

## **Appendix 3-B**

### **Fisheries Information for Upper Elk River**

The following sections provide some background information on the summaries of observations of salmonids and the location and condition of salmonid habitat within the Elk River watershed.

#### **Salmonid Observations**

While there has been no comprehensive salmonid population monitoring program in Elk River (as is occurring in the adjacent Freshwater Creek), numerous fisheries surveys have been conducted in the Elk River. Electroshocking, carcass, and redd surveys have been conducted by Palco, the Institute for River Ecosystems, Natural Resources Management, and CDFG (HBWAC, 2005). Trend analysis is difficult because the surveys have varied in timing and effort, along with relatively short (temporal) monitoring duration. However, the survey results do provide usable absence/presence data. Fish spawner surveys have been conducted in North and South Fork Elk River by CDFG as early as the 1950s. Compiled below are the total numbers of coho, Chinook, and steelhead carcasses and redds as observed during spawner surveys from 1986 to 2003. It must be noted that surveys conducted in the same year may double count fish because the same sites may have been surveyed within short periods of time. There is no appropriate level of interpretation included with this information due to the incongruent nature of its collection. Fish trend monitoring is complicated by the cyclic flux of salmonid populations.

The CDFG North Coast Watershed Improvement Center has conducted fisheries inventory stream surveys in numerous tributaries to Elk River. These surveys document the recent extent of these beneficial uses (spawning, rearing, migration, etc). Appendix C contains summaries of the fish and habitat surveys conducted in these Elk River tributaries. Regional Water Board staff summarized these data by hydrologic year (HY) and species for North Fork and South Fork Elk River. These data are presented in the eight charts of Figure 1.

While stream surveys were only conducted in recent years, limited anecdotal and written accounts exist describing Elk River fisheries over a greater time period. These accounts indicate that the Elk River fisheries were abundant.

The importance of estuaries to salmonids is described by Miller and Sado (2003):

“For salmonids other than coho salmon, faster growth in the estuary and larger size at ocean entrance has been shown to account for higher marine survival (Reimers 1973; Macdonald et al. 1988; Levings et al. 1989; Solazzi et al. 1991; Northcote 1997; Percy 1997; Trotter 1997). These survival benefits to coho salmon have largely been inferred from these studies, but coho salmon have substantially different life histories and estuary use patterns.”

In the adjacent Freshwater Creek, studies by CDFG suggest that coho rearing in the stream-estuary ecotone (and therefore larger in size than stream reared coho) have higher marine survival than stream reared coho.

A recent effort by CDFG to sample the utilization of different portions of the Humboldt Bay estuary has offered insight into overwinter utilization of smaller streams by coho. In a Martin Slough field note dated April 7, 2009, Mike Wallace, Fisheries Biologist for CDFG states:

“It appears a large number of juvenile coho reared throughout the winter in Martin Slough. This project has observed the arrival of smaller “stream-rearing” coho to the freshwater-estuary ecotone in Martin Slough and other Humboldt Bay tributaries in past years. The recapture of another juvenile coho originally tagged in Elk River Slough (now a total of five this year) is further evidence that juvenile coho throughout the Humboldt Bay watershed redistribute themselves, primarily downstream, to over-winter in low gradient habitat in the freshwater-estuary ecotone ringing Humboldt Bay. This “fall redistribution” of coho salmon searching for winter habitat has been observed by other researchers throughout the Pacific Northwest including the Klamath River basin. Continued studies of life history strategies of juvenile salmonids in Humboldt Bay tributaries appear to have relevance throughout a large portion of their range and may be representative of other watersheds in California and beyond.

We continued to capture juvenile coho in the east tributary again this month after they were absent throughout the summer and fall. This strongly suggests that they probably use this small stream only for over-winter habitat and as a refuge from high flows. We will continue to sample the east tributary throughout the rest of the year to determine their rearing patterns in this tributary. This small tributary is an example of seasonally important habitat for coho that might be overlooked during summer surveys. Seasonally flowing streams, ponds, and wetlands appear to provide temporary but important rearing opportunities for juvenile salmonids in the Humboldt Bay watershed.”

Results from the recent sampling efforts are shown in Figures 2- 4.

