Pistol River Enterprises LLC

26000 Myers Creek Road

Gold Beach, Oregon 97444

Ronald Adams

It is my desire to propose a plan to improve
The pistol river estuary

I have a plan to help the pistol river estuary and repair the salmon habitat. Presently their is a surplus of sediment, composed of sand, gravel and river bottom soil, which is causing the river to leave its bed and erode the river bottom away. This is causing the river to widen out and causing temperature rises, algae growth and shallow ponding which allows the young salmon to become land locked, diseased and numerous problems. If these goal are met, this would be enough but it will accomplish so much more. If we could remove surplus sediment and construct more of the structures that have been built along the Crook property, it will go a long way to lower the water temperature. The structures that have been build are working wonderfully, they are blowing the gravel up out of the river, deepening the channel causing a defined stream bed. They are are also helping to clean the gravel so that the water will run through it and not over it, which is causing the water to warm up beyond what is a survivable temperature for young salmon. This summer the mouth of pistol river stayed open all summer despite low rainfall, the water could not flow through the sand due to excess sediment. The gravel opposite these structures is being washed up two to three feet higher than the existing bottom land, which is great, but if the gravel isn't removed to alleviate the pressure on these structures during high water, they will eventually wash out. These structures are too valuable and important not to be maintain.

We need to build more of these structures on the south side of the river and then switch over to the north side of the river and build some along the north side to approximately ¼ mile from the bridge so that we can keep a deepened channel going clear to the bridge.

We have some serious problems on the river to deal with, not only is the fish habitats in a state of emergency but the bridge is also in a state of emergency. These structures will not only help with these serious problems, if they are constructed properly and installed in time they will help in many other ways. The

Carpentersville road is also very close to a state of emergency again. Installing these structures if done properly and in time should be a viable solution to that as well.

The 101 highway is also in a state of emergency and is only three miles from this area. Removing the sediment from Pistol River at this time will not only solve a lot of problems here but it will solve major traffic problems associated with all the truck traffic with having to haul rock through congested areas. It will also shorten the repair time considerable.

My plan for removing this sediment is as follows , I have marked out four areas on special maps showing the specific areas and sizes and the depth of the sediment that needs to be removed to enable the hydraulics of the river to work to enable the river to function like a normal river, that had not be inundated by refuge from man caused upstream activities. This debris is causing many problems in the river, such as warming of the water, widening of the river, slowing the stream flow, stream bank erosion, damage to the bridge, filling up of the estuary, and now it is appearing to keep the mouth of the river open during the summer months. It is important that the mouth of the river be closed during the summer month to keep salmon from enter the river before the river has enough water flow to enable them to survive. Also a major concern is approximately 1500 feet up river from the bridge is a large quantity of large rocks coming down the river. If these rocks make it past the bridge and make it into the estuary they will fill the estuary up and it will be decades before the river will be able to correct this. This is all man caused and the river needs help to correct this damage, caused by road building logging and fire. There is so much excess sediment in the river now that the river flow is slowed down. The normal transport of sediment is not allowed to happen which stops the river from transporting sediment down the river and out into the ocean. Once the river is free of the excess amounts of sediment the river will flow faster and that will initiate the natural and normal transport of sediment.

Right now Odot has a Huge need for this material that is causing most of the problems in the river. If we are able to go ahead and use this material for repairs to 101 highway we may be able to accomplish my goals in a couple years, because of the demand for gravel right now! what would normally take decades to do, we may be able to accomplish in a couple years.

my plan is to remove the material from these four areas down to a depth which will be approximately two feet above the normal water level of the river, which will allow the normal hydraulics to work. The total amount of debris to be remove from these four area will total approximately eight to ten thousand cubic yards if it was removed all in one year. We acknowledge that the likely hood of that happening {which would be the ideal plan} is very unlikely. The sediment that we are planning to remove has been deposited here in the last three to four years. There will not be any contact with the waters of Pistol River while removing any sediment. This will be replaced almost immediately by the abnormal transport of material that is upstream. That is why it is so important to install these structures {see attached illustration} immediately or as soon as is practical.

Specific placement and number of structures be determined by coordinating with Bob Lobdell and Tyler krug (division of state lands & Army corps), We acknowledge that more sediment will keep coming, but by putting these structures in they will help to keep the stream flow open. This is not the final solution, this is a working plan and will only be as good as the incentive to keep this a viable river. Once these structures are placed we should

not have to go back into the river flow area, we should be able to keep Pistol River a healthy river by removing sediment from the flood plane, which will be up and out of the normal waterway.

Specific plans on how the sediment will be removed will depend on whether or not we will be allowed to supply material for highway 101 repairs and or to the county road department. We are not a gravel company, though we do own some heavy equipment, we are not able to follow though with these plans without the opportunity to supply material to Odot and or the road department. We are a small profit for purpose LLc doing business under the name Pistol River Enterprises llc, it is a minority owned business. Sole owners are my wife (Geri Lee Adams) and myself (Ronald Adams) who is a disable combat Marine. We do own most all the property within 500 feet of all areas where work will be done. The actual equipment used in the operation will be dump trucks and loaders that will be owned by private contractors. Any other equipment will more than likely, for short periods, be portable rock crushers. All materials and equipment will be stored and stock piled up and away from the river on the north side of my property.

This is not to say that if We are not able to find a market for this material that none of these plans will take place but rather stating the facts that even if we were financially able to pay to restore the river, the government involvement makes it almost impossible or impractical to do without the use of grants or other sources of financing. Having a market for this material is more of a time factor, If this is delayed the cost of damage to the bridge, Carpentersville road and other things will just be a loss to all of us.

See attached maps, illustrations and photos

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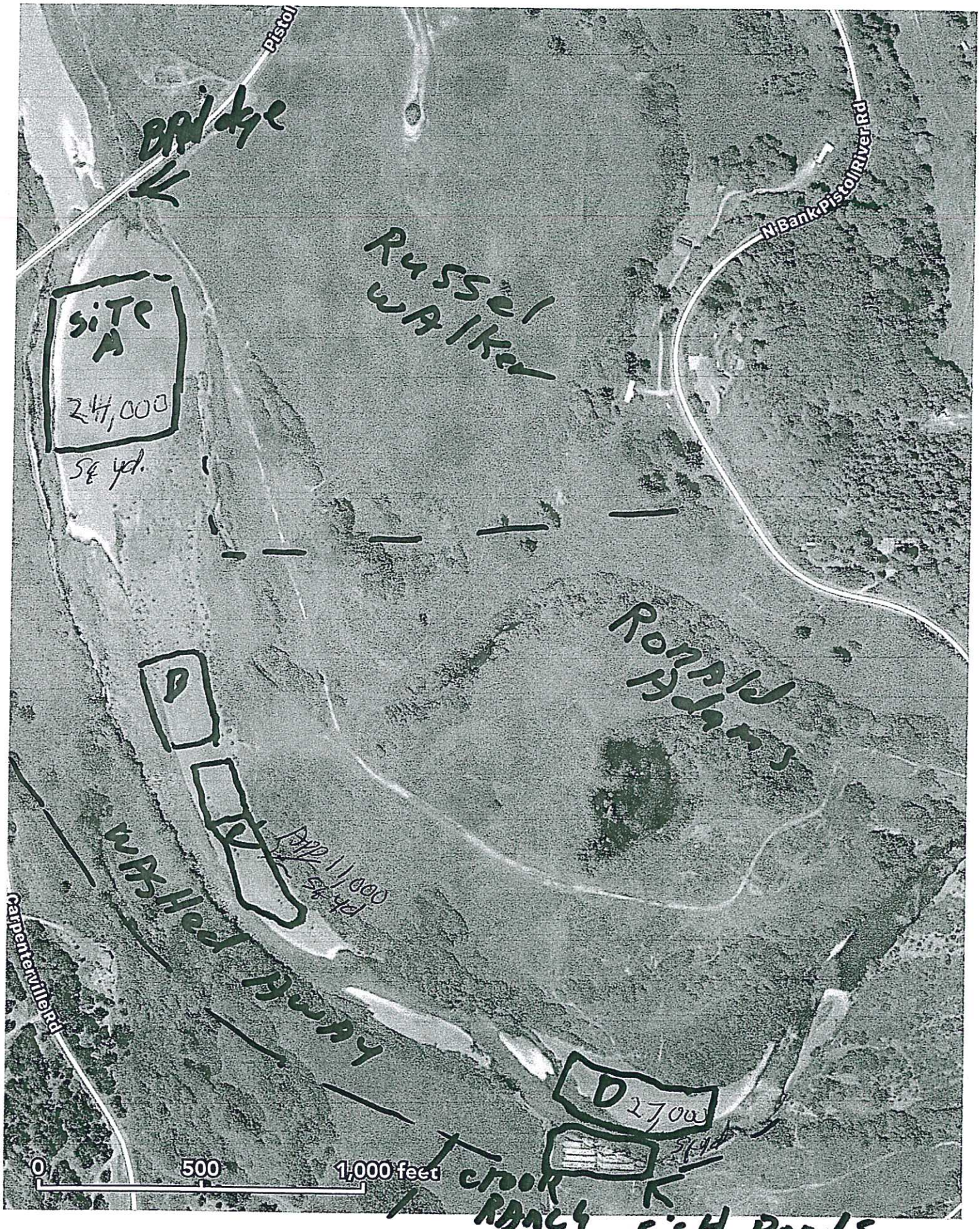
Ronald Adams
11-19-2019


Pistol
Bridge
N Bank Pistol River Rd
Russel Walker
Site A
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Creek Ranch
Fish Ponds
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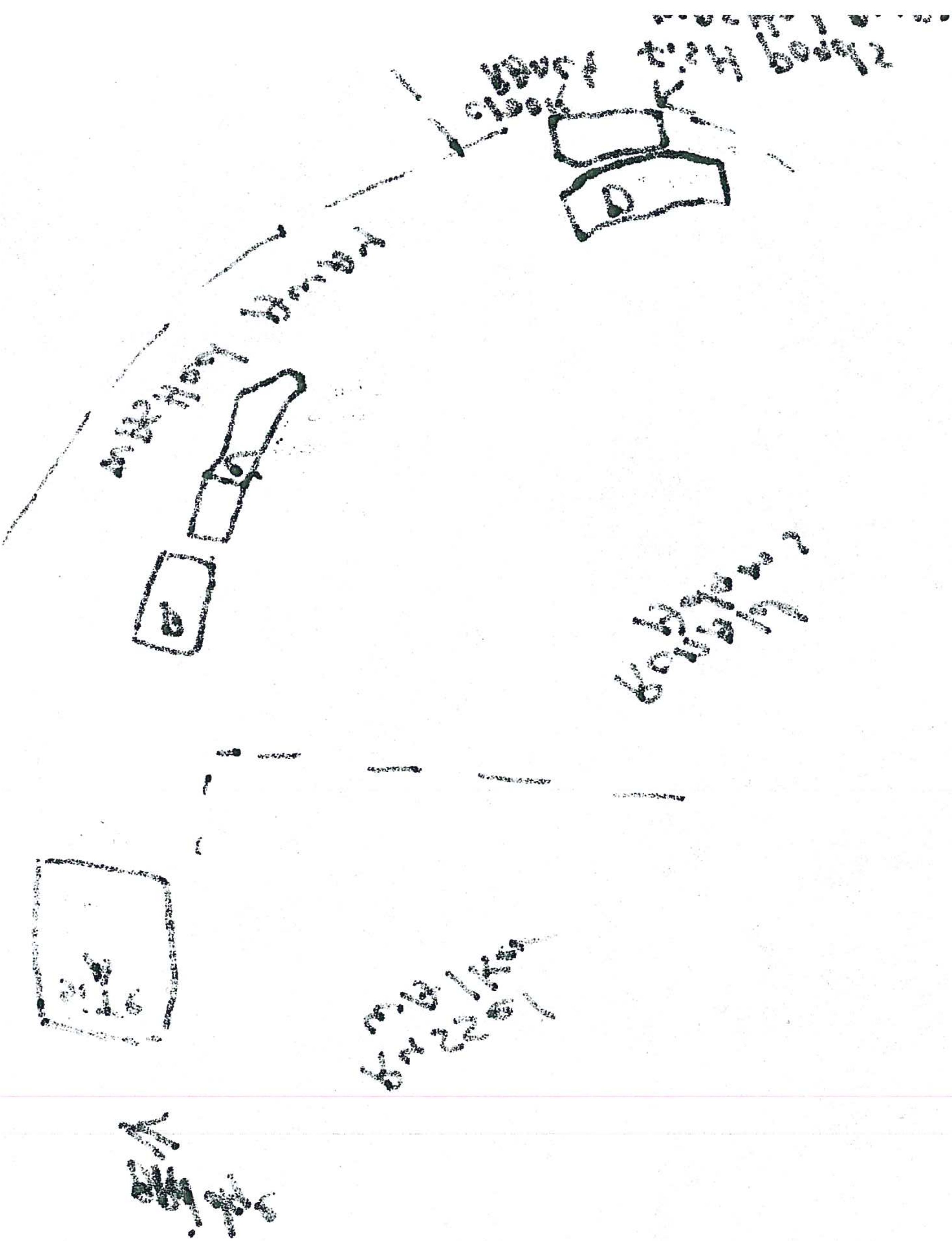
Closest
Fish Body

