BURNED AREA EMERGENCY RESPONSE
LIME COMPLEX FIRES
FISHERIES ASSESSMENT

Prepared by: John Lang[1]
22 August 2008

SUMMERY

Fish resource values at risk in the South Fork Trinity River (SFTR) are linked to sediment loads and water temperatures. The at-risk fish species in the SFTR are spring-run Chinook salmon, summer-run steelhead, and coho salmon. These populations declined severely following the flood of 1963 and currently remain significantly below pre-flood levels. The continued high rates of erosion and sedimentation are considered a major contributor to the depressed anadromous fish runs in the river basin. The high sediment loads have been attributed to unstable geology, management activities, and storm activity.

Approximately 80 percent of the affected acres were unburned or suffered only low-to-moderate burn intensity. Only 2 percent of burned acres suffered high intensity burns. These occurred primarily in isolated headwall areas (bowls) and along ridge lines. The BAER team utilized BARC maps to identify high severity burn areas, then considered underlying geology, existing slides, soil properties, and calculated increased run off potential and sediment yields for 2-year and 10-years post fire rain events. High priority areas were identified and screened for treatment suitability, i.e. slopes <60 percent, culvert size and condition, and the cost/benefit ratio to downstream fishery resources.

GENERAL BACKGROUND

- Assessment area - “Lime Complex”, Trinity County. CA. Includes the Lime, Miners, and Slide fires.
- Public (USFS) and private lands are included in this assessment.

I. OBJECTIVES

- Assess immediate impacts of the Lime Complex fires on fisheries and aquatic resources within and directly downstream of burned areas.
- Inventory and evaluate future impacts caused or enhanced by the Lime Complex within and downstream of burned areas and determine what emergency response is necessary.

II. ISSUES

In 1992, the SFTR was added to the Federal Clean Water Act Section 303(d) list with sediment as the stressor pollutant, which resulted in the development of a TMDL (total maximum daily load) for sediment (EPA 1998). In 1998, temperature was added to the water quality impairment list for the SFTR and monitoring efforts have been initiated (EPA 1998).

The SFTR is a designated Tier 1 Key Watershed in the Northwest Forest Plan. Key watersheds provide aquatic refugia for critical "stocks at risk" of extinction throughout National Forest System lands within the range of the northern spotted owl in California, Oregon, and Washington. A primary emphasis for key watersheds is restoration of roads, hillslopes, riparian areas, and aquatic habitats.

- SFTR Key Watersheds affected
  - Butter Cr.
  - Plummer Cr.

Hayfork tributaries in Roadless Area

- Miners Cr.
- Bear Cr.

1 Fishery Biologist. 2005 to present Tongass National Forest, Ketchikan-Misty Fiords RD.
2001-2005 Shasta-Trinity NF. Hayfork RD.

Due to their remoteness and a lack of significant past management activities, these watersheds should be viewed as "Key Watersheds" for Hayfork Creek because they provide refugia for at-risk fish. In addition, the Little Creek basin remote and has a relatively low road densities. Little Creek should also be considered refugia for at-risk fish in Hayfork Creek.

III. OBSERVATIONS

Background

Coho salmon: In May 1997, NOAA Fisheries listed the Southern Oregon/Northern California coast (SONCC) Ecological Significant Unit (ESU) coho salmon as threatened (62*FR* 6224588). SONCC critical habitat was designated (64 FR 24049 May 5, 1999) to include all river reaches accessible to listed coho salmon between Cape Blanco, Oregon, and Punta Gorda, California. Critical habitat (CH) consists of the water, substrate, and adjacent riparian zone of estuarine and riverine reaches (including off-channel habitats). Accessible reaches are those within the historical range of the ESU that can still be occupied by any life stage of coho salmon. In addition to being listed under the Endangered Species Act, SONCC coho salmon are also managed under the Magnuson-Stevens Fishery Conservation Management Act (MSFCMA), as amended by the Sustainable Fisheries Act of 1996 (public Law 104-297). The MSFCMA defines Essential Fish Habitat (EFH) as those waters and substrate necessary to fish for spawning, breeding, feeding, and growth to maturity. Similarly, EFH consideration is required under the MSFCMA as needed for Upper Klamath-Trinity Rivers (UKTR) Chinook salmon (*Oncorhynchus tshawytscha*) habitat, even if they are not listed under ESA.