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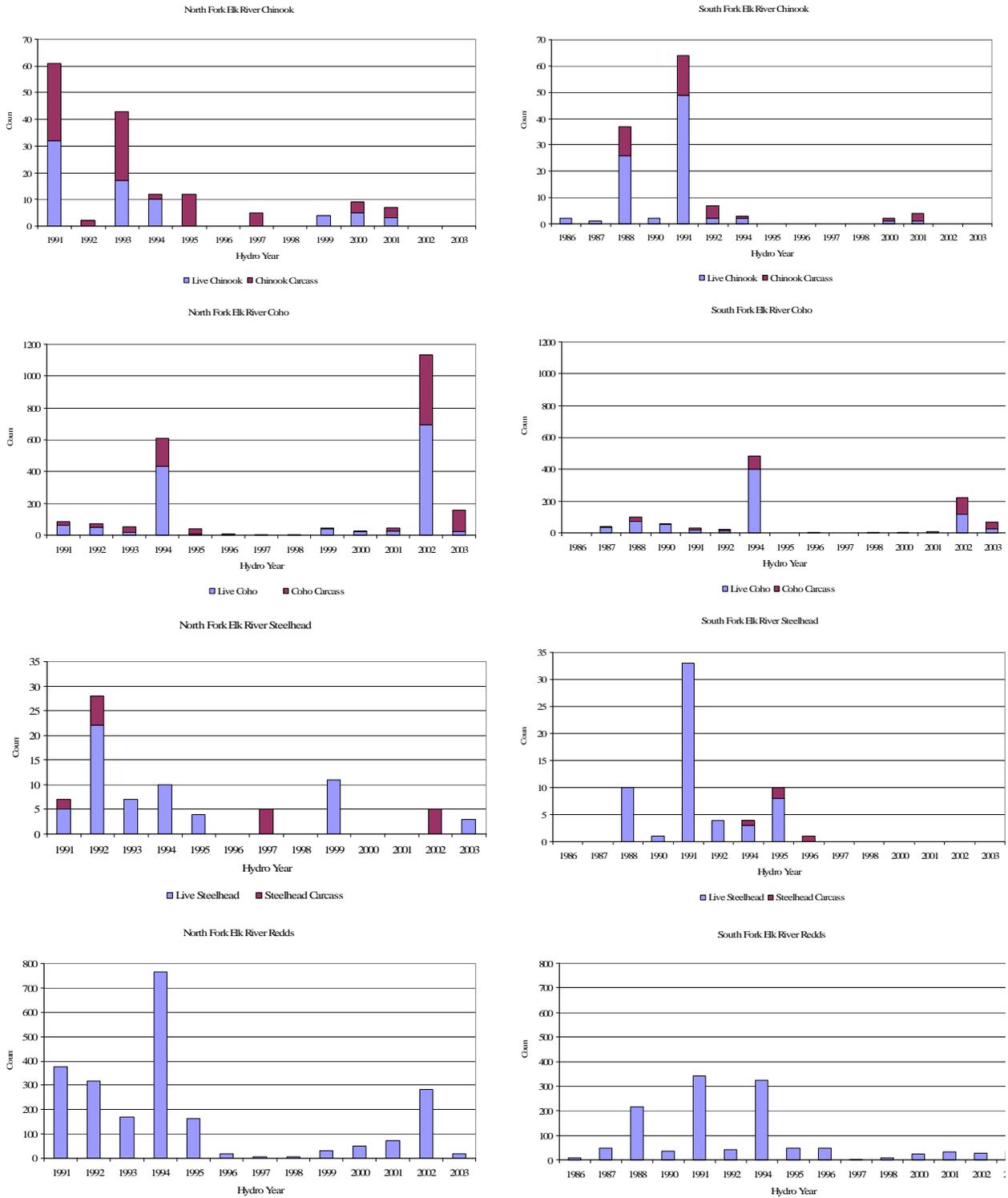
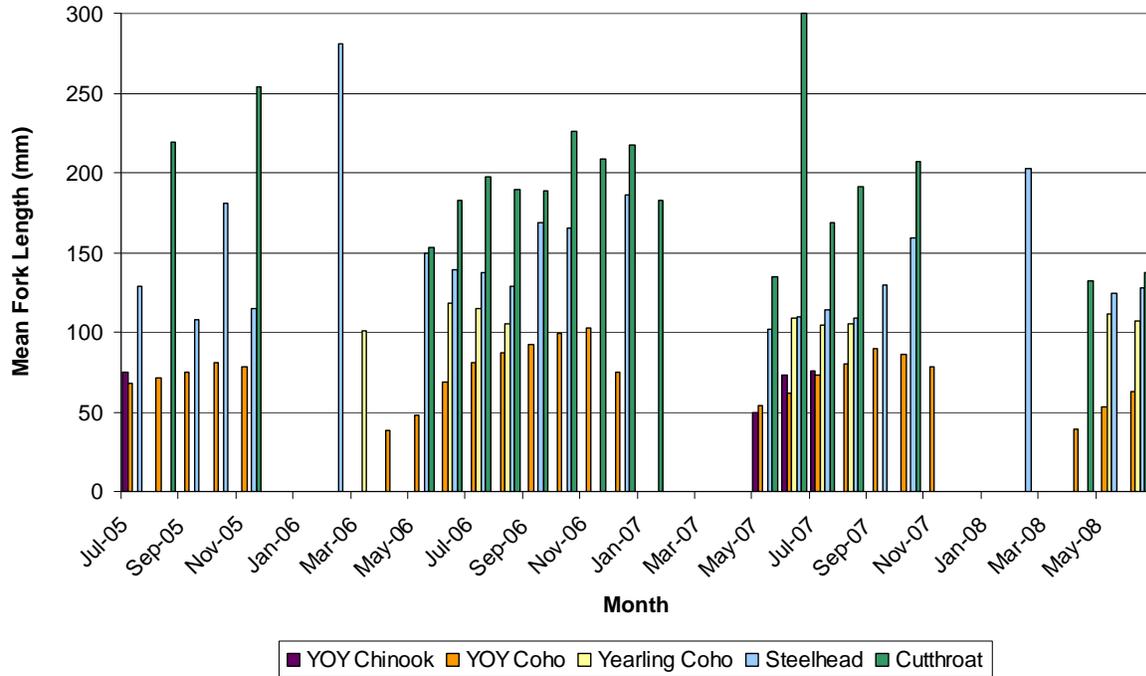
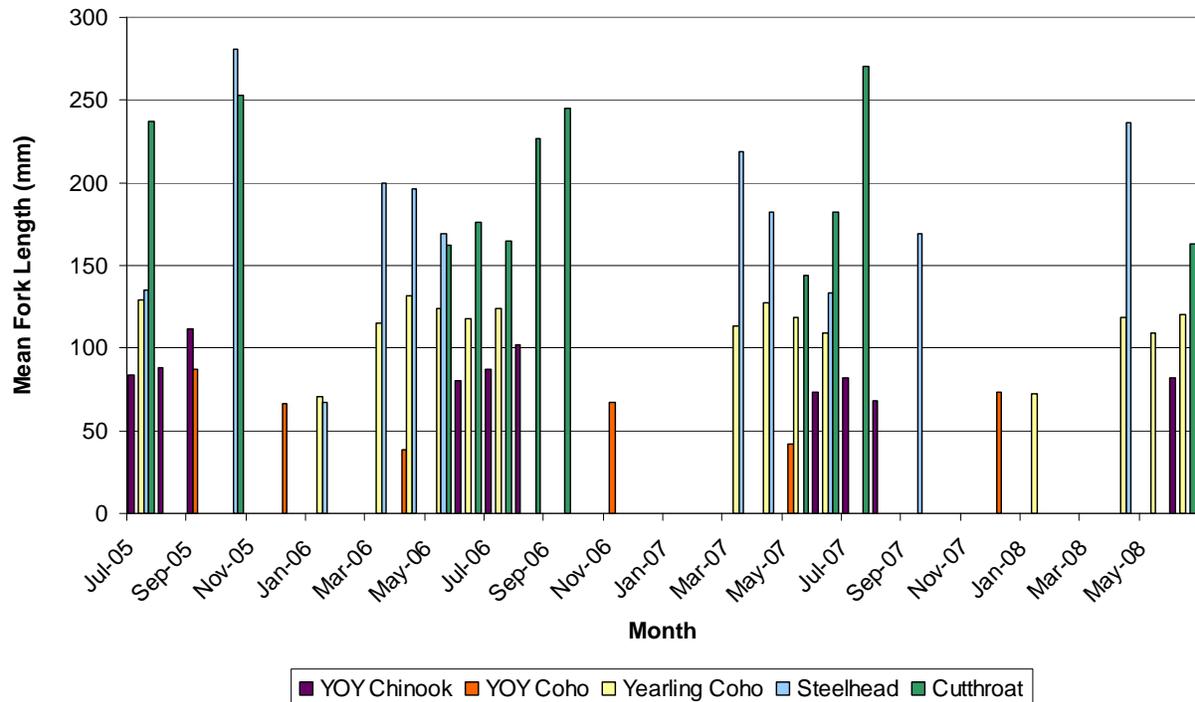