From: **Ronald Adams** ronadams3@icloud.com
Subject:
Date: **November 13, 2019 at 5:00 PM**
To: ronadams3@icloud.com

site D

~~NoName~~

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Area: **26,727 sq yd**

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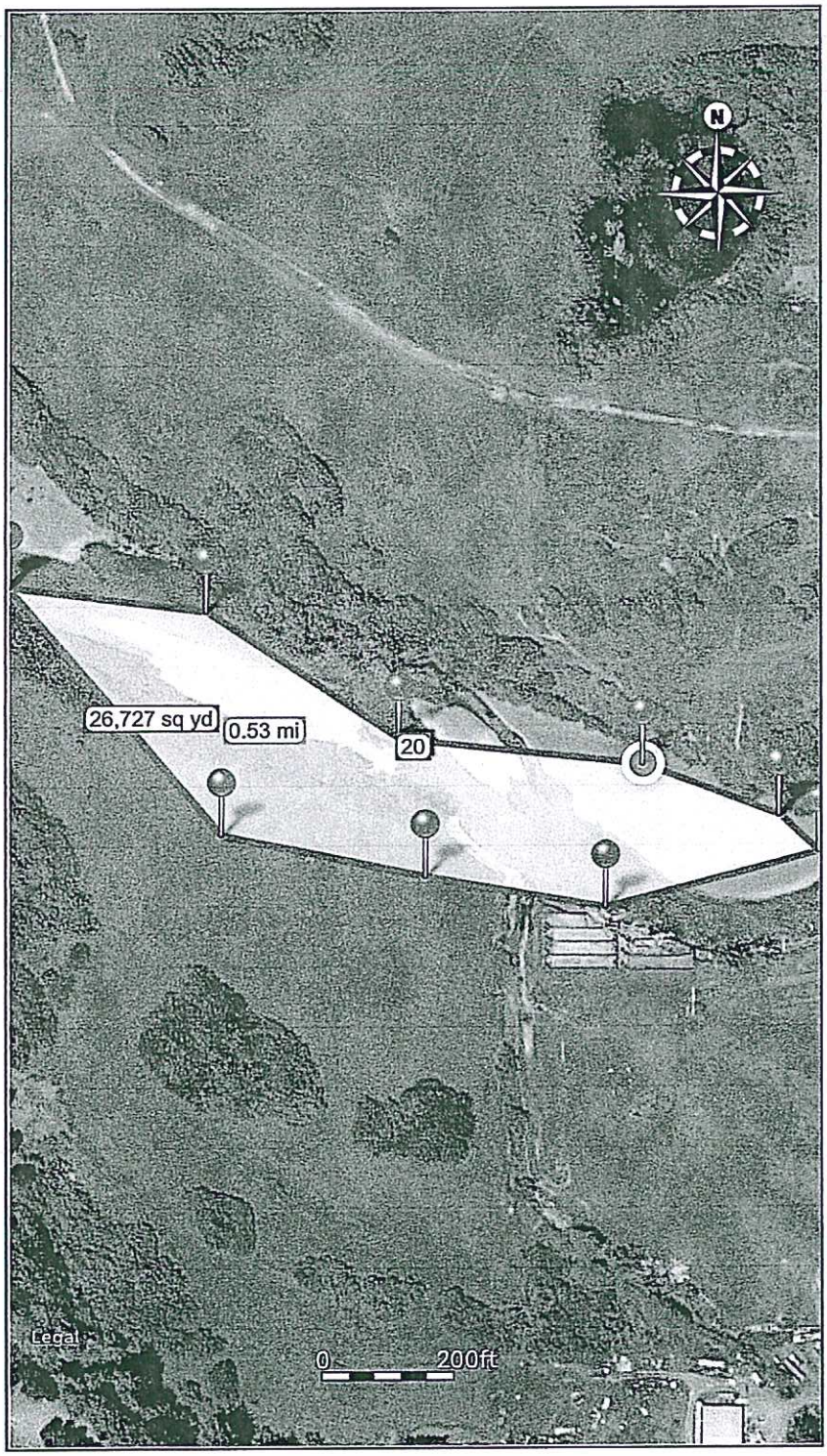

Parsel b down stream

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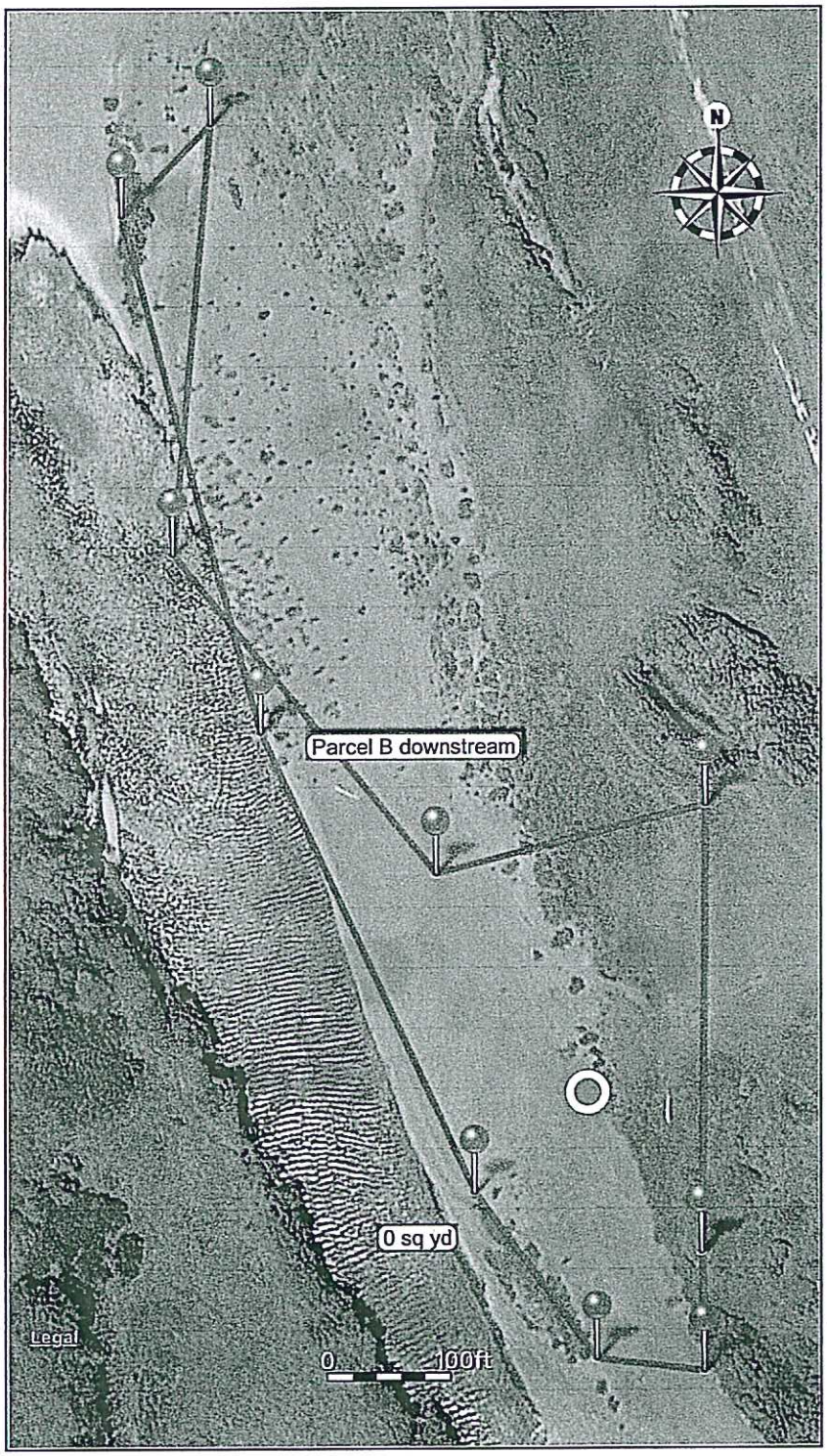

Map points:: Parsel b down stream

Polygon: **Parcel B downstream**
PerimetroKey: **0.5 mi**
Description: Parcel a down stream

Point	Latitude	Longitude	Distance to next	Azimuth	Angle	Altitude
n. 0	42.26663853	-124.39492157	98.1 ft	---	---	17.0 ft
n. 1	42.26636945	-124.39491355	89.0 ft	178.7°	82.2°	11.1 ft
n. 2	42.26639736	-124.39524036	171.0 ft	276.6°	133.1°	11.2 ft
n. 3	42.26677447	-124.39561627	418.5 ft	323.5°	168.4°	11.6 ft
n. 4	42.26781601	-124.39626779	442.8 ft	335.1°	170.2°	10.2 ft
n. 5	42.26898889	-124.39669519	105.7 ft	344.9°	120.8°	10.2 ft
n. 6	42.26919722	-124.39642345	356.9 ft	44.1°	39.2°	11.8 ft
n. 7	42.26822134	-124.39653546	342.2 ft	184.9°	224.2°	9.8 ft
n. 8	42.26749538	-124.39573364	229.9 ft	140.6°	245.0°	14.0 ft
n. 9	42.26765142	-124.39491075	369.1 ft	75.7°	75.2°	15.3 ft
n. 10	42.26663853	-124.39492157	---	180.5°	---	17.0 ft

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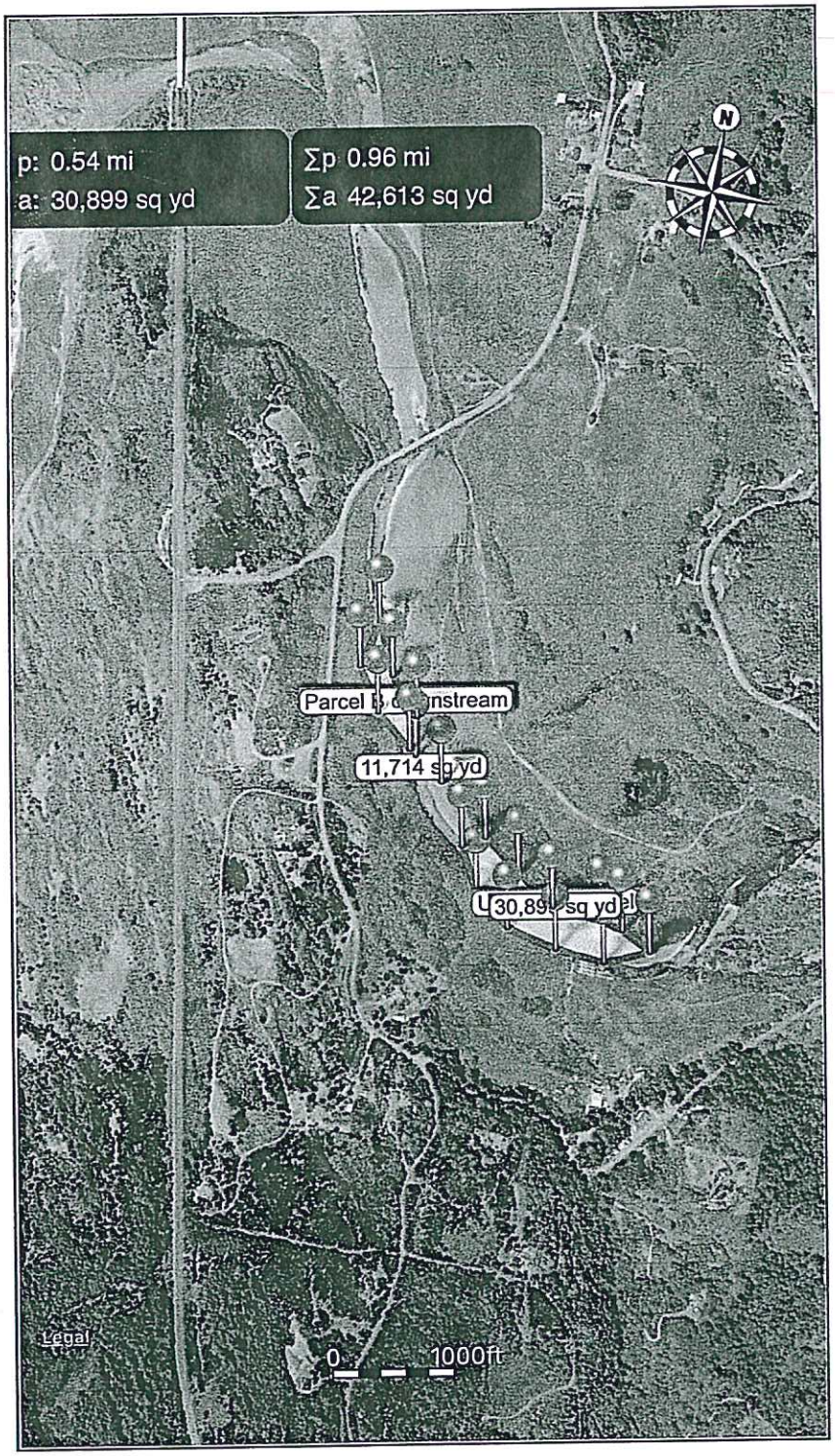

12.1 History of Habitat and Land Use

The relevant history of the Pistol River is described in the Pistol River Watershed Analysis (U.S Forest Service [USFS] 1998b) and the Pistol River Watershed Assessment (Maguire 2001e), which are the basis of this summary. Early settlers likely diminished the habitat capacity of the two lower river tributaries, which no longer have recognizable channels. Two ranches in the grassy meadows near the lower river have been in continuous grazing since that time.

