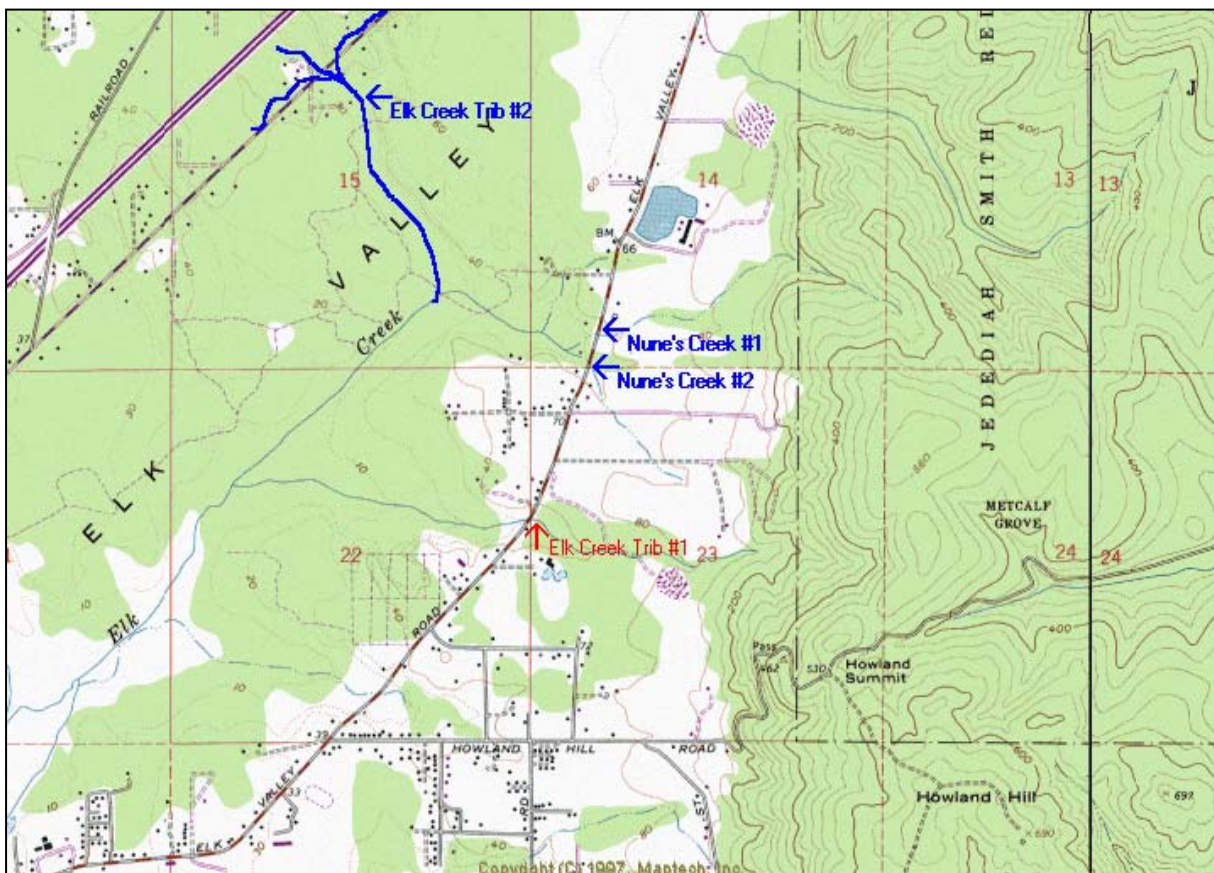
**Sizing:** Undersized; HW/D = 1 on approximately a two-year storm flow.

**Barrier Status:** FishXing determined as 59% passable for adult coho salmon, steelhead, and coastal cutthroat; 31% passable for 1+ juveniles; and 19% passable for young-of-year fish. Culvert is an at-grade swim-through, but small size and smooth concrete floor create velocity barrier for juveniles. Accounts by long-term landowners confirm past presence of adult salmonids in creek above culvert.

**Additional Road Crossings:** Downstream (2.5 miles), Highway 101 right at mouth of Elk Creek. This crossing is often back-watered by tidal influence. Upstream, no access; possible crossings on private property.

**Habitat:** Quantity = approximately 4,500' of potential fish-bearing habitat above Elk Valley Road. Quality = Fair. No current habitat or spawning surveys available. Cool flow of water during late-summer site visit. Dense riparian of hardwoods and conifers. However, small size of channel above Elk Valley Road limits the biological value of this tributary for salmonid spawning and rearing.