The historical upper limit of SONCC coho salmon in the SFTR and Hayfork Creek is unknown. Butter Creek on the SFTR and Olsen Creek and Corral creeks (lower Hayfork Creek tributaries) represent the current known distribution of SONCC coho salmon in Hayfork Creek. Observations SONCC coho salmon in these locations were made in the summer/fall months of 2002 and result from the 2001 adult escapement and the widest coho salmon spawning distributions in the Trinity River Basin in recent memory.

Upper Klamath-Trinity Rivers (UKTR) Chinook salmon:
Spring-run Chinook in the Klamath-Trinity system are on the verge of disappearing (Moyle 2002[2]). They are lumped in with fall-run and late-fall-run fish in the UKTR ESU by NOAA because of genetic similarities (Meyers et al. 1998[3]). In the Klamath drainage the principle run is in the north and south forks of the Salmon River and in Wooley Creek, tributary to the Salmon River (Moyle 2002). The north and south fork of the Trinity River, and possibly New River, also support a few fish (CDFG 1990, in Moyle 2002).

Historically, salmonid spawning runs in the SFTR were dramatically larger than they are today; spring Chinook represented the largest salmonid runs in the SFTR basin. In 1963 and 1964, prior to the December 1964 flood, spring Chinook escapement was greater than 10,000 fish (Healey 1963[4], LaFaunce 1967[5]; in EPA 1998[6]). The December 1955 flood probably also affected the fish population temporarily (La Faunce 1967, citing USFWS 1960 in EPA 1998).

The low number of spring-run Chinook salmon in the SFTR are largely a response to the 1964 flood, which triggered landslides that filled in holding pools and covered spawning beds (Moyle 2002). In addition, the

2 Moyle, P. 2002. Inland Fishes of California, 2nd Ed. University of California Press. Berkeley, CA.

3 Meyers, J.M. R.G. Kope, G.J. Bryant, D.Teel, L.J. Lierheimer, T.C. Wainwright, W. S. Grant, F. W. Waknitz, K. Neely, S.T. Lindley, and R.S. Waples. 1998. Status Review of Chinook salmon of Washington, Idaho, Oregon and California. USDC NOAA Technical Memorandum NMFS-NWFSC-35.

4 Healey, M.C. 1991. Life history of chinook salmon (Oncorhynchus tshawytscha). Pages 311-394 in C. Groot and L. Margolis, eds. Pacific salmon life histories. University of British Columbia Press. Vancouver, B.C., Canada.

5 La Faunce, D.A. 1967. A king salmon spawning survey of the South Fork Trinity River, 1964. California Dept. of Fish and Game. Marine Res. Admin Report. 67-10 13pp.

6 EPA (Environmental Protection Agency). 1998. South Fork Trinity River and Hayfork Creek Sediment Total Daily Maximum Loads. Region 9.

intensity of road building and timber harvest increased significantly in the early 1960s. Since the 1964 flood, the spring Chinook population has not recovered to anywhere near those former levels.

In the 16 years between 1989 and 2004, SFTR counts of adult spring-run Chinook salmon averaged 290 fish annually, ranging from 1,097 fish in 1996, to 7 fish in 1989 (CDFG 2004. Fall Chinook escapement in the SFTR basin has not been estimated as consistently as spring Chinook. La Faunce (1967) estimated 3,337 fall Chinook in 1964, prior to the flood. No estimates were made again until the 1980s, at which time the escapement was estimated to be as low as 345 in 1990 and as high as 2,640 in 1985 (Jong & Mills 1994).