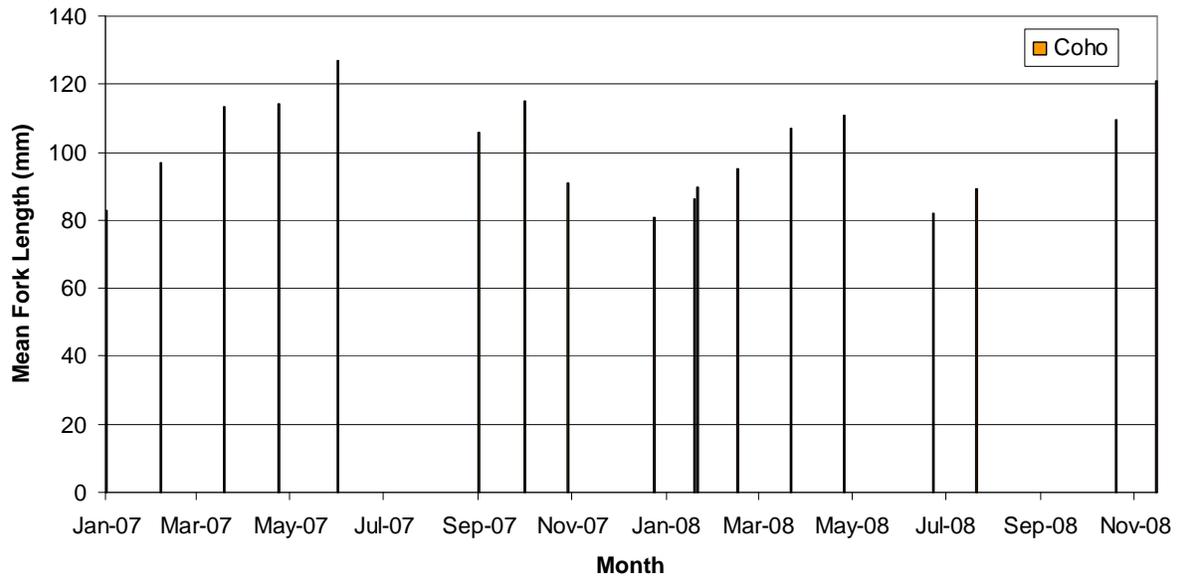
Figure 1. North Fork and South Fork carcass and redd survey results, 1986-2003.



**Figure 2. Monthly mean fork length (in millimeters) of young of the year (yoy) Chinook salmon, yoy coho salmon, yearling and older coho salmon, juvenile steelhead trout, and cutthroat trout in the Upper Elk River Slough. (Data collected and provided by Mike Wallace of CDFG).**



**Figure 3. Monthly mean fork length (in millimeters) of young of the year (yoy) Chinook salmon, yoy coho salmon, yearling and older coho salmon, juvenile steelhead trout, and cutthroat trout in the Lower Elk River Slough. (Data collected and provided by Mike Wallace of CDFG).**



**Figure 4. Monthly mean fork length (in millimeters) of all captured coho salmon in the Martin Slough. (Data are preliminary and were collected and provided by Mike Wallace of CDFG).**

The coho captured in Martin Slough are among the largest from estuaries and sloughs around the bay. This sampling effort highlights the importance of enhancing these types of habitat fisheries.