**Preferred Treatment:** when culvert wears-out, replace with a properly-sized arch-culvert on concrete footings or pipe-arch set below stream grade.





Site #21: Elk Creek Tributary #1/Elk Valley Road; tributary to Elk Creek





**Site #22:** Nune's Creek #1/Elk Valley Road; tributary to Elk Creek **Ranking:** #7 = **Moderate-priority**

**Location:** County Map # 1A44. T16N, R1W, Section 14 **Culvert Type:** Circular concrete pipe.

**Dimensions:** Diameter = 4.0' **Length:** 50.9' **Slope:** 0.83% **Modifications:** None.

**Fill Estimate:** 350 cubic yards. **Overall condition:** Fair, apparent scour and wear of pipe floor.

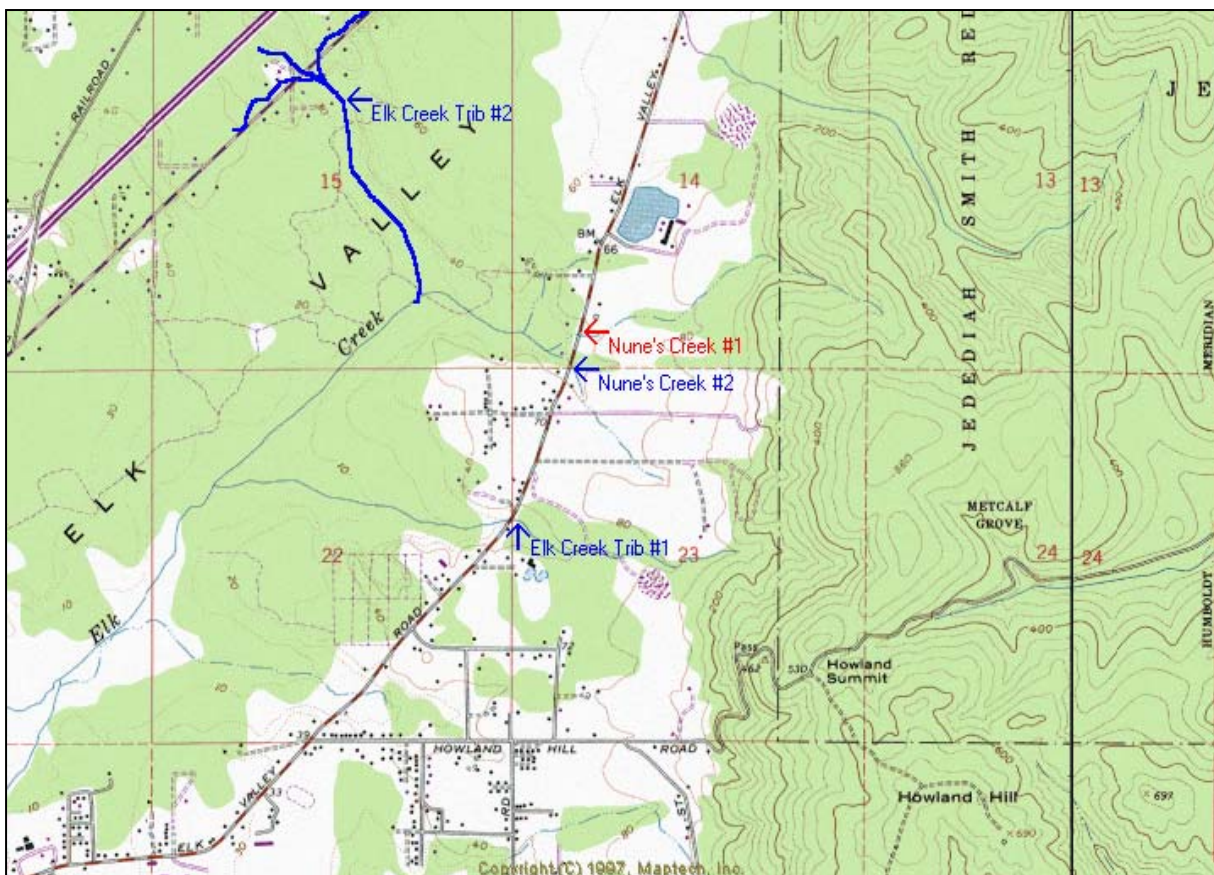
**Sizing:** Undersized; HW/D = 1 on approximately a two-year storm flow.

**Barrier Status:** FishXing determined culvert as 73% passable for adult coho salmon and steelhead; but 0% passable for adult coastal cutthroat and all age-classes of juveniles. Accounts by long-term landowners of past presence of adult salmonids in creek above culvert.

