Large-scale Fisheries Habitat Restoration in Working Landscapes

A Concurrent Session at the 40th Annual Salmonid Restoration Conference held in Fortuna, California from April 25–28, 2023

Session Coordinators:

- Jay Stallman, Stillwater Sciences
- Ann Willis, American Rivers, California Regional Director

Habitat restoration and conservation across working lands is a critical component to resilient, landscape-scale recovery of listed and at-risk anadromous salmonid populations. Working lands encompass a large percentage of critical habitat, which presents unique challenges and opportunities for scaling conservation work beyond isolated refugia within public lands and other high-value protected areas. This session features large-scale, multifaceted, and interdisciplinary habitat restoration and conservation efforts on working lands from the semi-arid middle and upper Klamath basin to the heavily forested outer North Coast Ranges and temperate stream estuary ecotone in north coastal river valleys. Topics include emerging science; creative technical approaches to planning and design; avenues for stakeholder engagement; cooperative agreements between private landowners, tribes, and public agencies; and funding and permitting mechanisms unique to habitat restoration on working landscapes.

Presentations

- Slide 4, **Klamath Reservoir Reach Restoration Plan: Assessing Habitat Conditions and Prioritizing Restoration Post-Dam Removal,** Bob Pagliuco, *NOAA Restoration Center*
- Slide 31, **Forest and Mountain Meadow Resiliency, Fisheries Restoration, and River Recovery Actions on Working Lands in the Scott River,** Charnna Gilmore, *Scott River Watershed Council*
- Slide 60, **Habitat Restoration on the Working Landscapes of the Smith River Plain,** Marisa Parish Hanson and Monica Scholey, *Smith River Alliance*
- Slide 92, **A Vision, Plan, and Strategy for Comprehensive Recovery of Lower Elk River**, Darren Mierau, *California Trout*
- Slide 108, **Trout Unlimited's North Coast Coho Project – Over 20 Years of Restoration on Working Forest Lands,** Anna Halligan,
- Slide 129, **Garcia River Estuary Enhancement Project and TNC's Approach to Restoration on the Mendocino Coast,** Peter Van De Burgt, *The Nature Conservancy* and Lauren Hammack, *PCI Ecological Design and Planning*



Klamath Reservoir Reach Restoration Prioritization Plan

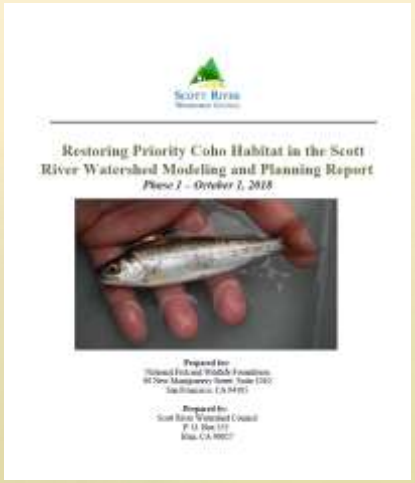
Salmonid Restoration Federation Conference
Fortuna, CA 4-27-2023

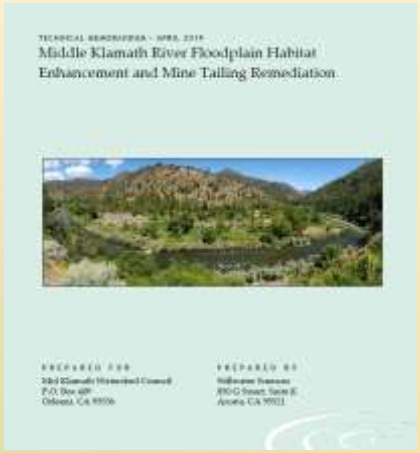
Bob Pagliuco - NOAA Restoration Center

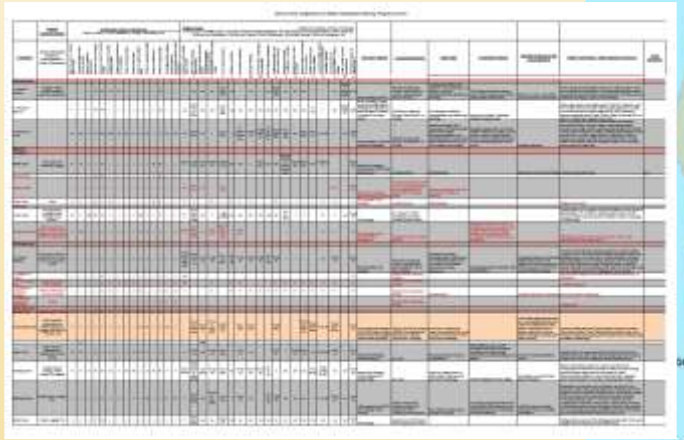
Co-authors- Chris O'Keefe and Brett Holycross - Pacific States Marine Fisheries Commission, Nell Scott and Tommy Cianciolo – Trout Unlimited

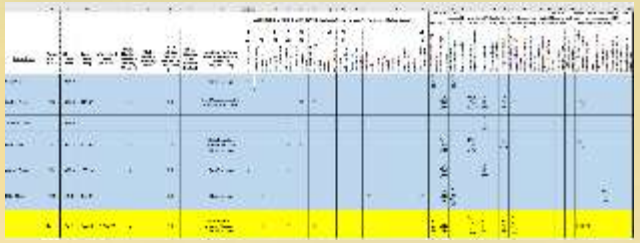
Klamath River Reservoir Reach Habitat Assessment and Restoration Plan

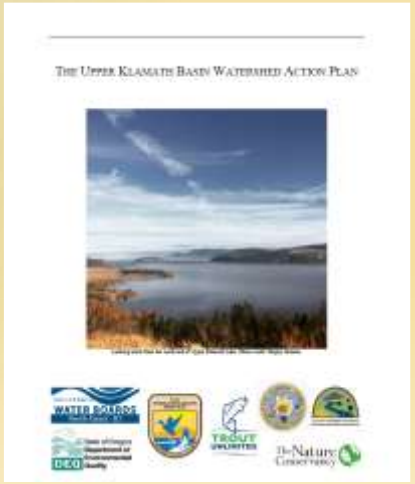
- Several geography-specific Restoration Plans exist both above and below the Klamath Dams.
- Field tours and IFRMP process highlighted a need to assess habitat and develop a prioritized restoration plan in the reservoir reach.

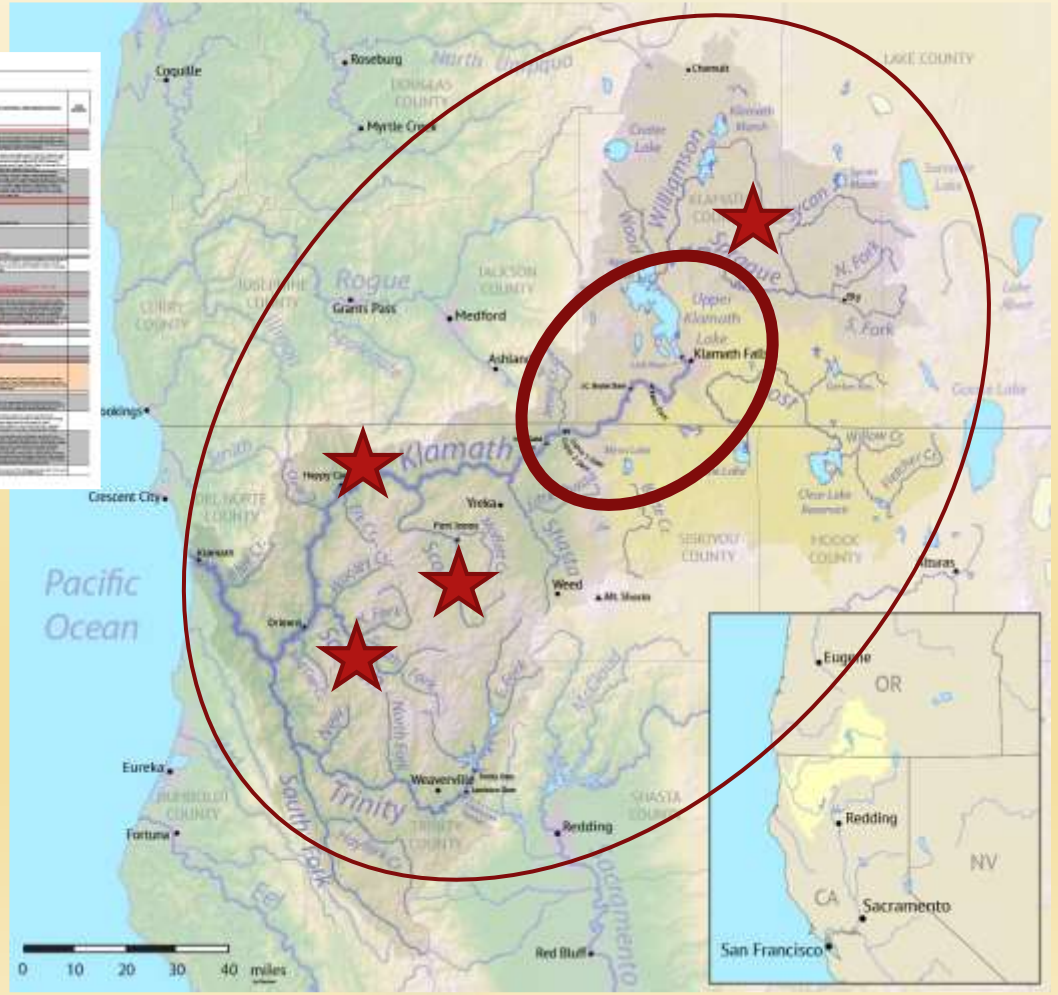






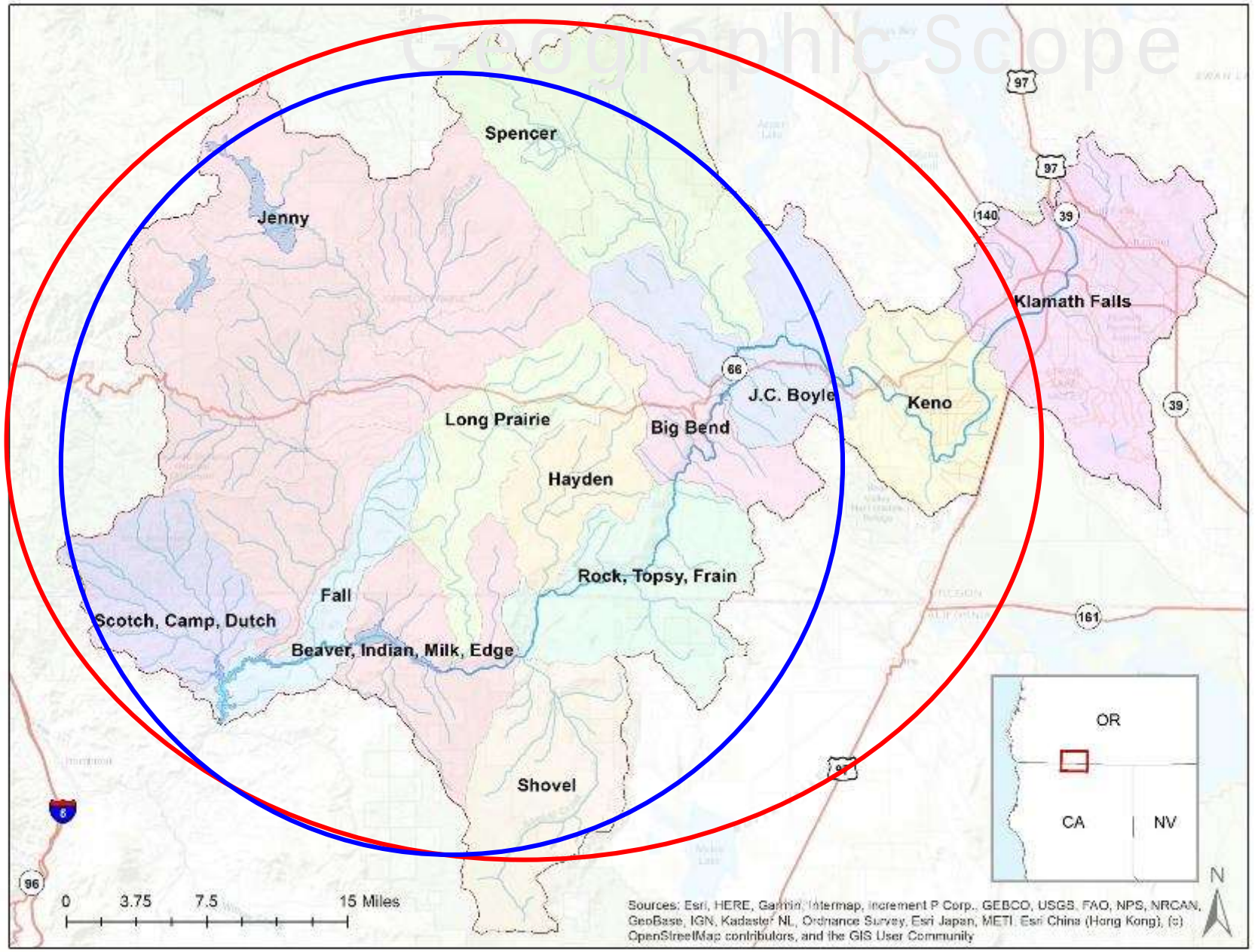






Klamath River Reservoir Reach Habitat Assessment and Restoration Plan Summary

- NOAA Restoration Center funded the effort after recognizing the importance of a road map in the reservoir reach post dam removal for NOAA Trust resources.
- Built a partnership with NOAA, PSMFC, and TU to work on shared goals
- Collaborated with experts in the field (science panel) to vet methods and a Technical Advisory Committee to develop prioritization criteria, score projects and develop prioritized lists for habitat restoration, screening and flow restoration projects.



Iron Gate Dam to Link River Dam

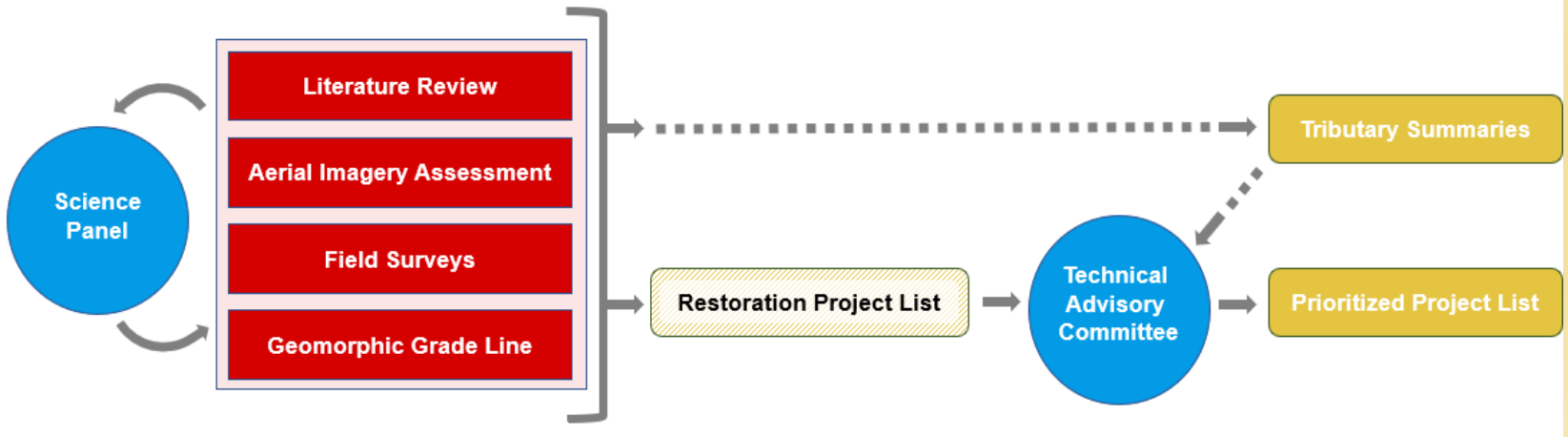
Habitat Survey Efforts

Flow and Screening Assessment Efforts

Ancestral lands of the Shasta Indian Nation, Modoc Tribe, Klamath Tribes, Yahooskin Paiute

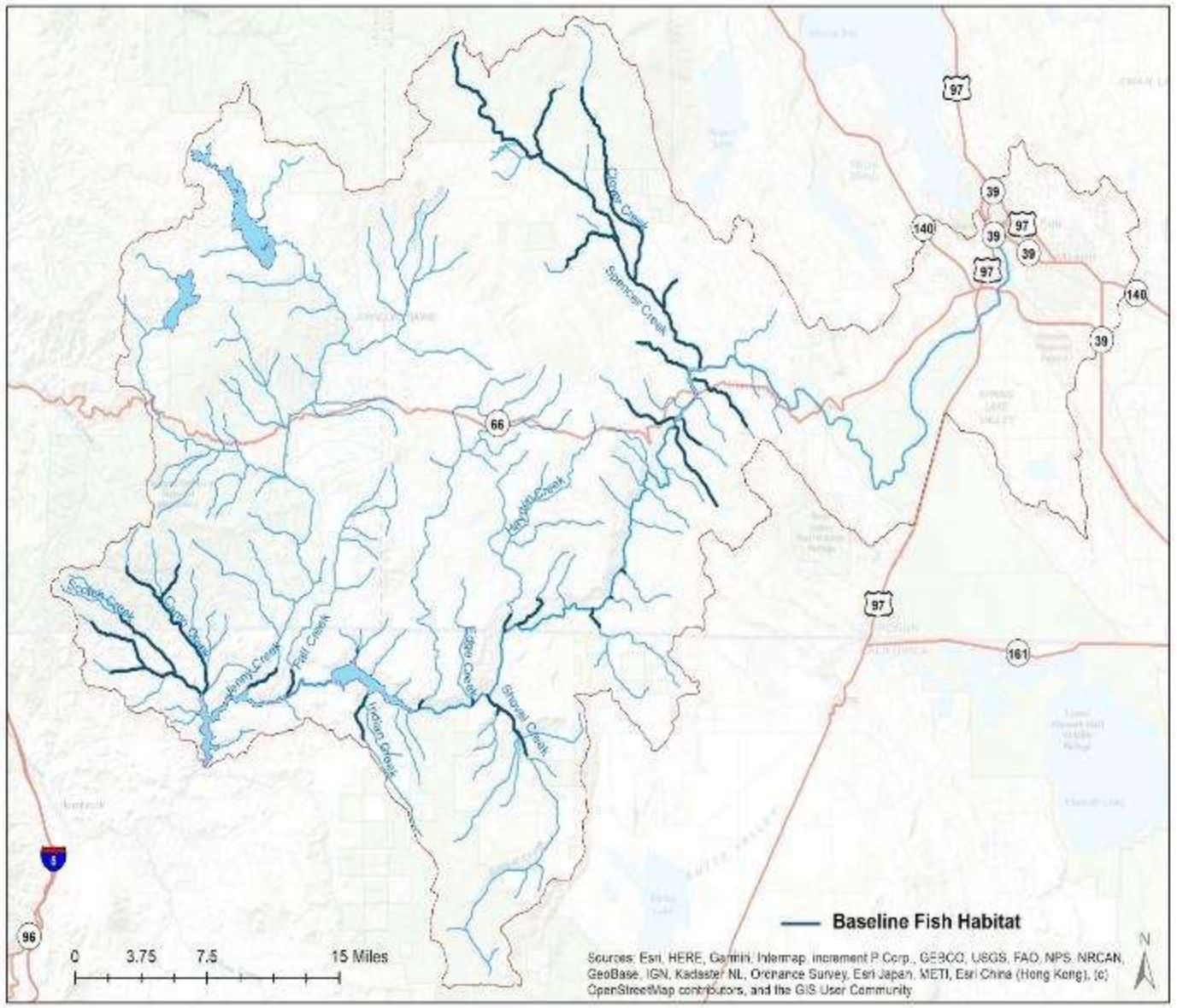
Project Elements

- Temperature Assessment (refugia)- Looking for cold water areas to protect and enhance
- Habitat Assessment - Collect Baseline data and inform stresses and threats
- Diversion Assessment - Focus on locations, volumes, screening and barriers
- Restoration Project ID - Develop list of potential projects via field surveys and LiDAR/aerial imagery efforts.
- Technical Advisory Committee and prioritization process
- Final Report



Developed Baseline Fish Habitat Layer for surveys within Anadromy

- This layer utilizes available information from known fish barriers, fish observations, and hydrography attributes to predict potential anadromous reaches.
- The layer was developed using the NHDPlus Version 2.1 (EPA/USGS) hydrography (Holycross 2021).



Aerial Imagery Surveys – Above Anadromy

AGOL and Google Earth Imagery
(NHDPlus)

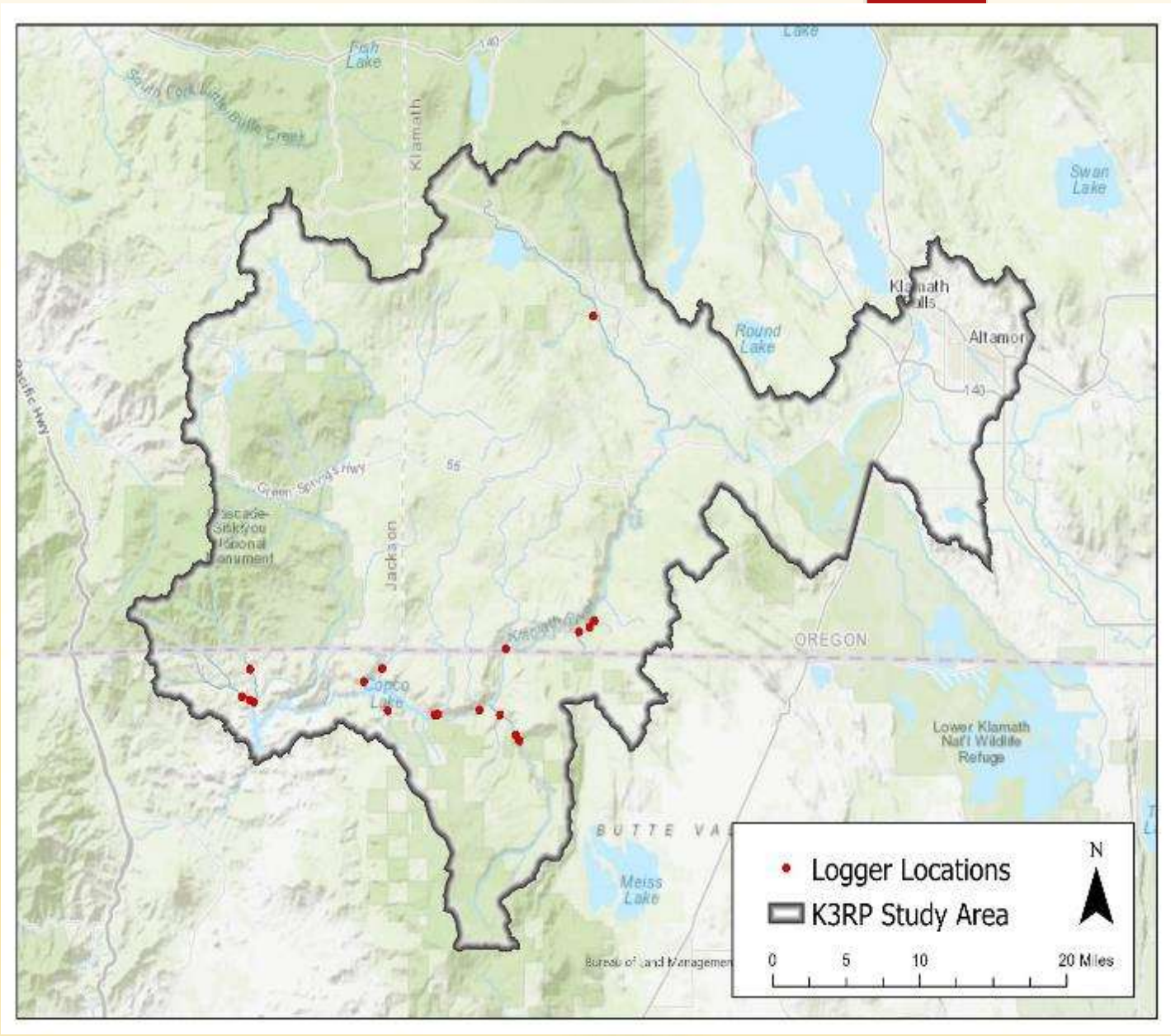
Developed online map to identify key features in the watershed that might have positive or negative effects on the habitat conditions

Above and within future anadromous reaches
-Cattle
-Crossings
-Riparian Vegetation
-Diversions
-Springs
-Recent Fire
-Beaver
-Straightened Channel