Long-time residents remember a river too cold to swim in most of the summer, before intensive timber harvest began in the 1950s (Maguire 2001e). The 1955 flood carried sediment that filled the lower river, which had previously been the site of major salmon spawning. Where the lower Pistol River had been a sequence of riffles and deep corner pools, it became a series of long riffles with small, shallow pools. Tributaries like Deep Creek were changed by repeated debris torrents after timber harvest, but local residents report prior use by 300 to 400 spawning salmon (Maguire 2001e). These same observers note that the river's flood flows rise and fall much more quickly than before timber harvest and that base flow conditions appear greatly reduced. The mouth of the river now opens later in the fall than it used to. Local residents used to breach the sand berm at the mouth of the Pistol River, but that is no longer allowed (Maguire 2001e).

Private industrial timber land ownership covers 30 percent of the basin and lies between the federally managed land in the upper basin and the ranchland in the lower valley.

Since the Northwest Forest Plan (US Department of Agriculture [USDA] and US Department of the Interior [USDI] 1994) was adopted, there has been a very low level of timber harvest in the Pistol River basin on USFS and BLM lands. Streams in these upper tributaries have started to recover. Private industrial timber harvest is active in the western portion of the Pistol River basin, including much of the South Fork, where harvest rotations are 30 to 50 years.

The intensity of grazing in the lower Pistol River has undoubtedly decreased since a cheese factory located in the lower basin ceased operation in the 1960s, but fields still constrain the lower river channel and occupy its floodplain. Residential development has occurred in the lower Pistol River, but not to the same degree as other southwest Oregon streams like Hunter Creek and the lower Chetco River. Widespread restoration efforts over the last decade have had mixed success (Swanson 2005).

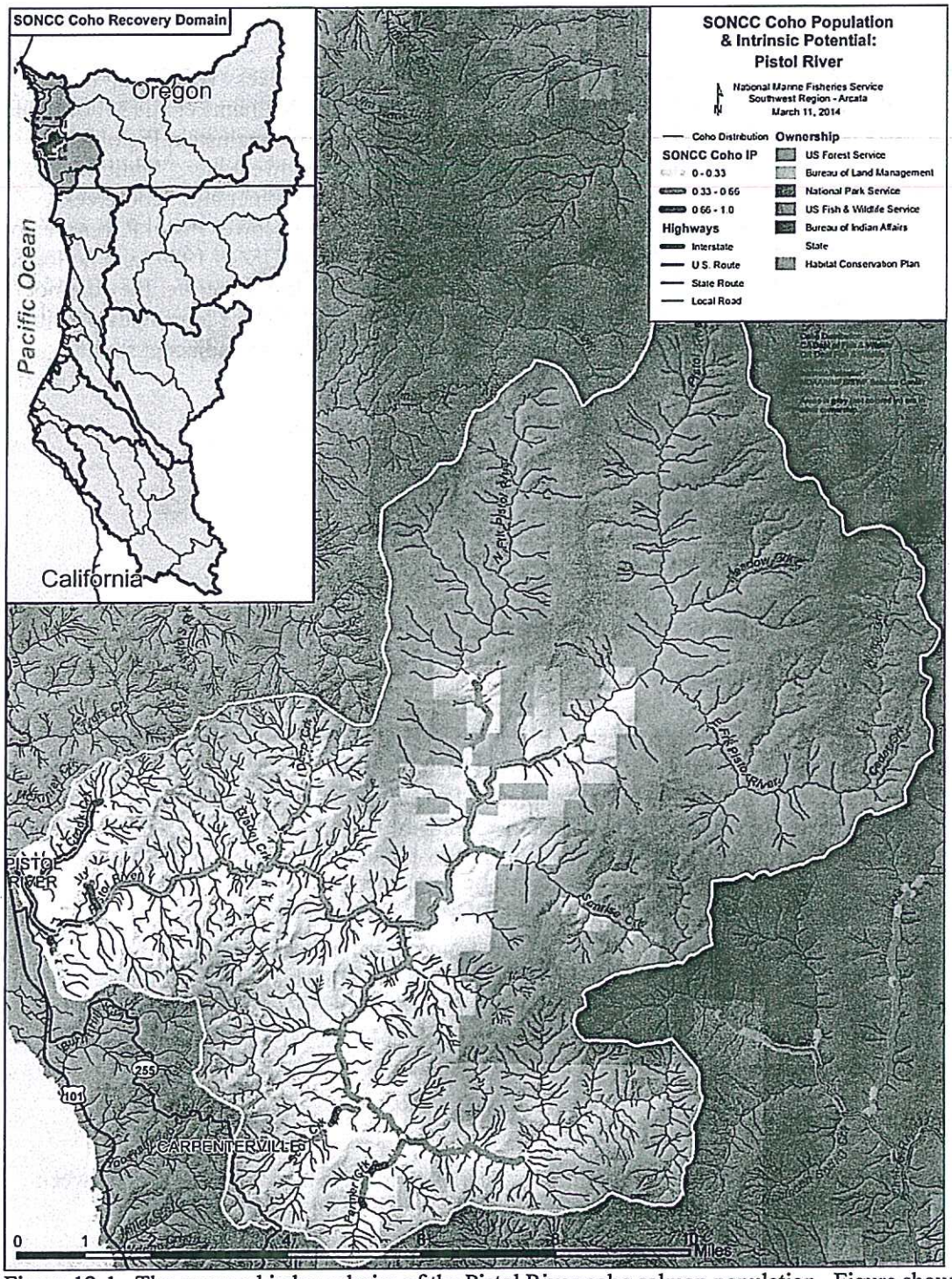

Figure 12-1. The geographic boundaries of the Pistol River coho salmon population. Figure shows modeled Intrinsic Potential of habitat (Williams et al. 2006), land ownership, coho salmon distribution (ODFW 2013a), and location within the Southern-Oregon/Northern California Coast Coho Salmon ESU and the Northern Coastal diversity stratum (Williams et al. 2006). Grey areas indicate private ownership.

12.2 Historic Fish Distribution and Abundance

The steep headwaters of the upper Pistol River prevent coho salmon access very far up major tributaries except in the South Fork (Maguire 2001e). Modeling by Williams et al. (2006) found high intrinsic potential (IP >0.66) habitat for coho salmon in the lower mainstem Pistol River, estuarine tributary Crook Creek and two unnamed tributaries of the lower river. Additionally, flat reaches in Deep Creek, and South Fork Pistol River tributaries, Farmer and Scott creeks, have patches of high IP (Table 12-1). The two unnamed tributaries of lower Pistol River are not found on U.S. Geological Survey (USGS) 1:24000 topographic map (USGS 1989) and no longer have recognizable stream channels when examined using aerial photos; therefore, they are not listed in Table 12-1. Pistol River had sufficient capacity before disturbance to provide possible refugia for smaller nearby populations and a modest source of colonists to adjacent smaller streams, such as Hunter Creek.

Table 12-1. Tributaries with high IP reaches (IP > 0.66) (Williams et al. 2006).

Stream Name	Stream Name	Stream Name
Crook Creek	Farmer Creek	Pistol River Estuary
Deep Creek	Lower Pistol River	Scott Creek

12.3 Status of Pistol River Coho Salmon

Spatial Structure and Diversity

Much of the high IP in the lower mainstem Pistol River and its tributaries is presently unsuitable for coho salmon spawning or rearing. Some low gradient tributaries of the lower river are only partially degraded, but others have been completely lost. Although coho salmon population levels are low, spawning still occurs in the mainstem Pistol River up to the East Fork Pistol, in Crook Creek and Deep Creek, in lower North Fork Pistol River, and in the lower South Fork Pistol River including its tributary Koontz and Davis Creek (Figure 12-1). The Oregon Department of Fish and Wildlife (ODFW; 2005a) conducted a total of 14 snorkel surveys at sites in the Pistol River basin from 2002 to 2004. They found juvenile coho salmon in 3 of 11 reaches (6 of 352 pools) sampled, all at very low levels of $\leq$0.001 coho/m^2, including in the lower South Fork and two mainstem Pistol River reaches upstream of the North Fork Pistol River. Pistol River coho salmon are still well distributed but persisting at low levels, which is likely diminishing genetic diversity.

Population Size and Productivity

Although ODFW (2005a) found coho salmon juveniles in each year of their surveys between 2002 and 2004, they were found only at extremely low levels. Coho salmon are only intermittently present in Crook Creek (Swanson 2005), a formerly productive tributary. Population estimates for 1998 to 2008 for south coast Oregon coho salmon were provided by ODFW (2009a). They estimated escapement in the Pistol River as 78 coho salmon in 1999, 155 in 2000, 118 in 2002, and zero in all the other years. The lack of consistent spawner returns within year classes and the absence of some year classes indicate very low productivity in the Pistol River. Because there is no information on ODFW survey effort, some qualification of

these results is required. If surveys were only in lower river tributaries, then coho salmon that spawned in upper basin tributaries would not have been counted. Similarly, in high flow years, counts may be difficult or impossible. Consequently, the population may be somewhat larger than estimated and there may have been some coho salmon adults in years when the population estimate was zero. The productivity and size of this population is driven not only by the dynamics of the Pistol River population, but by those of nearby populations as well, which contribute spawners as strays. However, the supply of strays to Pistol River is not expected to be substantial or consistent in the near term because most adjacent populations in the SONCC coho salmon ESU are at low levels.

Extinction Risk

Not applicable because the Pistol River is not an independent population.

Role in SONCC Coho Salmon ESU Viability

Although dependent populations such as the Pistol River are not viable on their own, they do increase connectivity by allowing dispersal among independent populations and provide areas of refugia for other populations, acting as a source of colonists in some cases. The Pistol River may have been a source of colonists to nearby dependent populations, such as Hunter Creek. Any restored habitat in Pistol River provides potential connectivity that assists metapopulation function in the SONCC ESU.

12.4 Plans and Assessments

State of Oregon

Oregon Plan for Salmon and Watersheds
http://www.oregon.gov/OPSW/about_us.shtml

The State of Oregon developed a conservation and recovery strategy for coho salmon in the SONCC and Oregon Coast ESUs (State of Oregon 1997). The Oregon Plan for coho salmon is a comprehensive plan that includes voluntary actions to address all of the threats currently facing coho salmon in these ESUs and involves all relevant state agencies. Reforms to fishery harvest and hatchery programs described in the Oregon Plan were implemented by ODFW in the late 1990s. Many habitat restoration projects have occurred across the landscape in headwater habitat, lowlands, and the estuary.

Report of the Oregon Expert Panel on Limiting Factors

ODFW (2008b) convened a panel of fisheries and watershed science experts as an initial step in their development of a recovery plan for Oregon's SONCC coho salmon populations. Deliberations of the expert panel provided ODFW with initial, strategic guidance on limiting factors and threats to recovery. Based on the input of panel members, ODFW (2008b) summarized the concerns for the Pistol River population as follows:

> Key concerns in the Pistol River were a loss of over-winter tributary habitat complexity and floodplain connectivity for juveniles, especially in the lowlands

which are naturally very limited in these systems and have been impacted by past and current urban, rural residential, and forestry development and practices. High water temperatures for summer parr due to a loss of riparian function and channel straightening is also a key concern in these streams. The secondary concern was related to a loss of over-winter, lowland habitat complexity due to past and current agricultural practices.

Cumulative Effects of Southwest Oregon Coastal Land Use on Salmon Habitat

Oregon State University (OSU) Oak Creek Labs conducted a study funded by ODFW and the Oregon Department of Forestry (ODF) to determine relationships between forest harvest and Pacific salmon productivity (Frissell 1992). The study assessed basins along the Oregon coast extending from the Sixes River to the southern border during the period from 1986 to 1992.

Curry County Soil and Water Conservation District

Pistol River Package Monitoring Report

The Pistol River Package Monitoring Report (Swanson 2005) describes conditions in the Pistol River after numerous basin enhancements were carried out, including large wood placement, fish passage improvements, riparian fencing and planting, rock weirs, and bio-engineered bank stabilization structures.

South Coast Watershed Council (Pistol River Watershed Council)

Pistol River Watershed Assessment

This assessment (Maguire 2001e) summarizes conditions, historic changes and restoration needs in the Pistol River basin. Community concerns, salmonid habitat, limiting factors, and prospects for recovery of fisheries and watershed health are included.

Pistol River Action Plan

The Pistol River Action Plan (Massingill 2001e) is a companion to Maguire (2001e), and proposes specific targets for restoration.

United States Forest Service

Pistol River Watershed Analysis

The Pistol River Watershed Analysis was written by the USFS (1998b) in accordance with the Northwest Forest Plan (USDA and USDI 1994) and sets a course of restoration for their ownership in the Pistol River. Planned activities include road decommissioning, hardwood thinning and conifer planting in riparian zones and combating the spread of Port Orford root disease in the watershed.

12.5 Stresses

Table 12-2. Severity of stresses affecting each life stage of coho salmon in the Pistol River. Stress rank categories, assessment methods, and data used to assess stresses are described in Appendix B.