**Additional Road Crossings:** Downstream (2.9 miles) Highway 101 right at mouth of Elk Creek. This crossing is often back-watered by tidal influence. Upstream, no access; possible crossings on private property.

**Habitat:** Quantity = approximately 2,800' of potential fish-bearing habitat above Elk Valley Road. Quality = Fair. Cool flow of water during late-summer site visit. No current habitat surveys available. Several recent spawning surveys confirmed adult coho salmon and redds above Elk Valley Road (Burgess, pers. com.).

**Preferred Treatment:** when culvert wears-out, replace with a properly-sized arch-culvert on concrete footings or pipe-arch set below stream grade.





Site #22: Nune's Creek #1/Elk Valley Road; tributary to Elk Creek





**Site #23:** Nune's Creek #2/Elk Valley Road; tributary to Elk Creek **Ranking:** #24 = **Low-priority**

**Location:** County Map # 1A44. T16N, R1W, Section 14 **Culvert Type:** Circular concrete pipe.

**Dimensions:** Diameter = 4.0' **Length:** 49.0' **Slope:** -0.71% **Modifications:** None.

**Fill Estimate:** 175 cubic yards. **Overall condition:** Good, no apparent wear or damage.

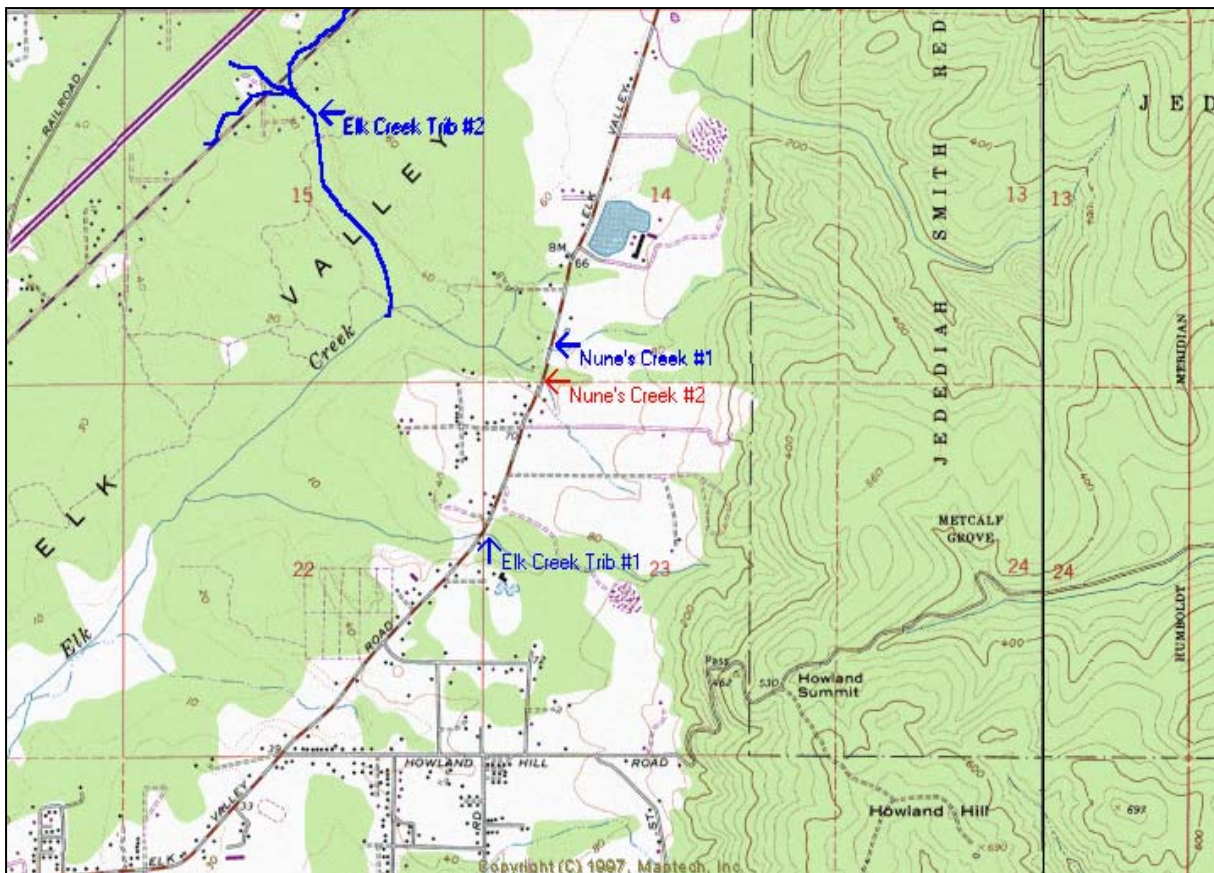
**Sizing:** Undersized; HW/D = 1 on approximately a two-year storm flow.