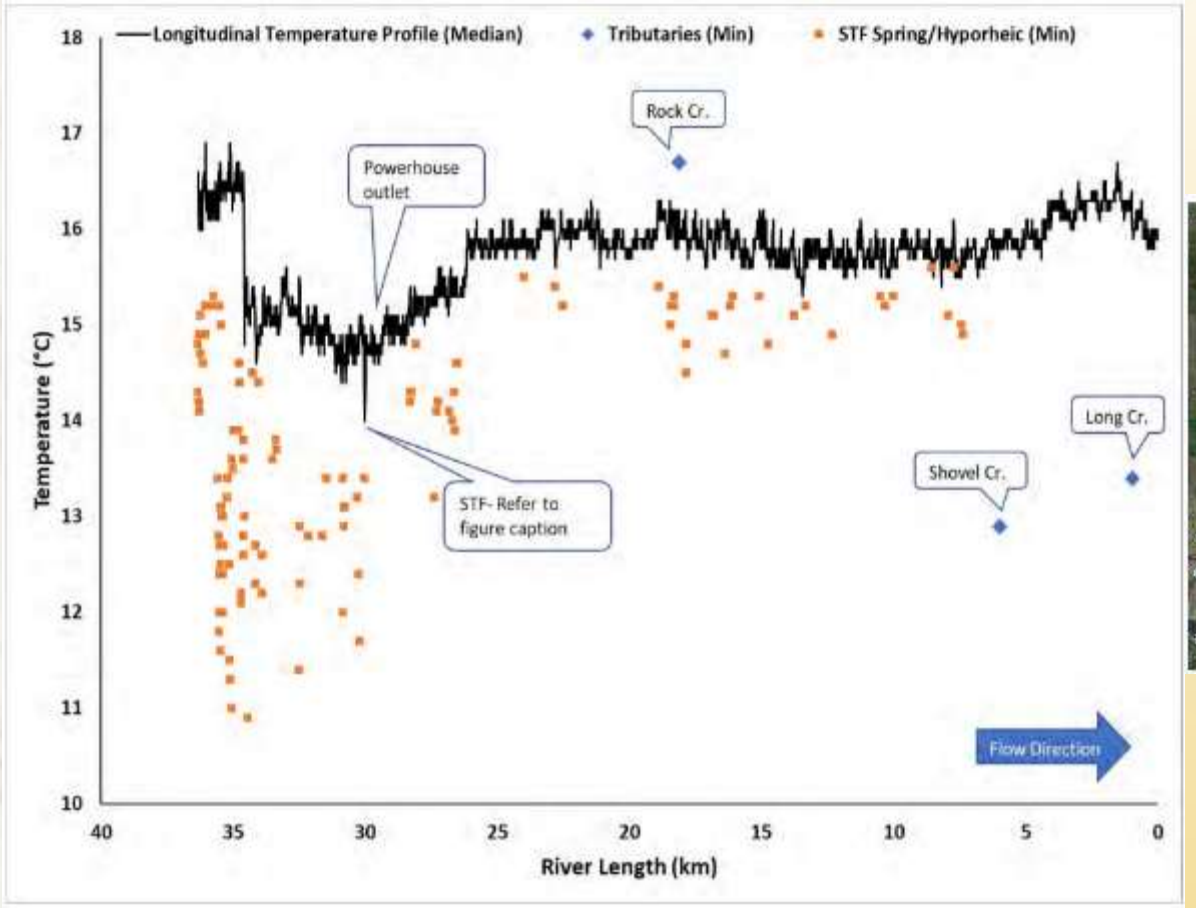
Refugia Project Locations

Installed Hobo Temperature loggers at 20 locations

- Scotch Creek (2)
- Camp Creek (2)
- Fall Creek Beaver Pond (1)
- Copco Springs (1)
- Deer Creek (1)
- Long Prairie Creek (2)
- Edge Creek (1)
- Shovel Creek and Tribs (4)
  - Grouse Spring Creek
  - Bear Canyon Creek
  - Panther Canyon Creek
  - Mainstem Shovel Creek
- Hayden Creek (1)
- Rock Creek (1)
- Crayfish Creek (1)
- Frain Creek Spring (1)
- Frain Creek (1)
- Miners Creek (1)
- PacifiCorp FLIR flight JC Boyle Reach



PacifiCorp FLIR flight JC Boyle Reach



E&S Environmental, NV5 Geospatial Inc (2022) found 119 Significant Thermal Features.

Deas (2022) found 234 cfs of spring water throughout this reach.

Additional Cold Water Refugia

Shovel Creek

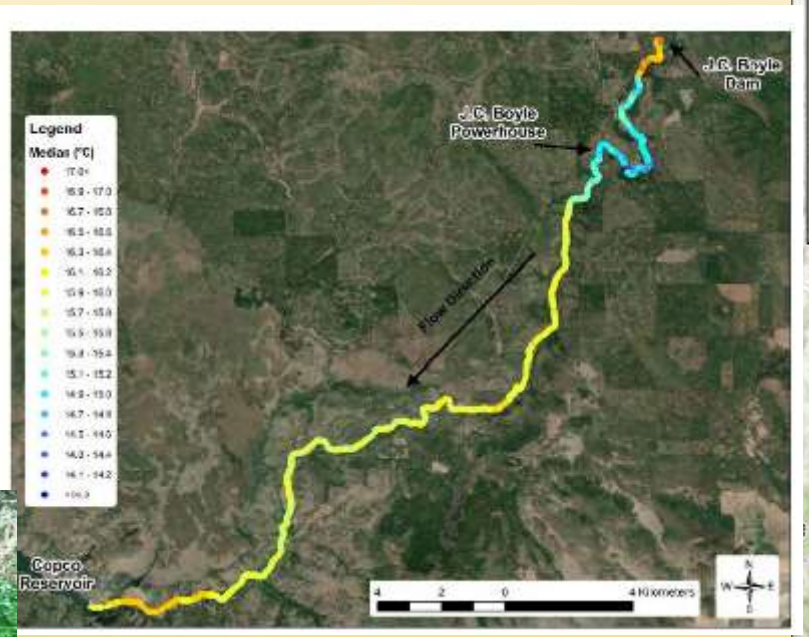
Long Prairie Creek

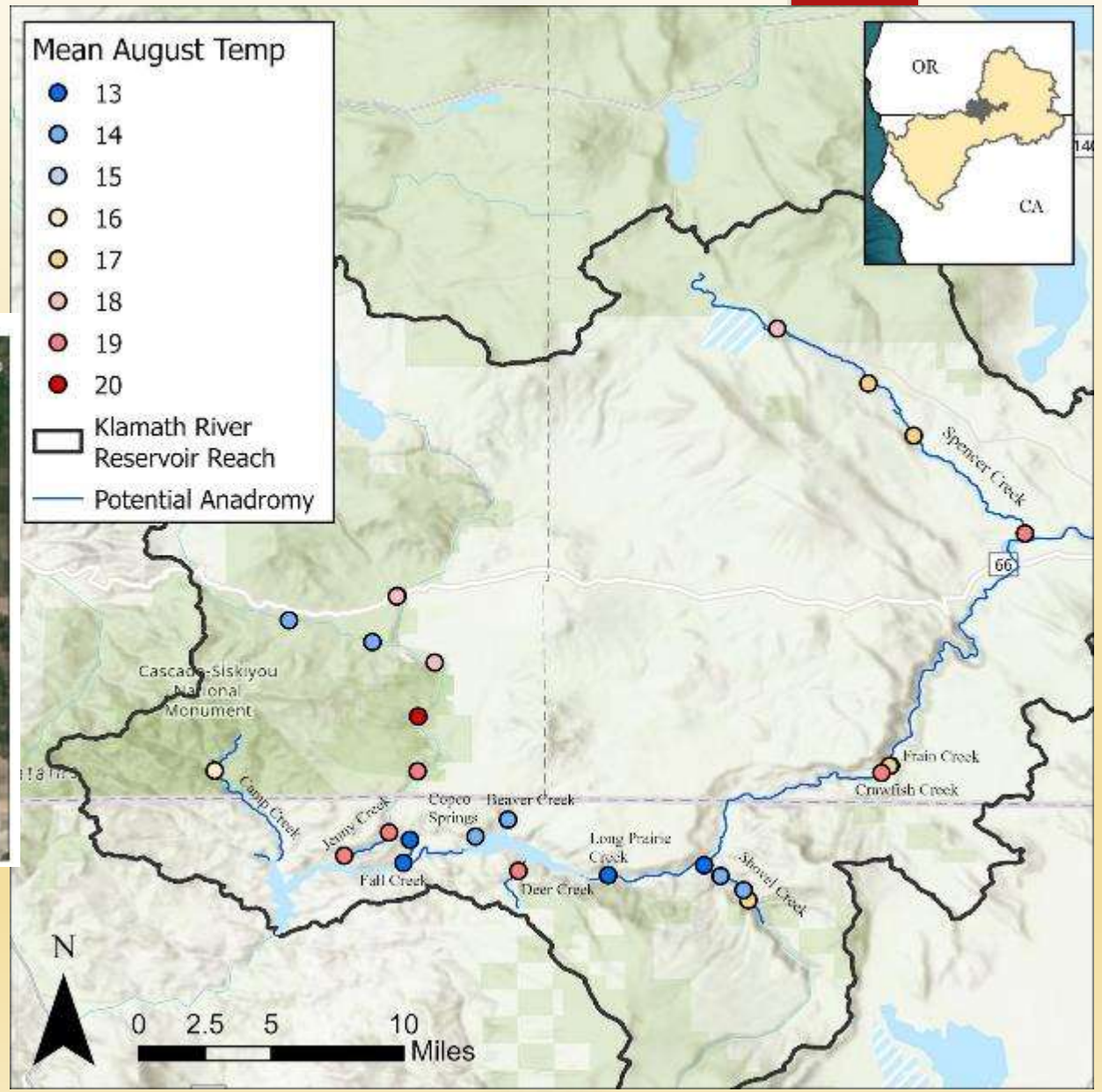
Fall Creek

Beaver Creek

Copco springs

JC Boyle Springs (234 cfs of 13 C water)





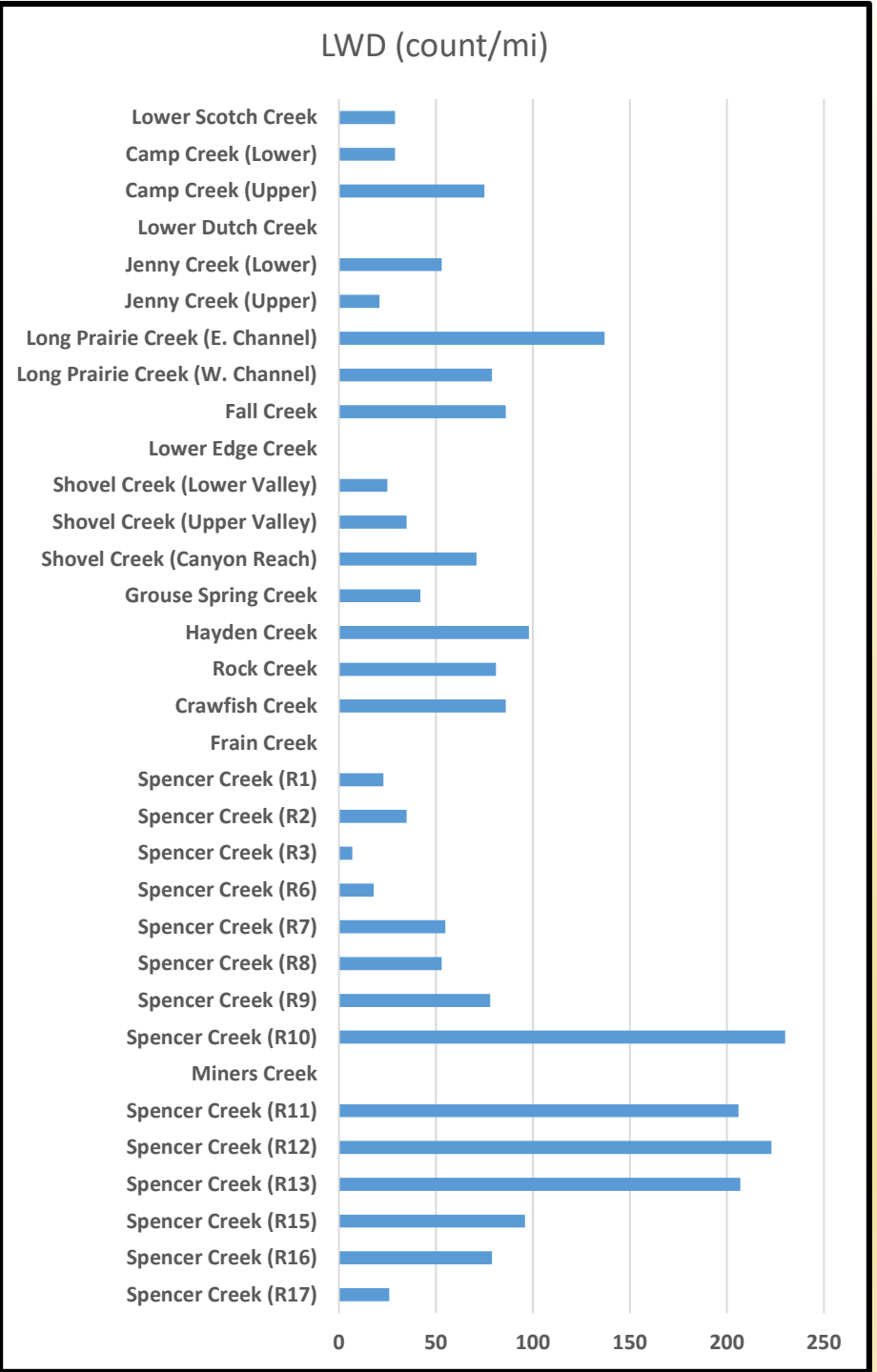
Habitat Surveys

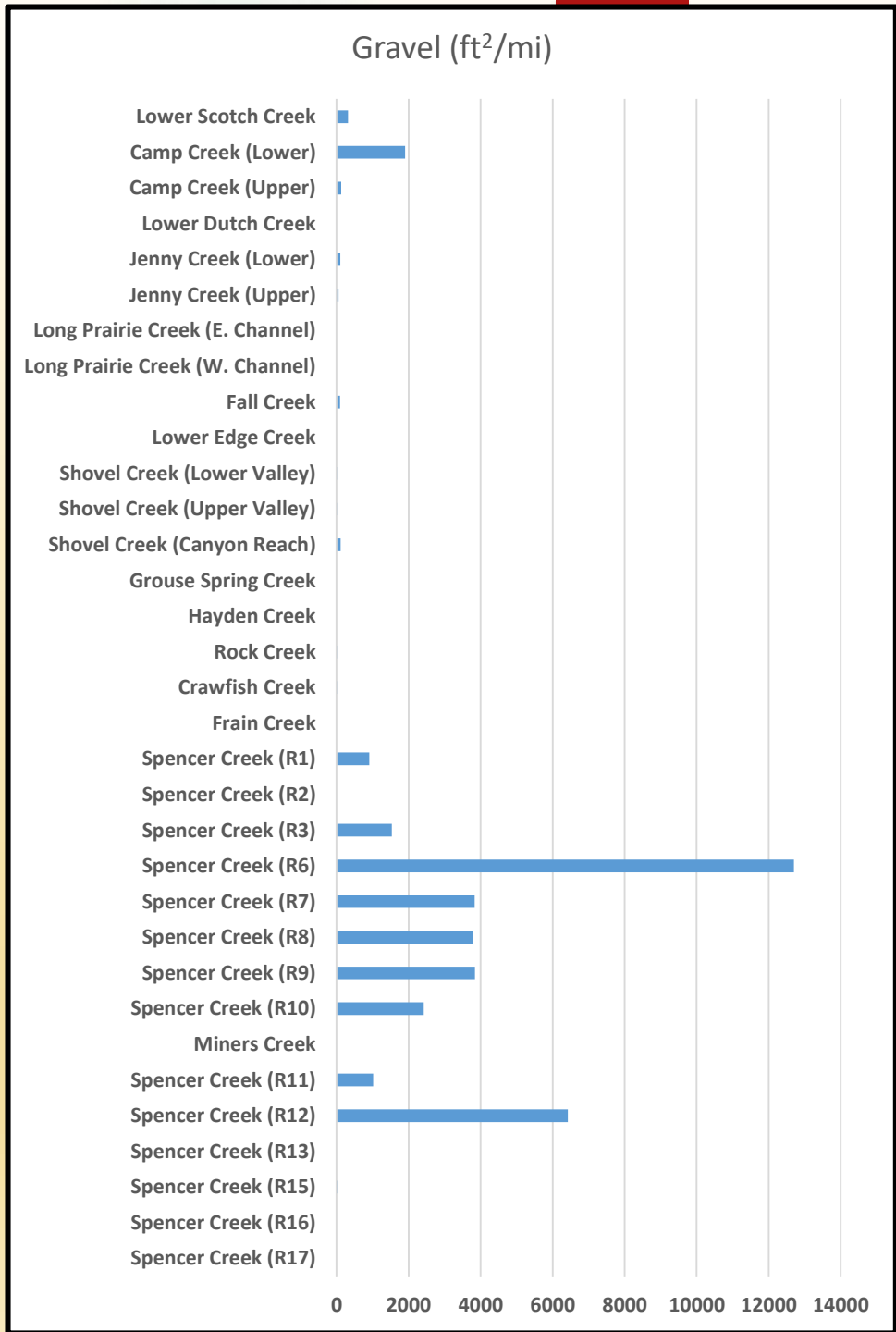
We assessed:
-Stream Flow
-Spawning Gravel
-Riparian Vegetation
-Relative Stream Gradient
-LWD Count
-Temperature
-Salmonid Presence
-Restoration Opportunities

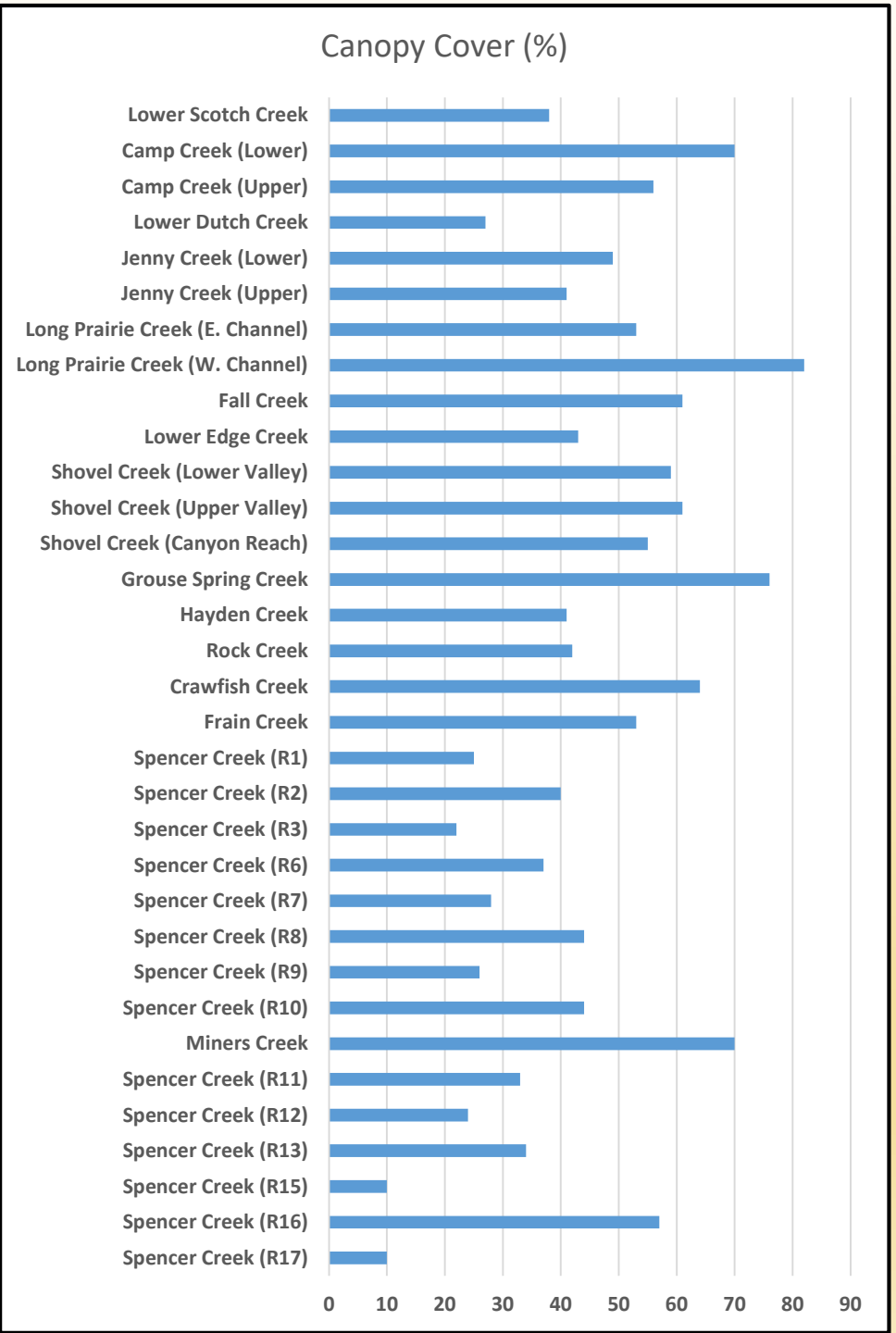
Most of these surveys were completed at the reach level

Tributaries	*Expected Length of Anadromy (miles, approximate)*
Klamath River Mainstem (Iron Gate to Lake Euwana)	62.3
Scotch Creek	2.2
Camp Creek	7.5
Jenny Creek	2.4
Fall Creek	1
Beaver Creek	2.1
Raymond Gulch	0
Deer Creek	2
Indian Creek	0
Spannaus Gulch	0
Milk Creek	0
Snackenbury Creek	0
Long Prairie Creek	0
Edge Creek	0.2
Shovel Creek	3.4
Grouse Spring Creek	0.8
Hayden Creek	0.2
Chert Creek	0
Rock Creek	0
Crawfish Creek	0.2
Frain Creek	0.2
Topsy Creek	0
Buck Creek	0
Spencer Creek	17
Clover Creek	0
Miners Creek	0.3
Total	**101.8**