	Stresses[2]	Egg	Fry	Juvenile[1]	Smolt	Adult	Overall Stress Rank
1	Lack of Floodplain and Channel Structure[1]	High	Very High	Very High[1]	Very High	High	Very High
2	Degraded Riparian Forest Conditions[1]	-	Very High	Very High[1]	High	High	Very High
3	Altered Sediment Supply	Very High	Very High	Very High	High	High	Very High
4	Impaired Water Quality	Medium	High	Very High	High	Low	High
5	Altered Hydrologic Function	High	High	High	High	Low	High
6	Impaired Estuary/Mainstem Function	-	Low	Very High	High	Medium	High
7	Barriers	-	Low	Low	Low	Low	Low
8	Adverse Hatchery-Related Effects	Low	Low	Low	Low	Low	Low
9	Adverse Fishery- and Collection- Related Effects	-	-	Low	Low	Low	Low

[1]Key limiting stresses and limited life stage.
[2]Increased Disease/Predation/Competition is not considered a stress to this population.

Key Limiting Stresses, Life Stages, and Habitat

The upper South Fork Pistol River above Farmer Creek may provide coho salmon refugia because it has suitable gradient, cool water temperatures, and pools greater than 1 meter deep; however, there are no data documenting coho presence in that reach. Otherwise there are currently no functioning coho salmon refugia in the Pistol River or its tributaries. Crook Creek is too warm at its convergence with the mainstem to support coho salmon (Maguire 2001e) and Deep Creek has excessive amounts of fine sediment (Swanson 2005).

The juvenile life stage is most limited and quality winter rearing habitat, as well as summer rearing habitat, is lacking as vital habitat for the population. Juvenile summer rearing habitat is impaired by an excess of fine sediment, which has filled in the mainstem, tributary channels, and the estuary, and contributes to high water temperature. Lack of floodplain and channel structure due to channelization and filling of the floodplain has eliminated much of the coho salmon rearing habitat in the basin. Winter rearing habitat is often formed by instream large wood, but is also found in estuaries and floodplain wetlands. Degraded riparian conditions have eliminated the source of large wood recruitment and floodplain wetlands have been filled or disconnected from the river. Overall, these findings are consistent with those of the Oregon Expert Panel (Section 12.4), except that the expert panel did not consider excess sediment to be a concern.

Lack of Floodplain and Channel Structure

Long-time lower Pistol River residents described the transformation of the channel from one with well-developed deep pools joined by short riffles to one dominated by riffles with few pools of limited depth (Maguire 2001e). High fine sediment load and bedload movement inhibit channel recovery and also creates adverse conditions for eggs because redds are scoured out or deposits smother eggs and prevent fry emergence.

Before disturbance, the Pistol River riparian zone was comprised of large conifers that lived hundreds of years and then fell into streams, forming pools and complex habitats with which coho salmon co-evolved. Large wood was swept from many mainstem and tributary channels in the 1955 and 1964 floods, which lead to a loss of habitat complexity. Current large wood recruitment is also low. Large wood surveys by ODFW show that all Pistol River reaches have poor levels of large wood (<1 key piece per 100m). USFS large wood surveys found very good levels of large wood in the upper East Fork Pistol River, North Fork Pistol River, and Sunrise Creek on USFS lands, but these streams are largely inaccessible to coho salmon.

Disconnection of the lower Pistol River and estuary from its floodplain and confinement of its channel (Figure 12-2) are major impediments to lower river recovery. Lower Crook Creek has high IP, but its lower reaches are channelized also.

ODFW and USFS habitat data indicate that in the mainstem Pistol River, pool frequencies are greater than 35 percent, which they rate as good. An upper East Fork Pistol River reach, lower Meadow Creek, and the South Fork tributary Koontz and Davis Creek all had poor ratings (<10 percent pools). Pool frequency is only fair (10 to 25 percent) in the lower North Fork, lower Sunrise Creek, Deep Creek, and South Fork tributaries including Scott Creek.

Pool depth of greater than one meter (3.3 ft.) is rated as good by ODFW, and on that basis the South Fork and mainstem Pistol River below the East Fork have good pool depth. However, the Pistol River formerly had pools that were up to 20 feet deep (Maguire 2001e).

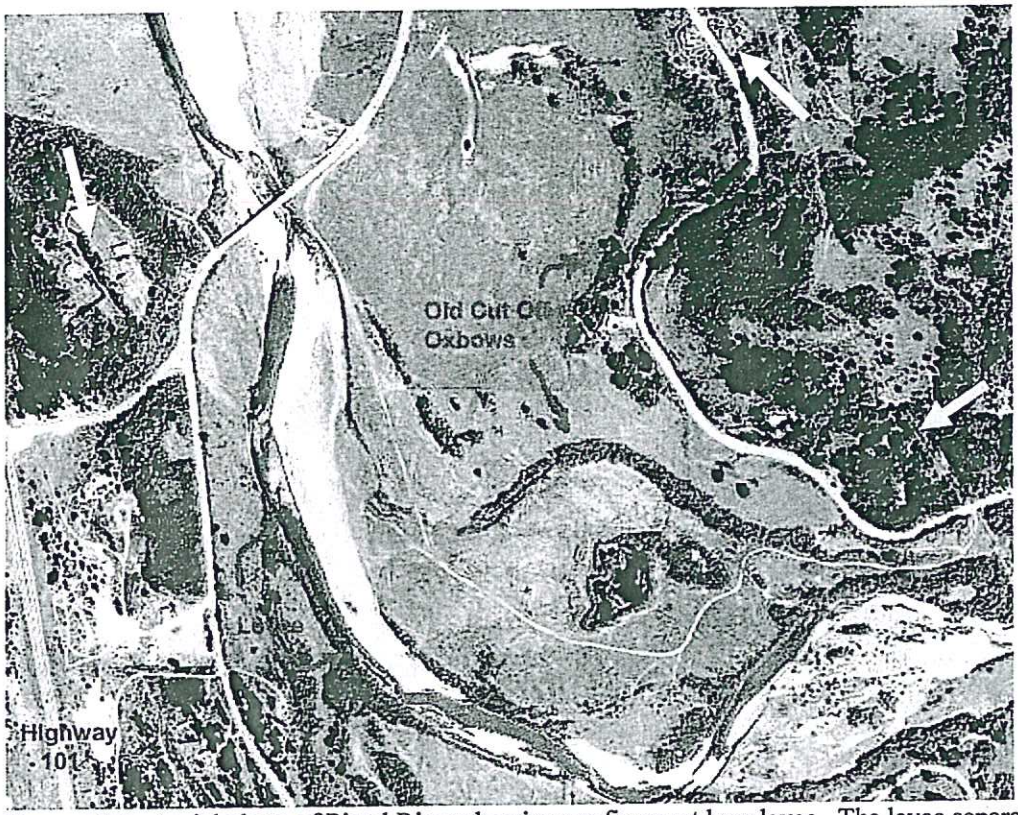

Figure 12-2. Aerial photo of Pistol River showing confinement by a levee. The levee separates the active channel from adjacent farm and industrial gravel operation to the west (left). The levees also cut off the river from oxbows and meanders on the east bank (right), which would have formerly created ideal coho salmon rearing areas. Yellow arrows highlight pockets of residential development.

Degraded Riparian Forest Conditions

ODFW surveys found fewer than 75 conifers greater than 36" in diameter per 1000 ft. on the South Fork Pistol River, mainstem Pistol River downstream of the East Fork, Sunrise Creek, and Deep Creek. This low density of large trees in the riparian zone has led to poor bank structure, reduced shade, and reduced thermal and nutrient buffering. The riparian zone of the mainstem Pistol River is predominantly hardwood trees (Figure 12-3), with very few large conifers. Willow and alder are the most abundant species in the alluvial valleys, although cottonwoods were once a significant part of the riparian community (Maguire 2001e). High bedload transport in the lower Pistol River is likely causing high mortality of both conifers and alders, because these species die if their root systems are buried.

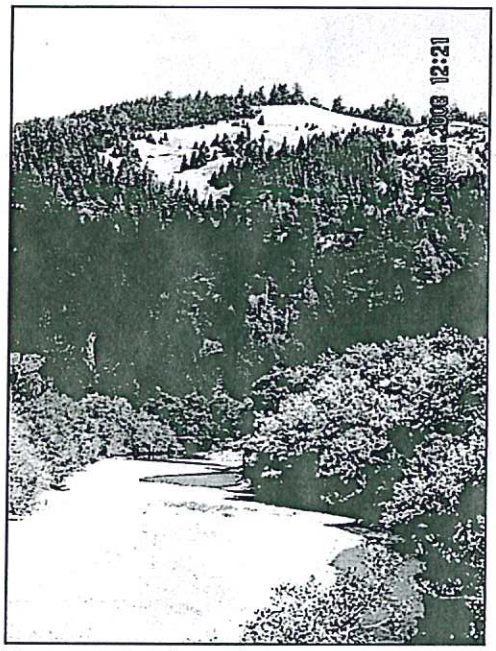

Figure 12-3. Photo of the lower mainstem Pistol River. The river has a willow and alder riparian zone. Note also excess sediment and lack of channel structure.

Altered Sediment Supply

Sediment contribution from landslides and erosion occurs naturally in the Pistol River basin; however, roads, timber harvest, and bank erosion following removal of riparian vegetation have elevated fine sediment input. For example, debris torrents in 2003 covered large wood restoration projects with approximately 100,000 to 200,000 cubic yards of sediment in lower Deep Creek (Swanson 2005). Debris flows significant enough to alter channel structure occurred in the South Fork Pistol River and upper mainstem Pistol River in 1996 (Maguire 2001e). Excess fine sediment directly impacts coho salmon egg viability and can reduce food for fry, juveniles and smolts. Poor pool frequency and depth throughout the Pistol River basin (Maguire 2001e) is likely due to elevated levels of fine sediment partially filling pools, a lack of scour-forcing obstructions such as large wood, and in some reaches diminished scour due to channel widening.

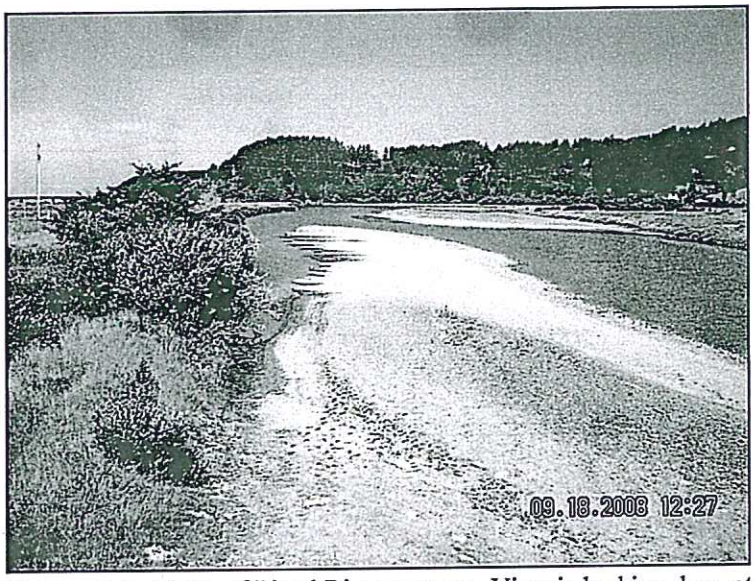

Figure 12-4. Photo of Pistol River estuary. View is looking downstream from the Pistol River Road bridge. The large gravel bars occupy a formerly deep channel here, suggesting excess fine sediment.

Impaired Water Quality

The mainstem Pistol River is listed under the Clean Water Act Section 303(d) for impaired temperature and dissolved oxygen from the mouth upstream to RM 19.8, and the lower half mile of the South Fork is also listed as temperature impaired. Maguire (2001e) reported that the ODEQ maximum floating weekly maximum temperature (MWMT) threshold for impairment of 64 °F was exceeded at all stations measured, indicating lack of suitability for coho salmon rearing; however, there are a few additional stations/years in the ODEQ LASAR database (see Appendix B) with temperatures below the 64 °F threshold: Glade Creek at mouth, upper Farmer Creek, South Fork Pistol River at upper crossing, Deep Creek at mouth (2 of 8 years), and North Fork Pistol River near mouth (1 of 6 years). Figure 12-5 shows water temperatures for the Pistol River from 1995 to 2000 as reported by Maguire (2001e). The lower East Fork Pistol River and Deep Creek are almost cool enough to provide suitable coho salmon habitat. Lower reaches of the North Fork and the upper mainstem Pistol River are showing improvement (65 °F to 69 °F), but the South Fork is much too warm to support coho salmon (71.4 °F to 72.8 °F). Lower mainstem Pistol River temperatures are also too warm (71.8 °F -75 °F). The Pistol River warms 2 to 4 °F between the East Fork Pistol and South Fork Pistol (Maguire 2001e).