MIS fish species on the Shasta-Trinity National Forest are the anadromous and resident forms of coastal *Oncorhynchus mykiss*, commonly referred to as "coastal steelhead" and "coastal rainbow trout", respectively. Trinity River Basin steelhead and rainbow trout are within the Klamath Mountains Province (KMP) ESU. Within the KMP ESU, steelhead have two life-history types, the summer-run and winter-run fish. Winter-run steelhead are an STNF MIS fish species (LRMP[7] Final EIS, pp. G-3). Summer-run steelhead however, are a Forest Service Sensitive fish (LRMP Final EIS, pp. G-5). Adults of the two run types are differentiated by their timing and duration of their spawning migration and the state of their sexual maturity at the time of their return to freshwater. Summer-run steelhead return to freshwater between May and October, in a sexually immature condition, their gonads mature over several months and they spawn in the winter through early-spring. Adult winter-run steelhead enter freshwater between November and April with well-developed gonads and spawn shortly thereafter. Steelhead utilize the accessible habitat in SFTR and its tributaries, including Grouse Creek, and upper SFTR.

South Fork Trinity River Watershed

The SFTR basin is undammed and approximately 970 square miles in size, and is the largest tributary of the Trinity River. The terrain is predominately mountainous and forested, with only about 15 percent of the basin available for farmland, most of which occurs in the Hayfork Valley, the largest tributary of the SFTR (TCRCD 2003[8]). Elevations in the basin range from more than 7,800 feet above sea level in the headwater areas, to less than 400 feet at the confluence with the Trinity River (TCRCD 2003).

Precipitation in the SFTR Watershed, as is typical of California, is highly seasonal, with 90 percent falling between October and April. Rainfall runoff dominates the hydrologic budget, although depending on location in the watershed and the water-year type, snowmelt runoff can be significant. There are few long-term annual precipitation records in the watershed, and instead records from Weaverville were used. Weaverville has a mean annual precipitation of 36.29 inches, for 1906-2001, excluding 1981-1983 during which the records are incomplete (TCRCD 2003). For Weaverville, the wettest year contained in this record is 1974, when precipitation totals reached 63.58 inches, only slightly wetter than 1998, the next highest, when 63.27 inches were recorded. The driest year at Weaverville was 1977, when only 12.57 inches of precipitation were recorded.

Hayfork Creek

Hayfork Creek is the largest free flowing tributary of the SFTR, draining an area of 243,000 acres. Much of lower Hayfork Creek flows through moderate gradient, fairly well contained channels (Rosgen channel types A and B) in steep mountainous terrain (USDA Forest Service, 1993). Below this gorge-like area, the channel gradient decreases (Rosgen channel types C and D) and in the very lower reach above the confluence with the SFTR, Hayfork Creek flows through unconfined channel (Rosgen channel type D). The Rosgen A and B channel types are predominantly transport channels, which function to deliver bedload to downstream reaches.

7 USDA Forest Service. 1995. Land and Resource Management Plan. Shasta-Trinity National Forest, Redding CA.

8 (TCRCD) Trinity County Resource Conservation District. 2003. South Fork Trinity River Water Quality Monitoring Project - Agreement No. P0010340 Final Report. Prepared for California Department of Fish and Game by TCRCD, with assistance from Graham Matthews . Weaverville, CA. 77 pp.

Reconnaissance Method

All field reconnaissance was completed by vehicle, foot access and two helicopter flights. The following list includes the date(s) the fire was visited. Areas of high and moderate burn severity were the priority for field survey work.

- Lime Complex – 08/15/08 – 08/19/08

Findings/Description of Emergency

Based on my observations, the fires composing the Lime Complex had a mostly positive effect on the landscape. However, there are a few isolated areas of high severity burn and will likely result in erosion and sedimentation to fish bearing streams. Map 1 thru Map 3 depict the fire perimeter and known distribution of Chinook and coho salmon (Note: the distribution of coho is based on the extent of habitat available for KMP steelhead), and except for areas along the Hyampom Road, the Miller Springs area on South Fork Mountain, and Cold Camp Creek; high intensity burns occurred mostly in isolated headwall areas and along ridge lines. Unburned or low-to-moderate burn intensity resulted in the areas between basin headwalls and streams. These areas act as buffers and should provide an adequate means of trapping and metering fine sediments coming off adjacent hill slopes.