**Barrier Status:** FishXing estimated crossing to be 88% passable for all adults (coho salmon, steelhead, cutthroat) and 1+ juveniles; and 49% passable for young-of-year juveniles. Culvert is an at-grade swim-through, partially embedded with substrate. Antidotal accounts by landowners of past presence of adult salmonids in creek above culvert.

**Additional Road Crossings:** Downstream (2.9 miles) Highway 101 right at mouth of Elk Creek. This crossing is often back-watered by tidal influence. Upstream, no access; possible crossings on private property.

**Habitat:** Quantity = approximately 4,600' of potential fish-bearing habitat above Elk Valley Road. Quality = Fair. Cool flow of water during late-summer site visit. No current habitat surveys available. Several recent spawning surveys confirmed possible coho or steelhead redds above Elk Valley Road (Burgess, pers. com.).

**Preferred Treatment:** when culvert wears-out, replace with a properly-sized arch-culvert on concrete footings or pipe-arch set below stream grade.





Site #23: Nune's Creek #2/Elk Valley road; tributary to Elk Creek





**Site #24:** Elk Creek Tributary #2/Elk View Road; tributary to Elk Creek **Ranking:** #24 = **Low-priority**

**Location:** County Map # 1A44. T16N, R1W, Section 22 **Culvert Type:** Two, circular aluminum pipes.

**Dimensions:** Diameter: Left Bank pipe = 3.0' Right Bank pipe = 4.0' **Length:** each pipe = 38.0'

**Slope:** LB = -0.02%; RB = 0.40% **Modifications:** None. **Fill Estimate:** <500 cubic yards.

**Overall condition:** Good, no apparent wear or damage.

**Sizing:** HW/D =1 (both pipes combined) on approximately an eight-year storm flow.

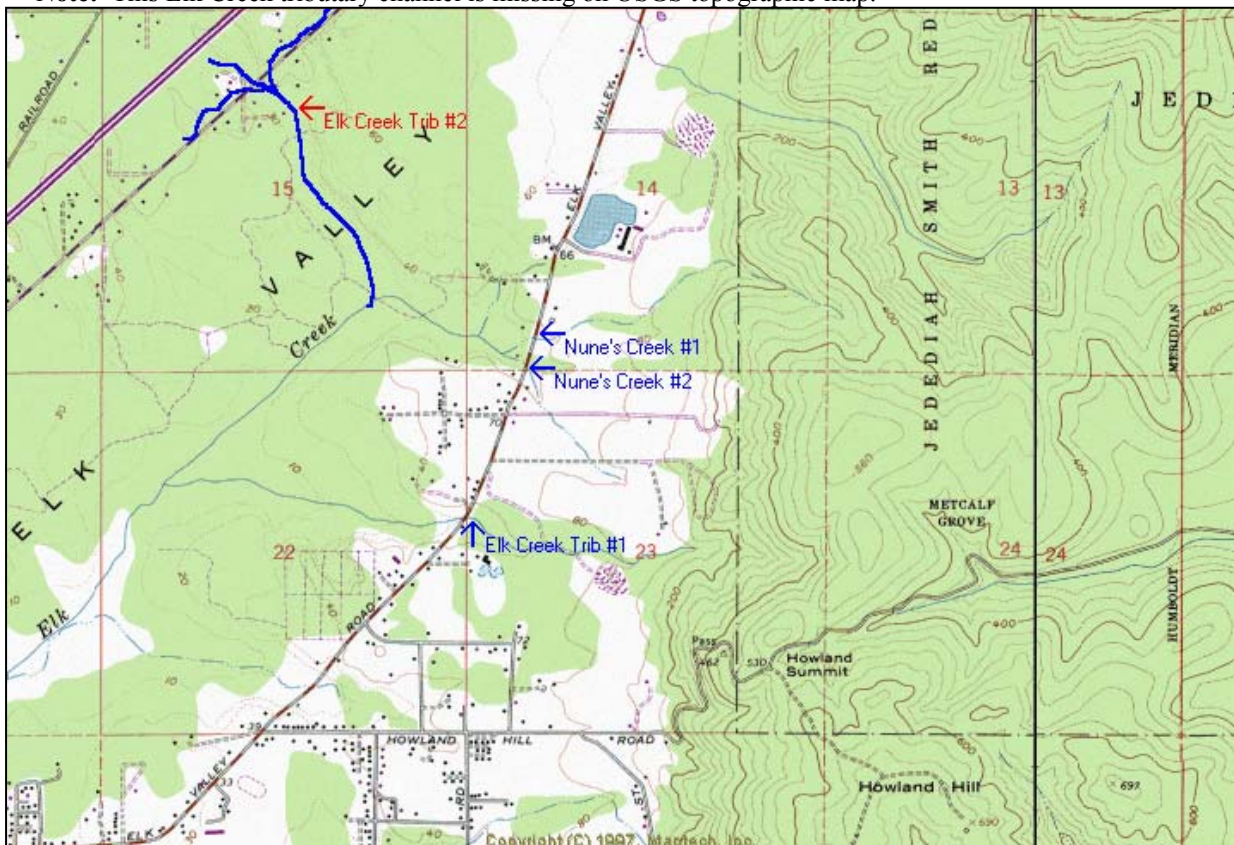
**Barrier Status:** FishXing estimated crossing is 93% passable for adult coho salmon and steelhead; 95% passable for adult coastal cutthroat; and 97% passable for 1+ and young-of-year juveniles.