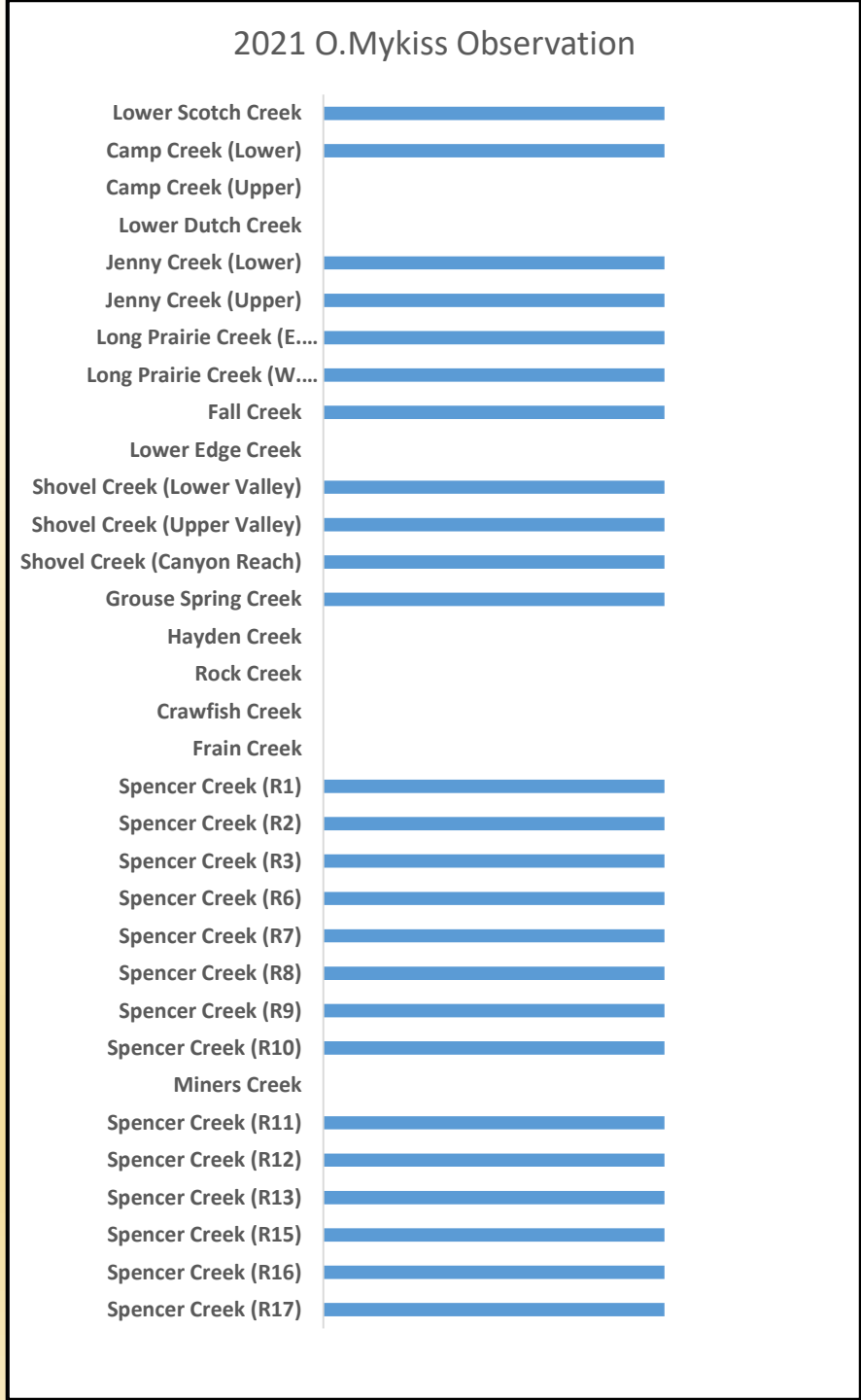
Habitat Summaries



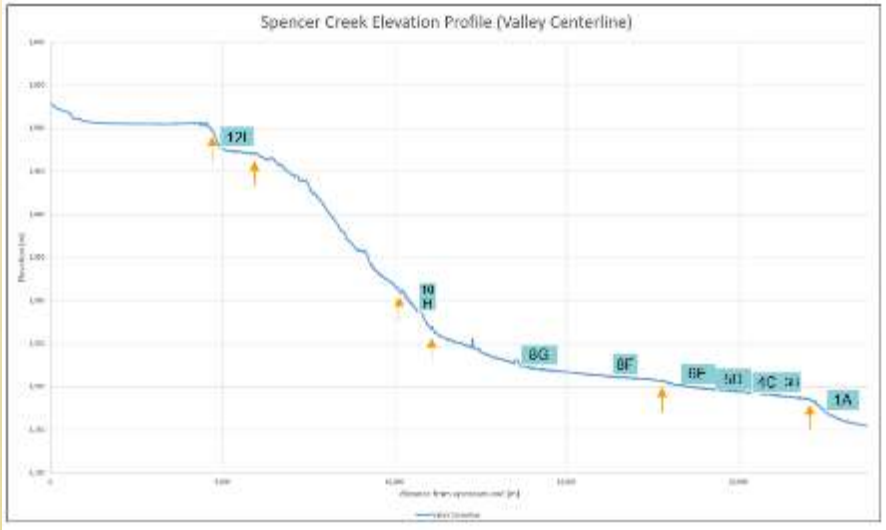


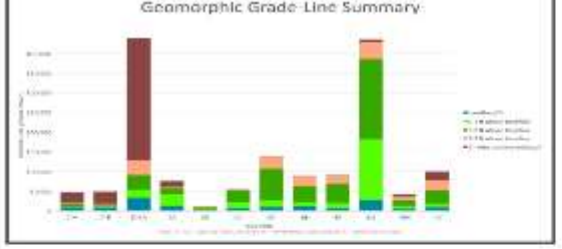


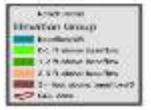
Habitat Summaries

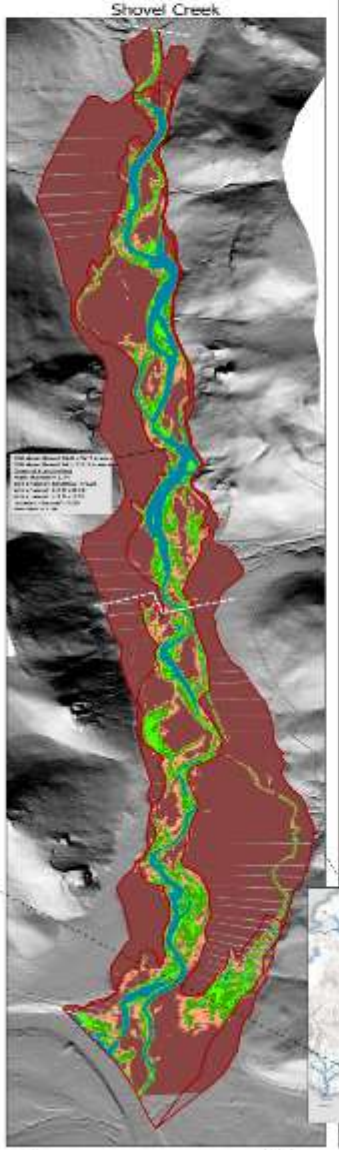


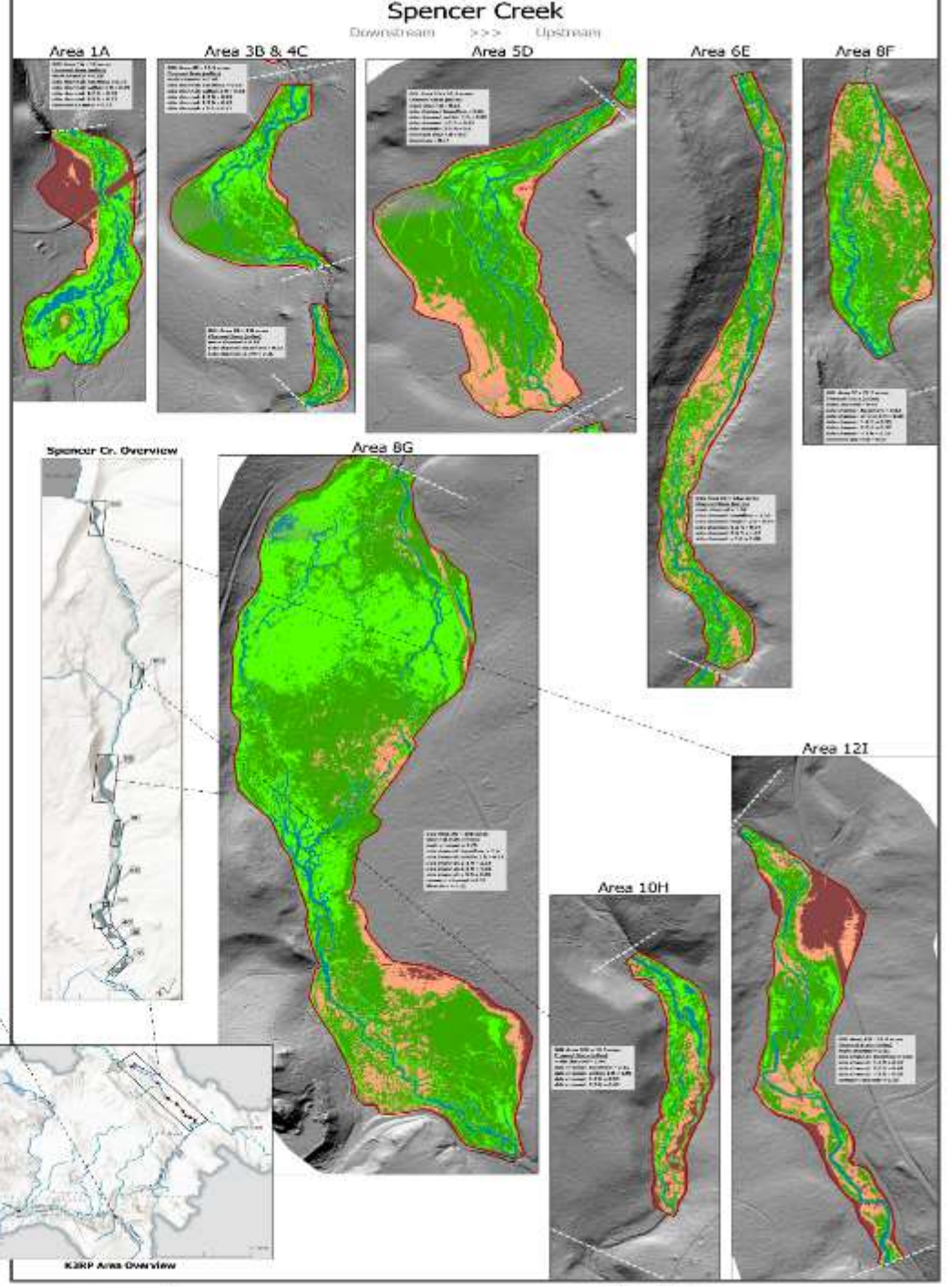
Geomorphic Grade Line Analysis in Shovel, Jenny and Spencer Creeks to identify floodplain reconnection projects.











Tributary Summaries

3.3.3 Deer Creek

Location

Deer Creek is a tributary that flows into the southern side of Copco Lake (Figure 45). Once Copco Dam is removed, Deer Creek will flow into the Klamath River at river mile 200.4.

Ownership

The watershed is privately owned with some federal (BLM and USFS) parcels.

Size

The watershed is approximately 7 square miles. Estimated 2 miles of anadromy based on Baseline Fish Habitat, but unable to confirm due to private property.

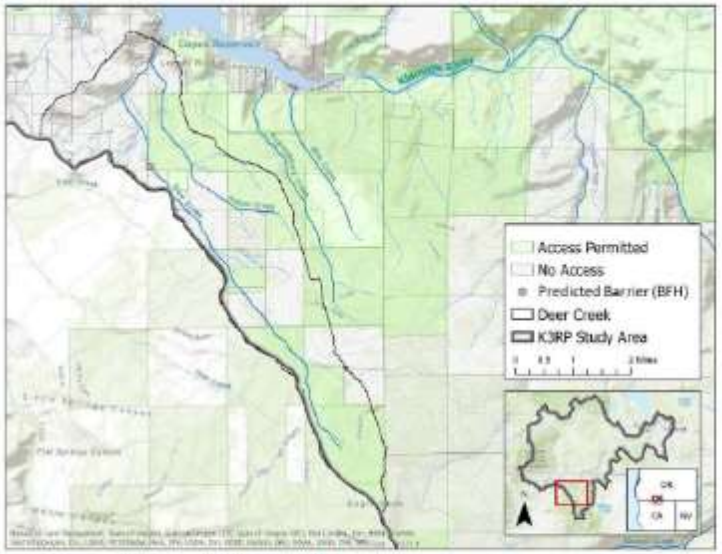


Figure 45. Deer Creek watershed. No habitat surveys were conducted in 2021. The location of the predicted barrier is the expected limit of anadromy in the creek based on the Baseline Fish Habitat model.

Natural Barriers

- Unknown. K3RP and previous groups were unable to gain access.

Man-Made Barriers

- Unknown. K3RP and previous groups were unable to gain access.

Temperature

- Temperatures were within a suitable range for coho salmon and *O. mykiss* during the summer-drought conditions of 2021 (Figure 46) (K3RP Temperature Assessment 2021).

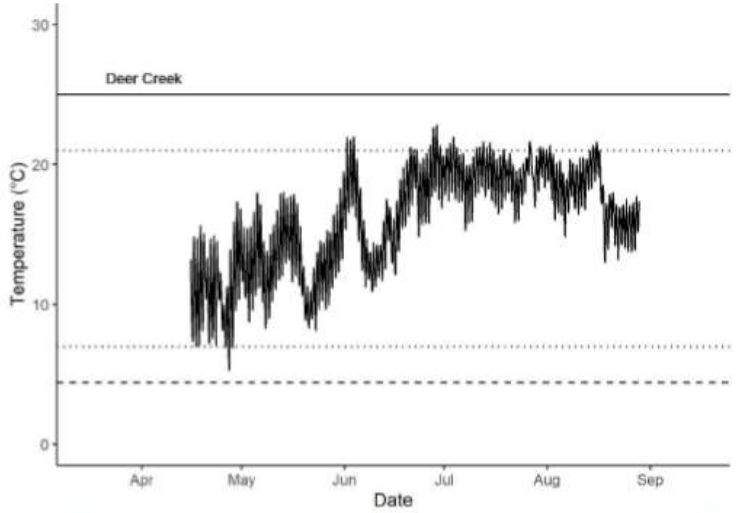


Figure 46. Deer Creek temperature data from 2021 for a logger placed just below Ager Beswick Road Crossing. Logger was installed on 04/15/2021 and the pool remained wetted throughout the summer. The black line indicates the temperature. Recommended summertime rearing temperature for juvenile coho salmon is 7 – 21 °C (dotted lines), cessation of growth occurs at a minima of 4.4 °C (dashed line), and the Upper Lethal Temperature (ULT) occurs at 25.0°C (solid black line).

Stream Flows

- Stream remained wetted during the 2021 drought. On April, 15, flows were ~1.0 CFS and on Augsut 28, flows were ~0.5 CFS. The consistent stream flows even during the drought period might suggest the creek has spring inputs (K3RP Temperature Assessment 2021).

Diversions

- Aerial imagery suggests there are several diversions in the upper watershed for cattle and flood irrigation activities. There is likely a large percentage of summer base flow being diverted on private parcels (K3RP Aerial Imagery Assessment 2021).

Salmonid Presence

- Salmonid presence is unknown, we but suspect *O. mykiss* and possibly coho salmon might use this tributary, especially if the habitat was restored (K3RP Habitat Assessment 2021).
- Bullfrogs were spotted near the Age Beswick culvert during the 2021 K3RP effort and they might have a negative impact on salmonid rearing success (K3RP Habitat Assessment 2021).

Habitat Description

- Unable to survey due to restricted access, but based on assessing the stream from the road, it seems like a relatively small tributary with some sections of low gradient habitat (Figure 47). There might be some areas suitable for coho and *O. mykiss* spawning. The few habitat units near the road crossing have significant issues with fine sediments covering the substrate, likely caused by the upstream cattle ranching (K3RP Habitat Assessment 2021).

Tributary Summaries continued

Figure 47. Looking downstream from the road at the Ager Beswick culvert on Deer Creek on 06/25/2021.

Identified Habitat Limitations

- Diversions likely limit flow (K3RP Aerial Imagery Assessment 2021)
- Significant issues with fine sediments covering the substrate (Figure 48) (K3RP Habitat Assessment 2021).

Figure 48. Looking upstream from the stream channel at the Ager Beswick culvert on Deer Creek on 06/25/2021.

Restoration Recommendations

- Restoration efforts should focus on assessing the impacts of agricultural practices and determine if a water quality improvement project would benefit Deer Creek.

Restoration Projects Identified

- Project #113 (high priority): Assess impacts of agricultural practices and determine if a water quality improvement project would benefit Deer Creek

Project List

- Identified 82 potential projects by goal, reasoning, and specific description
- Developed prioritization Criteria
- Vetted Criteria and project list with TAC

Project_numb	Watershed	Described_locat	Featu	Project_description_NEW	Restoration_Goal_NEW	Project_reasoning_NEW	Restoration_type_NEW
50	Long Prairie Creek	River Right Channel	Point	Replace the undersized culvert structure just upstream of Copco Reservoir	Assess culvert for fish passage. Replace if not passing fish at all life stages.	Erosion patterns below the culvert indicate that it is not properly sized for the channel.	Road Impacts
51	Long Prairie Creek	River Left Channel	Point	Remove the ATV/small vehicle crossing near the mouth or build a bridge	Prevent channel degradation from vehicles crossing the ford	Stream crossing does not have a bridge	Road Impacts
52	Long Prairie Creek	River Right Channel - Lower 300-400 feet	Line	Reconnect the floodplain and add complexity just upstream of the culvert on the RR channel by adding LWD	Floodplain connection, channel complexity for spring, summer and fall rearing.	The lower 300-400 feet of the river right channel is low gradient with some floodplain. Might be a good spot for off-channel ponds and LWD	LWD
55	Miners Creek	Lower 1500 feet of Miner Creek	Line	Install BDAs, raise elevation of the channel, add LWD to increase floodplain connectivity.	Reconnect channel to the floodplain for slow water refugia	Miner's Creek is about 2-4 feet wide and incised (3-4 ft) for much of the lower ½ mile reach. The vegetation was dominated by sedges, willows, and aspens, suggesting that the water table was not far below the surface. This might be a good spot for BDAs. There was also signs of recent beaver activity in the area	Channel alteration
56	Miners Creek	Just above the confluence with Spencer Creek	Point	Decommission logging road or provide an appropriate crossing structure.	Prevent channel degradation	The ford on Miners Creek appears to be degrading channel at the confluence	Road Impacts
57	Scotch Creek	From Iron Gate Reservoir upstream about 1200 feet	Line	Install structures (lwd/BDAs) in the lower 1200 feet	Retain water and provide habitat complexity	Scotch and Camp could benefit from water retention restoration	Water Retention (BDA)
59	Scotch Creek	From about 1 mile to 1.25 miles upstream of IGR	Line	Install BDAs in the meadow upstream of the barrier	Water retention	Scotch and Camp could benefit from water retention restoration. The meadow section has a year round spring. BDAs could also be highly beneficial for other aquatic and terrestrial species in the watershed	Water Retention (BDA)

Habitat Project Prioritization Results

Table 9. Average Technical Advisory Committee restoration project scores for each tributary.

Tributary	Project Count	Mean Weighted Project Score
Beaver Creek	1	3.6
Buck Creek	1	2.0
Camp Creek	3	2.4
Chert Creek	1	1.7
Clover Creek	2	2.1
Copco Springs	1	2.8
Crawfish Creek	4	2.4
Deer Creek	1	3.5
Edge Creek	2	1.8
Fall Creek	9	3.3
Frain Creek	1	2.5
Grouse Spring Creek	1	2.4
Hayden Creek	5	2.8
Jenny Creek	8	3.3
Klamath Mainstem	7	3.4
Long Prairie Creek	5	2.6
Mainstem Klamath, Long Prairie Creek, & Shovel Creek	1	4.7
Miners Creek	2	2.4
Scotch Creek	3	2.8
Shovel Creek	3	3.7
Spencer Creek	20	3.4
Total	**82**	**3.0**

Rank	Project	Location	Project Description	Score	Tier
1	#108	Mainstem Klamath, Long Prairie Creek, & Shovel Creek	Purchase PacifiCorp Parcel A lands for conservation and future restoration	4.69	High
2	#109	Spencer Creek	Obtain a conservation easement in the Spencer Creek floodplain areas for conservation and future restoration	4.54	High
3	#95	Spencer Creek	Make Buck Lake a lake again <OR> regrade channels in the lake to improve habitat conditions, add LWD, BDAs, vegetation, and cattle fencing to the depositional valley 14J	4.34	High
4	#99	Shovel Creek	Regrade stream channel to allow for full floodplain reconnection in this reach, and add cattle fencing	4.17	High
5	#47	Jenny Creek	Develop Upper Jenny Creek riparian and fencing plan to address water quality and temperature	4.16	High
6	#48	Klamath Mainstem	Improve upstream and downstream passage at Keno and Link River Dams for all life-stages of anadromous fish	4.11	High
7	#110	Fall Creek	Assess impacts of agricultural practices and determine if a water quality improvement project would benefit Fall Creek	4.00	High
8	#70	Spencer Creek	Remove cattle operation or work with landowner to keep cattle out of the riparian area and revegetate the riparian zone. Modify or remove diversion infrastructure used for cattle to ensure fish passage. If cattle removal is not possible, add cattle fencing.	3.93	High
9	#89	Spencer Creek	Reconnect floodplain, add LWD, add cattle fencing, and increase riparian vegetation to the depositional valley 4C	3.88	High
10	#91	Spencer Creek	Remove berm, reconnect channel to floodplain, add LWD, add cattle fencing, and increase riparian vegetation to the depositional valley 5D	3.85	High

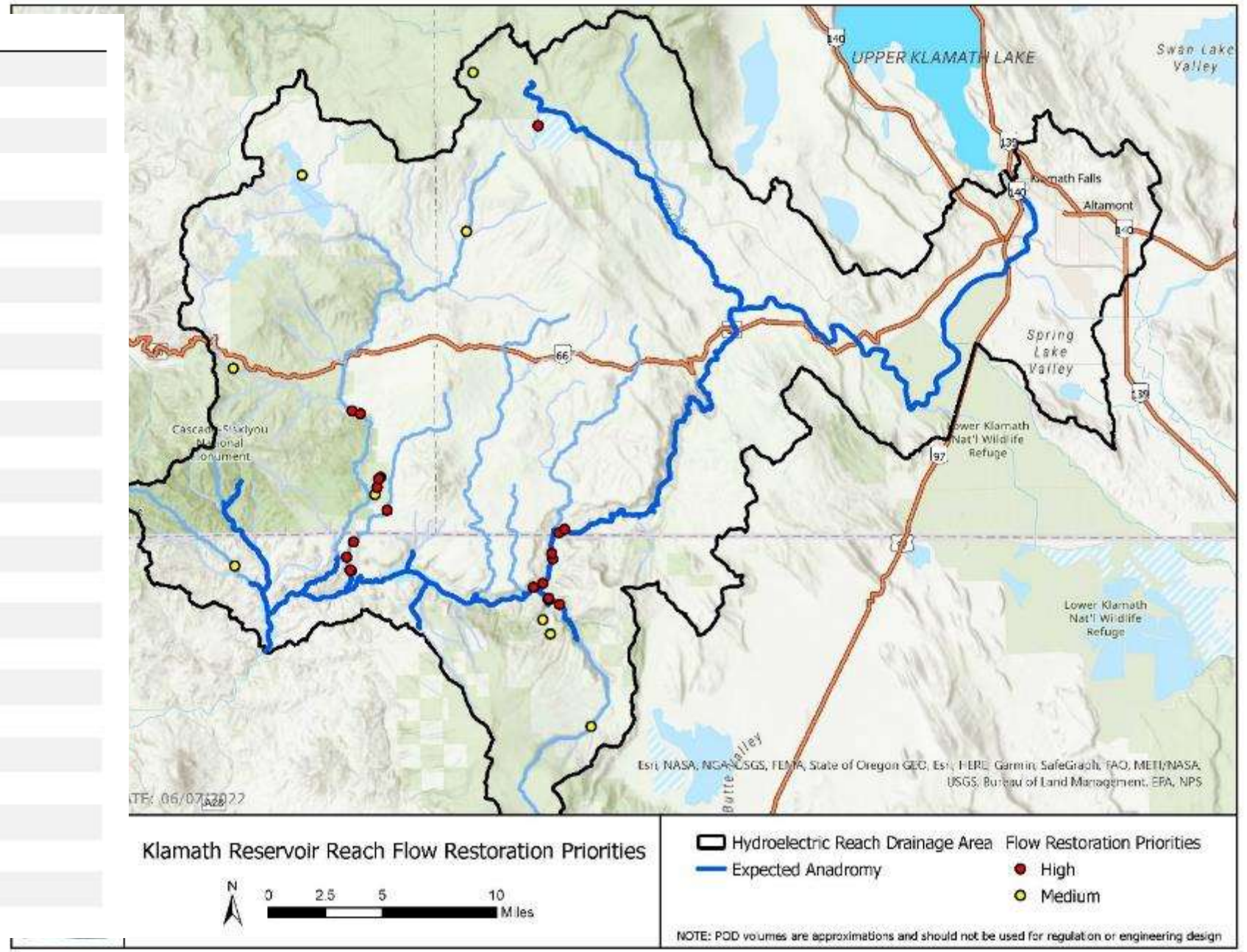
Flow Restoration Results

Tributary	High Priority	Medium Priority	Low Priority
Beaver Creek			19
Camp Creek			2
Deer Creek			2
Edge Creek			2
Fall Creek	6		18
Hayden Creek			2
Jenny Creek	4	9	47
Klamath River (downstream of Keno Dam)	6		4
Long Prairie Creek			1
Scotch Creek		1	3
Shovel Creek	3	3	1
Spencer Creek	4	2	5
	23	15	106

Diversion Rate	Water Right Priority Date	Priority Category
≥1 cfs	Before 1920 (or no priority date)	High
≥1 cfs	After 1920	Medium
0-1 cfs	Any	Low

Flow Restoration Results – 38 medium and high Projects

Project Number	Primary Tributary	Priority Tier
FA-1a	Fall Creek	High
FA-2	Fall Creek	High
FA-3	Fall Creek	High
FA-4	Fall Creek	High
FA-5	Fall Creek	High
FA-6	Fall Creek	High
GS-1	Shovel Creek	High
JE-2	Jenny Creek	High
JE-4	Jenny Creek	High
JE-6	Jenny Creek	High
JE-7	Jenny Creek	High
KL-1	Klamath River	High
KL-2	Klamath River	High
KL-3	Klamath River	High
KL-4	Klamath River	High
KL-5	Klamath River	High
KL-6	Klamath River	High
SH-1	Shovel Creek	High
SH-2	Shovel Creek	High
SP-6	Spencer Creek	High
SP-7	Spencer Creek	High
SP-8	Spencer Creek	High
SP-9	Spencer Creek	High
JE-1	Jenny Creek	Medium
JE-10	Jenny Creek	Medium
JE-3a	Jenny Creek	Medium