Hidden Valley frontal watersheds represent the greatest risk to fish values (water quality) in the SFTR due to the geology and close proximity to the SFTR. Based on the limited amount of time I had to assess the effects of the fire in the Hidden Valley area, I believe cost effective BAER opportunities are limed. The primary opportunities for BAER are Road treatments (upgrading culverts, constructing rolling dips and or critical dips. People familiar with the effects of the fire in this area mentioned the 1N24 and 1N24E roads as requiring BAER treatment(s) to curb excessive sediment delivery to the SFTR. Forest road engineers or district personnel will need to evaluate these roads.

Limedyke Lookout slide – The slide area is perched in the headwall areas and will affect the SFTR directly if where to slip. The BAER team geologist has identified possible treatments.

Butter Cr. Watershed
Cold Camp Creek is a small tributary to Indian Cr., which flows into Butter Creek above a large waterfall. Cold Camp Creek burned hot in 1987 and received BAER treatments including sediment dams to prevent head-cutting. These 1987 structures are no longer present, but the issue of sediment delivery to Butter Creek remains. Juvenile coho salmon are consistently found in Butter Creek. Butter Creek has only 1.6 miles of anadromous fish habitat, but is one of eleven Key watersheds upstream of Hyampom.

Little Creek - High priority areas were identified and screened for treatment suitability, i.e. slopes <60 percent, culvert size and condition, and the cost/benefit ratio to downstream fishery resources.

Bear Creek & Miners Creek – These drainages are located in the roadless area and are formed by a mixed bag of geologic formations and soil types. Highly erodable areas (granitics) were identified in the headwalls but given low priority for treatment due to affected stream length and the high probability for the channel to trap and meter sediments overtime. The lower portions of these drainages adjacent to Hayfork Creek and the Hyampom road were evaluated using the BARC map, GIS soil layers and treatable slopes (i.e. slopes <60 percent). South facing slopes in close proximity to Hayfork Creek were given high priority for treatment. A small portion of private land in Bear Creek is located adjacent to a high intensity burn area. This area was also given high priority.

Goods Creek – a small portion of Goode Creek was affected by fire. This are was given high priority due to its high erosive soil type.

IV. TREATMENT RECOMMENDATIONS

a. Management Treatments

Plummer Watershed - No immediate fisheries related treatments are proposed in this area. This assessment considered the effects of the Wallow Fire (2007) and the Jim Fire (2003?), which are in the immediate area and share common geology. BAER on the Wallow Fire prescribed only Road treatments. No Land or Channel treatments were prescribed and there did not appear to be erosion issues (personal observation).

Hidden Valley Watershed - The following generalized treatments are proposed to minimize impacts to fisheries and aquatic resources at a large scale. Individual treatments for specific road sections will need to be designed and proposed by the proper resource specialists (i.e. hydrology, soils and engineering). A range of generalized treatments that would minimize impacts to aquatic resources follows: 1) temporarily close roads for first wet season, 2) provide adequate road drainage features (i.e. rolling dips, critical dips, armoring, outsloping, appropriately sized culverts, removal of berm on outside/downhill side of road), 3) storm patrol during precipitation events for 1-3 seasons following the fire, and 4) proper signage of road indicating closure or, hazards if road is not completely closed. These proposed treatments are not meant to be mutually exclusive, rather they are meant to provide a range of alternative treatment combinations with differing levels of protection for aquatic resources. We feel that the most protective option will include specific elements of all the points listed above, at appropriate locations.

Limedyke Lookout slide – Recommendations provided by the BAER team geologist are sound and should be adopted to reduce direct adverse impacts to the SFTR and SFTR at-risk fish.

Butter Creek Watershed - Cold Camp Creek was an area of high severity burn (20-year old plantation) (Photo 1). Land Treatments: Areas within 150 to 200 feet of existing roads should be hydro-mulched. Mulch areas beyond the reach of a mulch blower by hand and/or fell dead trees and shrubs on-site to provide additional ground cover and sediment traps.