### Salmonid Habitat Location and Habitat Conditions

Elk River is included in the Eureka Plain Hydrologic Unit according to both the Basin Plan and CDFG’s *Coho Recovery Plan* (2004). Figure 5 shows the coho salmon distribution in the Eureka Plain. When population, risk, and watershed conditions are considered, CDFG identifies the Eureka Plain as having a “high” restoration and management potential (5 on a scale of 1-5). CDFG (2004) identified impairments in the Humboldt Bay watershed including high instream sediment levels, stream channel aggradation and widening, lack of stream habitat structure (i.e., deep pools), high water temperatures, and loss of functioning estuary habitat. Observers have seen changes in the occurrence and magnitude of flooding and in the fish-community structure, such as avoidance of degraded tributaries by spawning adults. Simplification of the stream channels has decreased the quantity and quality of aquatic habitat. Human-made obstructions to upstream and downstream migration frequently restrict access of adult and juvenile salmonids to spawning and rearing habitat. Culverts and tide gates have been identified as fish passage barriers.

Figure 6 shows coho distribution and intrinsic potential as described by NOAA’s Coho recovery plan (NOAA, 2012)

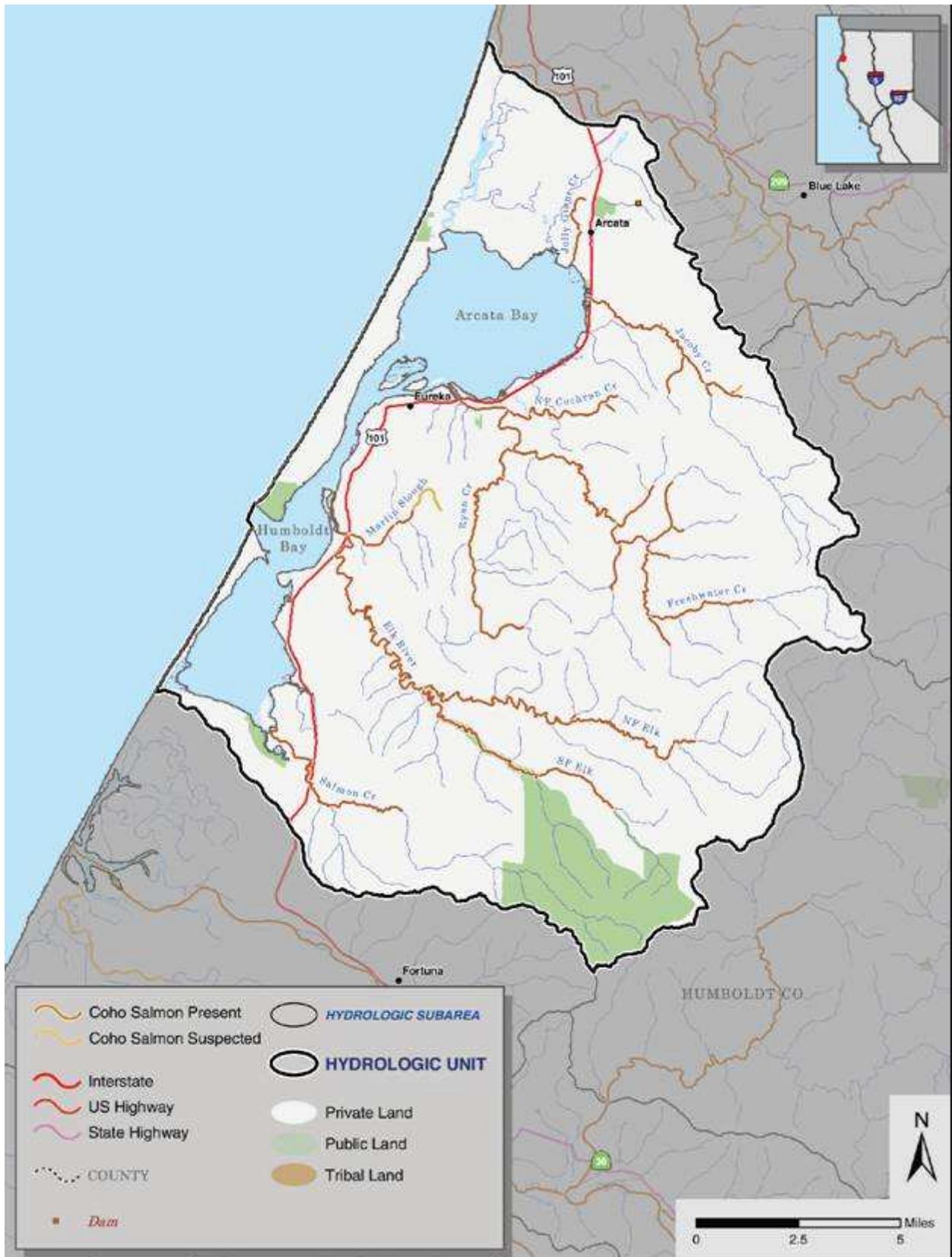


Figure 5. Coho salmon distribution in the Eureka Plain (CDFG, 2004).