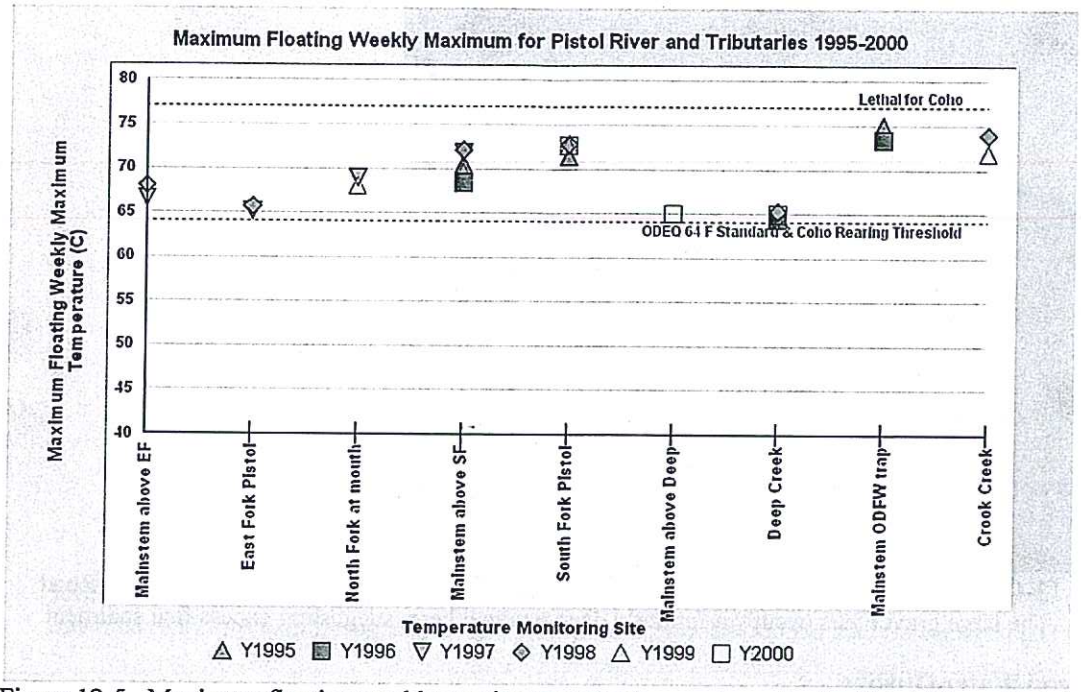

Figure 12-5. Maximum floating weekly maximum water temperatures for the Pistol River. Data includes tributaries and shows a pattern of exceeding coho salmon rearing requirements (McCullough 1999) and ODEQ standards (64 °F). The lethal temperature reference value of 77 °F is from Sullivan et al. (2000).

Water quality in the Pistol River is also compromised by low dissolved oxygen (DO) levels. The low DO levels are likely due to stagnation and to algal blooms, which are encouraged by excess nutrients and lack of shade. There are seasonal problems with elevated phosphorous, *E. coli* and biological oxygen demand (Maguire 2001e).

Altered Hydrologic Function

Changes in Pistol River basin hydrology have led to a substantial decrease in available habitat for coho salmon, resulting in a high level of stress for most life stages. Excess fine sediment blocks surface and groundwater interactions by clogging interstitial spaces of stream gravels that are known to help maintain cool temperatures. This type of connection likely created cold water strata at depth in the deeper pools that were formerly common, even when surface waters were warm. Some Pistol River Watershed Council members believe that the summer base flows have also diminished (Maguire 2001e). Studies elsewhere in the Pacific Northwest indicate that converting forest stands of fewer large trees to ones with many small trees can decrease base flows for several decades (Murphy 1995).

The hydrology of the lower basin has been substantially altered through disconnection of the floodplain and channelization. High road densities in some Pistol River watersheds are likely to lead to increased peak flows. These peak flows can scour eggs and flush fry, juveniles, and smolts from the river system.

Impaired Estuary/Mainstem Function

The Pistol River estuary retains little of its historic form or function and provides little opportunity for estuarine rearing. Studies elsewhere in Oregon found that estuarine tributaries and sloughs can be important habitat types for rearing coho salmon juveniles (Koehler and Miller 2003, Miller and Sadro 2003). The remnants of past estuarine habitat indicate the Pistol River estuary was formerly large with numerous tributaries, tidal channels, and likely tidal wetlands. The diking and filling for conversion to agricultural uses has completely eliminated these habitats. Lack of riparian vegetation in the estuary and the accretion of fine sediment have led to highly degraded water quality and habitat conditions. Long-time residents remember pools up to 20 feet deep, while ODFW 1991 habitat data indicated a mean pool depth of only 3.3 feet in the lowermost Pistol River reach (Maguire 2001e). Long-time residents noted a decrease in estuarine use by smelt, which is likely due to a change in seasonality of the opening of the mouth. Crook Creek, the largest estuary tributary, loses surface flow during the summer for its last 500 feet (Swanson 2005), seasonally preventing fish use of this important rearing stream. Highway 101 bisects the estuary near the mouth of the river, constraining the estuary and preventing full tidal inundation upstream. The estuary to the west of Highway 101 encompasses a fair amount of sand and mudflat habitat that could be used for rearing, but it lacks complex habitat features such as large wood or deep pools. Reduced estuarine function poses an overall high stress to Pistol River coho salmon.

Barriers

Although road densities in the Pistol River basin are high, which increases risk of passage problems, coho salmon still have access to most of the basin (Maguire 2001e). The dry reach at the mouth of Crook Creek (Swanson 2005) is a seasonal barrier to juveniles. A major passage problem into Deep Creek has been resolved by replacing a culvert with a bridge (Swanson 2005). Consequently, barriers represent a low stress.

Adverse Hatchery-Related Effects

Hatchery-origin coho salmon may stray into Pistol River; however, the proportion of adults that are of hatchery origin is likely less than five percent and there is no hatchery in the basin producing other species of salmonids. Therefore, adverse hatchery-related effects pose a low risk to all life stages.

Adverse Fishery- and Collection-Related Effects

Based on estimates of the fishing exploitation rate, as well as the status of the population relative to depensation and the status of NMFS approval for any scientific collection (Appendix B), these activities pose a low stress to juveniles, smolts, and adults.

12.6 Threats

Table 12-3. Severity of threats affecting each life stage of coho salmon in the Pistol River. Threat rank categories, assessment methods, and data used to assess threats are described in Appendix B.

	Threats[2]	Egg	Fry	Juvenile[1]	Smolt	Adult	Overall Threat Rank
1	Roads[1]	High	Very High	Very High[1]	Very High	Very High	Very High
2	Timber Harvest[1]	Very High	Very High	Very High[1]	Very High	Medium	Very High
3	Channelization/Diking	Medium	Very High	Very High	Very High	Very High	Very High
4	Agricultural Practices	Low	Medium	High	High	High	High
5	Dams/Diversion	Low	Medium	Medium	Medium	Low	Medium
6	Urban/Residential/Industrial Dev.	Low	Medium	Medium	Medium	Medium	Medium
7	High Severity Fire	Low	Medium	Medium	Medium	Medium	Medium
8	Climate Change	Low	Low	Medium	Medium	Medium	Medium
9	Mining/Gravel Extraction	Low	Low	Low	Low	Low	Low
10	Road-Stream Crossing Barriers	-	Low	Low	Low	Low	Low
11	Hatcheries	Low	Low	Low	Low	Low	Low
12	Fishing and Collecting	-	-	Low	Low	Low	Low

[1]Key limiting threats and limited life stage.
[2]Invasive and Non-Native/Alien Species is not considered a threat to this population.

Key Limiting Threats

The two key limiting threats, those which most affect recovery of the population by influencing stresses, are roads and timber harvest.

Roads

Roads pose an overall very high threat to the Pistol River coho salmon population. There are high road densities (2.5 to 3.0 mi/mi^2) in the South Fork Pistol River and very high densities (>3.0 mi/mi^2) in the Upper and Lower Pistol River. Road densities are medium (1.6-2.5 mi/mi^2) in the East Fork Pistol River, North Fork Pistol River, and in mainstem watersheds between the East Fork and South Fork Pistol River. Additionally there is a high number of road stream crossings, streamside roads, and many road segments that cross steep unstable slopes or erodible soils. These conditions all pose a risk of elevated fine sediment yield. Road density estimates are conservative because they do not include skid roads, landings, or temporary roads. The main

timber harvest haul road along the Pistol River has initiated large landslides (Maguire 2001e). A main haul road also follows the South Fork Pistol River.

Timber Harvest

Timber harvest poses an overall very high threat to the coho salmon population. Private industrial timber lands managed under the Oregon Forest Practices Act occupy 30 percent of the landscape, but they coincide with nearly all the low gradient intrinsic potential streams. Therefore, these lands have a disproportionate effect on coho salmon. The high harvest rates and associated roads negatively impact multiple aspects of coho salmon habitat. Deep Creek is an example of where short timber harvest rotations are likely inhibiting channel and coho salmon recovery.

Studies of adjacent southwest Oregon basins found that "downstream, cumulative impacts of human activity are pervasive in southwest Oregon, wherever logging has occurred over an extensive portion of a drainage basin or has involved operations on steep, unstable slopes. The downstream effects of channel sedimentation and aggradation can severely damage streams even where buffer zones of riparian vegetation have been retained, and such effects persist more than 20-30 years after logging activities have ceased" (Frissell 1992).

Channelization/Diking

Channelization and diking have occurred in high IP reaches in the lower tributaries, along the lower mainstem, and in the estuary. Crook Creek had ideal gradient and valley width for coho salmon, but the channel has been straightened and greatly reduced in complexity (Figure 12-6). The lower mainstem and estuary have been similarly channelized and disconnected from the floodplain and adjacent wetlands. Roads that follow the river or tributaries may cut them off from their floodplains as well.

Agricultural Practices

The same farms and ranches have operated in the lower river for well over 100 years and levels of grazing are likely not as high as they were in the past. Nonetheless, long term activities have led to the disconnection of the lower Pistol River and estuary from floodplains (Figure 12-2). Lower Pistol River tributaries have also been profoundly altered; two unnamed tributaries with high IP now have unrecognizable channels. Crook Creek has also been straightened and disconnected from its floodplain (Figure 12-6), but landowners have been trying to restore it (Swanson 2005). The negative effects of pesticides and herbicides on Pacific salmon species and aquatic ecosystem function are becoming more well documented regionally (National Marine Fisheries Service (NMFS) 2008, Laetz et al. 2009), but the extent of use of these chemicals by Pistol River farms and ranches is unknown.

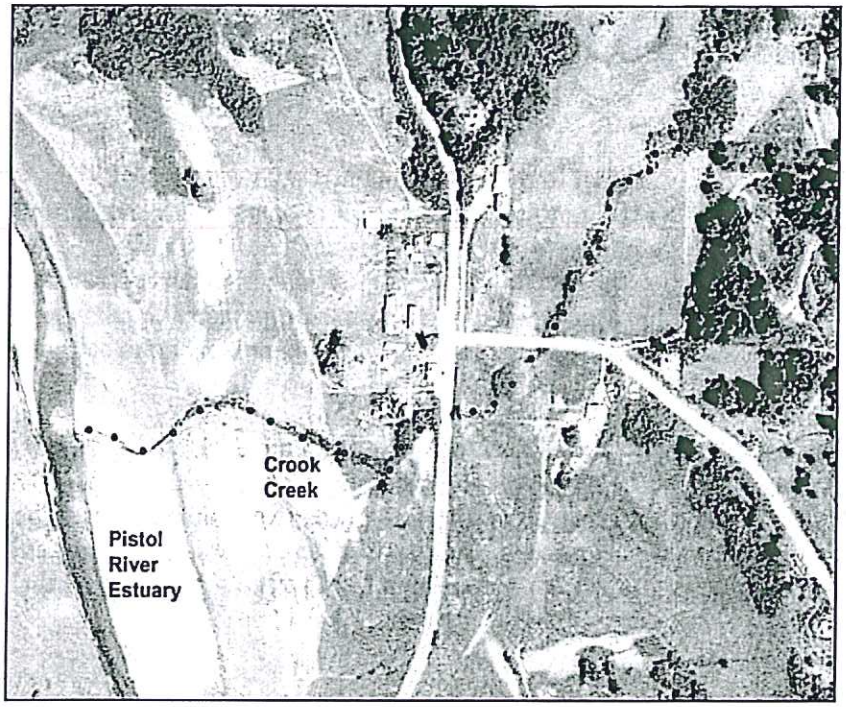

Figure 12-6. Photo of Crook Creek joining the Pistol River estuary. Convergence is at center left. The creek's channel is straightened and confined. It also lacks a functional riparian zone.

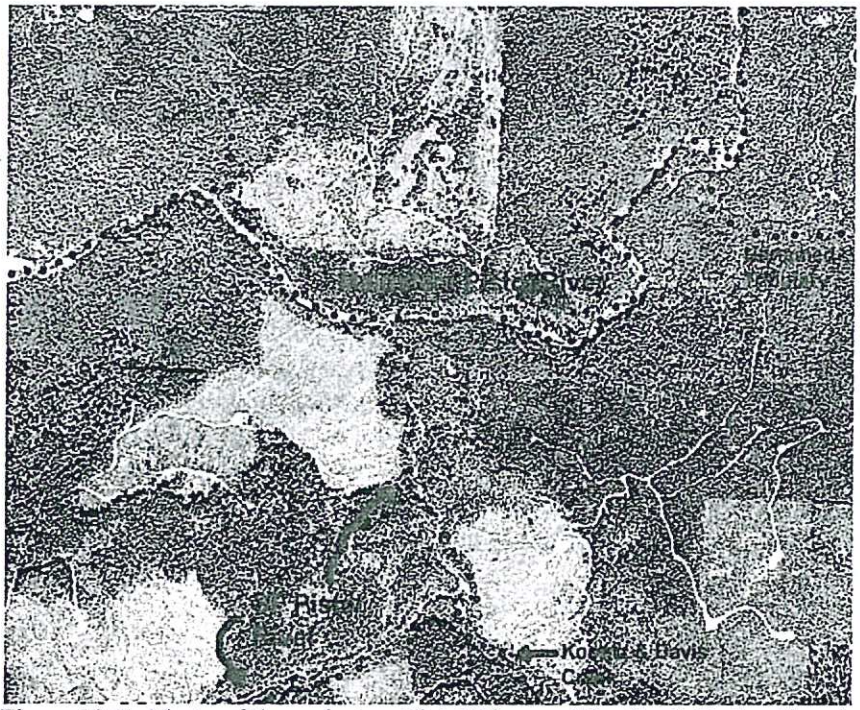

Figure 12-7. Photo of the mainstem Pistol River and the South Fork. Also shown is lower tributary Koontz and Davis Creek. Note extensive clear cuts and high road density.