Road Treatments: Four culverts occur in the drainage and there size appears adequate for their respective locations. However, theses culverts are at increased risk of plugging by downed wood that can be carried downstream in rain events. Constructing critical dips at each culvert would eliminate diversion potential and potential road fill failure.

Channel Treatments: containment of eroded soils in the general area of there origin could be accomplished by placing multiple straw-bake check dams in the ephemeral draws and high-tech check dams in the main channels.

:

- KMP steelhead (spawning/rearing)
- SONCC coho (spawning/rearing)

Photo 1. Cold Camp Creek looking downstream.

Little Creek, Bear Creek, Miner's Creek and Gates Greek – the treatment consensus was straw mulching of priority areas.

b. Monitoring

Plummer Cr. Watershed – No specific monitoring is proposed.

Hidden Valley - No immediate fisheries related monitoring is proposed.

Cold Camp Creek – It is anticipated all sediment retention structures will be fill within the first couple of years and the integrity of the straw-check dams will be significantly reduced within 3-years (Annetta Mankins, personal communication, 2008). Monitoring for up to 3-years or following a significant (>25-year storm event) is warranted.

c. Long-term project proposals / NFP

Affected Lime Complex watersheds – Support the continuation of long-term monitoring projects conducted by all federal, state and private groups. At this time we do not anticipate requesting any fisheries-specific funding.

V. CONSULTATION

At this time, no consultation with the National Marine Fisheries Service (NMFS) has been initiated, as it is not required by an assessment team. Future activities (including BAER implementation) will require indirect

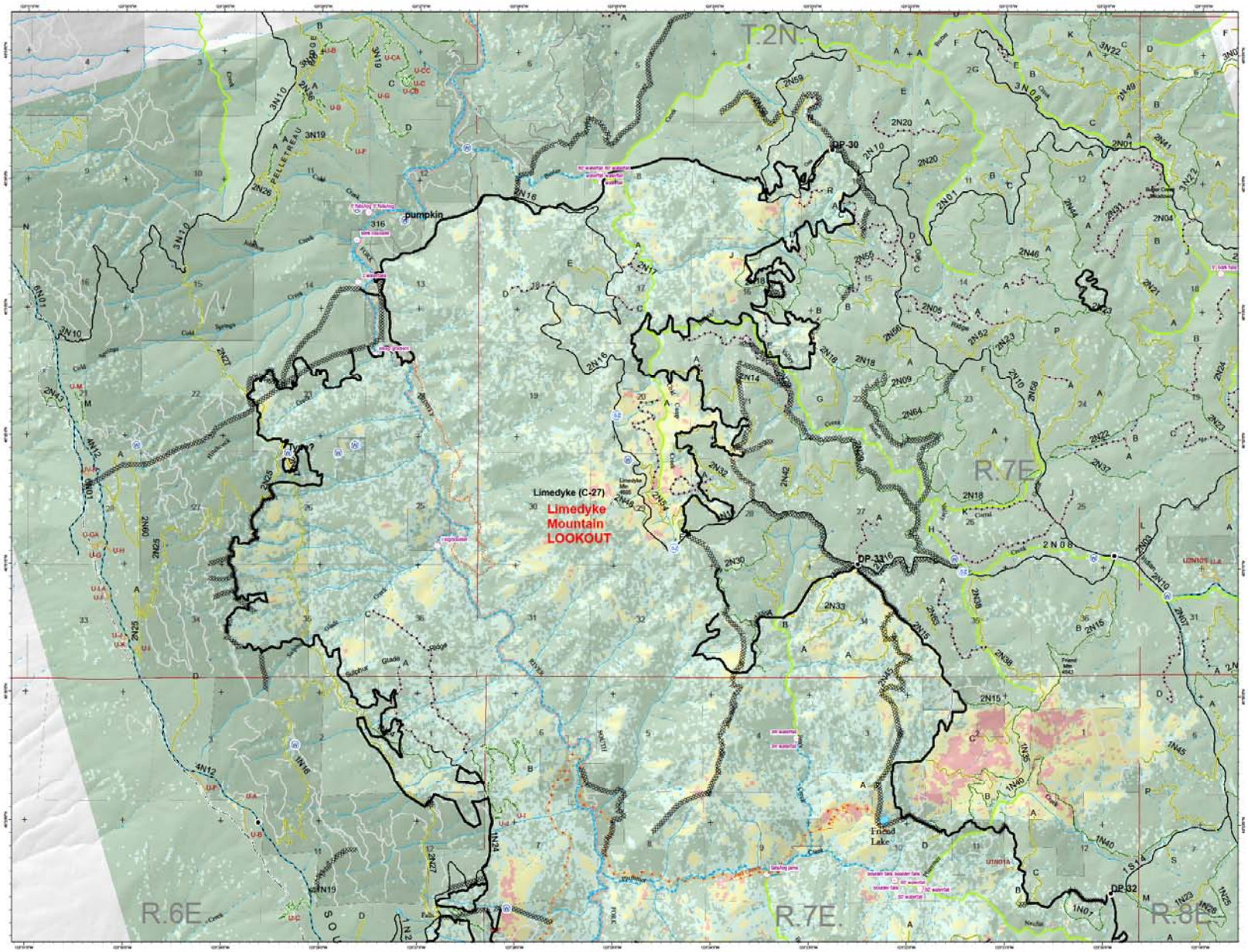
consultation through the National Fire Plan Counterpart Regulations or through personnel of the National Marine Fisheries Service office in Arcata, CA.