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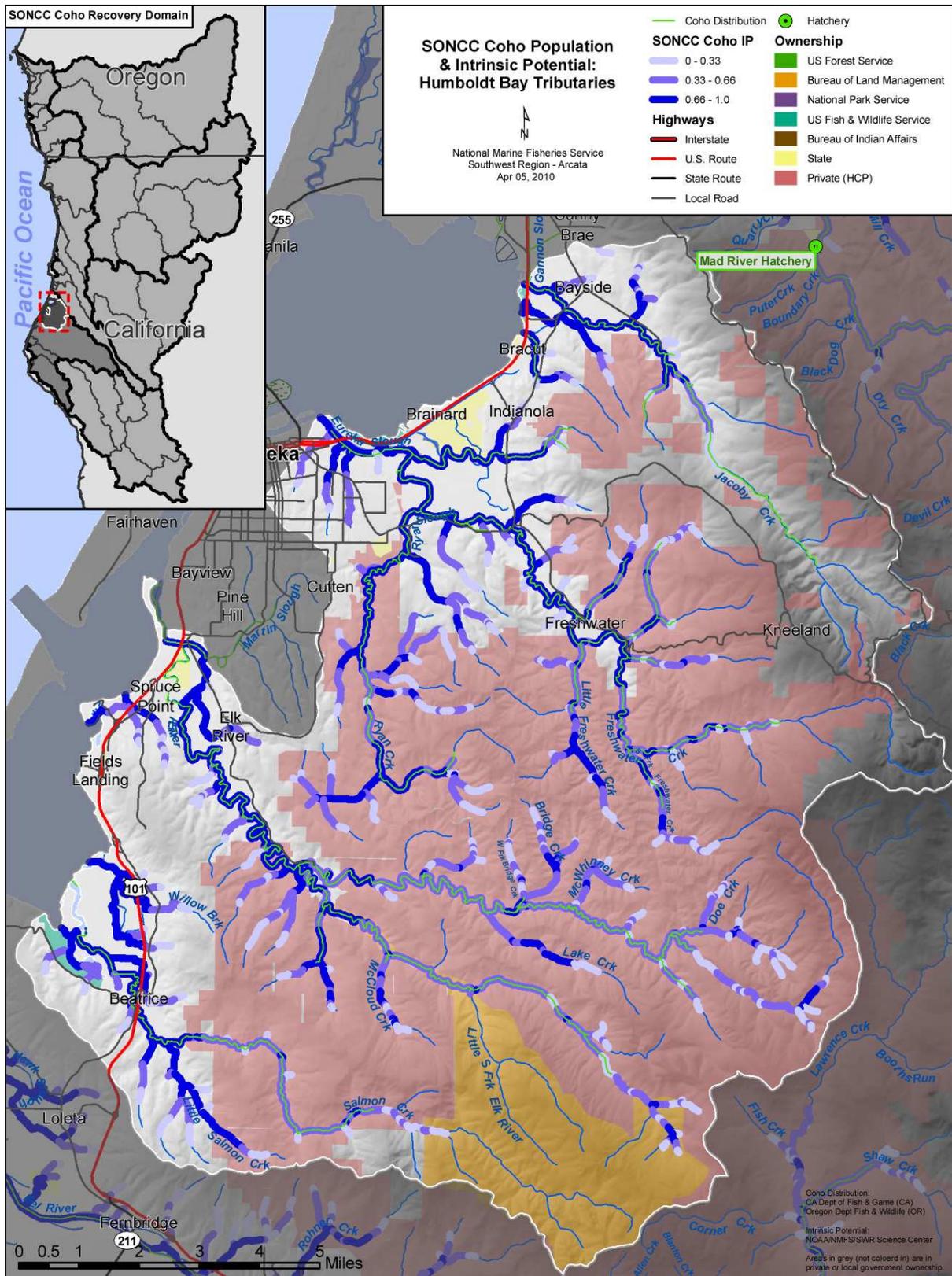


Figure 6 Coho distribution and intrinsic potential as described by NOAA's Coho recovery plan (NOAA, 2012)

Significant recent effort has gone into identifying and designing tide gates that have a muted tidal signal and allow for fish passage. A tide Gate on Martin Slough is slated for replacement in an effort lead by Redwood Community Action Agency.

Culverts that act as fish passage barriers are to be identified by timber companies as part of timber harvest plan preparation. However, there is not a comprehensive program by which barriers are identified on other private lands. Associated with the Elk River and Salmon Creek Watershed Analysis (Palco, 2004) Palco and Hart Crowser mapped current fish distribution in the Elk River watershed, including identification of potential barriers to migration (Figure 7).