**Additional Road Crossings:** Downstream (2.8 miles) Highway 101 right at mouth of Elk Creek. This crossing is often back-watered by tidal influence. Upstream (within 800') this Elk Creek tributary splits into several, small channels that cross Parkway Drive.

**Habitat:** Quantity = approximately 1,200' of potential fish-bearing habitat above Elk Valley Road. Quality = Fair. Cool flow of water during late-summer site visit with dense riparian zone. Limited spawning and rearing habitat. Dominant substrate is sand. No current habitat surveys available. Several recent spawning surveys confirmed possible coho or steelhead redds downstream of Elk View Road (Burgess, pers. com.). Several resident trout (most likely cutthroat) up to 7" long observed in outlet pool.

**Preferred Treatment:** when culvert wears-out, replace with a properly-sized arch-culvert on concrete footings or pipe-arch set below stream grade.

**Note:** This Elk Creek tributary channel is missing on USGS topographic map.





**Site #24:** Elk Creek Tributary #2/Elk View Road; tributary to Elk Creek





**Site #25:** Mynot Creek/Mynot Creek Road; trib to Hunter Creek/ Klamath River

**Ranking:** #5 = **High-priority**    **Location:** County Map # 1B25. T14N, R1E, Section #34

**Culvert Type:** Rectangular concrete box (two bays) with upstream and downstream concrete aprons.

**Dimensions:** LB bay = 6.5 'H x 12.0'W; RB bay = 7.5'H x 12.0'W    **Length:** 66.0' (including upstream apron)    **Slope:** 1.89% through both bays    **Modifications:** None.

**Fill Estimate:** No fill within road crossing.    **Overall condition:** Good, no apparent wear or damage.

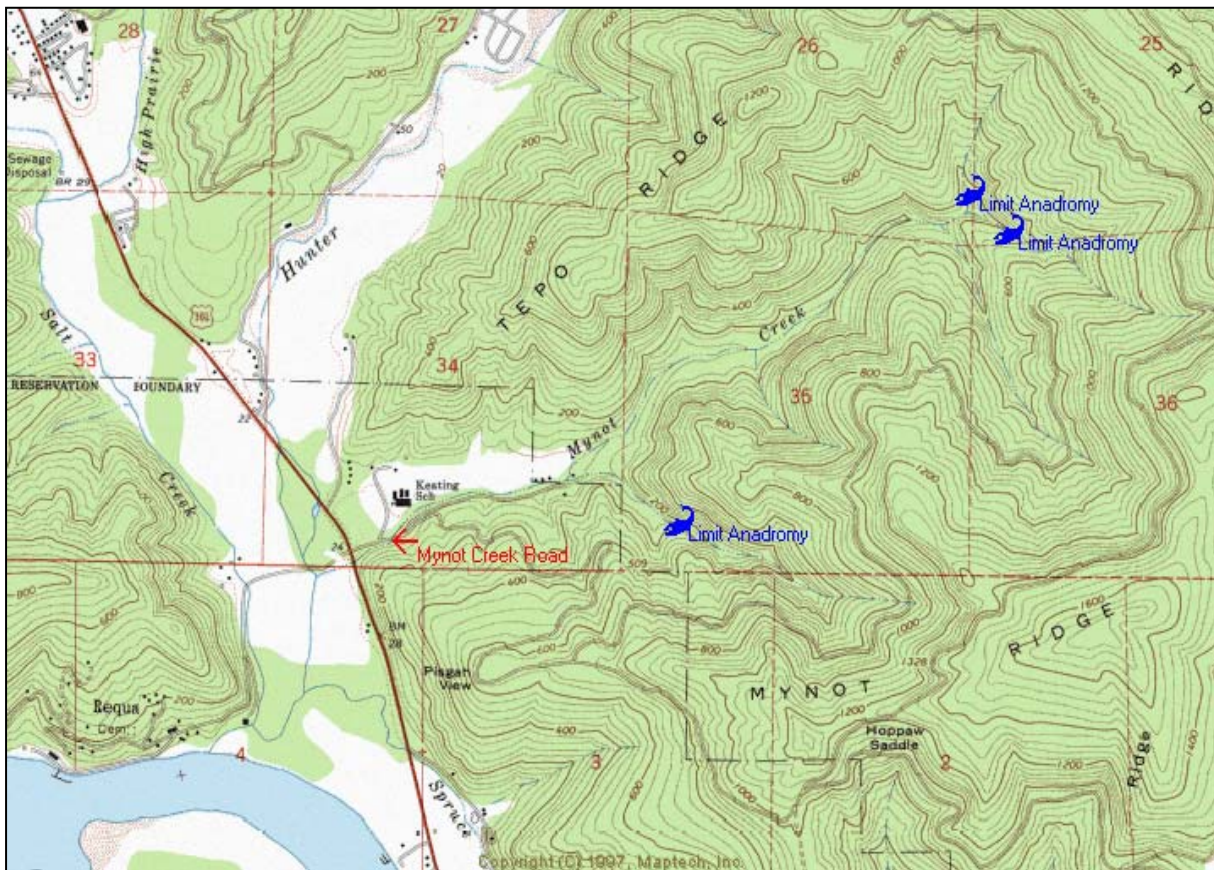
**Sizing:** Undersized; for both bays combined: HW/D = 1 on approximately a 15-year storm flow .