VI. MAPS

Lime North Fish Distribution

Lime South Fish Distribution

Miners Fish Distribution



Lime North Fish Distribution

Legend

Roads
- NFS Roads - Closed Routes
- NFS Roads - High Clearance Vehicles
- NFS Roads - Decision Signed for Closure
- NFS Roads - Decision Signed for Decommissioning
- NFS Roads - Suitable for Passenger Cars (Rough Surfaces)
- NFS Roads - Suitable for Passenger Cars
- State / County / Non-Forest Roads
- Unauthorized Route
- Decommissioned Routes
- 8, Jeep Roads
- 20, Interstate Highway On and Off-Ramps
- 22, State Highway (Do not show on legend)
- Private Road

Trails
- Existing NFS Trails
- Decommissioned NFS Trail

Fire Information
- FirePolygon
- Drop Point
- Helispot
- Incident Command Post
- Safety Zone
- Staging Area
- Water Source
- Completed Dozer Line
- Completed Line
- Hand Line
- Uncontrolled Fire Edge
- spring2006

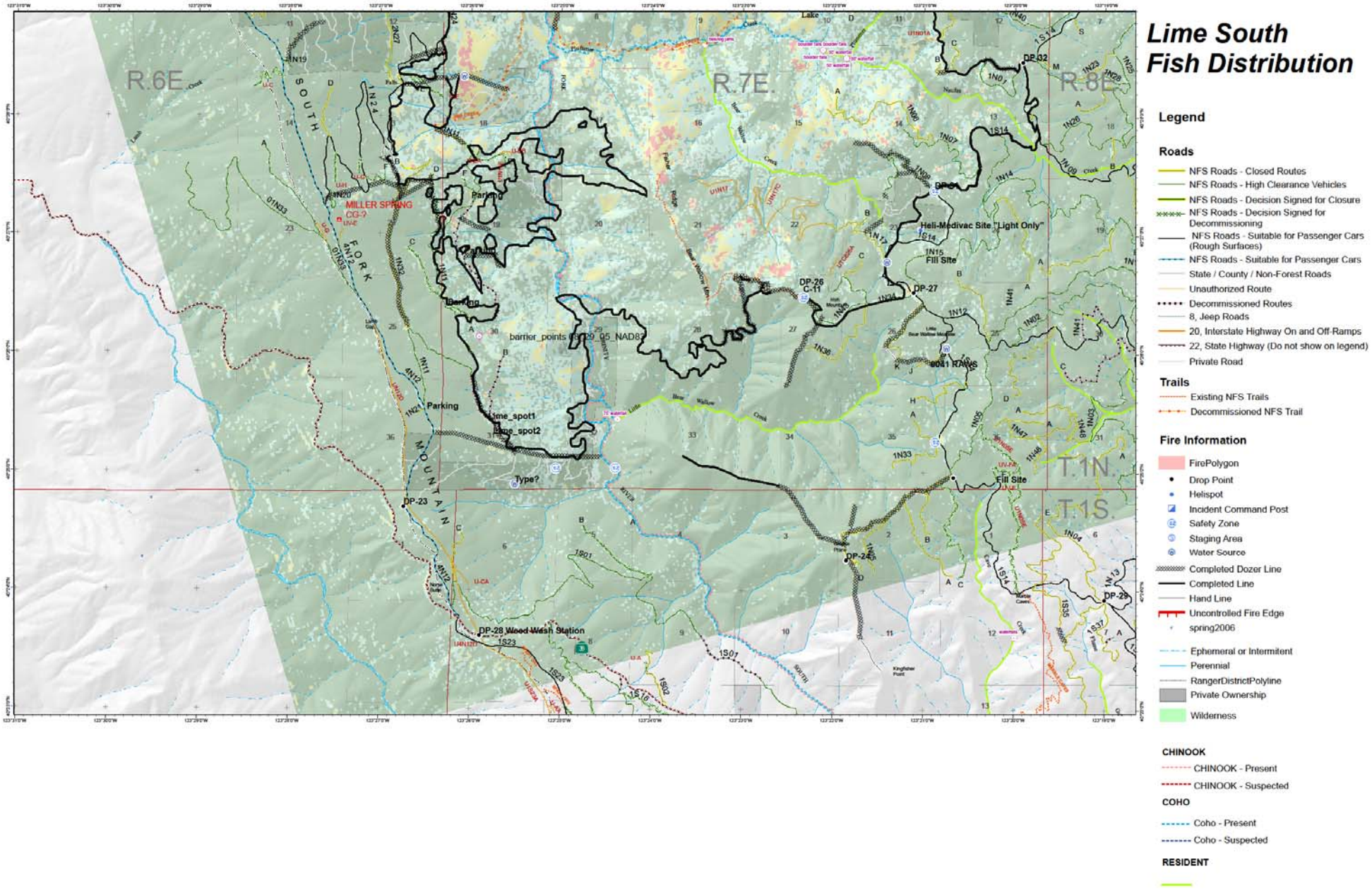
- Ephemeral or Intermitent
- Perennial
- RangerDistrictPolyline
- Private Ownership
- Wilderness