Screening Project Methods

- Used OR and CA water right records from OWRD and CA Water Board and on the ground observations
- Downstream of Keno (26) – analyzed all diversions within 400 ft of potential anadromy using all three criteria shown below.
- Upstream of Keno - 65 diversions were evaluated during the field/boat survey using criteria 1 below. We did not have enough data to include category 2 or 3 for this reach. 10 were determined not to exist, leaving 55 to prioritize

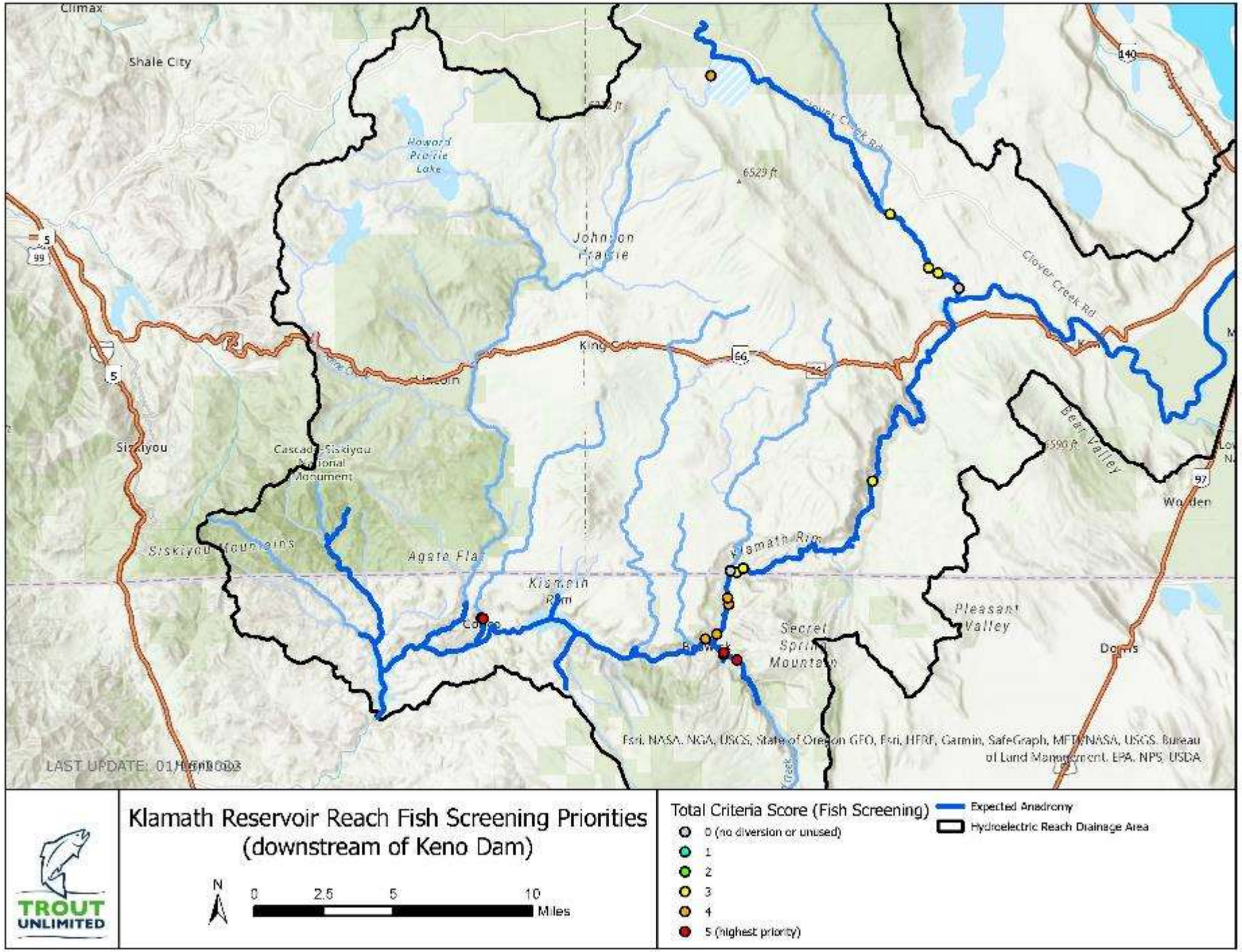
1. Diversion Size: Larger diversions are assigned a higher priority. Score depends on location of diversion (Klamath River Mainstem or Tributary). Estimates of mean September flow rates are derived from the NHD database.	2. Benefit to anadromous salmonids? Consider the number of anadromous salmonids and other native species of concern that will benefit from the project. For this analysis, seasonal races are considered one species.	3. Impact to Fish: Using best professional judgement, evaluate the potential impact to fish from the existing diversion. Factors to consider include entrainment potential, seasonality of diversion, existing infrastructure, and any other factors deemed relevant.
Weight: 0.2	0.2	0.6

Screening results (downstream of Keno)

20 unscreened diversions

3 screened diversions

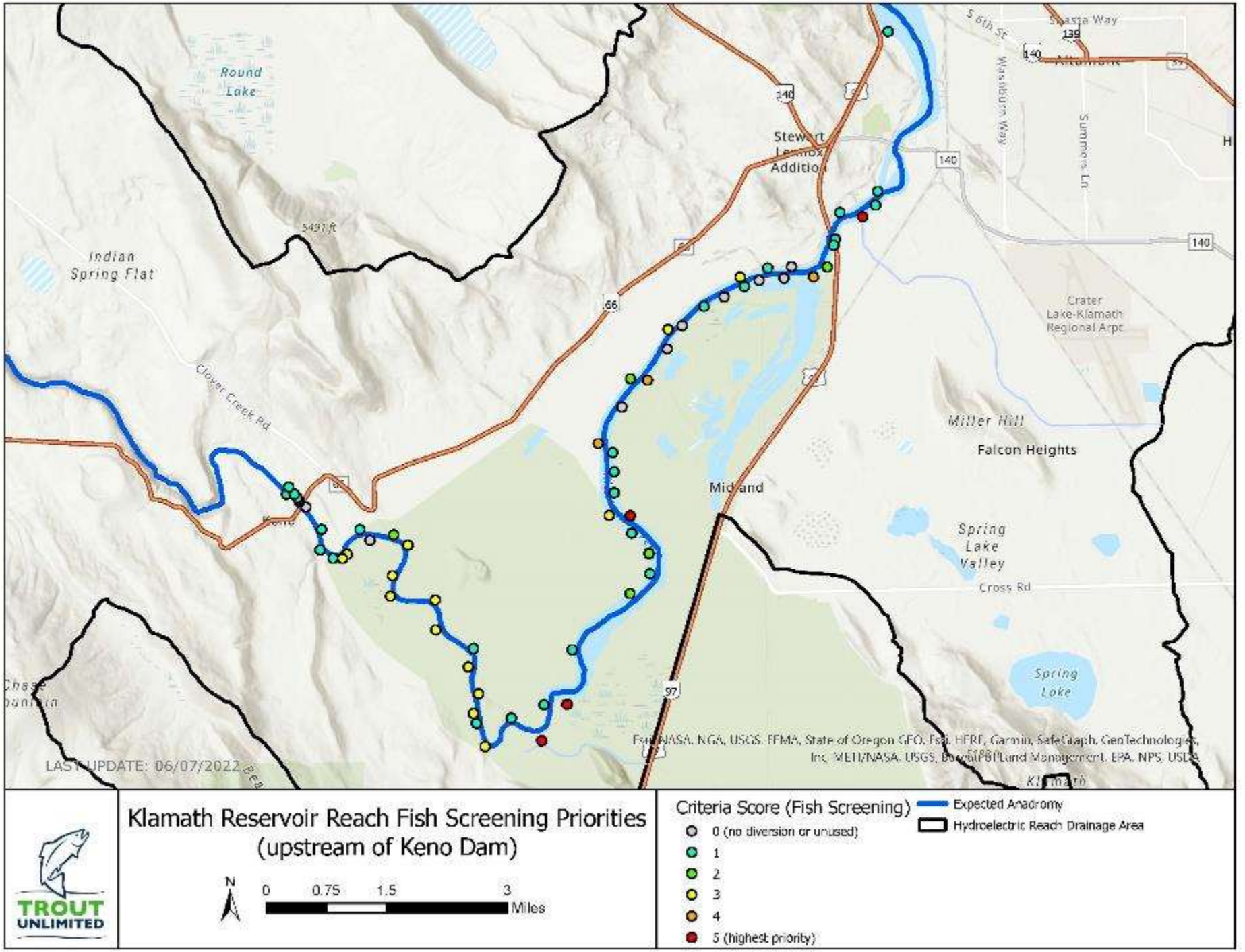
Fall Creek	4
Grouse Springs Creek	1 (Screened)
Klamath River Downstream of Keno	8
Shovel Creek	2 (both screened)
Spencer Creek (and tributaries)	8



Screening results (upstream of Keno)

50 unscreened diversions

5 screened diversions



Keno Impoundment Reach Top 15 List

Project Number	Volume (cfs)	Priority Tier	Screened	Project Description
KENO-05	1903	High	no	Lost River Diversion Ditch, open canal at river, radial gates on canal 0.65 miles from river, can flow both directions, used year round
KENO-41	1102.6	High	no	Ady Canal, open canal at river, canal size limits flow to 350cfs
KENO-39	710.1	High	no	North Canal, open canal at river, fence to keep boats out, used year round
KENO-43	545.02	High	no	Klamath Straits Drain, open canal at river, only drains and does not divert from Klamath River
KENO-18	56.64	High	no	open canal at river
KENO-29	32.43	High	no	24" headgate
KENO-13	31.15	High	yes	2 options, pump or headgate. Pump has conveyor belt screen, headgate is unscreened. When pump doesn't work (at certain river levels), headgate is used (according to ODFW). Miller Island #1
KENO-12	20.4	High	no	pump, industrial intake with debris screen
KENO-45	15.18	High	no	24" headgate
KENO-14	14.81	High	unknown	Unclear if/how diversion functions. Heavily vegetated open canal at river
KENO-42	14.72	High	no	2, 24" headgates and one pump house, all unscreened. Unclear which is diversion and which is drain
KENO-49	14.07	High	no	open canal at river
KENO-51	13.33	High	no	24" headgate
KENO-53	13.33	High	no	24" headgate and pump
KENO-36	12.74	High	yes	vertical panel screen on canal at river

Some Caveots regarding our Methods

- Diversion rates in all of the fish screening data layers are based on paper water rights, are approximate and likely do not reflect actual diversion rates.
- Diversion rates are sometimes maximum rates for a group of diversions, which means that there would not be the listed rate coming out of each diversion simultaneously.
- Other factors that could potentially influence fish entrainment such as microhabitat conditions at the POD, season and timing of diversion, or diversion infrastructure configuration were outside the scope of this project and were not analyzed.
- The time and cost associated with assessing every diversion in this reach and it's potential entrainment risk is not feasible at this time and should not preclude moving forward with screening diversions while continuing to prioritize other diversions in the basin.

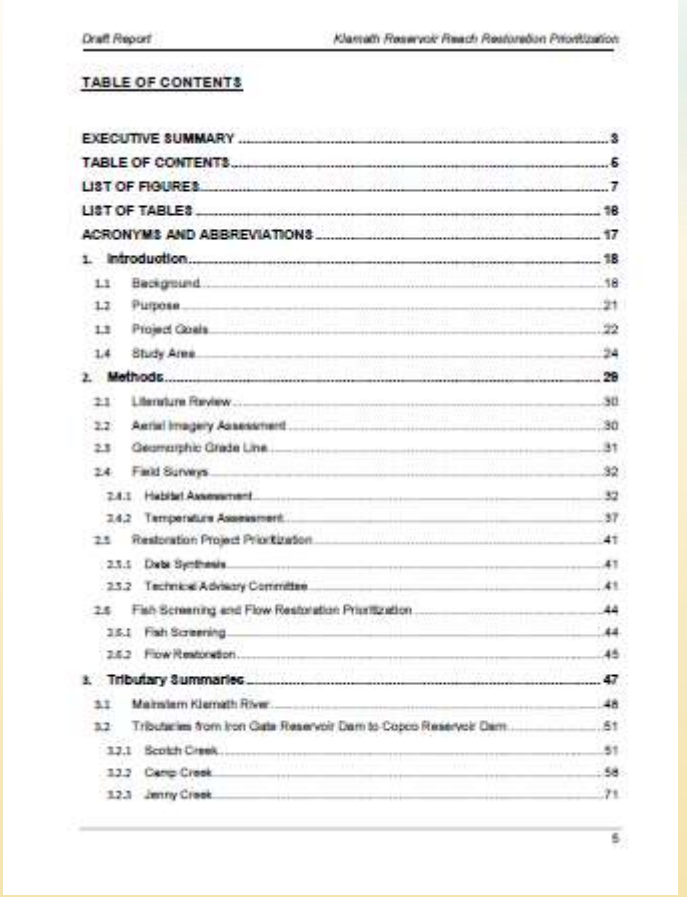
Current Status and Next Steps

- We released the plan on December 2022. https://k3rp-psmfc.hub.arcgis.com/

- Start working on 82 habitat projects, 70 potential screening projects and 38 potential flow restoration projects.

- Continue collecting temperature data until 2023

- Outreach to Tribes, irrigation districts, practitioners, stakeholders.



Draft Report — Klamath Reservoir Reach Restoration Prioritization

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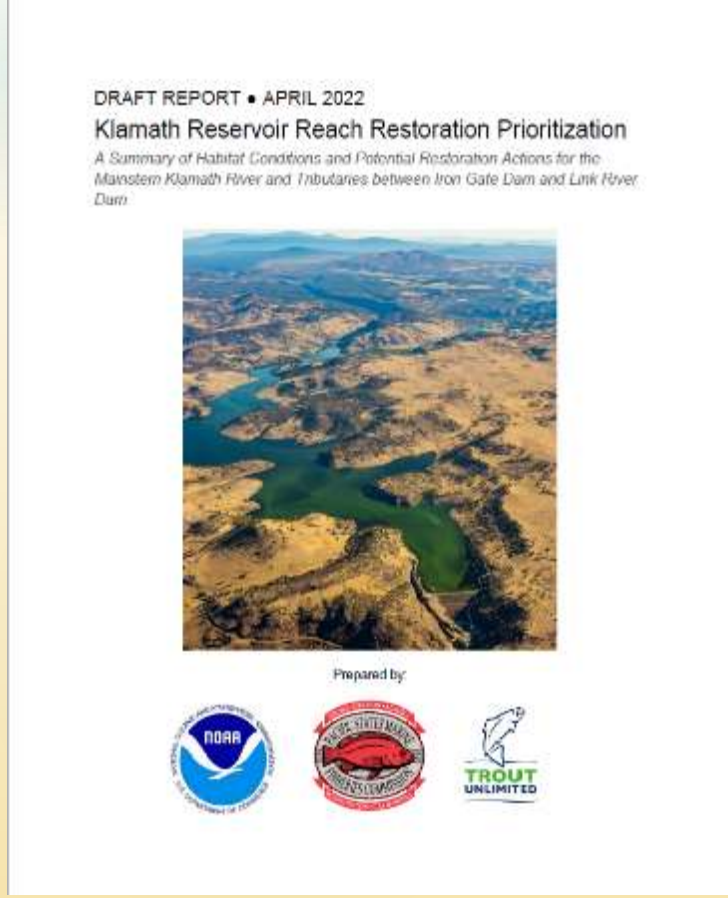


DRAFT REPORT • APRIL 2022

Klamath Reservoir Reach Restoration Prioritization

A Summary of Habitat Conditions and Potential Restoration Actions for the Mainstem Klamath River and Tributaries between Iron Gate Dam and Link River Dam

Prepared by:

NOAA

TROUT UNLIMITED

Current Outreach Efforts to implement K3RP Plan

- NOAA and TU have been coordination meetings with interested stakeholders and landowners and water users to understand where these entities intend to work, what projects they are applying for and for general coordination purposes.

- 27 groups interested in implementing this plan are meeting every 2-3 months to coordinate efforts and let the community know where they intend to work.

- The group met twice so far – Next meeting on May 2 from 1-3pm

NOAA	Trout Unlimited
BOR	Caltrout
BLM	RES
USFWS	Klamath River Renewal Corporation
CDFW	Ducks Unlimited
ODFW	Mid Klamath Watershed Council
Klamath Soil and Water Cons. District	Klamath Watershed Partnership
Family Water Alliance	Ridges to Riffles
Keno Irrigation District	Shasta Indian Nation
Klamath Water Users Association	Karuk Tribe
Klamath Drainage District	Klamath Tribes
Klamath Irrigation District	Yurok Tribe
Green Diamond	Modoc Nation
PacifiCorp	

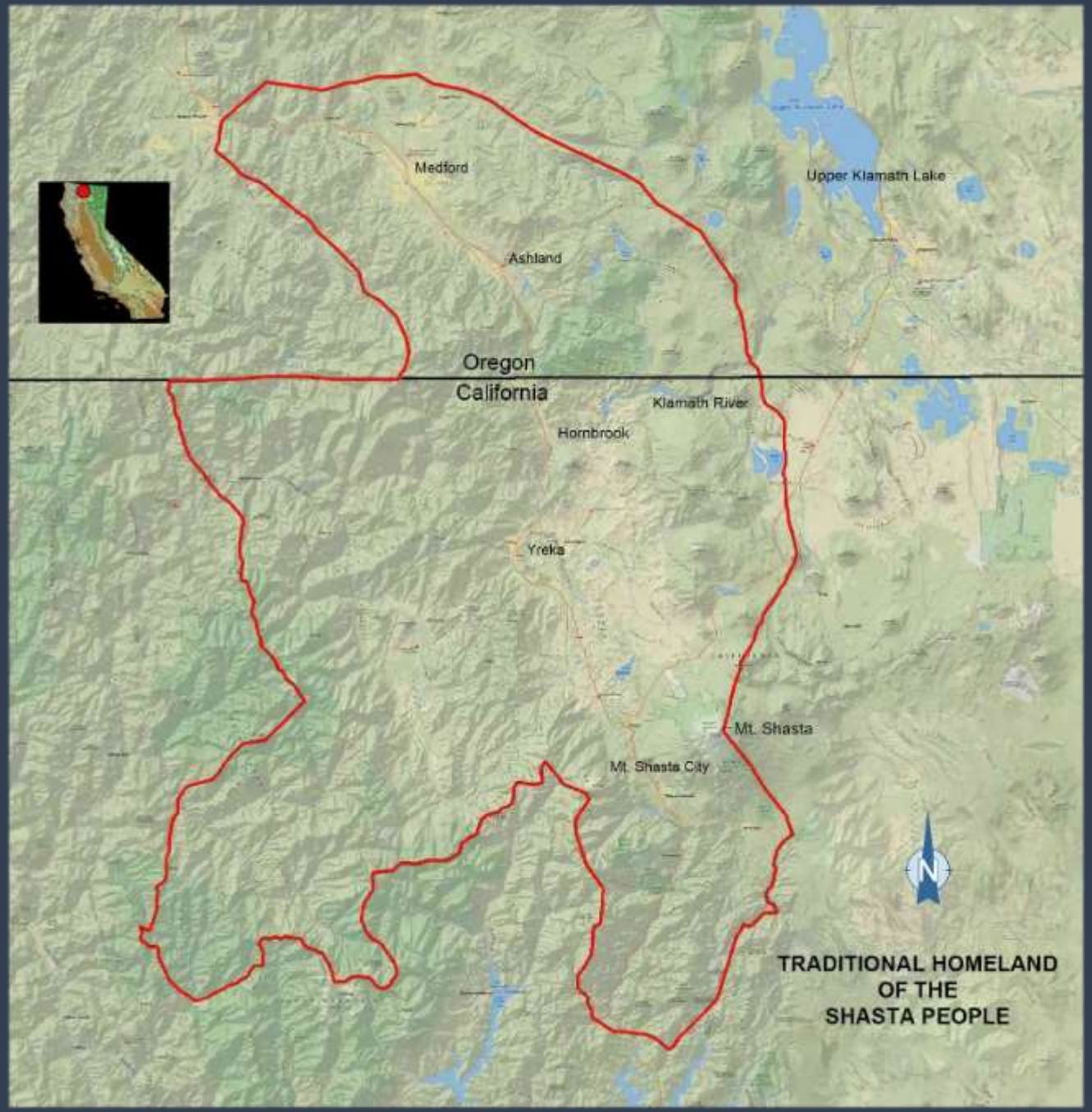


Forest and Mountain Meadow Resiliency, Fisheries Restoration, and River Recovery Actions on Working Lands in the Scott River

SCOTT RIVER WATERSHED COUNCIL

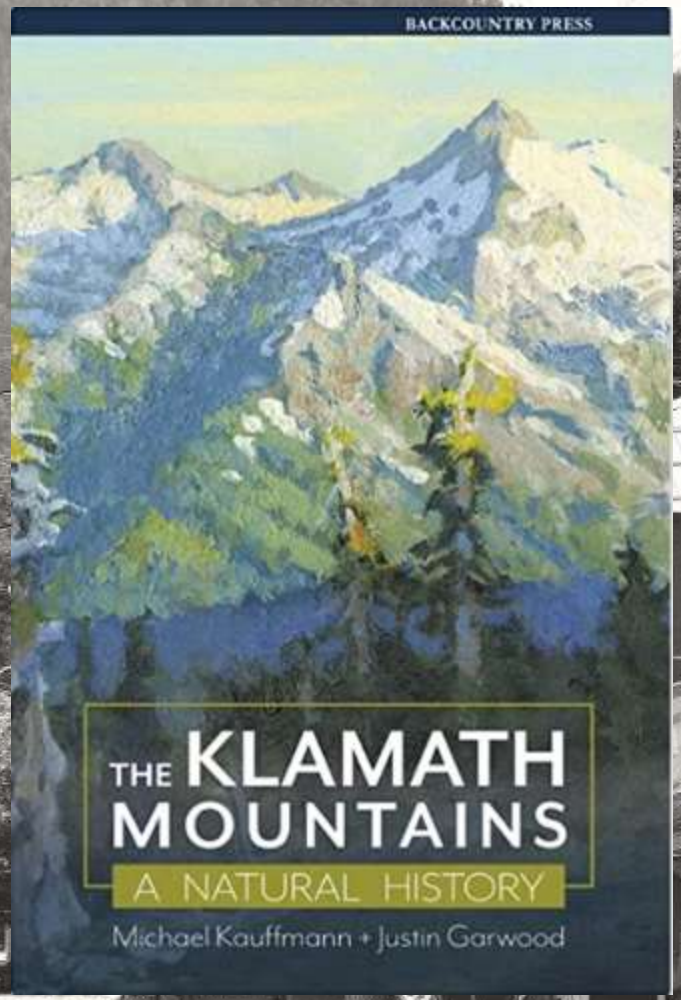
Scott River Watershed Council
Charnna Gilmore, Erich Yokel, Betsy Stapleton
April 27, 2023