**Barrier Status:** FishXing determined culvert to be a complete barrier to all adult and juvenile salmonids. Depending on stream flow, barrier is caused by: excessive entry jump required, lack of depth through culvert, and excessive velocities. On 12/13/99 measured velocities of 4.6 ft/sec through left bay. Flow shoots several feet out into outlet pool.

**Additional Road Crossings:** Downstream (700'), stream crossing at Highway 101 is a bridge. Upstream, no access, potentially are private road crossings on Simpson Timber Company property.

**Habitat:** Quantity = 13,600' of potential fish-bearing habitat above Mynot Creek Road. Quality = Poor; channel is highly aggraded with minimal habitat complexity. Flow is sub-surface during summer. Yurok Tribal biologists have sampled low numbers of juveniles (coho, chinook, steelhead and coastal cutthroat) up to county road crossing – the juvenile salmon were presumed to have migrated up Mynot Creek from lower Hunter Creek (Gale, per. com.). Only resident coastal cutthroat trout and steelhead juveniles were sampled (in low numbers) above Mynot Creek Road.

**Preferred Treatment:** replace with a properly-sized arch-culvert on concrete footings or a bridge.





**Site #25: Mynot Creek/Mynot Creek Road; trib to Hunter Creek/ Klamath River**





**Site #26:** Richardson's Creek/Klamath Beach Road; tributary to Klamath River

**Ranking:** #21 = **Low-priority** **Location:** County Map # 1B25. T14N, R1E, Section #34

**Culvert Type:** Circular CSP. **Dimensions:** Diameter = 5.0'

**Slope:** Not measured, appears less than 2.0% **Modifications:** None. **Fill Estimate:** 30,860 cubic yards.

**Overall condition:** Poor, culvert floor is rusted through in places.

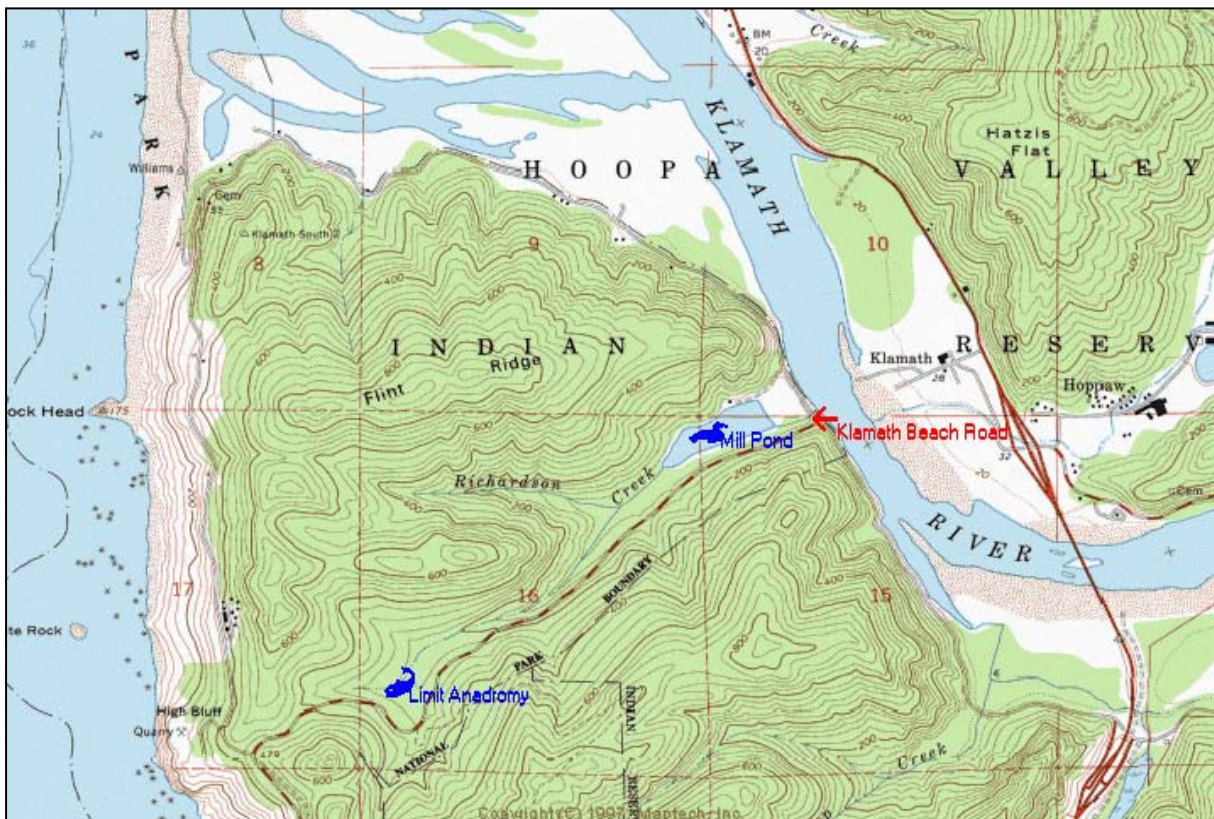
**Sizing:** Extremely undersized; HW/D = 1 on approximately a one-year storm flow.

**Barrier Status:** Unable to conduct survey for FishXing evaluation. However, crossing most likely passes fish due to mild slope of culvert, plus crossing is often back-watered by flow and/or tidal influence within the Klamath River.

**Additional Road Crossings:** Downstream, none: enters Klamath River immediately below Klamath Beach Road. Upstream, none: however, old mill pond upstream has a beaver dam at outlet and an extensive swampy area at the upper end.

**Habitat:** Quantity = 8,900' of potential fish-bearing habitat above Klamath Beach Road. Quality = Poor: channel above mill pond appears in fair condition; dense riparian area and cool flow in summer. However, swamp at upper end of mill pond may prevent salmonid migration. An illegal dump was observed along Alder Camp Road that extends from road down to creek channel. Reports of exotic species (largemouth bass) in pond may impact successful rearing of juvenile salmonids. Yurok Tribal fisheries program has not yet sampled Richardson's Creek (Gale, per. com.).

**Preferred Treatment:** when culvert wears-out, replace with a properly-sized arch-culvert on concrete footings or pipe-arch set below stream grade. National Park trail located along upstream side of road fill; suggest requesting National Park share cost of upgrading this crossing.