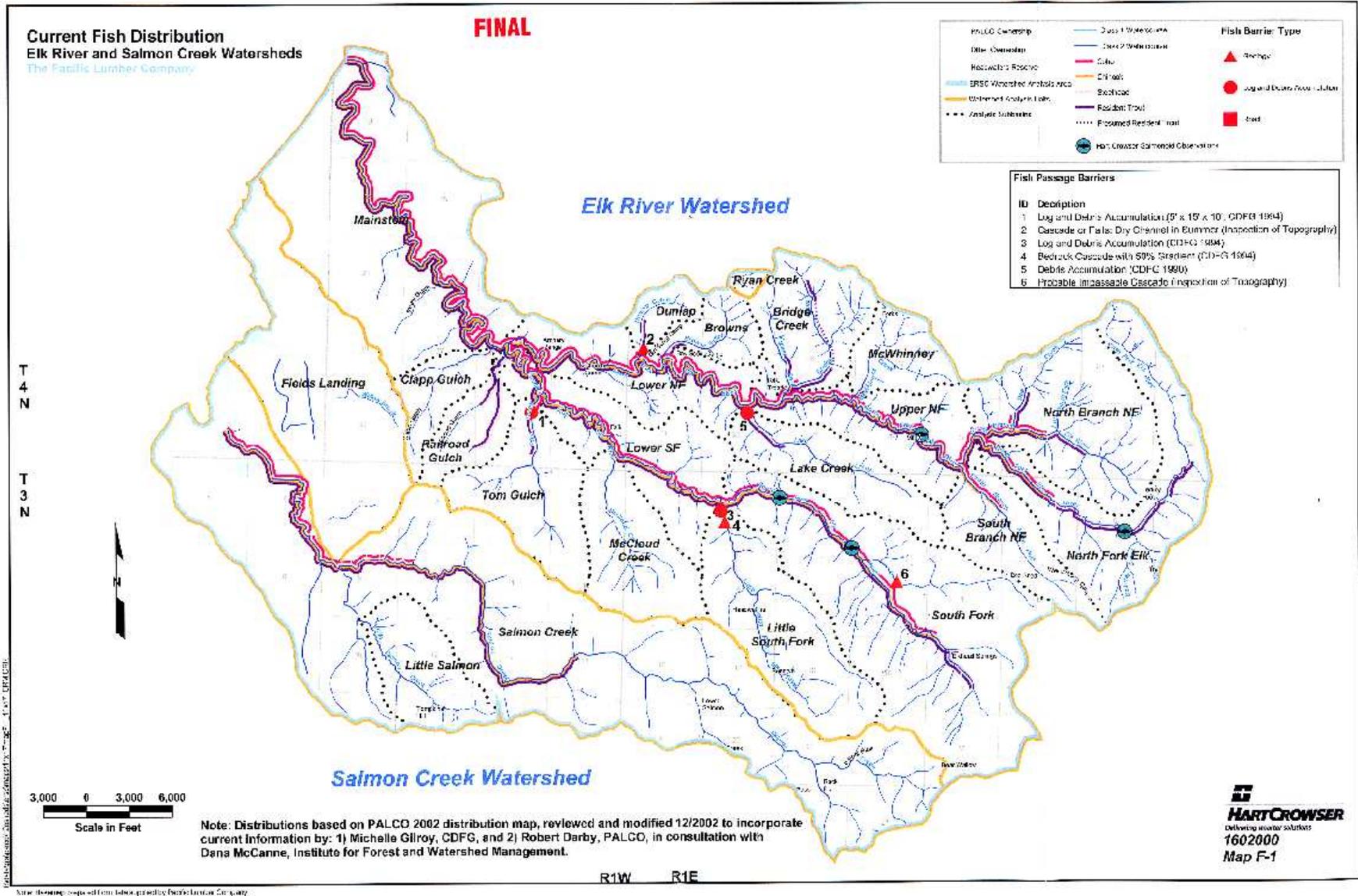


Figure 7. Distribution of fish habitat in Elk River (as presented by Palco and Hart Crowser in Figure F-1 of the Elk River and Salmon Creek Watershed Analysis (2004)).

Following is summary of fisheries observations for tributaries of Upper Elk River

**BRIDGE CREEK:**

A DFG Stream Survey was conducted on 9/8/83 from the mouth to 1.25 miles upstream. Three unidentified salamanders were observed at - 10 - one site, but no fish. It was recommended that Bridge Creek should not be considered as a viable anadromous spawning or rearing stream due to unsuitable habitat.

No known spawning surveys have taken place on this stream, however, stream inventories were conducted during the summers of 1990 and 1994. On 8/7/90, three sites were electrofished. The first site, a lateral scour pool 21' above the mouth, yielded 23 coho salmon ranging from 42-97mm, 3 coastal cutthroat ranging from 40-45mm, and 20 stickleback. The second site, a trench pool below a culvert at 270' above the mouth, yielded nine coastal cutthroat trout ranging from 42-52mm. The last site, a mid-channel pool above the culvert at 736' above the mouth yielded eight coastal cutthroat trout between 40-57mm. On 6/22/94, three sites were electrofished. The first, a plunge pool 434' above the mouth, yielded one 79mm steelhead, 20 coho between 40-63mm, and one 102mm coastal cutthroat trout. The second site, a mid-channel pool 802' above the mouth, yielded 19 coho between 41 and 51mm. The last site, a mid-channel pool 1,446' above the mouth, yielded 15 coho ranging from 3-55mm, two coastal cutthroat from 84 and 93mm, and one Pacific giant salamander.

On 4/10/98, a memorandum was sent to Glen J. Newman (Chief Coast/Cascade Region, CDF) from the CDFG Region 1 regarding the focused PHI report for THP #1-97-489-HUM, SCOPAC, Bridge Creek Tributary to North Fork Elk River. Within this document, it states that current coho habitat on Bridge Creek ends approximately 0.25mi below the downstream end of the plan boundary, and that cutthroat habitat is present in all Class 1 reaches as identified by the RPF in the Plan. Chinook salmon and steelhead are not known to use any portion of Bridge Creek above the haul road crossing. This document has further statements about fish migration barriers, habitat locales, fish distribution, and numerous sediment references.