Dams/Diversions

There are no known dams on the Pistol River. The Oregon Water Resources Department has a Pistol River instream water right of 15 cfs (Maguire 2001e). The sum of the diversion water rights in the Pistol River basin is 1.5 cfs, primarily for agricultural use, but only 0.1 cfs of this is senior to the instream right (Maguire 2001e). The effects of water diversions on coho salmon in the Pistol River basin are not well understood. Crook Creek, an important coho salmon tributary, loses surface flow at the downstream end of an agricultural area. However, the contribution of diversions to the dry creek condition is unknown A potentially significant contributor to the diminished flow in the Pistol River is the aggradation of the stream bed, with more flow now sub-surface.

Urbanization/Residential/Industrial Development

Both commercial and residential development is occurring in the sensitive lower river and estuary. This area once held some of the most productive coho salmon habitats.

High Severity Fire

High severity fires in this basin pose a medium threat to this coho salmon population. The Pistol River is very near the coast and has moderate air temperatures and high rainfall. Consequently, it should have naturally low fire risk; however, hot (100 °F) 35 mph east winds occur seasonally, which can cause extreme seasonal fire risk (Maguire 2001e). Large areas of the Pistol River basin are presently covered by even-aged plantations and hardwoods that elevate fire risk. Sudden oak death syndrome is known to occur in the adjacent North Fork Chetco basin (Oregon Department of Agriculture (ODA) 2008) and could become a significant contributor to increased fire risk if it causes mortality of tanoaks in the Pistol River basin.

Climate Change

There is low risk of average temperature increase over the next 50 years (Appendix B). Modeled regional average temperature shows a moderate increase over the next 50 years (Appendix B). Average temperature could increase by up to 1 °C in the summer and by a similar amount in the winter. The risk of sea level rise is also low (Appendix B, Thieler and Hammer-Klose 2000). Adults may be negatively impacted by climate-related ocean acidification, changes in ocean conditions, and prey availability (see Independent Science Advisory Board 2007, Feely et al. 2008, Portner and Knust 2007). Overall, climate change poses a medium threat to the population.

Mining/Gravel Extraction

Mining poses a low threat to the coho salmon population. Pistol River does not have geologic formations that bear gold and so was spared mining impacts that were experienced by interior basins of the Rogue River. Gravel mining can inhibit channel recovery by flattening the stream's profile upstream and downstream from the point of extraction. The Sixes River company gravel permit for operation in the Pistol River has expired and there is no prospect of gravel mining activity in the near future (Wheeler 2009).

Road-Stream Crossing Barriers

Road-stream crossing barriers pose a low threat to the coho salmon population. Although there are many road-stream crossings on private industrial timber lands in the western Pistol River basin, many are well above the range of coho salmon. Maguire (2001e) and the ODFW (2008e) fish passage database do not indicate that road-stream crossing barriers are a significant problem for coho salmon distribution in the Pistol River basin.

Hatcheries

Hatcheries pose a low threat to all life stages of coho salmon in the Pistol River population area. The rationale for these ratings is described under the "Adverse Hatchery-Related Effects" stress

Fishing and Collecting

Based on estimates of the fishing exploitation rate, as well as the status of the population relative to depensation and the status of NMFS approval for any scientific collection (Appendix B), these activities pose a low threat to juveniles, smolts, and adults.

12.7 Recovery Strategy

The most immediate need for habitat restoration and threat reduction in the Pistol River is in those areas currently occupied by coho salmon in mainstem Pistol River, Crook Creek, Deep Creek, North Fork Pistol River, South Fork Pistol River, and Koontz and Davis Creek. Unoccupied areas must also be restored to provide enough habitat for coho salmon recovery, and the places with the greatest chance of success are those with high IP, such as the lower mainstem Pistol River, the estuary, Crook Creek, Deep Creek, Scott Creek, and Farmer Creek.

The Pistol River population is considered dependent and therefore cannot be viable on its own; however, it is necessary to restore habitat within the basin so that it can support all life stages of coho salmon and provide connectivity between other populations in the ESU. The recovery criterion for this population is that 80% of available IP habitat must be occupied in years following spawning of brood years with high marine survival.

The most important factor limiting recovery of coho salmon in the Pistol River is a deficiency in the amount of suitable rearing habitat for juveniles. The processes that create and maintain such habitat must be restored by increasing habitat complexity within the channel, re-establishing off-channel rearing areas, restoring riparian forests, and reducing threats to instream habitat. The effects of fishing on this population's ability to meet its viability criteria should be evaluated.

Table 12-4 on the following page lists the recovery actions for the Pistol River population.

Table 12-4. Recovery action implementation schedule for the Pistol River population. Recovery actions for monitoring and research are listed in tables at the end of Chapter 5.

Action ID	Target	KLS/T	Strategy	Action Description	Area	Priority
Step ID	***Step Description***					
SONCC-PisR.19.3.3	Timber Harvest	Yes	Improve wood recruitment, bank stability, shading, and food subsidies	Improve timber harvest practices	All areas where coho salmon would benefit immediately	2b
SONCC-PisR.19.3.3.1	*Determine how to revise Oregon Forest Practice Rules so that they do not limit recovery of SONCC coho salmon and make appropriate revisions*					
SONCC-PisR.19.3.3.2	*Adopt rules for fish-bearing streams sufficient to protect both water quality and fish habitat*					
SONCC-PisR.19.3.3.3	*Adopt rules to increase protection of non-fish-bearing streams that address practices that adversely impact water quality and fish habitat*					
SONCC-PisR.19.3.3.4	*Ensure management measures for landslide prone areas include protection of water quality and fisheries habitat*					
SONCC-PisR.19.3.3.5	*Until more permanent regulatory mechanisms can be put in place, immediately adopt interim rules that increase protection for salmon habitat in forested areas, including increased natural recruitment of large wood on perennial and intermittent streams likely to deliver wood downstream, increased shade on all perennials, and protective buffers on small intermittent streams.*					
SONCC-PisR.19.3.40	Timber Harvest	Yes	Improve wood recruitment, bank stability, shading, and food subsidies	Improve timber harvest practices	Population wide	2c
SONCC-PisR.19.3.40.1	*Determine how to revise Oregon Forest Practice Rules so that they do not limit recovery of SONCC coho salmon and make appropriate revisions*					
SONCC-PisR.19.3.40.2	*Adopt rules for fish-bearing streams sufficient to protect both water quality and fish habitat*					
SONCC-PisR.19.3.40.3	*Adopt rules to increase protection of non-fish-bearing streams that address practices that adversely impact water quality and fish habitat*					
SONCC-PisR.19.3.40.4	*Ensure management measures for landslide prone areas include protection of water quality and fisheries habitat*					
SONCC-PisR.19.3.40.5	*Until more permanent regulatory mechanisms can be put in place, immediately adopt interim rules that increase protection for salmon habitat in forested areas, including increased natural recruitment of large wood on perennial and intermittent streams likely to deliver wood downstream, increased shade on all perennials, and protective buffers on small intermittent streams.*					
SONCC-PisR.2.2.6	Floodplain and Channel Structure	Yes	Reconnect the channel to the floodplain	Construct off channel habitats, alcoves, backwater habitat, and old stream oxbows	Lower mainstem, estuary, Crooks Creek, and all streams where coho salmon would benefit immediately	2b
SONCC-PisR.2.2.6.1	*Identify potential sites to create refugia habitats. Prioritize sites and determine best means to create rearing habitat*					
SONCC-PisR.2.2.6.2	*Implement restoration projects that improve off channel habitats to create refugia habitat, as guided by assessment results*					
SONCC-PisR.2.2.41	Floodplain and Channel Structure	Yes	Reconnect the channel to the floodplain	Construct off channel habitats, alcoves, backwater habitat, and old stream oxbows	Population wide	2c
SONCC-PisR.2.2.41.1	*Identify potential sites to create refugia habitats. Prioritize sites and determine best means to create rearing habitat*					
SONCC-PisR.2.2.41.2	*Implement restoration projects that improve off channel habitats to create refugia habitat, as guided by assessment results*					

Action ID	Target	KLS/T	Strategy	Action Description	Area	Priority
Step ID	*Step Description*					
SONCC-PisR.2.2.7	Floodplain and Channel Structure	Yes	Reconnect the channel to the floodplain	Increase beaver abundance	All streams where coho salmon would benefit immediately	2b
SONCC-PisR.2.2.7.1	*Develop a beaver conservation plan that includes education and outreach, technical assistance for land owners, and methods for reintroduction and/or relocation of beaver as a last resort*					
SONCC-PisR.2.2.7.2	*Implement education and technical assistance programs for landowners, guided by the plan*					
SONCC-PisR.2.2.7.3	*Reintroduce or relocate beaver if appropriate, guided by the plan*					
SONCC-PisR.2.2.42	Floodplain and Channel Structure	Yes	Reconnect the channel to the floodplain	Increase beaver abundance	Population wide	2c
SONCC-PisR.2.2.42.1	*Develop a beaver conservation plan that includes education and outreach, technical assistance for land owners, and methods for reintroduction and/or relocation of beaver as a last resort*					
SONCC-PisR.2.2.42.2	*Implement education and technical assistance programs for landowners, guided by the plan*					
SONCC-PisR.2.2.42.3	*Reintroduce or relocate beaver if appropriate, guided by the plan*					
SONCC-PisR.28.1.4	Roads	Yes	Reduce sediment delivery to streams	Reduce road-stream hydrologic connection	Population wide; prioritize upper South Fork Pistol River and Crook, Deep, Farmer, and Scott creeks	2b
SONCC-PisR.28.1.4.1	*Assess and prioritize road-stream connection, and identify appropriate treatments*					
SONCC-PisR.28.1.4.2	*Decommission roads, guided by assessment*					
SONCC-PisR.28.1.4.3	*Upgrade roads, guided by assessment*					
SONCC-PisR.28.1.4.4	*Maintain roads, guided by assessment*					
SONCC-PisR.12.1.26	Agricultural Practices	No	Improve agricultural practices	Improve regulatory mechanisms	Population wide	2b
SONCC-PisR.12.1.26.1	*Determine the best way to revise the Agricultural Water Quality Management Act (AWQMAP) so that it does not limit recovery of SONCC coho salmon and recommend appropriate revisions*					
SONCC-PisR.12.1.26.2	*Ensure basin rules are specific and linked to implementing AWQMAP recommendations, including developing specific standards for riparian buffers*					
SONCC-PisR.12.1.26.3	*Ensure that AWQMA plans address both impaired areas and proactive prevention of water quality impairment*					
SONCC-PisR.12.1.26.4	*Adopt interim buffers equal to the buffer standards NMFS is recommending in Washington state until the state establishes its own buffers*					
SONCC-PisR.12.1.26.5	*Develop a process in the AWQMA Program that tracks and evaluates implementation*					
SONCC-PisR.12.1.26.6	*Change the complaint-based compliance monitoring process to a focused compliance program*					

Action ID	Target	KLS/T	Strategy	Action Description	Area	Priority
Step ID	*Step Description*					
SONCC-PisR.7.1.22	Riparian	No	Improve wood recruitment, bank stability, shading, and food subsidies	Improve grazing practices	Private lands and all areas where coho salmon would benefit immediately	2b
SONCC-PisR.7.1.22.1	*Assess grazing contribution to sediment delivery, pollutants, and impaired riparian conditions*					
SONCC-PisR.7.1.22.2	*If problems are identified, develop and implement grazing management strategy that decreases delivery of sediment and pollutants to streams and improves riparian condition*					
SONCC-PisR.7.1.22.3	*Monitor effectiveness of grazing management to ensure grazing does not limit recovery of SONCC coho salmon*					
SONCC-PisR.7.1.45	Riparian	No	Improve wood recruitment, bank stability, shading, and food subsidies	Improve grazing practices	Population wide	2c
SONCC-PisR.7.1.45.1	*Assess grazing contribution to sediment delivery, pollutants, and impaired riparian conditions*					
SONCC-PisR.7.1.45.2	*If problems are identified, develop and implement grazing management strategy that decreases delivery of sediment and pollutants to streams and improves riparian condition*					
SONCC-PisR.7.1.45.3	*Monitor effectiveness of grazing management to ensure grazing does not limit recovery of SONCC coho salmon*					
SONCC-PisR.28.2.25	Roads	No	Reduce pollutants and stormflow	Increase regulatory oversight	Population wide	2b
SONCC-PisR.28.2.25.1	*Strengthen city and county ordinances to minimize new impervious surfaces and require treatment to current standards*					
SONCC-PisR.28.2.25.2	*Strengthen city and county ordinances to require treatment to current standards when existing impervious surfaces are expanded, reconditioned, reconstructed or replaced*					
SONCC-PisR.28.2.25.3	*Develop local regulatory mechanisms that limits development and reduces amount of total impervious area through incentives*					
SONCC-PisR.7.1.2	Riparian	Yes	Improve wood recruitment, bank stability, shading, and food subsidies	Improve long-range planning	Private land	2c
SONCC-PisR.7.1.2.1	*Review General Plan or County Ordinances to ensure coho salmon habitat needs are accounted for. Revise if necessary*					
SONCC-PisR.7.1.2.2	*Develop watershed-specific guidance for managing riparian vegetation. Consider larger riparian buffers in coho occupied habitat*					
SONCC-PisR.2.2.35	Floodplain and Channel Structure	No	Reconnect the channel to the floodplain	Improve regulatory mechanisms	Population wide	2c
SONCC-PisR.2.2.35.1	*Improve protective regulations for beaver and develop guidelines for relocation that are practical for restoration groups*					
SONCC-PisR.10.2.9	Water Quality	No	Reduce pollutants	Set standard	Population wide	2d
SONCC-PisR.10.2.9.1	*Develop TMDLs for water bodies listed under Clean Water Act Section 303(d)*					