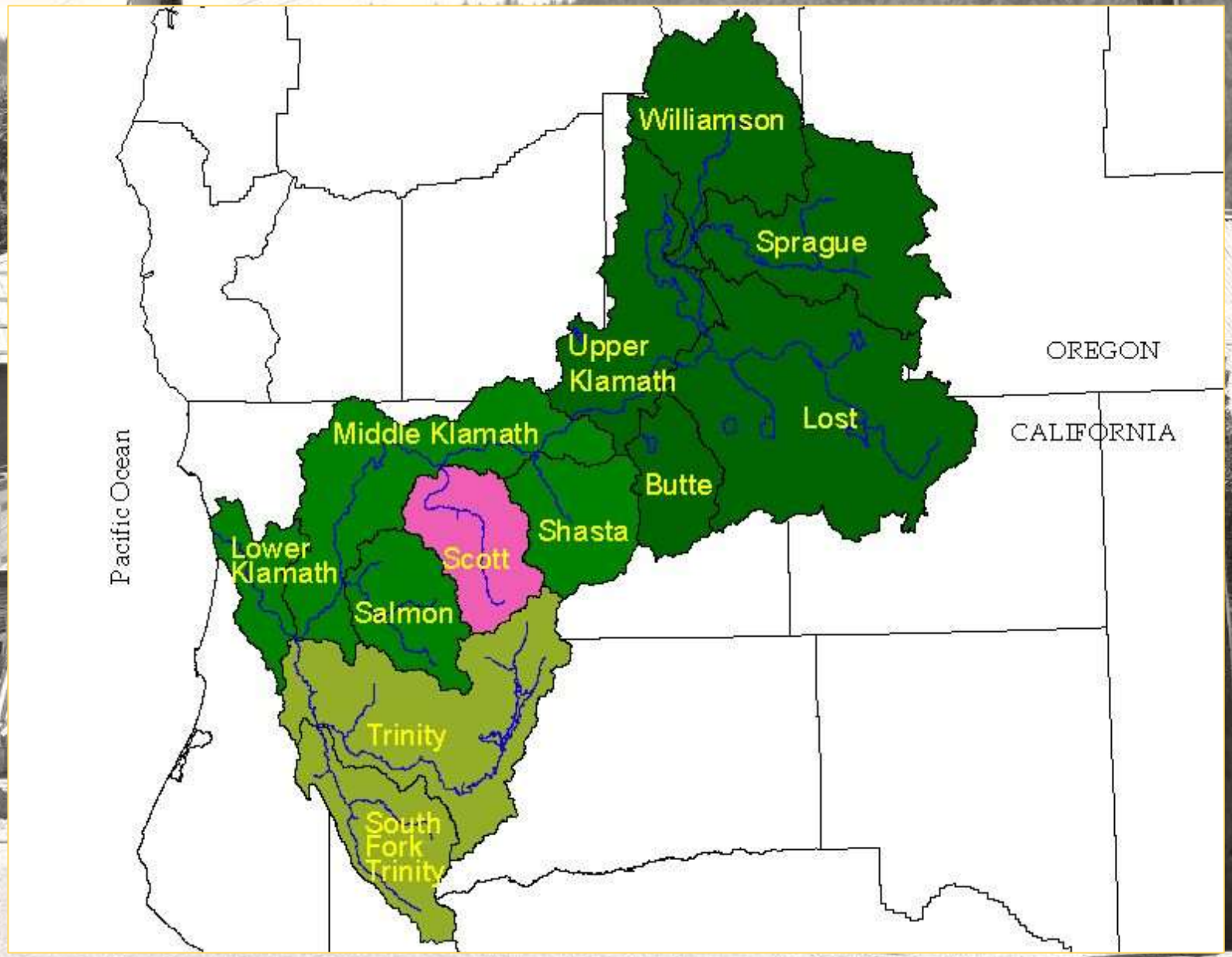
- Came to Siskiyou County in 1987 with the California Conservation Corp (CCC)
- Returned in 1988 for the CCC Backcountry Trail Program, Klamath National Forest in 1989
- Granddaughter of a miner, Bernard McDonald, the inventor of the McDonald T Hard Hat
- Married to Darren Gilmore, long time resident of Etna and has two girls, Cassidy & Coy
- Joined SRWC as Board of Director (~2006), ED in 2014



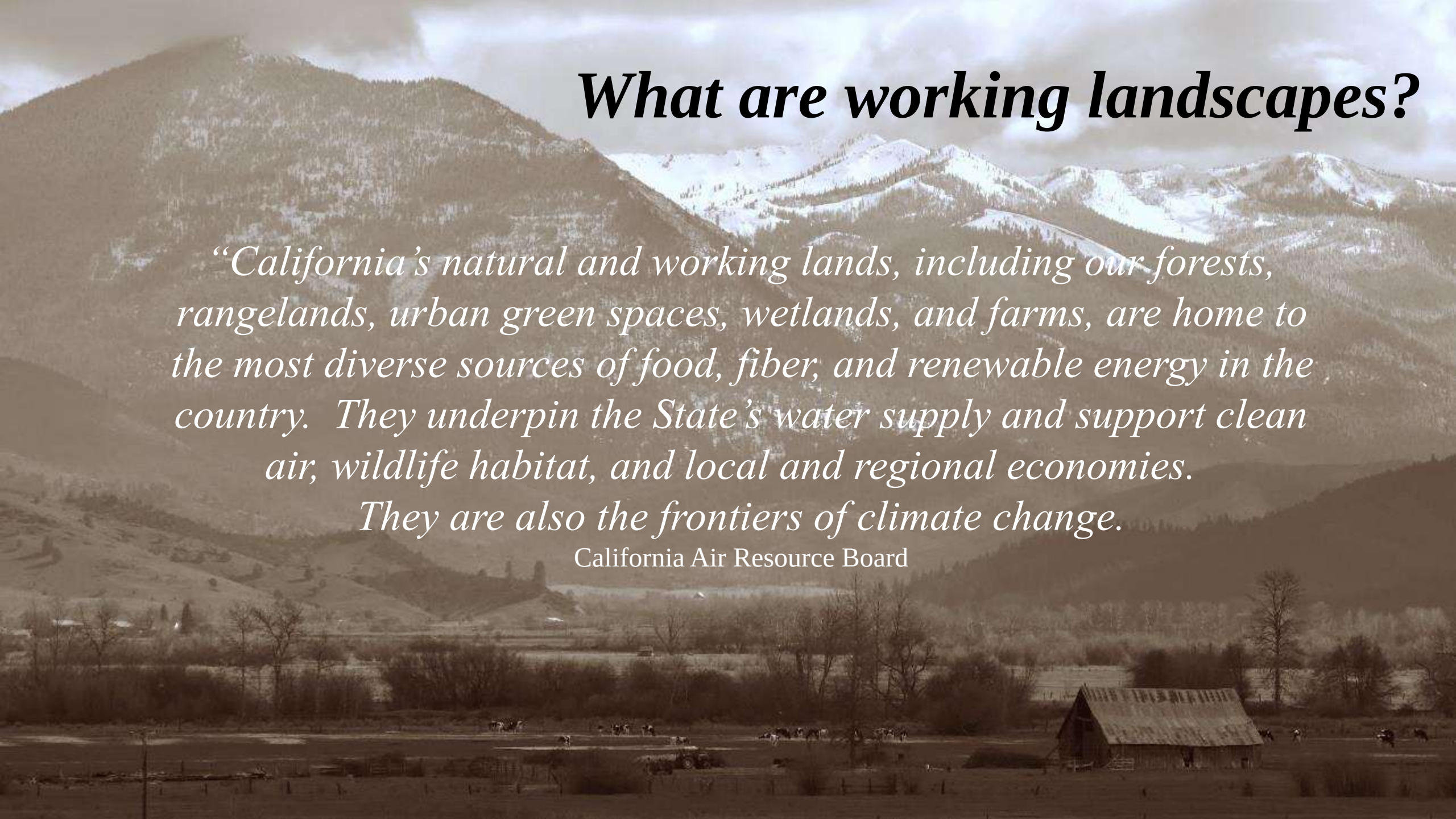
SHASTA INDIAN NATION

Quartz Valley Indian Reservation


BACKCOUNTRY PRESS
THE KLAMATH MOUNTAINS
A NATURAL HISTORY
Michael Kauffmann + Justin Garwood


Williamson
Sprague
Upper Klamath
Lost
Middle Klamath
Butte
Shasta
Scott
Lower Klamath
Salmon
Trinity
South Fork Trinity
OREGON
CALIFORNIA
Pacific Ocean


THE GREAT SEAL OF
STATE OF JEFFERSON
XX



What are working landscapes?

"California's natural and working lands, including our forests, rangelands, urban green spaces, wetlands, and farms, are home to the most diverse sources of food, fiber, and renewable energy in the country. They underpin the State's water supply and support clean air, wildlife habitat, and local and regional economies. They are also the frontiers of climate change.

California Air Resource Board

Photos from the Siskiyou RCD 2022


2023 Preliminary Estimated Coho Outmigration from Scott River
Scott Coho 1+ Cumulative Population Estimate
80000
70000
60000
50000
40000
30000
20000
10000
0
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
21-Jan
21-Feb
21-Mar
21-Apr
21-May
21-Jun
5,025
21-Jan
28-Jan
4-Feb
11-Feb
18-Feb
25-Feb
4-Mar
11-Mar
18-Mar
25-Mar
1-Apr
8-Apr
15-Apr
22-Apr
29-Apr
Julian Week End Date
Min-Max Range 2003-2022
Mean 2003-2022
Median 2003-2022
Preliminary Estimate 2023
CALIFORNIA
DEPARTMENT OF
FISH &
WILDLIFE

"If you want to go fast, go alone; If you want to go far, go together"

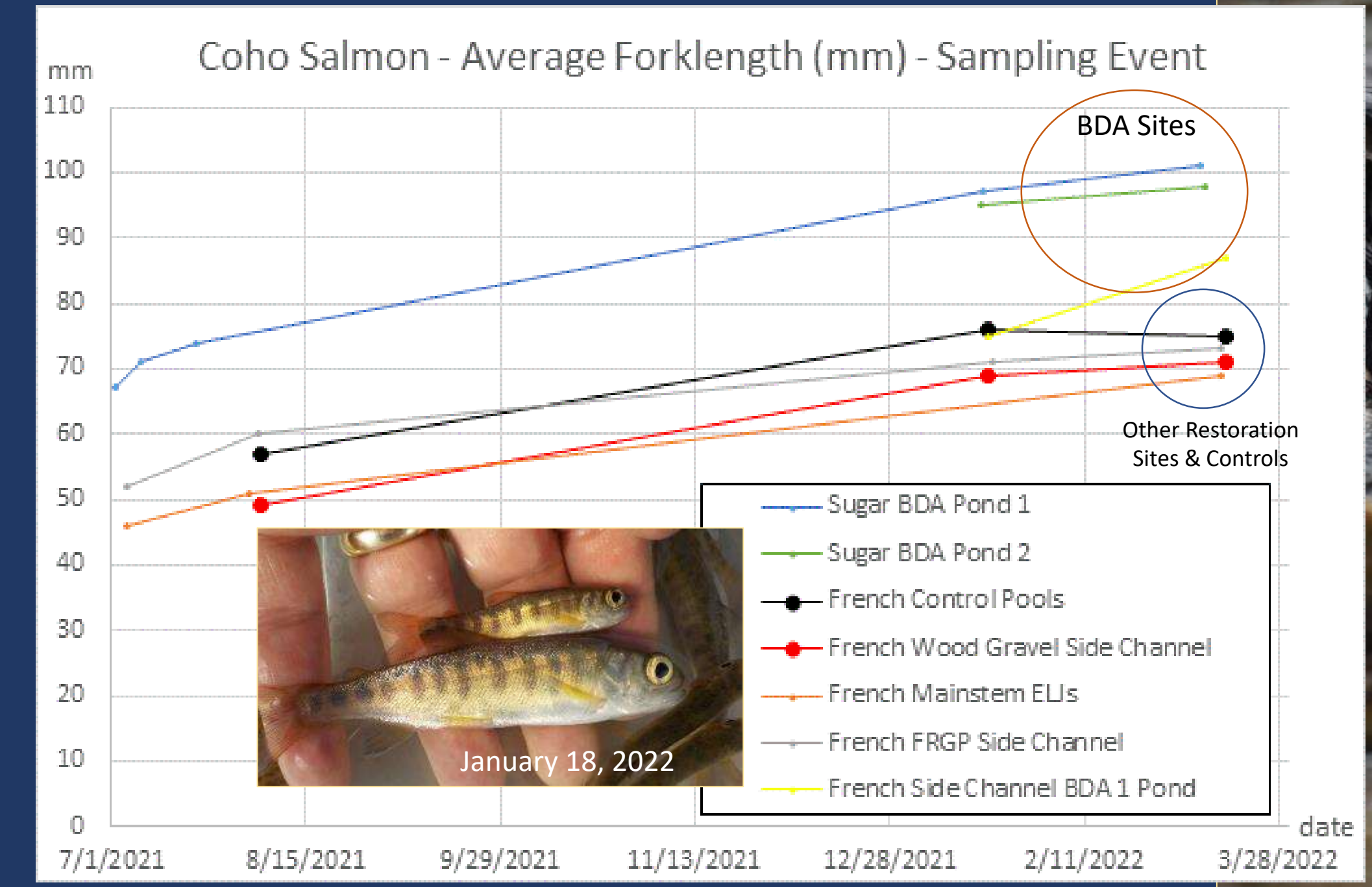
Scott River Beaver Dam Analogs (BDAs)

- Beaver Dam Analogs (BDAs) Construction
  - 2014, 2017, 2021, 2022
- Beaver Dam Analogues (BDAs) Maintenance
  - 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022
- Monitoring 2014-2023
  - Fish Utilization
  - Surface Water Elevations
  - Water Quality
  - Beaver Utilization
  - Food Web
  - Geomorphic Change
  - Discharge (streamflow)

Photo was taken
October 28, 2022

October 28, 2022
Scott River Discharge
6.81 cubic feet per second (cfs)

Coho Salmon - Average Forklength (mm) - Sampling Event



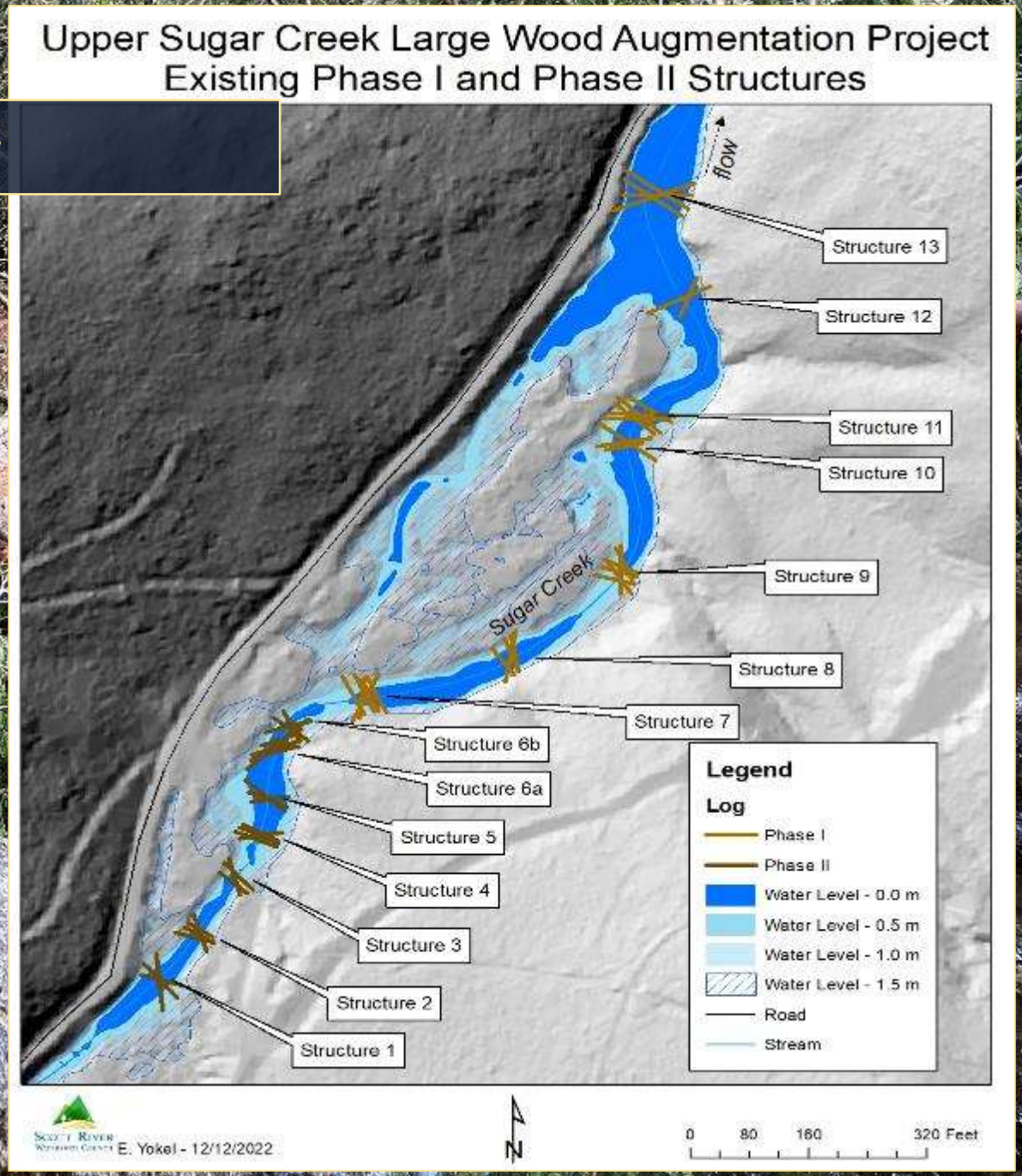
Date	Stream	Location Detail	Gear	Distance (km)	PIT Code	FL	Weight	Mark	Recap
2/26/2021	Miners Creek	MinersBelowUpperBDA	MT		989001039965887	76	5.1	x	
4/2/2021	French Creek	Mid French Creek RKM 4.5 - Below Miner	Array 18	0.15	989001039965887				
4/2/2021	French Creek	Mid French Mainstem RKM 3.1	Array 17	1.4	989001039965887				
4/2/2021	French Creek	Mid French Mainstem RKM 2.9 - US	Array 10	0.2	989001039965887				
4/2/2021	French Creek	Mid French Mainstem RKM 2.9 - DS	Array 11	0	989001039965887				
12/14/2022	Scott River	Scott Weir RKM 29.2	Array 94		989001039965887				

Date	Stream	Location Detail	Gear	Distance (km)	PIT Code	FL	Weight	Mark	Recap
12/15/2020	French Creek	FRGP Side Channel	MT		989001038203477	77	4.8	x	
12/16/2020	French Creek	FRGP Side Channel	Array 12	0	989001038203477				
1/26/2021	French Creek	FRGP Side Channel	MT	0	989001038203477	80	5.1		x
2/1/2021	French Creek	FRGP Side Channel	Array 12	0	989001038203477				
2/1/2021	French Creek	FRGP Side Channel	Array 15	0	989001038203477				
5/28/2021	Scott River	Scott Weir RKM 29.2	Array 94	51.5	989001038203477				
12/24/2022	Scott River	Scott Weir RKM 29.2	Array 94		989001038203477				

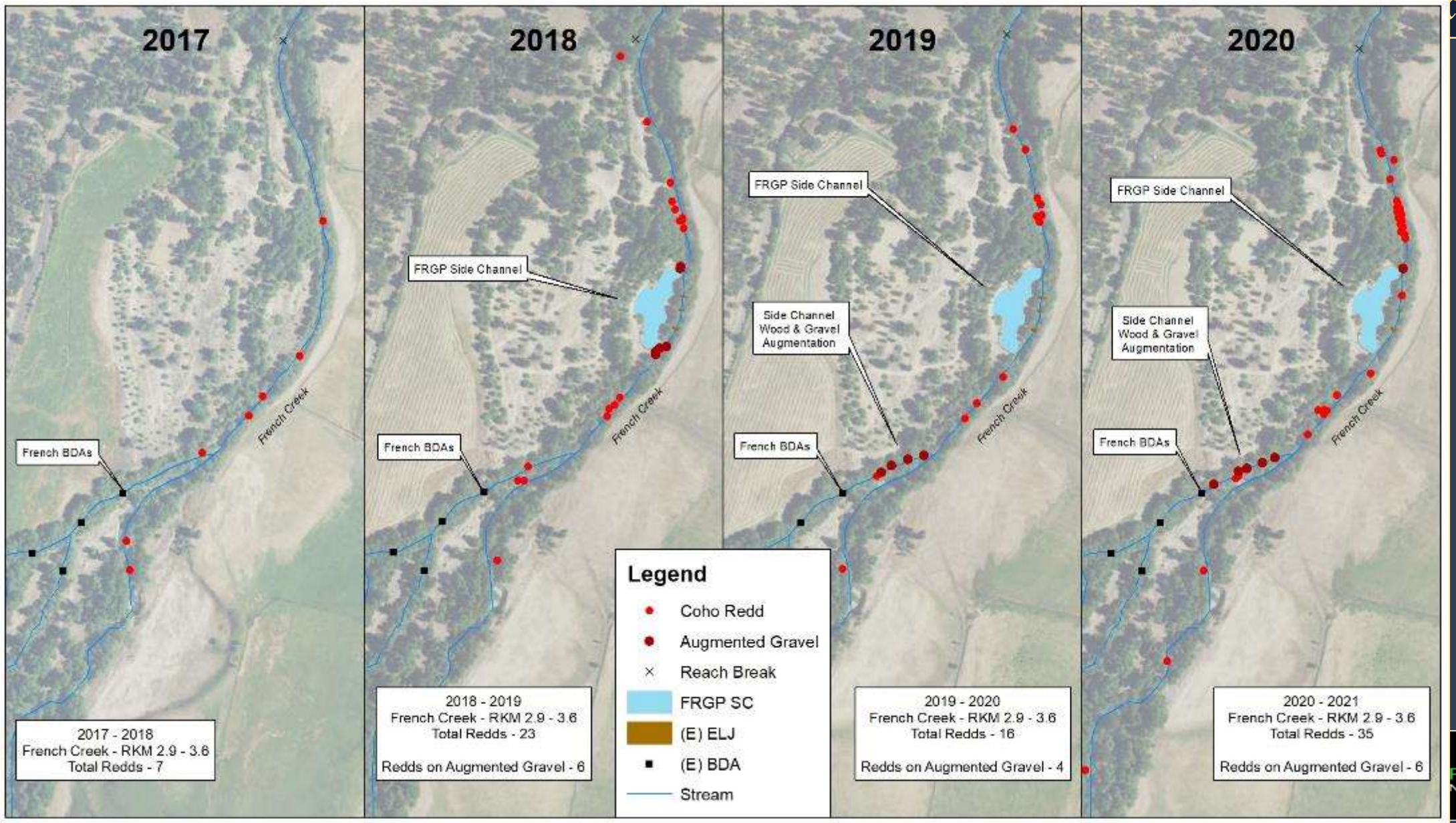
Date	Stream	Location Detail	Gear	Distance (km)	PIT Code	FL	Weight	Mark	Recap
10/7/2020	French Creek	French Control Pool 3	Seine		989001038203611	66	2.8	x	
11/25/2020	French Creek	Mid French Mainstem RKM 2.9 - US	Array 10	1.6	989001038203611				
12/26/2022	Scott River	Scott Weir RKM 29.2	Array 94		989001038203611				

Klamath Basin Fisheries Collaborative

Tributary Wood Loading Projects



French Creek- RKM 2.9 - 3.6 - Coho Salmon Redds - Brood Year 2017 - Brood Year 2020

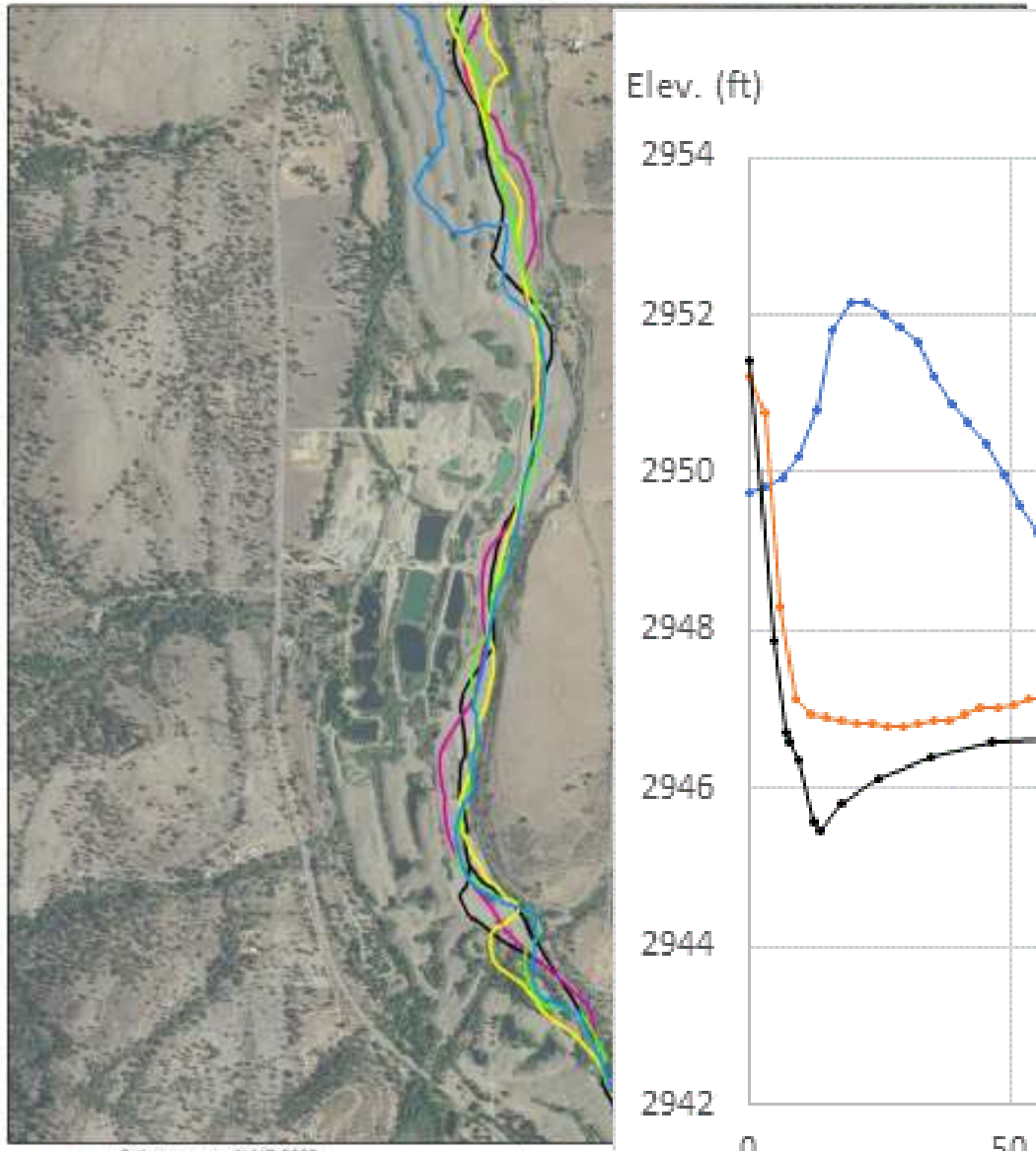


Scott River Watershed Council E. Yokel - 2/16/2021

Scott River Tailings Restoration Design, Monitoring & Implementation

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE · Coastal Conservancy · U.S. FISH & WILDLIFE SERVICE · Stillwater Sciences · LWA LARRY WALKER ASSOCIATES science | policy | solutions · Siskiyou County Farm Bureau · CALIFORNIA TROUT FISH · WATER · PEOPLE · Cascade STREAM SOLUTIONS · The Nature Conservancy