A stream inventory was conducted from 6/6/05 to 6/8/05. This survey did not include a biological inventory, though salmonids were observed throughout the survey. Frequent log debris accumulations, most retaining sediment, were noted throughout the survey reach. No fish seen above log debris accumulation at 2,860 feet from confluence with North Fork Elk River; possible barrier. Survey ended at 3,017 feet from confluence with North Fork Elk River due to no fish observed past possible barrier described above.

**BROWNS GULCH:**

A field note was produced by CDFG for a survey on 1/5/82 that attempted to assess the value of this creek to anadromous salmonids. Twenty-five live and one coho salmon carcass were observed in the first 250' above the mouth.

A stream inventory was conducted on 6/13/05. Metal culvert in good condition under main haul road noted at 200 feet from confluence with North Fork Elk River. Survey ended 553 feet from confluence with North Fork Elk River due to dry units. The next unit was dry for 84 feet.

**CLAPP GULCH:**

A field note was produced by CDFG for a survey on 7/14/83 that attempted to assess the value of this creek to anadromous salmonids. The stream was surveyed from the mouth to a point 1000' upstream, and no fish were observed. The survey ended at this point due to the complete lack of any suitable spawning or rearing habitat.

**DOE CREEK:**

A DFG Stream Survey was conducted on 9/7/83 from the mouth to 1.25 miles upstream. Fish were not observed.

No known spawning surveys have taken place on this stream, however, a stream inventory was conducted during the summer of 1994. Two young of the year salmonids were observed during the habitat survey portion of the inventory approximately 1700' above the mouth. On 6/24/94, a site roughly 169' above the confluence consisting of two mid-channel and one plunge pools was electrofished, but no fish were sampled. Numerous Pacific giant salamanders were observed.

A stream inventory was conducted from 8/9/2005 to 8/10/2005. Several log debris accumulations retaining sediment throughout survey reach. Log debris accumulation 1,363 feet from confluence with North Branch North Fork Elk River noted as possible barrier to coho salmon. Log debris accumulation at 2,197 feet from confluence with North Branch North Fork Elk River noted as possible barrier. Survey ended 3,192 feet from confluence with North Branch North Fork Elk River due to numerous log debris accumulations and no fish observed since possible barrier at 2,197 feet.

**DUNLAP GULCH:**

A field note was produced by CDFG for a survey on 1/5/82 that attempted to assess the value of this creek to anadromous salmonids. "Fish would have access to only about 100' of stream, but none were seen. Gravel was too small for spawning, and the stream was too narrow and short for use by anadromous fish."

A stream inventory was conducted from 6/14/05 to 6/28/05. Metal culvert noted 124 feet from confluence with North Fork Elk River, bottom covered with silt/gravel/cobble. Log debris accumulations retaining silt to gravel noted frequently throughout survey reach. Log debris accumulation at 569 feet from confluence with North Fork Elk River noted as probable barrier to salmonids. Fish observed upstream were likely resident trout. At 716 feet from confluence with North Fork Elk River possible old railroad remnants were noted in the channel for

180 feet, with cut logs spanning the channel from bank to bank. At 970 feet from the confluence with North Fork Elk River large woody debris was noted, possibly due to an historic bridge. A few plunges in the water due to logs spanning the channel were noted. Survey ended 2,448 feet from confluence with North Fork Elk River due to numerous log debris accumulations and water going subsurface for at least the next 250 feet.

**HILL GULCH:**

A field note was produced by CDFG for a survey on 7/14/83 that attempted to assess the value of this creek to anadromous salmonids. There is no mention of salmonids being present in the 700' of stream surveyed from the mouth upstream.

**LAKE CREEK:**

A field note was produced by CDFG for a survey on 9/12/83 that attempted to assess the value of this creek to anadromous salmonids. No fish were observed in the survey section from the mouth to 0.5mi upstream due to the absence of spawning gravels as well as the continual mud and silt sources.

No known spawning surveys have taken place on this stream, however, a stream inventory was conducted during the summer of 1994. Three sites were electrofished on 6/27/94 and 6/28/94. The first site was a mid-channel pool 79' above the mouth and yielded one 100mm steelhead, 31 coho between 45 and 70mm, three coastal cutthroat trout between 77 and 85mm, one 50mm three-spine stickleback, and one Pacific giant salamander. The second site, a run/mid-channel pool combination 140' above the mouth, yielded 6 coastal cutthroat trout between 43 and 97mm. The last site, a series of mid-channel pools 6100' above the mouth yielded 13 coastal cutthroat trout between 38 and 111mm.

A stream inventory was conducted from 6/6/05 to 6/7/05. Log debris accumulations were noted frequently throughout the sampling reach. Survey ended 1,925 feet from the confluence with North Fork Elk River. Though juvenile salmonids (likely coastal cutthroat trout) were present beyond this point, the channel was full of log debris with little visible water, making the stream too difficult to survey further.

**LINE CREEK:**

No known spawning surveys have taken place on this stream, however, a stream inventory was conducted during the summer of 1994. Three sites were electrofished on 7/5/94. The first, a low gradient riffle approximately 442 feet from the mouth, yielded two steelhead (84 and 196mm), eight coho ranging between 48 and 70mm, four Pacific Giant salamander, and one tailed frog. The second, a log-formed backwater pool 2,209' above the mouth, yielded four steelhead between 36 and 119mm and two Pacific giant salamanders. The last site, a high gradient riffle-run series located 3,330' above the mouth, yielded numerous Pacific giant salamander but no fish.