Action ID	Target	KLS/T	Strategy	Action Description	Area	Priority
Step ID	*Step Description*					
SONCC-PisR.7.1.23	Riparian	No	Improve wood recruitment, bank stability, shading, and food subsidies	Improve grazing practices	Federal lands	3b
SONCC-PisR.7.1.23.1	*Monitor effects of livestock grazing on coho salmon habitat and adjust or discontinue grazing if effects of livestock grazing on salmon habitat are limiting coho recovery*					
SONCC-PisR.7.1.24	Riparian	No	Improve wood recruitment, bank stability, shading, and food subsidies	Increase regulatory oversight	County	3b
SONCC-PisR.7.1.24.1	*Strengthen city and county ordinances to limit development within the 100 year channel migration zone*					
SONCC-PisR.7.1.24.2	*Strengthen city and county ordinances to limit development within the 50 year flood elevation*					
SONCC-PisR.7.1.1	Riparian	Yes	Improve wood recruitment, bank stability, shading, and food subsidies	Increase conifer riparian vegetation	Federal forest lands	3c
SONCC-PisR.7.1.1.1	*Develop an appropriate timber harvest management plan for benefits to coho salmon habitat*					
SONCC-PisR.7.1.1.3	*Plant conifers, guided by the plan*					
SONCC-PisR.5.1.10	Passage	No	Improve access	Remove barriers	All streams where coho salmon would benefit immediately	3c
SONCC-PisR.5.1.10.1	*Use ODFW and SCWC fish passage barrier database to improve access based on known coho use or data identifying suitable habitat conditions above*					
SONCC-PisR.5.1.44	Passage	No	Improve access	Remove barriers	Population wide	3d
SONCC-PisR.5.1.44.1	*Use ODFW and SCWC fish passage barrier database to improve access based on known coho use or data identifying suitable habitat conditions above*					
SONCC-PisR.3.1.21	Hydrology	No	Improve flow timing or volume	Increase instream flows	All streams with ODFW water rights for fish and all streams where coho salmon would benefit immediately	3c
SONCC-PisR.3.1.21.1	*Secure adequate instream flows to fulfill ODFW water rights for fish*					
SONCC-PisR.3.1.43	Hydrology	No	Improve flow timing or volume	Increase instream flows	Population wide	3d
SONCC-PisR.3.1.43.1	*Secure adequate instream flows to fulfill ODFW water rights for fish*					

Action ID	Target	KLS/T	Strategy	Action Description	Area	Priority
Step ID	*Step Description*					
SONCC-PisR.10.2.19	Water Quality	No	Reduce pollutants	Reduce pesticides	All areas where coho salmon would benefit immediately	3c
SONCC-PisR.10.2.19.1	*Develop a pesticide management plan*					
SONCC-PisR.10.2.19.2	*Implement pesticide management plan and technical assistance program*					
SONCC-PisR.10.2.38	Water Quality	No	Reduce pollutants	Reduce pesticides	Population wide	3d
SONCC-PisR.10.2.38.1	*Develop a pesticide management plan*					
SONCC-PisR.10.2.38.2	*Implement pesticide management plan and technical assistance program*					
SONCC-PisR.10.7.37	Water Quality	No	Restore nutrients	Add marine-derived nutrients to streams	Population wide	3c
SONCC-PisR.10.7.37.1	*Develop a plan to supply appropriate amounts of marine-derived nutrients to streams (e.g. carcass placement, pellet dispersal)*					
SONCC-PisR.10.7.37.2	*Supply marine-derived nutrients to streams guided by the plan*					
SONCC-PisR.10.7.39	Water Quality	No	Restore nutrients	Add marine-derived nutrients to streams	Population wide	3d
SONCC-PisR.10.7.39.1	*Develop a plan to supply appropriate amounts of marine-derived nutrients to streams (e.g. carcass placement, pellet dispersal)*					
SONCC-PisR.10.7.39.2	*Supply marine-derived nutrients to streams guided by the plan*					
SONCC-PisR.3.1.12	Hydrology	No	Improve flow timing or volume	Educate stakeholders	Population wide	3d
SONCC-PisR.3.1.12.1	*Develop an educational program about water conservation programs and instream leasing programs*					
SONCC-PisR.10.2.8	Water Quality	No	Reduce pollutants	Educate stakeholders	Lower mainstem, estuary, and Crooks Creek	3d
SONCC-PisR.10.2.8.1	*Develop an educational program that teaches landowners about avoiding pollution from septic systems, backyard pesticides, fuels, and nutrients*					
SONCC-PisR.10.2.20	Water Quality	No	Reduce pollutants	Increase regulatory oversight	Population wide	3d
SONCC-PisR.10.2.20.1	*Increase application of Low Impact Development (LID) techniques through education and incentives*					
SONCC-PisR.10.2.20.2	*Incorporate LID in Clean Water Act permits for projects that result in stormwater discharge*					

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Map points:: NoName

Polygon: **Parcel B downstream**
Area: **11,714 sq yd**

Point	Latitude	Longitude	Distance to next	Azimuth	Angle	Altitude
n. 0	42.26634826	-124.39513473	271.9 ft	---	---	11.1 ft
n. 1	42.26676724	-124.39596605	292.4 ft	304.2°	174.8°	9.7 ft
n. 2	42.26727583	-124.39680137	297.3 ft	309.3°	162.3°	17.8 ft
n. 3	42.26796017	-124.39739900	292.2 ft	327.0°	134.4°	18.4 ft
n. 4	42.26874243	-124.39716210	334.7 ft	12.7°	36.8°	9.9 ft
n. 5	42.26790385	-124.39665751	287.3 ft	155.9°	197.3°	9.7 ft
n. 6	42.26731216	-124.39595612	232.3 ft	138.6°	148.6°	11.8 ft
n. 7	42.26668428	-124.39580782	219.5 ft	170.0°	226.1°	9.6 ft
n. 8	42.26634826	-124.39513473	---	123.9°	---	11.1 ft

Polygon: **Upstream parcel**
Area: **30,899 sq yd**

Point	Latitude	Longitude	Distance to next	Azimuth	Angle	Altitude
n. 0	42.26427377	-124.38989628	278.9 ft	---	---	12.3 ft
n. 1	42.26396207	-124.39083744	301.2 ft	246.0°	151.4°	9.8 ft
n. 2	42.26402853	-124.39194640	313.7 ft	274.6°	172.2°	19.4 ft
n. 3	42.26421373	-124.39307798	282.3 ft	282.4°	154.9°	18.4 ft
n. 4	42.26468526	-124.39390546	288.9 ft	307.5°	155.8°	18.0 ft
n. 5	42.26538304	-124.39441207	144.5 ft	331.7°	93.0°	7.7 ft
n. 6	42.26558903	-124.39395590	290.2 ft	58.7°	113.4°	9.7 ft
n. 7	42.26512907	-124.39308094	288.7 ft	125.3°	181.7°	8.2 ft
n. 8	42.26469135	-124.39219202	299.7 ft	123.5°	208.0°	8.1 ft
n. 9	42.26461248	-124.39109014	142.0 ft	95.5°	172.5°	13.7 ft
n. 10	42.26452487	-124.39057908	206.2 ft	103.0°	166.7°	15.2 ft
n. 11	42.26427377	-124.38989628	---	116.3°	---	12.3 ft

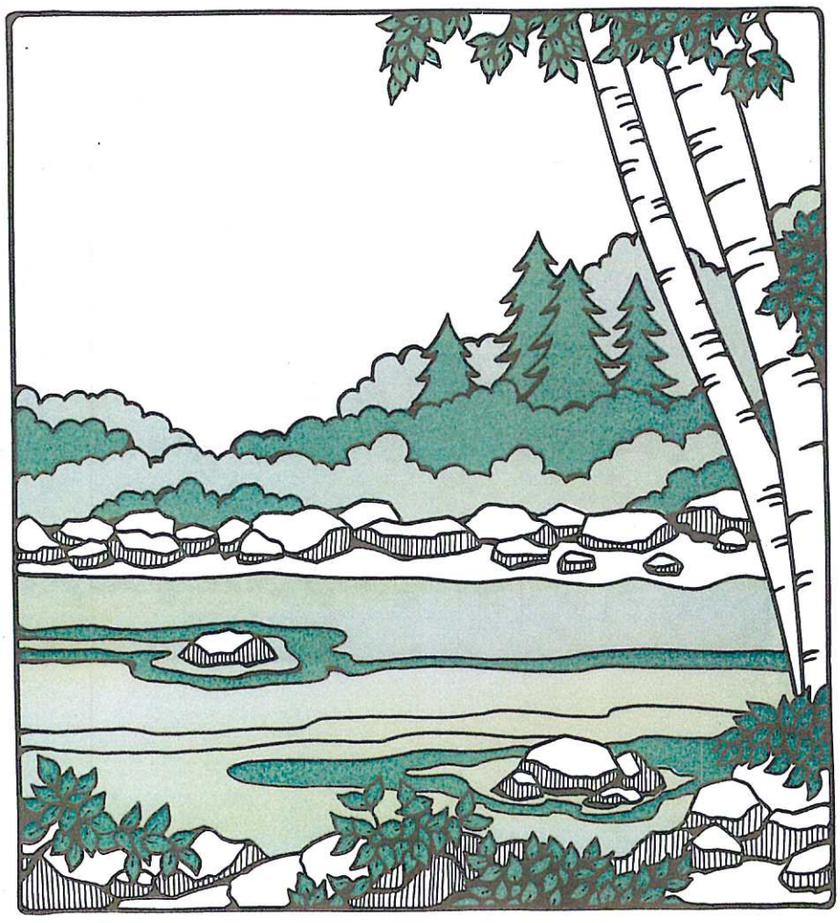
Funds from the Oregon State Lottery, provided through the Watershed Health Program, supported printing this publication. The United States Forest Service, Siskiyou National Forest, provided additional funding.

The Oregon Department of Fish and Wildlife Salmon and Trout Enhancement Program (STEP) developed this publication.

This publication and artwork are adapted with permission from *Stream Care*, Salmonid Enhancement Program, Fisheries and Oceans Canada, #400 - 555 West Hastings Street, Vancouver, B.C. V6B 5G3

STREAM CARE

Protecting and Enhancing Stream Habitat



Hints for Landowners

- ☞ Why should we take care of our streams?
- ☞ What are some stream care guidelines?
- ☞ What is being done?
- ☞ What can you do?
- ☞ Who can you contact?

What can you do?

- ✔ Be informed.
- ✔ Follow the stream care guidelines.
- ✔ Be observant. If you see anyone damaging a stream, please call the nearest appropriate regulatory agency (see examples below).

Observation	Responsible Oregon Agencies
Illegal withdrawal or wasteful use of water	Department of Water Resources
Forest practices which remove streamside vegetation	Department of Forestry
Agriculture practices resulting in pollution	Department of Agriculture
Illegal fill or removal	Division of State Lands
Water pollution	Department of Environmental Quality
Pollution from confined animal feedlot	Department of Agriculture
Fish kills resulting from pollution	Department of Fish and Wildlife
☛ To report violations on weekends or after hours	Oregon Emergency Response (Salem) Phone: 1-800-452-0311

Get directly involved in stream care by developing or participating in a stream enhancement project. These projects are generally supervised through the Department of Fish and Wildlife's Salmon-Trout Enhancement Program (STEP) or other habitat improvement programs. Contact the nearest office of the Oregon Department of Fish and Wildlife for more information. Examples of projects include: repairing stream beds, planting streamside vegetation, or restoring fish passage. Don't forget to review state laws and follow permit approval processes prior to working on any stream.

You can also participate in the Oregon Department of Fish and Wildlife's Riparian Tax Incentive Program, Storm Drain Marking Program, or Naturescaping. Contact the nearest Oregon Department of Fish and Wildlife office for more information.

What is being done about stream care?

It is important to tell people about our streams and how to help protect them.

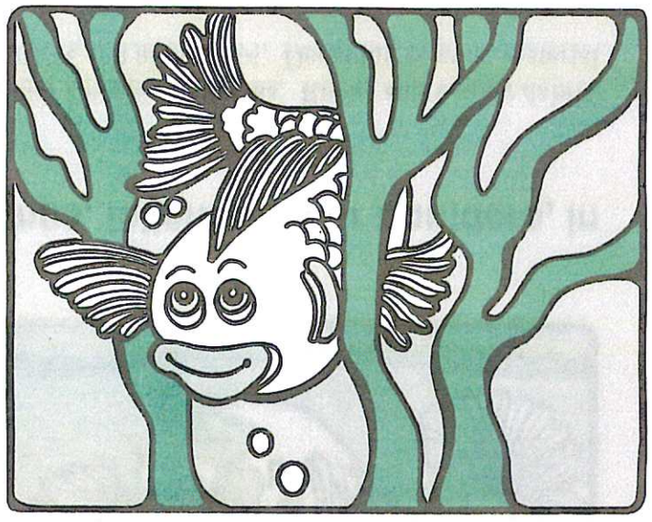
At the same time, laws and rules protect streams and natural habitat from willful or negligent damage and destruction.