Scott River Tailings - Stream Alignment 1944 - 2020



Orthoimagery - NAIP 2020

Scott River Watershed Council

E. Yokel - 1/10/2022

N

0 550 1,100 2,200 Feet

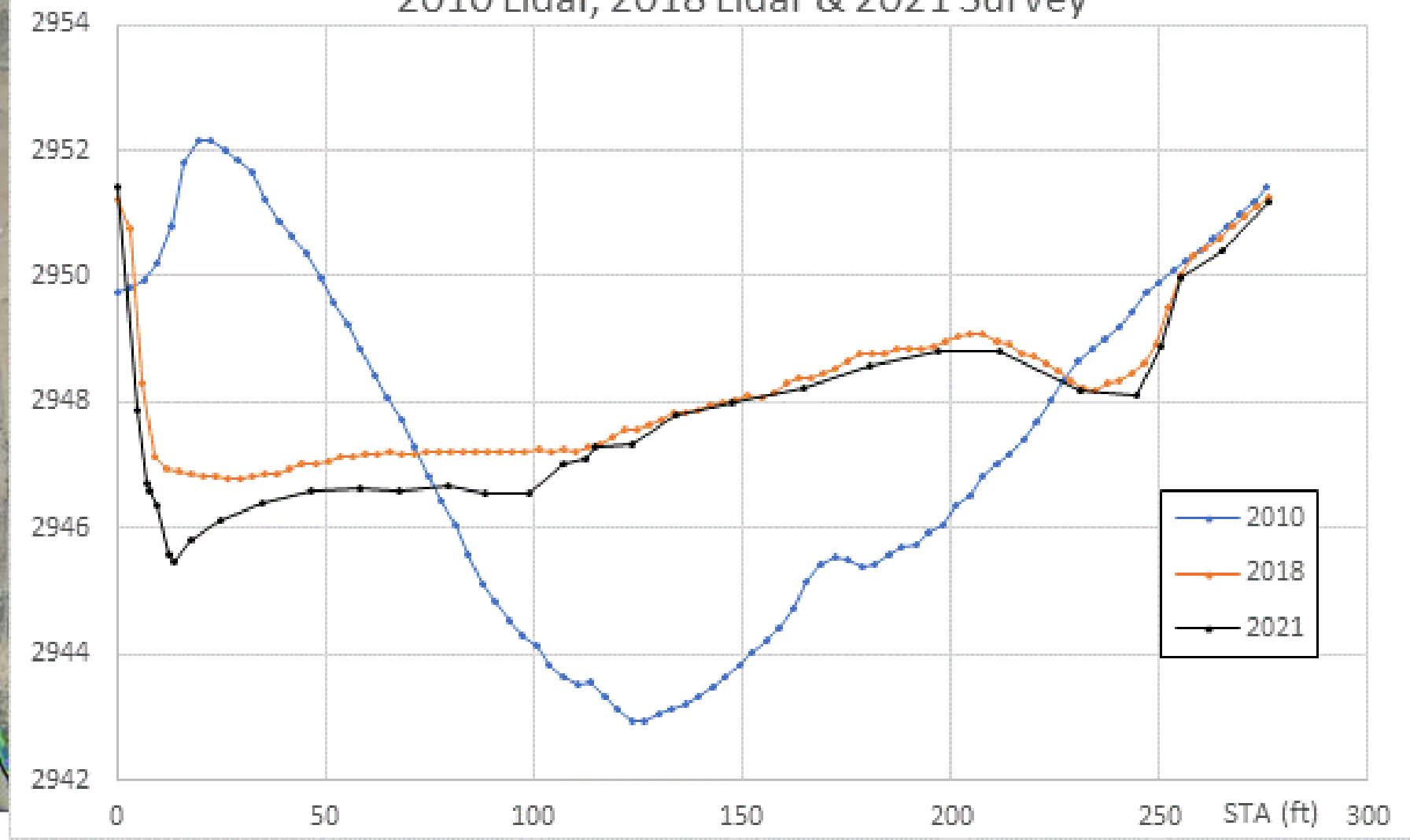
Tailings Ponds - Existing Bathymetric Survey and DTM

N

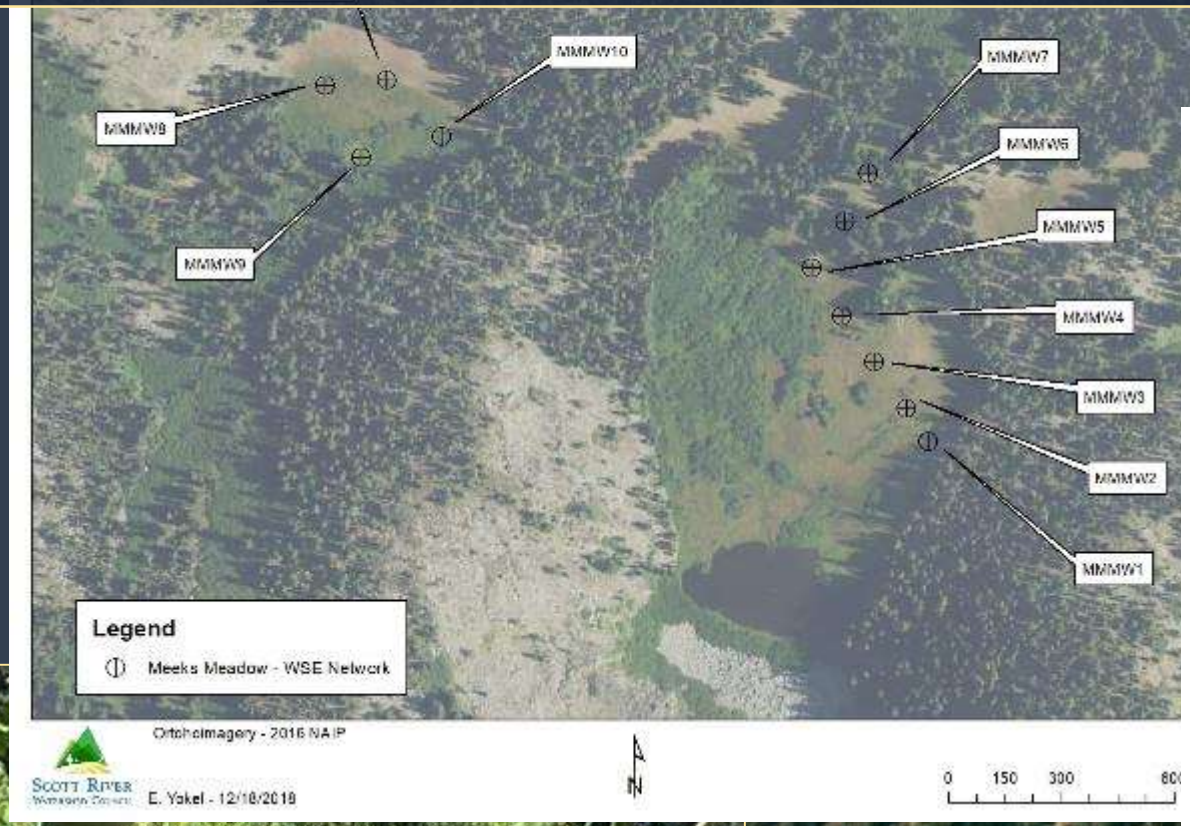
0 375 750 1,500 Feet

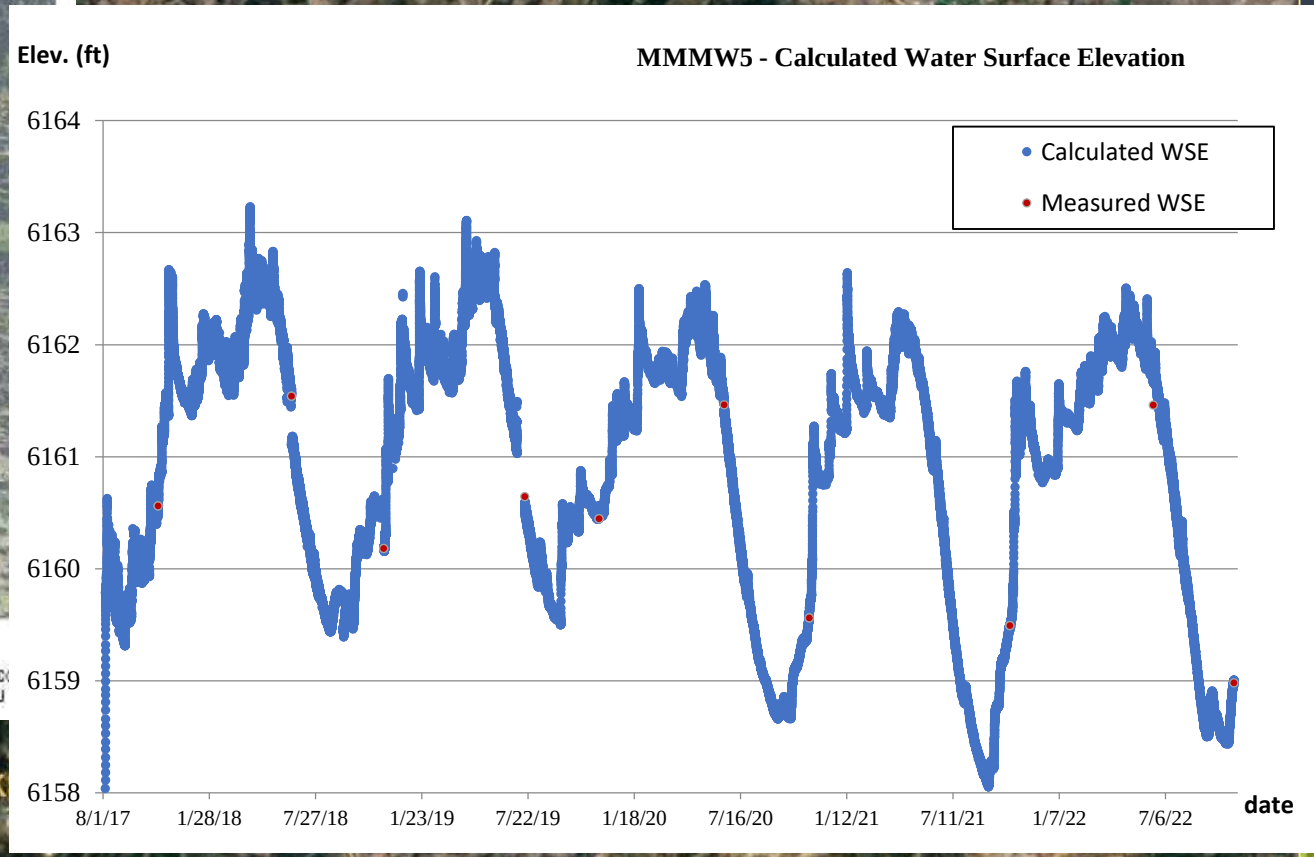
E. Yokel - 1/10/2023

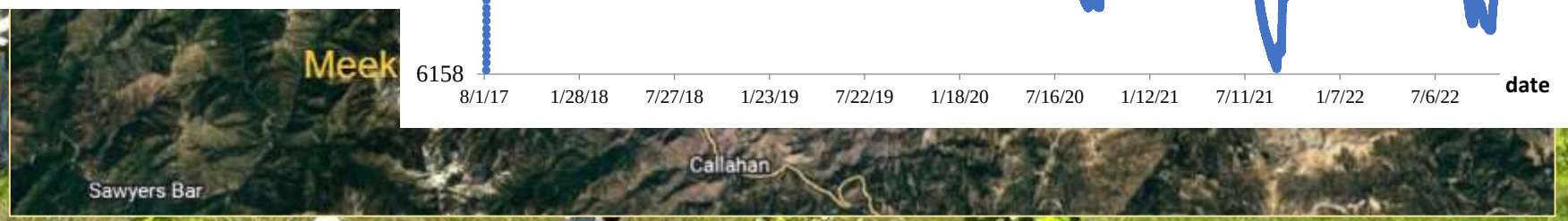
Scott River Tailings - X Section 13
2010 Lidar, 2018 Lidar & 2021 Survey



Meeks Meadow Monitoring – Groundwater and Aspen - 2017







YESS
YOUTH ENVIRONMENTAL SUMMER STUDIES

FOREST SERVICE
US
DEPARTMENT OF AGRICULTURE

Big Meadows Aspen and Mountain Meadow Restoration - 2019

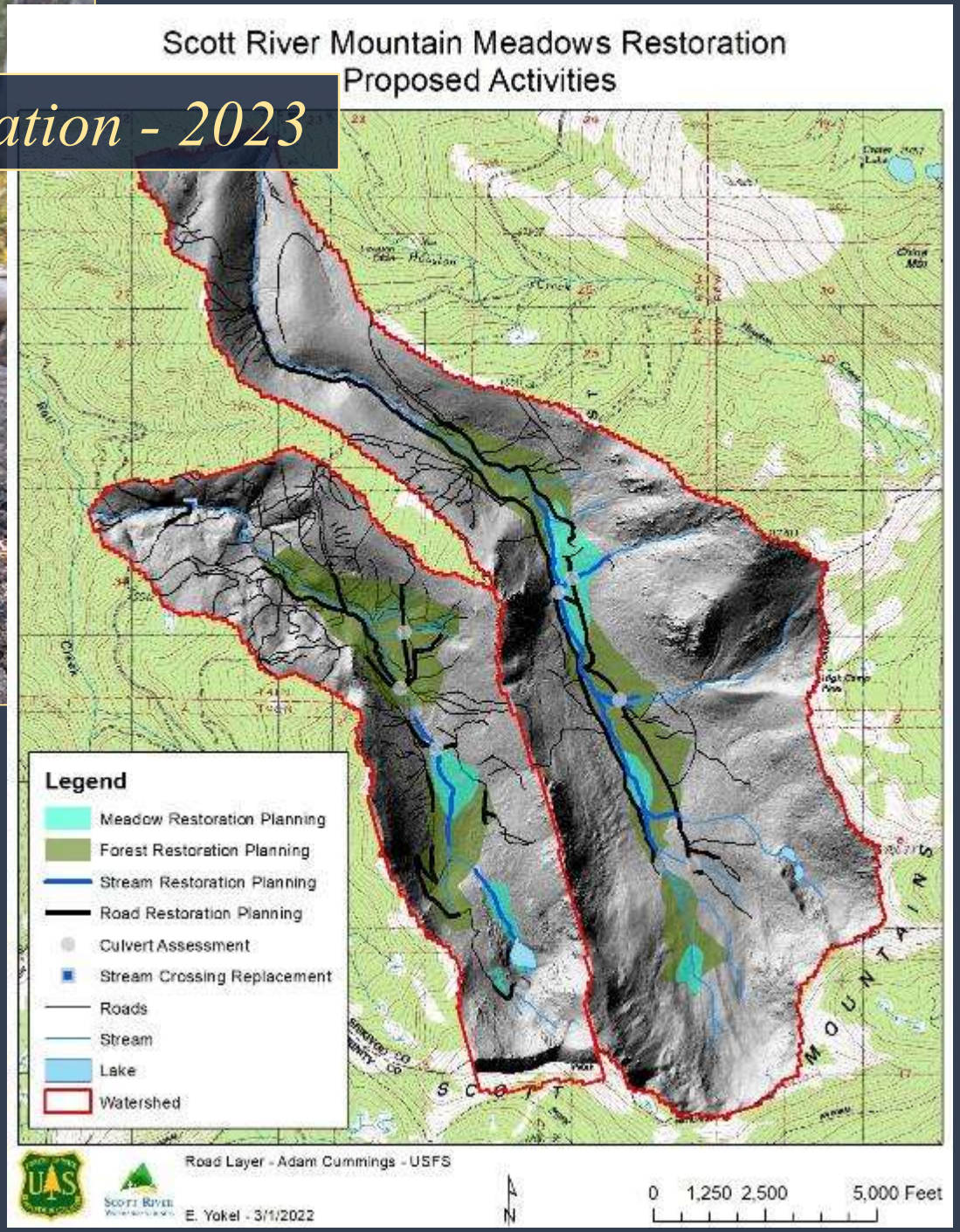
U.S. FISH & WILDLIFE SERVICE

EFM

YESS
YOUTH ENVIRONMENTAL SUMMER STUDIES

ROCKY MOUNTAIN ELK FOUNDATION
Working for Wildlife

Cabin Creek and Rock Fence Meadow Restoration - 2023



FOREST SERVICE
DEPARTMENT OF AGRICULTURE

Stillwater Sciences

NORTH COAST RESOURCE PARTNERSHIP

Southern OREGON UNIVERSITY

BBW & ASSOCIATES
FORESTRY CONSULTANTS

Wildlife Conservation Society
Climate Adaptation Fund

Siskiyou Prescribed Burn Association

SISKIYOU PBA
PRESCRIBED BURN ASSOCIATION

Since 2020 Acres Underburned	Acres Pile Burned	# Burns Conducted	# Interagency Burns Supported	# of Training Workshops	# of Community Members Engaged
35	110	8	8	4	120

RCD SHASTA VALLEY RESOURCE CONSERVATION DISTRICT
CAL FIRE
ETNA
SCOTT VALLEY FIRE DIST.
COUNTY OF SISKIYOU CALIFORNIA

Scott River Headwaters Forest Health and Water Quality Improvement Project

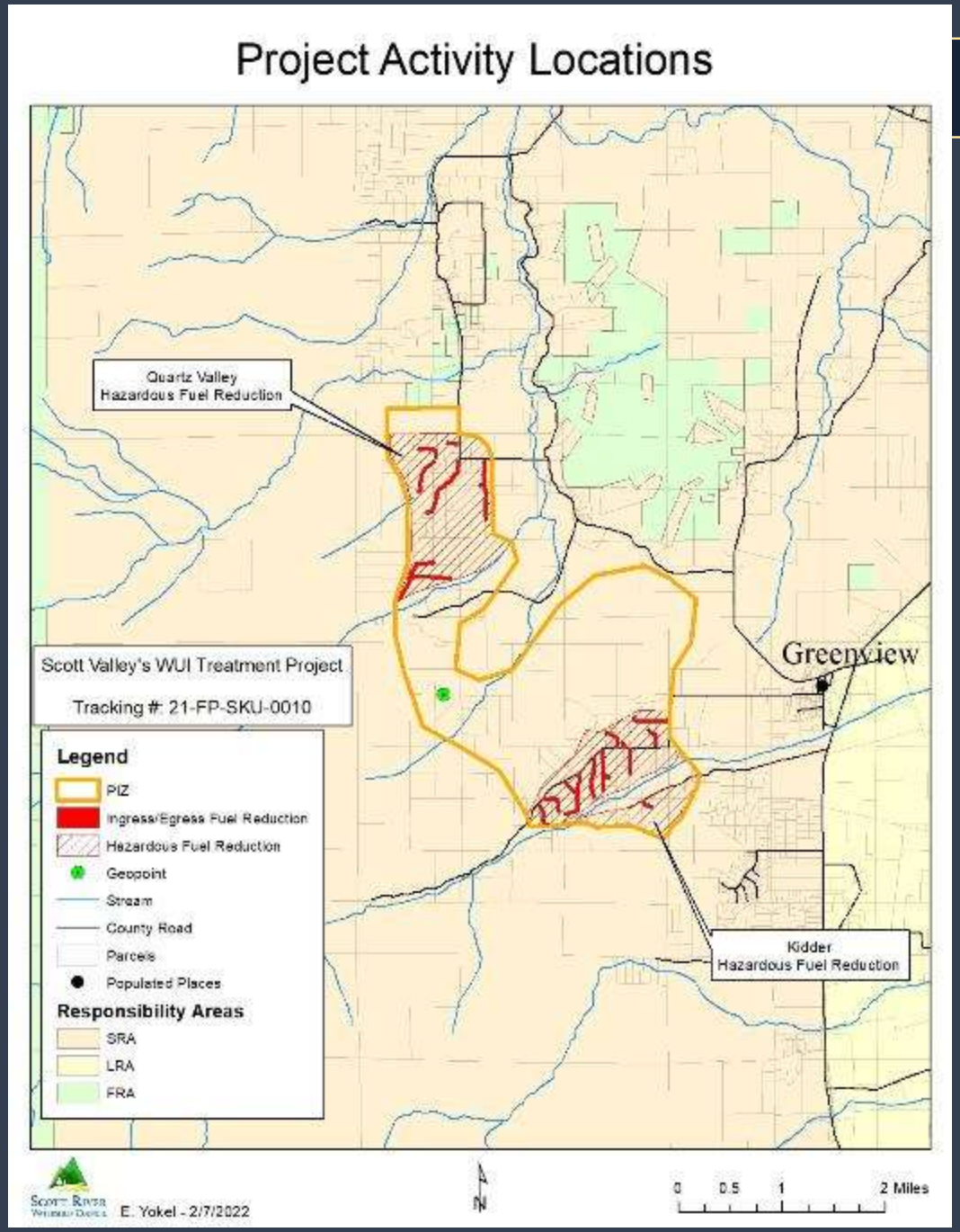
EFM

Jefferson Resource Company

Premier Clearing Inc.
530.340.0277

North Coast Resource Partnership

Johnson Contracting LLC



Scott Valley WUI Vegetation Reduction Project

500 acres of the Wildland Urban Interface areas (WUI) and will treat 5.25 miles (an additional 125 acres) of roadside to create and connect strategic fuel breaks