barrier_points 08_29_05_NAD83

CHINOOK
- CHINOOK - Present
- CHINOOK - Suspected

COHO
- Coho - Present
- Coho - Suspected

RESIDENT


Lime South
Fish Distribution
Legend
Roads
NFS Roads - Closed Routes
NFS Roads - High Clearance Vehicles
NFS Roads - Decision Signed for Closure
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Wilderness
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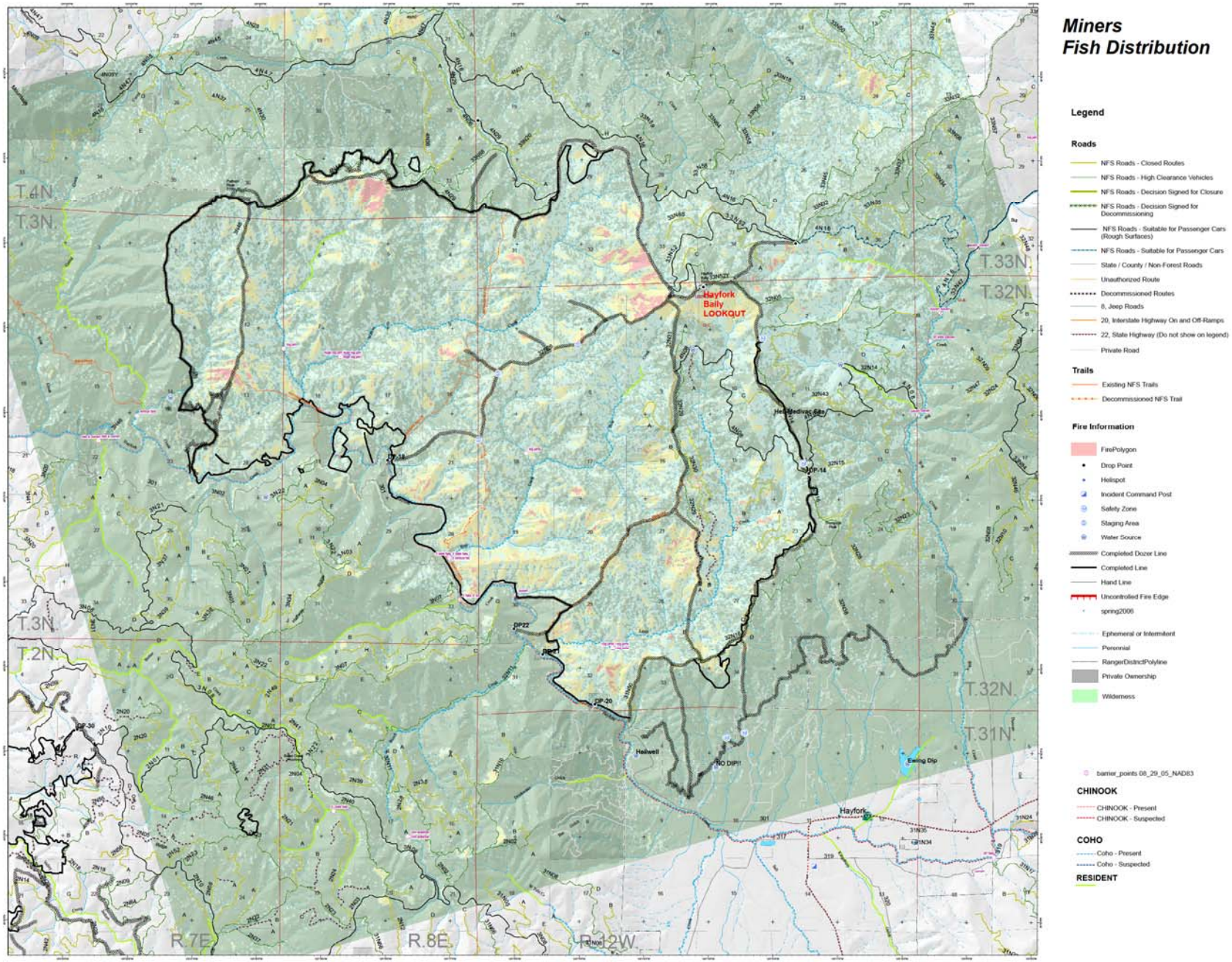
CHINOOK - Present
CHINOOK - Suspected
COHO
Coho - Present
Coho - Suspected
RESIDENT
R.6E.
R.7E.
R.8E.
T.1N.
T.1S.
SOUTH FORK
MOUNTAIN
MILLER SPRING CG-?
Parking
Parking
Parking
Lime_spot1
Lime_spot2
Type?
barrier_points_1929_05_NAD83
Heli-Medivac Site "Light Only"
1N15 Fill Site
Fill Site
DP-26 C-11
DP-27
DP-23
DP-24
DP-28 Weed Wash Station
DP-29
DP-32
9041 RANGE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T.4N.
T.3N.
T.33N.
T.32N.
T.3N.
T.2N.
T.32N.
T.31N.
R.7E.
R.8E.
R.12W.
Hayfork Baily LOOKOUT
DIP-14
DIP22
DIP21
DIP-20
DIP-36
Hellwell
NO DIP!!
Ewing Dip
Hayfork