Proposed activities that may affect fish habitat, such as altering the stream channel or streamside areas, are reviewed by various agencies which may include the Oregon Department of Fish and Wildlife, Oregon Division of State Lands, U. S. Army Corps of Engineers, county planning departments, or the Oregon Department of Forestry.

Under Oregon law, any activity that proposes the removal, filling or alteration of more than 50 cubic yards of material within the bed or banks of the waters of the State of Oregon requires a permit from the Oregon Division of State Lands. In many cases, an additional permit is also required from the U. S. Army Corps of Engineers. Typical examples of projects requiring permits include gravel removal, dredging, gold mining, streambank protection, land reclamation, channel alteration or relocation, pipeline crossings and construction of irrigation diversions.

Some cities and counties have laws which further restrict changes to local streams, watercourses and streamside vegetation. Contact your city or county planning department for information on local ordinance requirements.

Why should we take care of our streams?



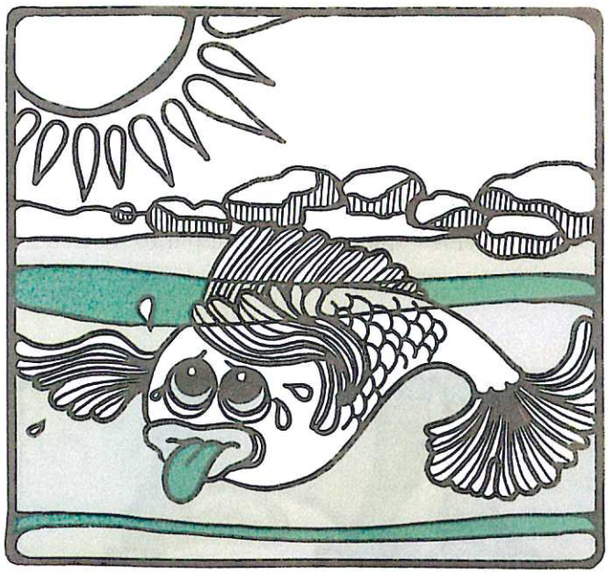
Streams provide living, feeding and spawning areas for fish. A healthy stream for salmonids (salmon, trout and steelhead) and nongame species (dace, sculpins, suckers, etc.) has many different characteristics. Although young fish may not use the same areas as spawning fish, all salmonids need an adequate flow of clean, cool water.

A stream suitable for rearing young fish should have a variety of habitats that provide protective cover (pools, woody debris, boulders, overhanging trees and brush), moderate summer temperatures, and plenty of insects for food. A good spawning stream should have spawning gravel with free-flowing, silt-free water.

Unfortunately, streams are easily and often seriously damaged. Sometimes, the damage is caused by careless or inappropriate agriculture, logging, or mining practices, or by poorly-planned urban and industrial growth and the pollution that accompanies it. As a landowner along a stream, many of these factors are beyond your control. But you might be surprised by how many you CAN control. This guide will help you do just that!

What are some stream care guidelines?

Leave natural streamside vegetation alone.

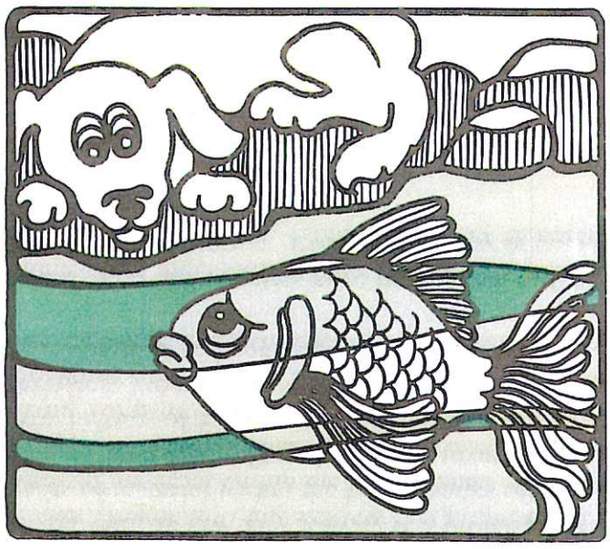


Trees and shrubs provide shade for the stream. This helps to keep the water cool. The roots of these plants also strengthen stream banks and reduce soil erosion. Leaves falling into streams provide food for aquatic insects, which in turn become food for fish.

Many cities and counties in Oregon have "set-back" rules that make it illegal to remove vegetation or build structures within a certain distance of a stream. The Forest Practices Act also governs commercial harvest of streamside vegetation on private forest lands.

Leave natural debris, such as stumps, fallen trees or boulders, in the stream.

These materials offer additional habitat for fish and other aquatic organisms. Rocks and woody debris provide hiding areas where fish seek refuge from predators and high flows. Decaying organic material also provides a food source for aquatic insects.



A water right is needed to remove water from a stream.

Water in streams belongs to the State of Oregon, not to the landowners along streams. For most purposes, it is unlawful to remove water from a stream without first obtaining an approved water right. Landowners with water rights should use water as efficiently as possible to avoid waste. Illegally removing water from a stream can reduce fish habitat or cause the stream to dry up. Unscreened diversions and pumping stations kill fish, and diversion dams can be fish passage barriers. Contact the Oregon Department of Water Resources for information about water rights and the Oregon Department of Fish and Wildlife for information about fish screening and passage.

Apply stream care guidelines to all streams even if they only flow for portions of the year.

Many people think that fish do not use streams that dry-up during the summer. Some species use these streams for spawning, rearing, and feeding sites while water is available and then migrate out as flow drops. These streams also affect the quality of downstream areas and need the same protection as those that flow year-round.

Avoid disturbing erodable soils (soils that can be washed away) especially during the wet, rainy season.

Stream banks can be easily damaged during rainy seasons. Heavy rainfall can soften stream banks, washing mud and soil into the stream.

Be careful when clearing land or building near streams.

Equipment activity in or around the stream can ruin spawning gravel, destroy fish habitat, and damage stream banks.

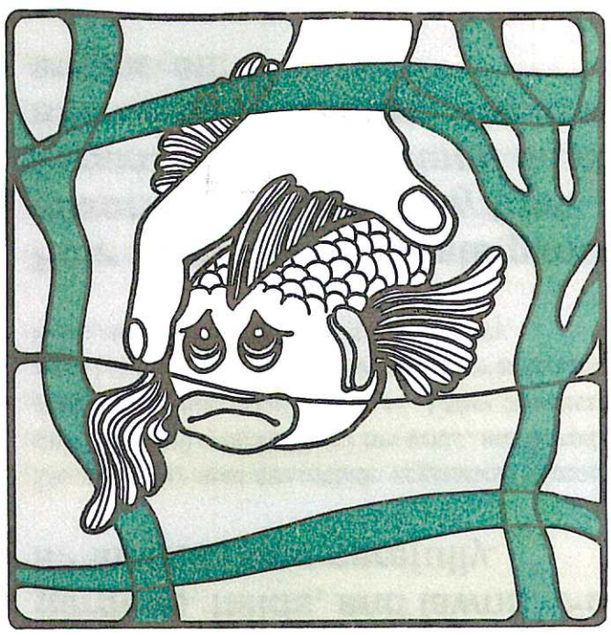
Stabilize disturbed streambanks. Replace damaged or destroyed streamside vegetation as soon as possible. Fish depend on it for food and shelter. When streamside cover is removed, the water temperature rises because it is no longer shaded. Warm water causes poor health and disease in fish.

Avoid redirecting the stream's flow or making changes to the stream channel.

Disturbing, covering, or removing streambed material destroys spawning, rearing or food-producing areas. Fish could become stranded in an isolated pool if the stream's flow is changed. A permit from the Oregon Division of State Lands or the U. S. Army Corps of Engineers may be required to fill or remove material from a stream. Consult these agencies before doing any instream work.

Avoid damming up streams.

Most fish move from one part of the stream to another to reach spawning, rearing and feeding areas. Dams used to create swimming holes or divert water for irrigation are barriers to fish movement. It is against Oregon law to build any structure that prevents or does not provide for fish passage.



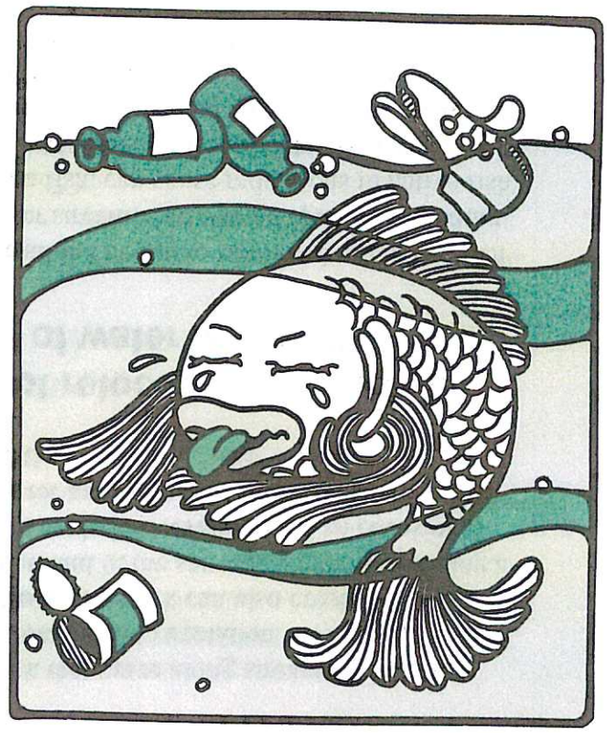
Reduce the impacts of livestock on streams.

Livestock that graze along stream banks often destroy streamside vegetation. When walking in streambeds, livestock can also crush fish eggs that have been laid in the spawning gravel. Fencing a stream to exclude livestock, with an occasional opening for animals to get water, will reduce the damage these animals cause.

Do not relocate fish from one body of water to another.

It is illegal in Oregon to catch and move live fish to another stream. Introduced species, including aquarium fish, can cause reductions in native fish populations through disease, interbreeding, and competition for food and space. Illegal introductions of predatory fish can also reduce the number of other fish species living in a stream.

Use chemicals sparingly on gardens, fields, and lawns. Follow all instructions carefully.



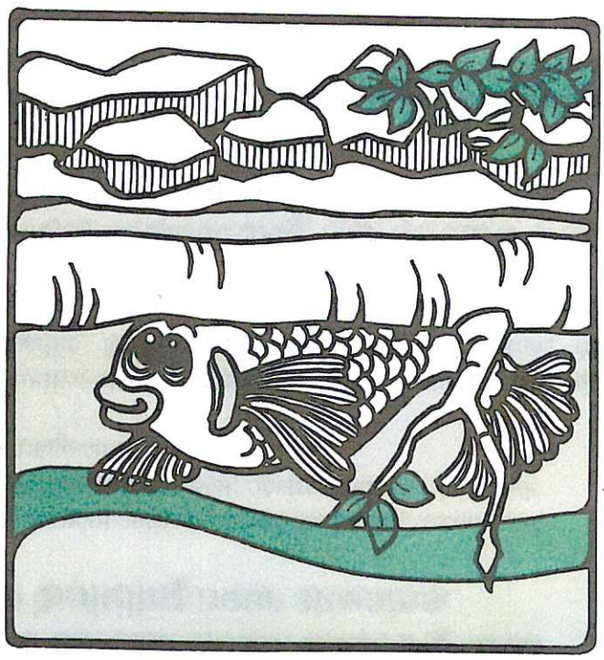
Do not spray near streamside vegetation. Some chemicals (bug and weed killers) are toxic, and harmful to people, fish and aquatic insects. Other chemicals (fertilizers) can make algae and weeds grow in streams and lakes, and disturb the fish's food supply.

Pour soapsuds and detergents onto absorbent ground away from streams, not down storm drains or into roadside ditches. Recycle engine oil.

When you wash the waste-water containing these substances down storm drains, it enters the streams untreated and pollutes the water. Contact your local public works office for details about proper disposal of household, garden and automotive chemicals.

Remove garbage from the stream area.

Unlike natural debris (boulders, fallen trees, etc.) human litter in the stream can ruin the water and may be toxic to the fish and wildlife that use it. The beauty of a stream is spoiled by throwing unwanted articles into it. Compost yard debris rather than disposing of it on streambanks or in streams.



Plant vegetation on the sides of a stream to stabilize its banks.

Plants with spreading roots knit the soil together, strengthening the banks and preventing them from being washed away during floods. Shrubs and bushes, conifers such as fir and cedar trees, alder trees, and willows provide good root systems for this purpose, and can be planted on the banks. Trees also provide critical woody debris when they fall into the stream.

Prevent muddy runoff water from construction, agricultural, or other developed sites from entering the stream.

Brown water full of sediment can smother fish eggs which are incubating in the gravel. Also, fish food organisms (like insects) will be buried and then fish may go hungry. Sediments can damage the gills of fish and suffocate them.