NORTH COAST RESOURCE PARTNERSHIP

NRCS
Natural Resources Conservation Service

Studying Biochar in Hay, Pasture, and Rangeland Production Systems

Water Quality Projects

U.S. FISH & WILDLIFE SERVICE

FOREST SERVICE
USDA
DEPARTMENT OF AGRICULTURE

THE WILDLANDS

NORTH RIVERS CONSTRUCTION

NORTH COAST RESOURCE PARTNERSHIP

EFM

JEFFERSON RESOURCE COMPANY

Scott River Recovery Action Plan

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE

RESOURCES LEGACY FUND

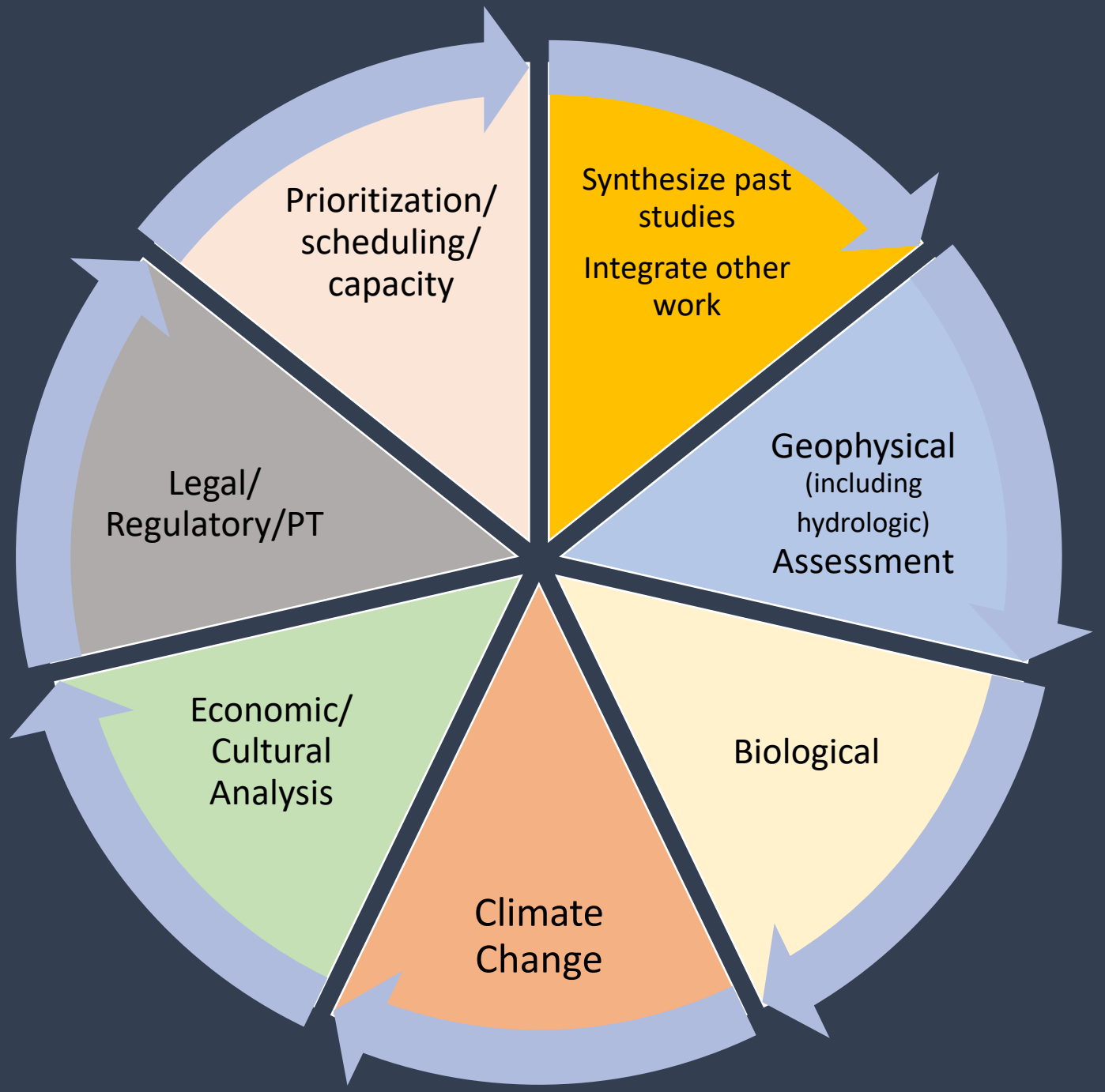
The Nature Conservancy

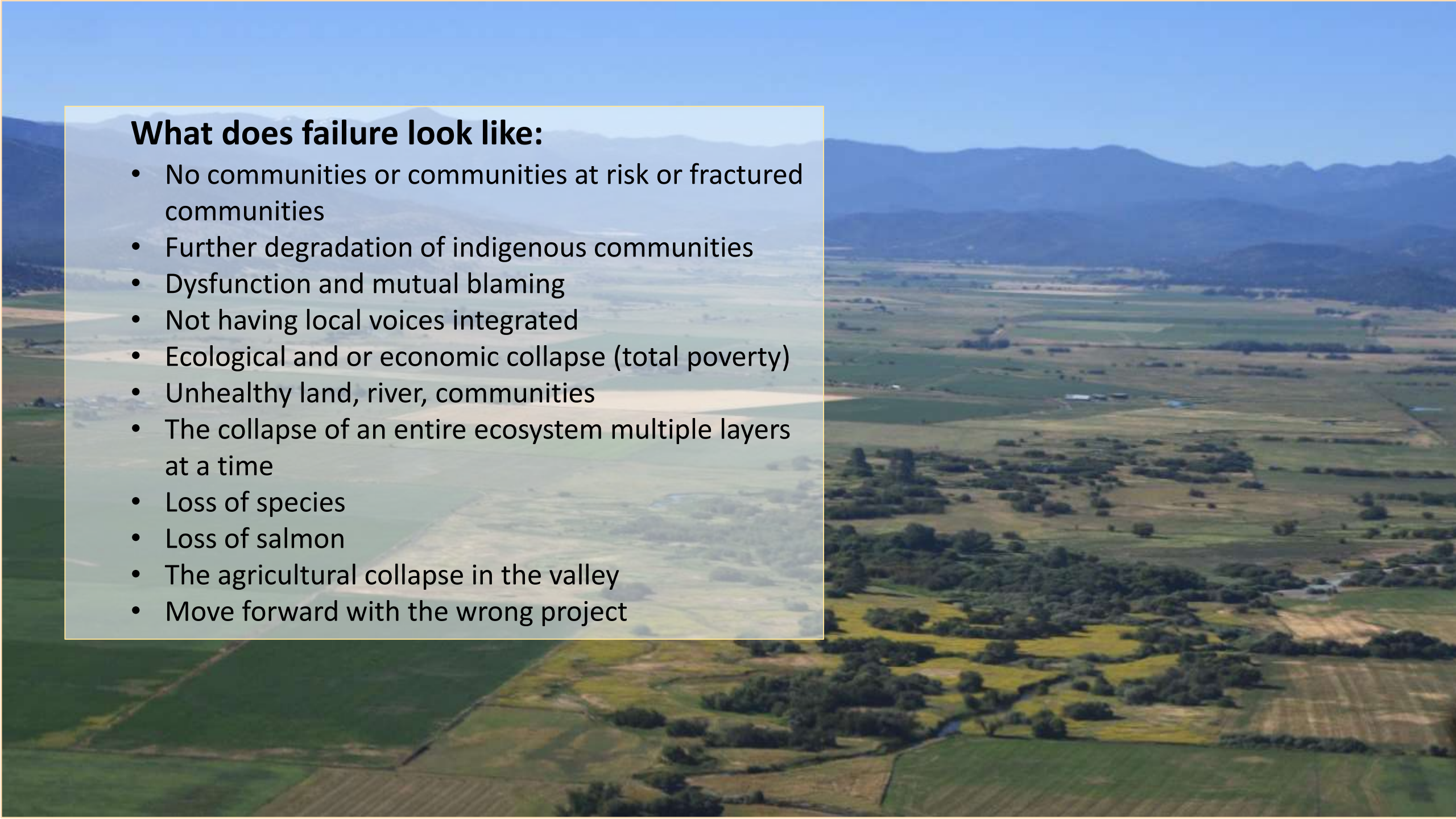
Siskiyou County Farm Bureau

CALIFORNIA TROUT
FISH · WATER · PEOPLE

SISKIYOU LAND TRUST

SEATONE CONSULTING


Prioritization/ scheduling/ capacity
Synthesize past studies
Integrate other work
Geophysical (including hydrologic) Assessment
Biological
Climate Change
Economic/ Cultural Analysis
Legal/ Regulatory/PT



What does failure look like:

- No communities or communities at risk or fractured communities
- Further degradation of indigenous communities
- Dysfunction and mutual blaming
- Not having local voices integrated
- Ecological and or economic collapse (total poverty)
- Unhealthy land, river, communities
- The collapse of an entire ecosystem multiple layers at a time
- Loss of species
- Loss of salmon
- The agricultural collapse in the valley
- Move forward with the wrong project

What success looks like:

- Environmental, economic, and cultural resilience thanks to watershed scale projects that could only occur with planned cooperation
- Self-sustainable, healthy communities, sustainable quality of life
- Properly functioning ecosystem for future generations to adapt and thrive
- Clear actions leading to the recovery of salmon and healthy Scott River communities
- Better collaboration with all parties involved (especially for future projects)
- Slow or stop the downward trajectory of river discharge
- Science-based resolutions/change
- Broad awareness of the plan
- Resilient ecosystem, restored riverine corridor, continuous surface flow
- Long-term sustainability and viability of both ag and fish
- Healing relationships to achieve healing of watershed
- Trust and harmony amongst groups in the watershed
- Resilience
- Leveraged skills and capacity
- Getting along to shift focus from what “is not” to “what could be”

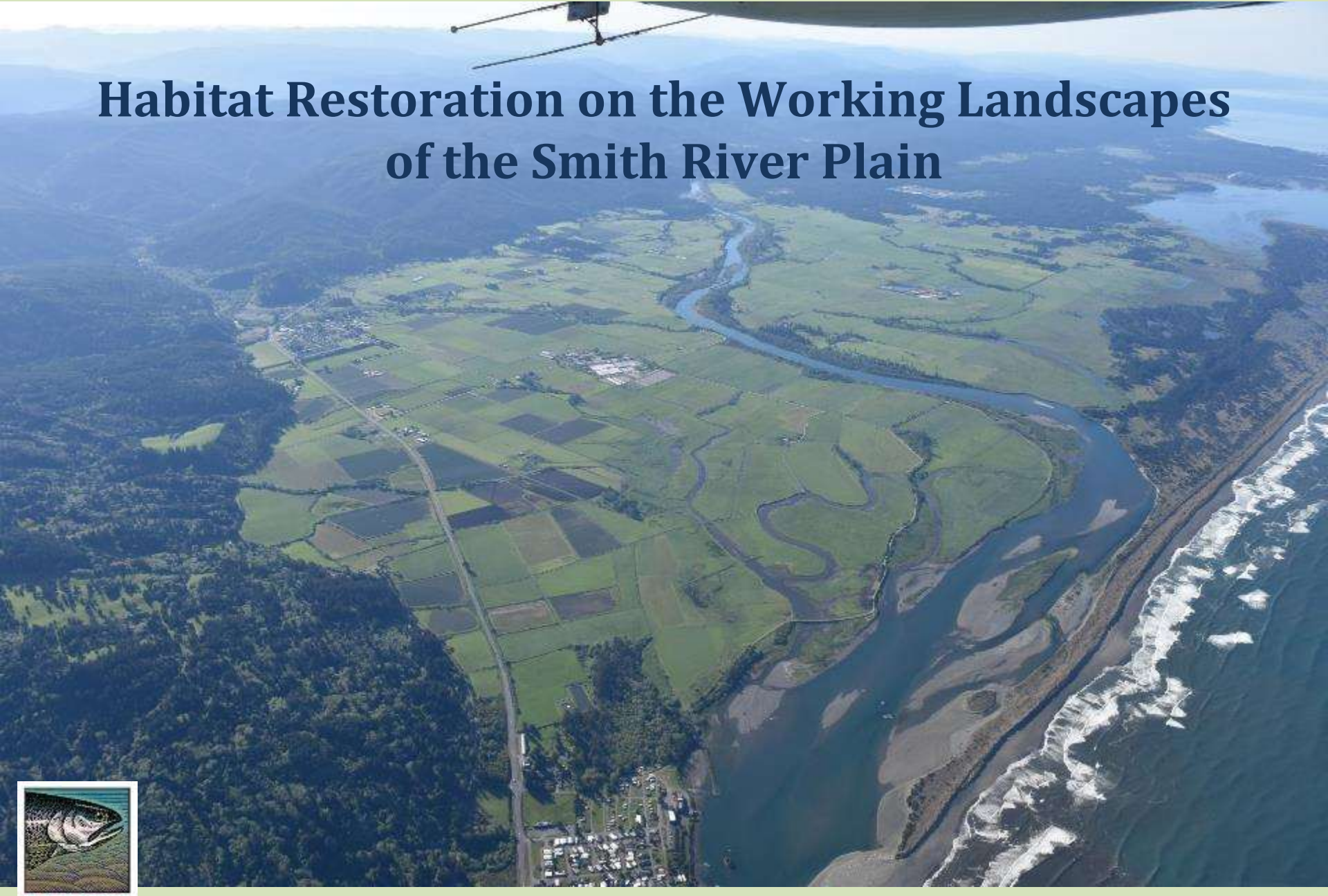
Go Big or Go Home

A huge **THANK YOU** to the SRWC Board & Staff, our Tribal partners, landowners, volunteers, funders, permitting friends, and all our project partners!

Questions

Charnna Gilmore
charnna@scottriver.org
www.scottriver.org

Habitat Restoration on the Working Landscapes of the Smith River Plain



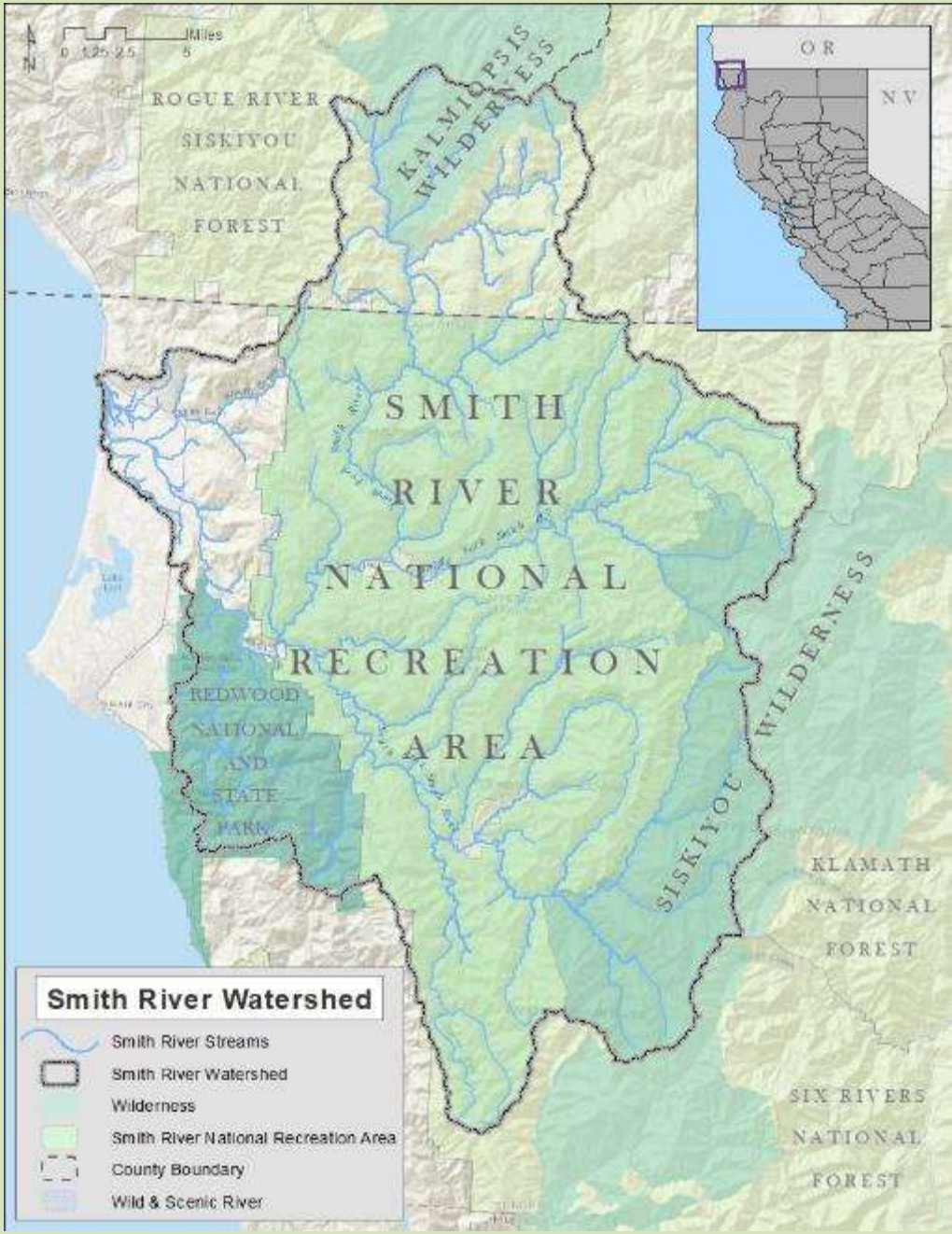
Marisa Parish Hanson & Monica Scholey
Smith River Alliance

Outline

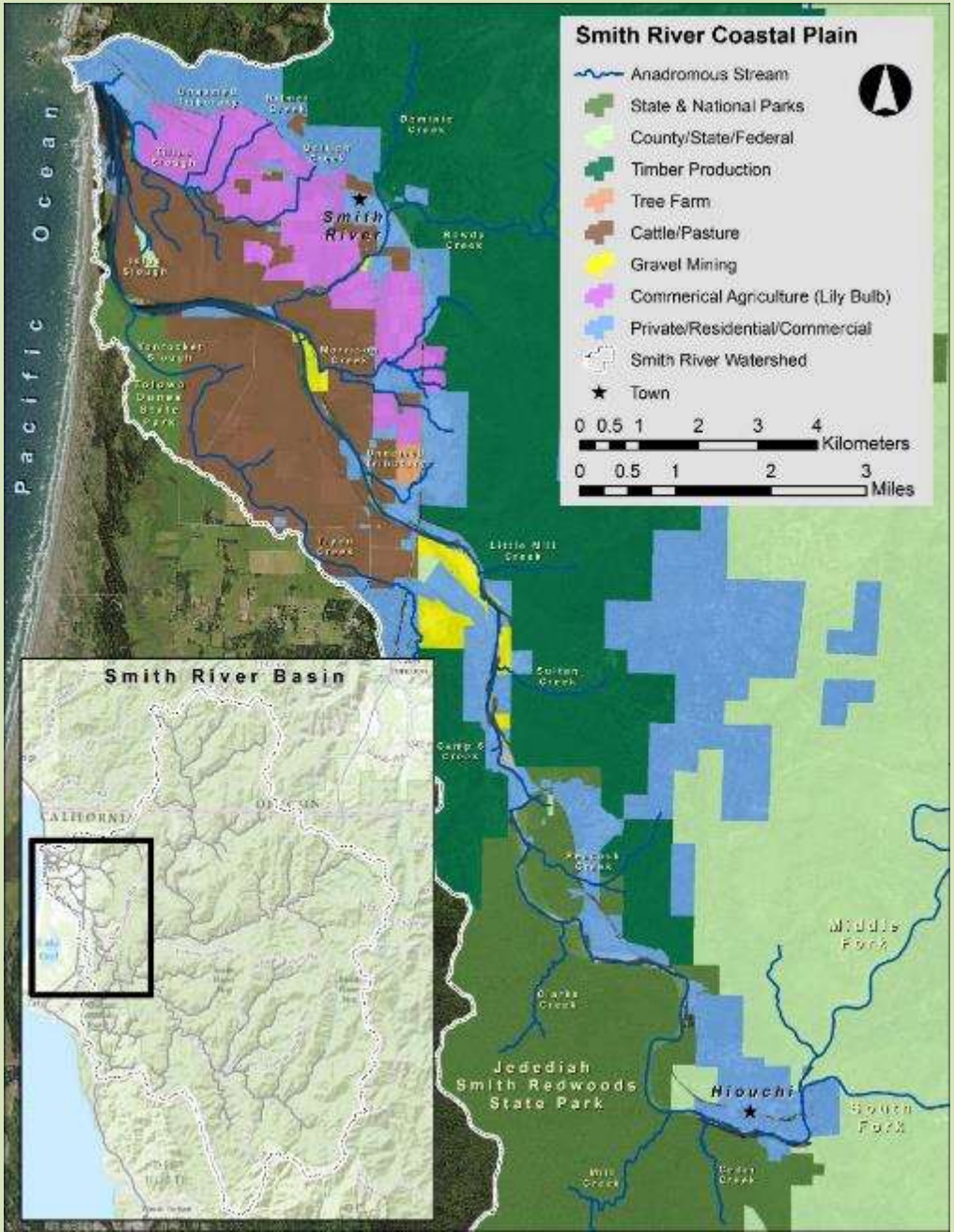
- Background
  a) Watershed
  b) Monitoring
- Assessment of working lands projects
- Examples of our working lands projects
- Successes and Challenges

Smith River

- 725 mi^2
  - 91 mi^2 in Oregon
- Wild and Scenic
  - 325.4 miles
- Smith River NRA
  - 450 mi^2
- National & State Parks
- 83% public lands



Agriculturally Dominated Landscape



Restoration Planning

- Smith River Anadromous Fish Action Plan - 2002
- CA Coho Recovery Plan – CDFW 2004
- SONCC Recovery Plan – NOAA 2014
  - Few specific projects on public land/roads
  - Lack specificity/ does not identify specific projects

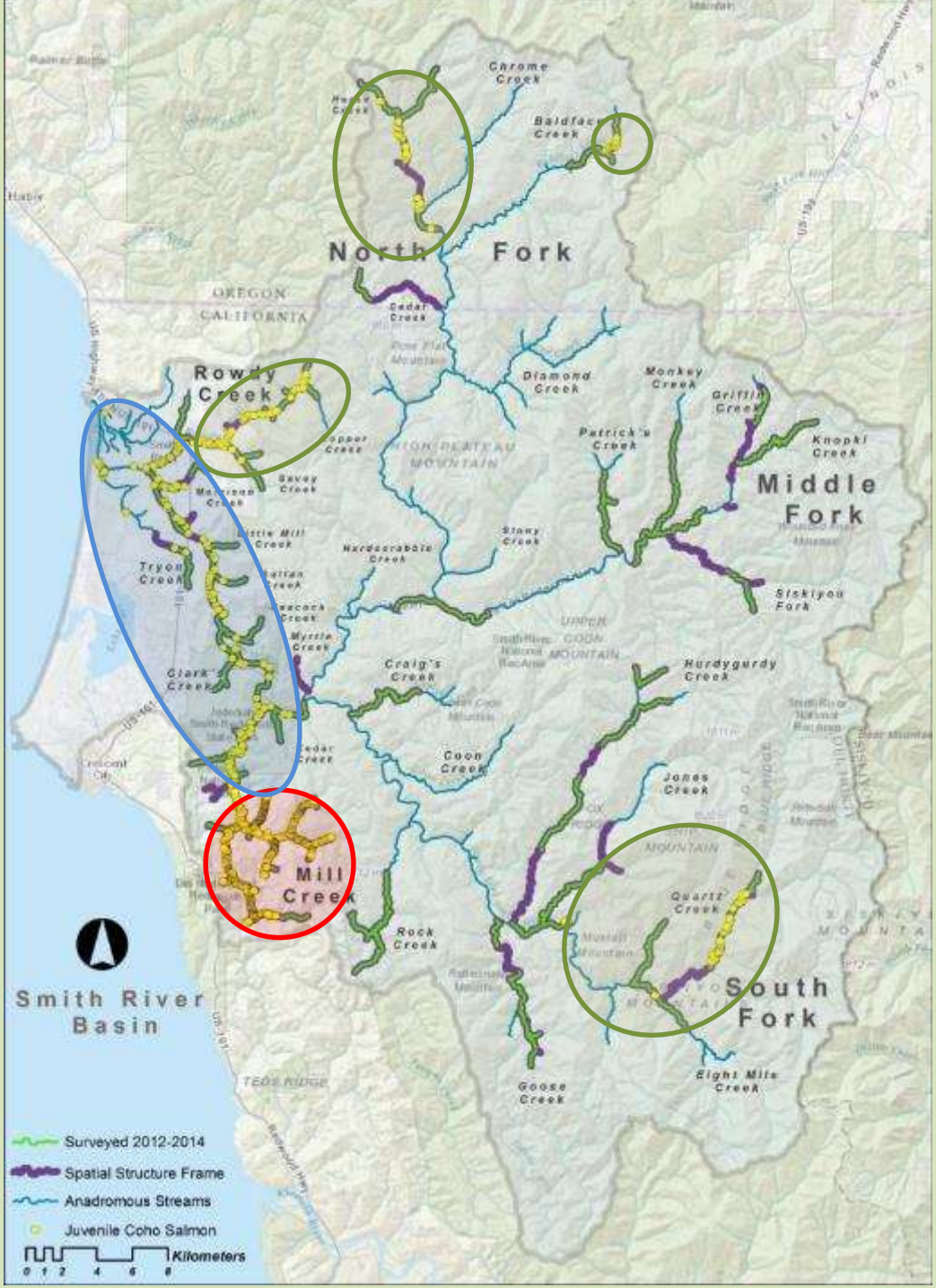
All Identify the need to assess and prioritize restoration, particularly in coastal tributaries on private working lands.