A stream inventory was conducted from 6/27/05 to 6/30/05. Log debris accumulations retaining sediment were frequent throughout the survey reach. Log debris accumulation 1,518 feet from confluence with South Fork Elk River noted as possible barrier to coho salmon. Starting at 3,125 feet from the confluence with South Fork Elk River, the stream gradient was >10%. The survey ended 3,638 feet from the confluence with South Fork Elk River due to high stream gradient.

**LITTLE NORTH FORK ELK RIVER:**

A stream inventory was conducted from 8/15/05 to 8/16/05. A slide blocking stream flow was noted at 343 feet from the confluence with North Branch North Fork Elk River, described as evidence of old road crossing. Several log debris accumulations retaining sediment were noted, as well as several sites of bank erosion. A log debris accumulation at 1,356 feet from the confluence with North Branch North Fork Elk River was noted as a possible barrier, as no fish were seen above it. The survey was ended 2,258 feet from the confluence with North Branch North Fork Elk River due to several log debris accumulations and the fact that no fish had been observed since the log debris accumulation at 1,356 feet.

**LITTLE SOUTH FORK ELK RIVER:**

A stream inventory was conducted from 6/9/05 to 6/15/05. Several large debris accumulations were observed in the survey reach. An accumulation at 682 feet from confluence with South Fork Elk River was noted as a possible barrier to coho salmon. At 1,220 feet from confluence with South Fork Elk River, bio-inventory methods were switched to bank observation due to difficulty climbing through the large log debris accumulations with the backpack electrofisher. No fish observed upstream of log debris accumulation at 1,872 feet from confluence with South Fork Elk River. Continued survey approximately 1,000 feet past this point and channel was dry. Survey ended at 3,758 feet from confluence with South Fork Elk River due to steep gradient, approximately 16% over 220 feet.

**McCLOUD CREEK:**

A field note was produced by CDFG for a survey conducted on 5/24/72 to obtain information about the creek and its potential as an anadromous fishery. The creek was surveyed from the mouth to a point 1mi upstream. No fish, redds, or spawning areas were observed, and it was observed that this creek was not capable of supporting an anadromous fishery due to the siltation problem.

On 10/17/83, a stream survey was conducted on McCloud Creek for the mouth to a point 0.5mi upstream to assess the value of the creek to anadromous salmonids. One 1" unidentified fish was observed, but it was suggested that the creek is only capable of supporting a small, non-anadromous fish population due to heavy siltation. "Rearing habitat was of fair quality and degraded by much small debris." A few frogs and salamanders were observed.

A stream inventory was conducted from 6/29/05 to 7/6/05. Frequent log debris accumulations retaining sediment were noted throughout the survey reach. 869 feet from the confluence with South Fork Elk River a log debris accumulation was noted as a possible barrier to fish, as no fish were seen above this point. The survey ended 3,795 feet from the confluence with South Fork Elk River due to numerous log jams and overall poor quality of habitat, including 40 feet of dry unit above the last log jam. Notes indicate that after the first 850 feet, the channel was filled with deep silt and not suitable for spawning.

**McWHINNEY CREEK:**

A stream inventory was conducted on 6/6/05. There were two log debris accumulations in the survey reach, both associated with a debris flow 300' tall x 100' wide x 20' deep 604 feet from the confluence with North Fork Elk River. Sediment backup in this area was impeding flow for the next 200 feet. The survey was ended at this point due to the large log debris accumulations associated with the debris flow.

**NORTH FORK ELK RIVER:**

A stream inventory was conducted from 6/30/05 to 10/19/05. Though a biological inventory was not included in this survey, fish were observed throughout the survey. 1+ or bigger salmonids observed at 61,047 and 62,967 feet from confluence with South Fork Elk River. Log debris accumulations were noted frequently throughout the survey, most of which were not retaining sediment. Erosion on right bank noted at 54,004 feet from confluence with South Fork Elk River. Erosion on left bank noted at 58,726 feet from confluence with South Fork Elk River. Several plunges over boulders, bedrock and logs were noted, ranging from 2.5 feet to 9 feet. Log debris accumulation at 63,686 feet from confluence with South Fork Elk River noted as first possible barrier, as no fish were observed above this point. Later log debris accumulations also noted as possible barriers. At 75,325 feet from confluence with South Fork Elk River, the stream gradient was measured at 14%. Survey was ended at 74,455 feet due to high stream gradient, numerous log debris accumulations, and no fish observed since the log debris accumulation at 63,686 feet.

**RAILROAD GULCH:**

On 11/7/83, a stream survey was conducted on Railroad Gulch for the mouth to a point 0.25mi upstream to assess the value of the creek to anadromous salmonids. No fish were observed due to “muddy water,” although a few frogs and salamanders were noted above the forks. It was thought by surveyors to be possibly fish bearing, but “of limited use due to lack of spawning gravel, siltation, and debris obstructions.”

**SHAW GULCH:**

A field note was produced by CDFG for a survey on 7/14/83 that attempted to assess the value of this creek to anadromous salmonids. The stream was surveyed from the mouth to a point 1mi upstream. It was determined that the general

characteristics (such as sand and silt dominant substrate, unstable banks, and few aquatic insects) made the stream unsuitable for anadromous spawning and rearing. No fish were observed.

**TOM GULCH:**

On 9/21/83, a stream survey was conducted on Tom Gulch for the mouth to a point 0.75mi upstream (the forks) to assess the value of the creek to anadromous salmonids. One unidentified fish, about 1" long, was observed about 805' above the mouth.