**Site #26: Richardson's Creek/Klamath Beach Road: Before and After shots of blocked inlet**





**Site #27:** Saugep Creek/Klamath Beach Road; trib. to lower Klamath River **Ranking:** #23 = **low-priority**

**Location:** County Map # 1B25. T14N, R1E, Section #34 **Culvert Type:** Circular CSP (two pipes).

**Dimensions:** Diameter = 4.5' (each pipe). **Length:** 103.0' (each pipe).

**Slope:** LB pipe = -0.23%; RB pipe = -0.48% **Modifications:** None. **Fill Estimate:** 2,053 cubic yards.

**Overall condition:** Poor, pipes are crushed and starting to rust through.

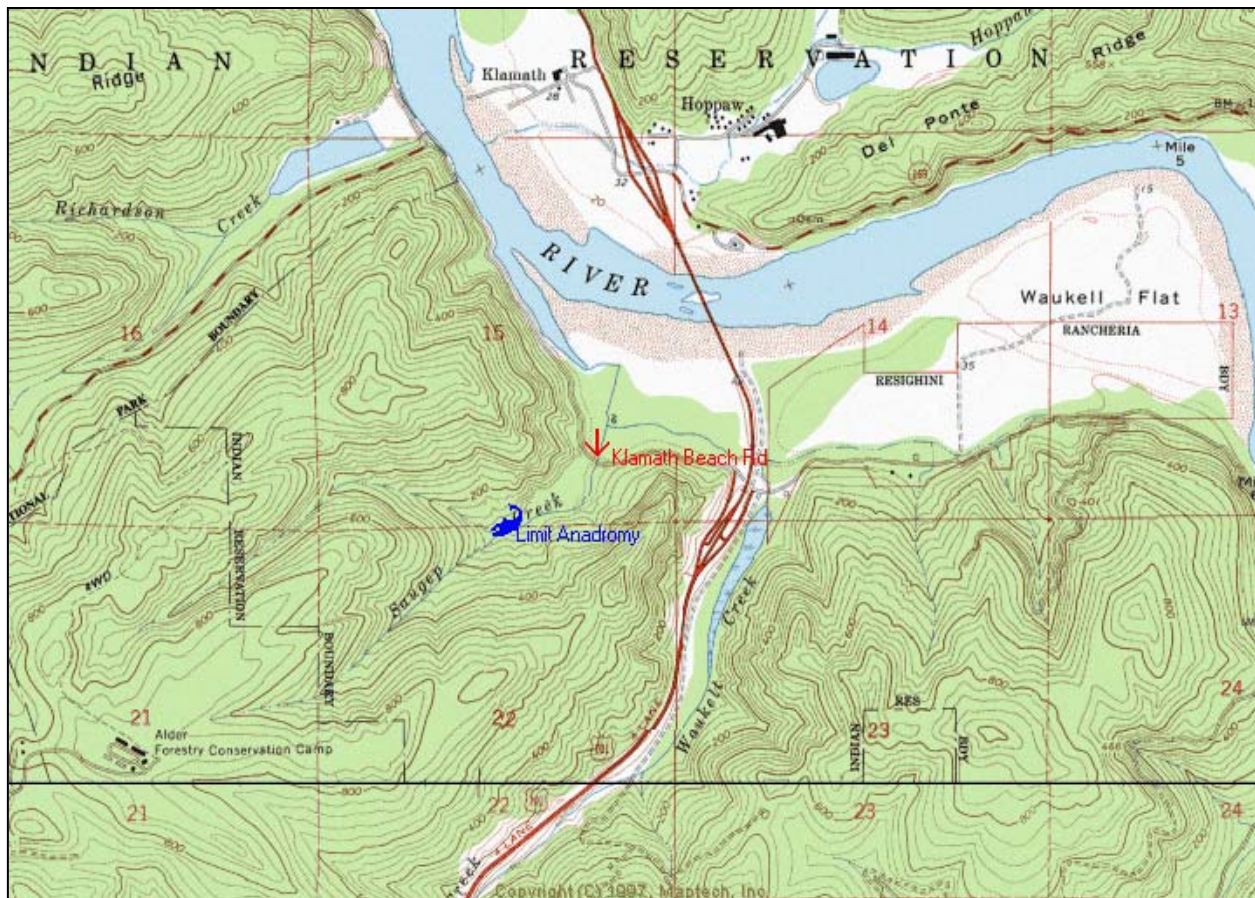
**Sizing:** Extremely undersized; for both pipes combined: HW/D = 1 on approximately a one-year storm flow.

**Barrier Status:** FishXing determined culvert as 67% passable for adult coho salmon and steelhead; 84% passable for adult coastal cutthroat trout; 92% passable for 1+ juveniles; and 49% passable for young-of-year fish.

**Additional Road Crossings:** Downstream, none, flows directly into Klamath River. Upstream, none.

**Habitat:** Quantity = 2,500' of potential fish-bearing habitat above Klamath Beach Road. Quality = Poor; channel appears aggraded with minimal habitat complexity. Has a dense riparian of hardwoods and young conifers. Yurok biologists have sampled low numbers of juvenile chinook, coho, steelhead and cutthroat up to county road crossing (Gale, per. com.). Above the county road only coho (1), steelhead and coastal cutthroat were found in low numbers. Dump adjacent to creek, upstream of Klamath Beach Road.

**Preferred Treatment:** when culvert wears-out, replace with a properly-sized arch-culvert on concrete footings or pipe-arch set below stream grade.





Site #27: Saugep Creek/Klamath Beach Road; trib. to lower Klamath River









**Site #28:** Waukell Creek/Klamath Beach Road; trib. to Klamath River