Smith River

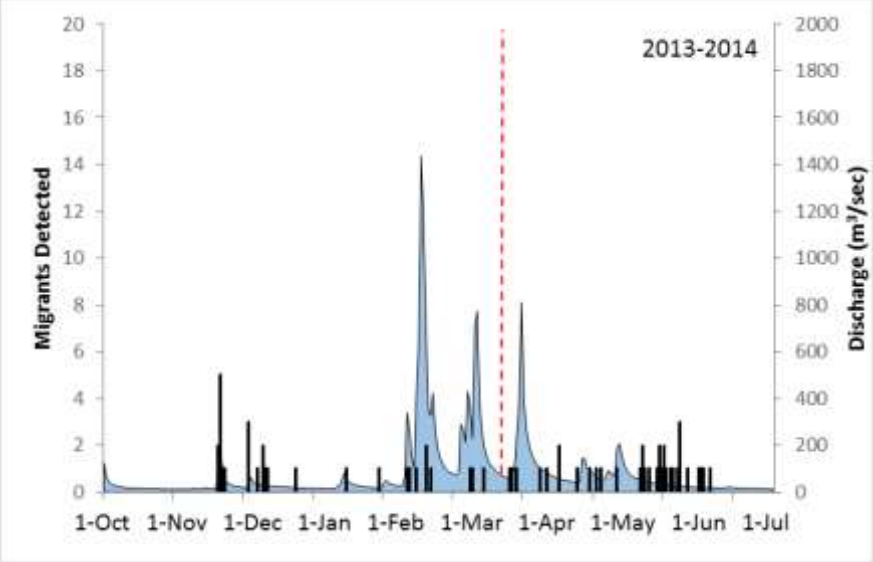
- Data collection begins
  - Spawner - 2011
  - Spatial structure – 2012
  - LCM – 2014
    - DSMT 1995

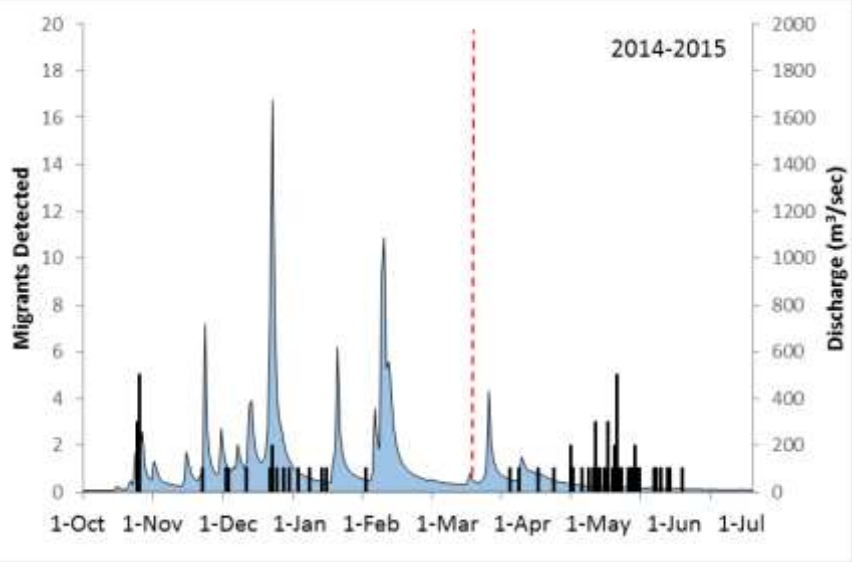
<u>Non-natal Rearing</u>

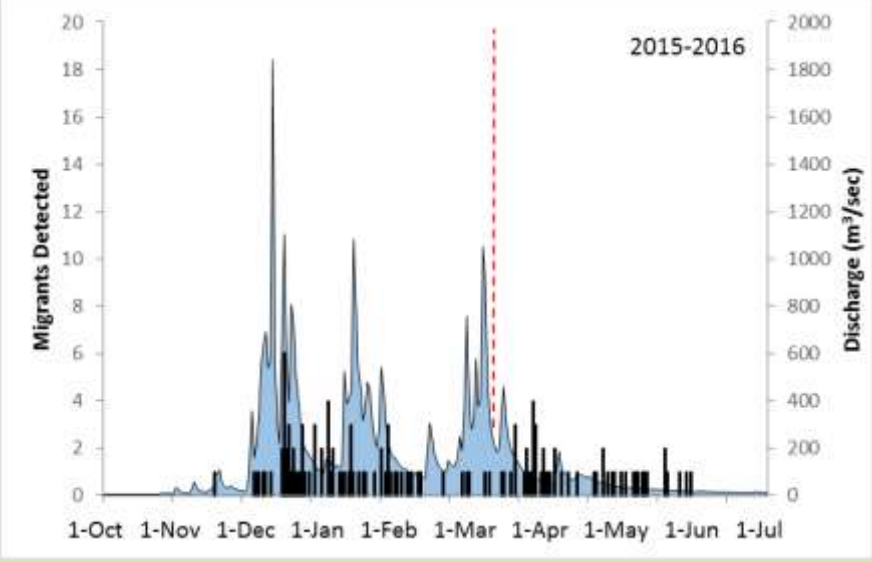
- Rearing destination?
- Tenure?
- Survival?
- Growth?

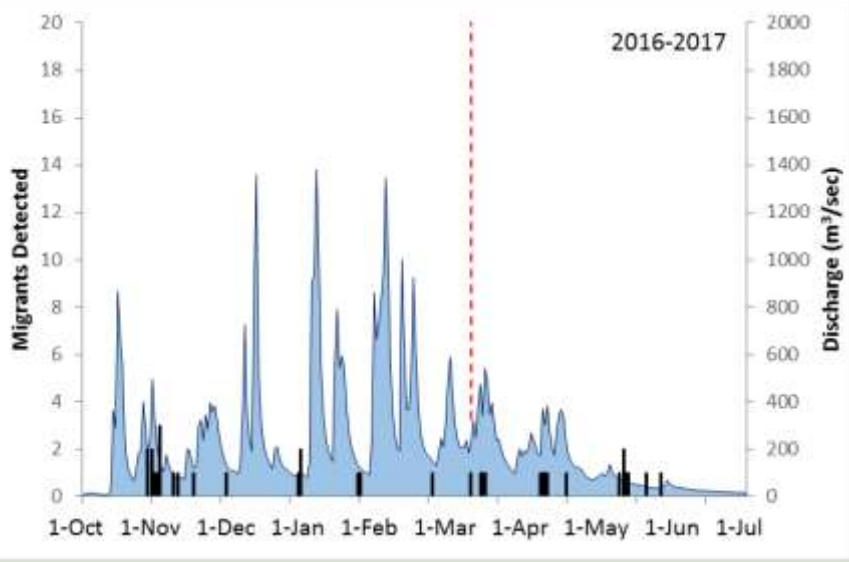


Seasonal Migration









Summer and Winter Surveys

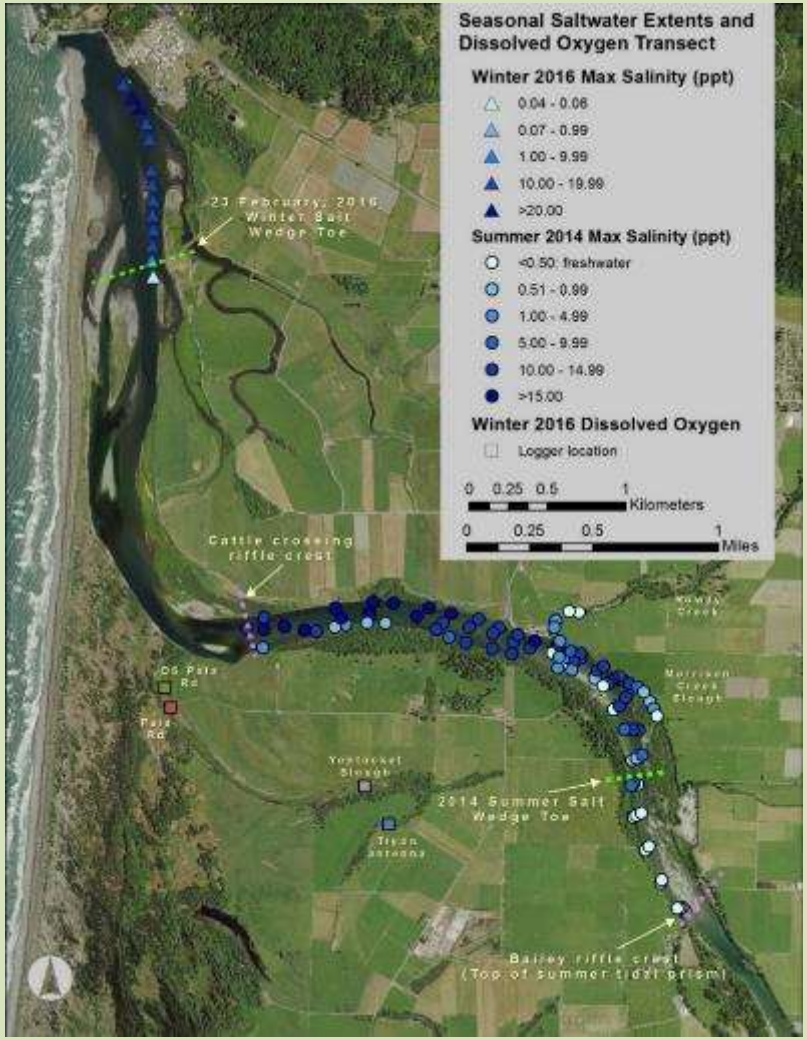
Diving

Seining

Minnow Trapping

Seasonal variation

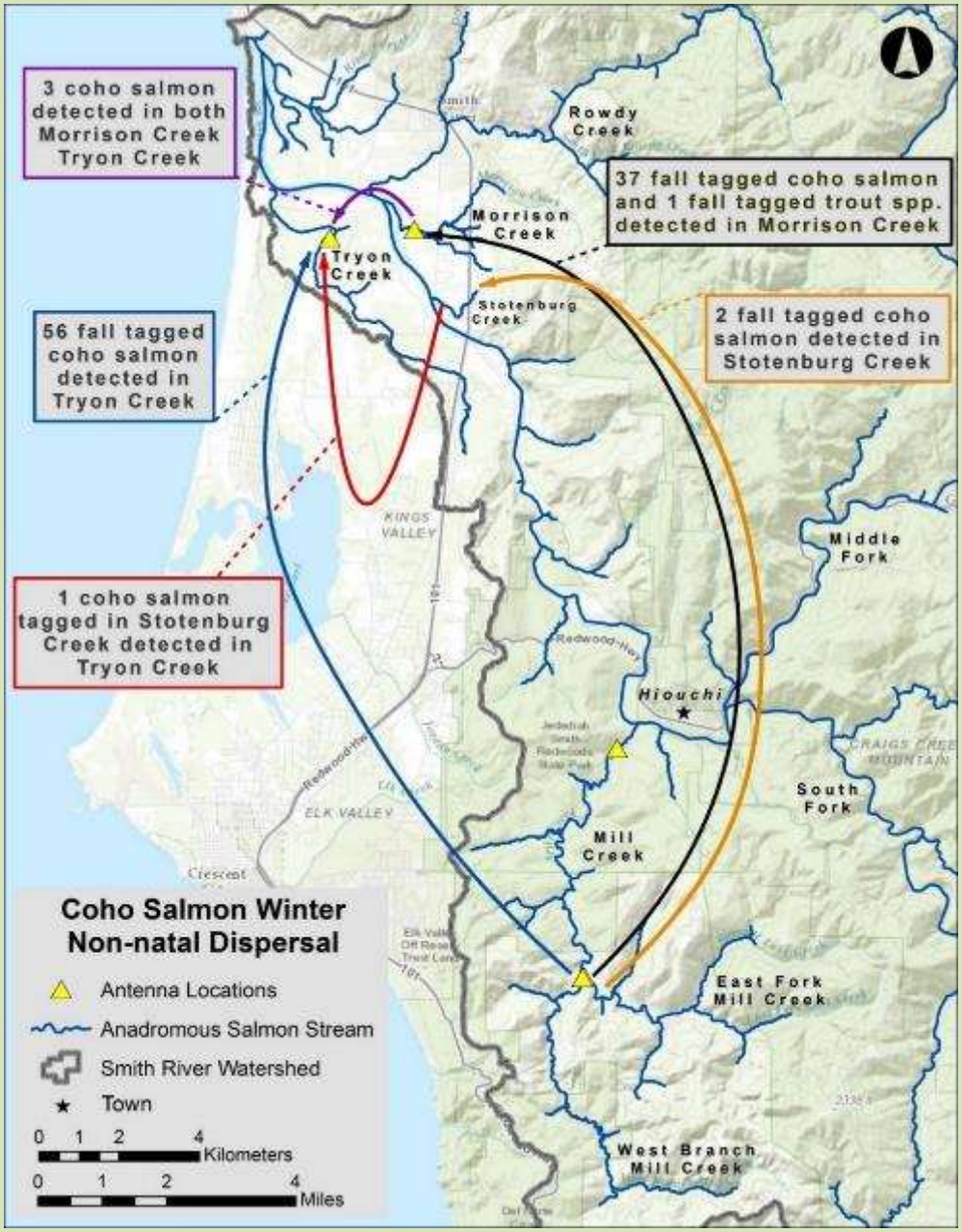
- Habitat availability



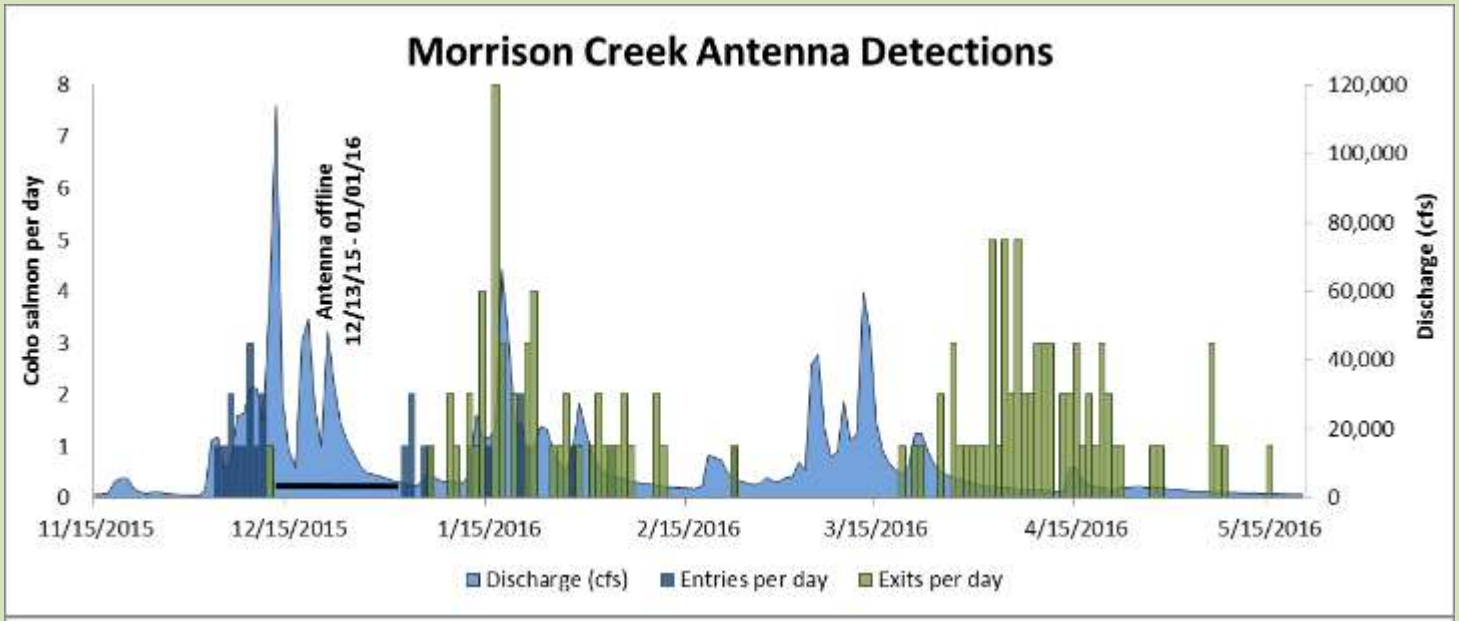
Tributaries - Seasonal habitat

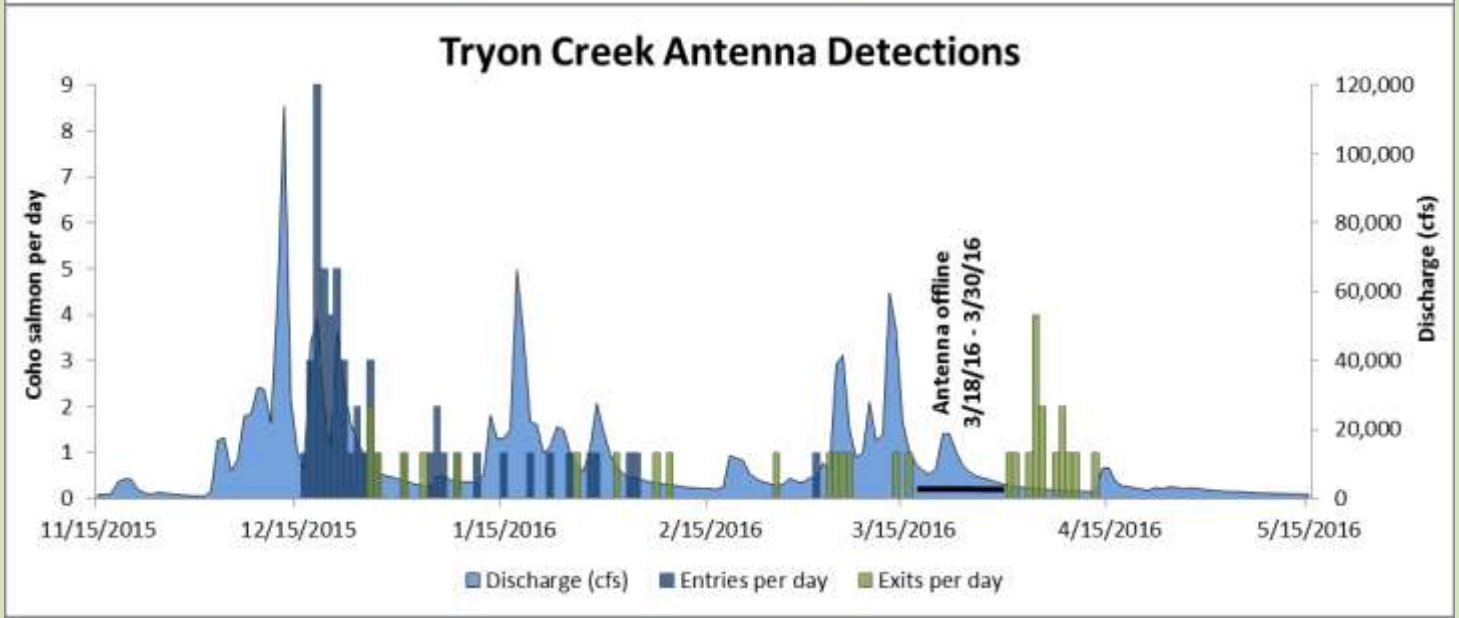
Detections – trapping and antennas

11.7% of fall tagged coho detected rearing in estuary

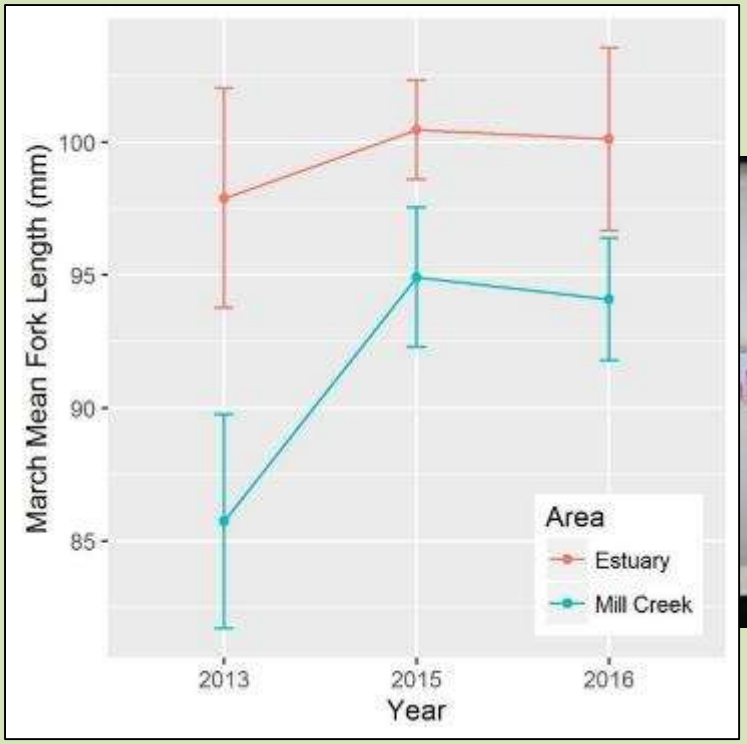


Tenure


Morrison Creek Antenna Detections
Coho salmon per day
Discharge (cfs)
Antenna offline
12/13/15 - 01/01/16
0
1
2
3
4
5
6
7
8
0
20,000
40,000
60,000
80,000
100,000
120,000
11/15/2015
12/15/2015
1/15/2016
2/15/2016
3/15/2016
4/15/2016
5/15/2016
Discharge (cfs)
Entries per day
Exits per day


Tryon Creek Antenna Detections
Coho salmon per day
Discharge (cfs)
Antenna offline
3/18/16 - 3/30/16
0
1
2
3
4
5
6
7
8
9
0
20,000
40,000
60,000
80,000
100,000
120,000
11/15/2015
12/15/2015
1/15/2016
2/15/2016
3/15/2016
4/15/2016
5/15/2016
Discharge (cfs)
Entries per day
Exits per day

Growth


March Mean Fork Length (mm)
100
95
90
85
2013
2015
2016
Year
Area
Estuary
Mill Creek

Systematic Planning

Identify and prioritize a list of potential restoration and conservation projects focused in the Smith River Plain.

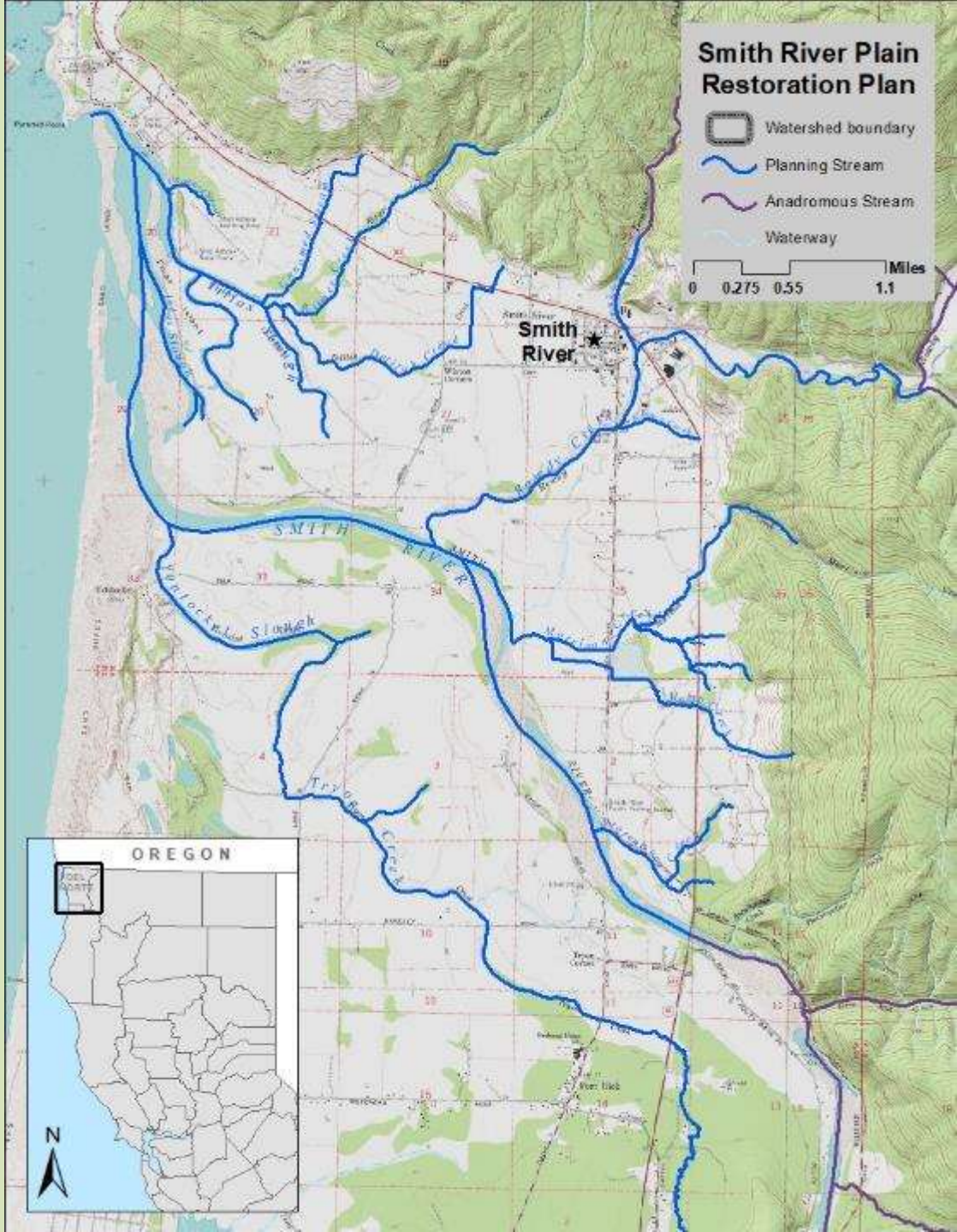
Partnered with RCD and included extensive landowner engagement (2016)

Included planning and assessment for community supported project

Planning Area

Smith River Plain
- Coastal zone tributaries
- 37.46 miles

- Available Data
- Evaluate
  - Fish passage/stream crossings
  - Riparian condition
  - Invasive plant presence
  - Channel condition
  - Floodplain and Off-channel habitat
- Landowner engagement

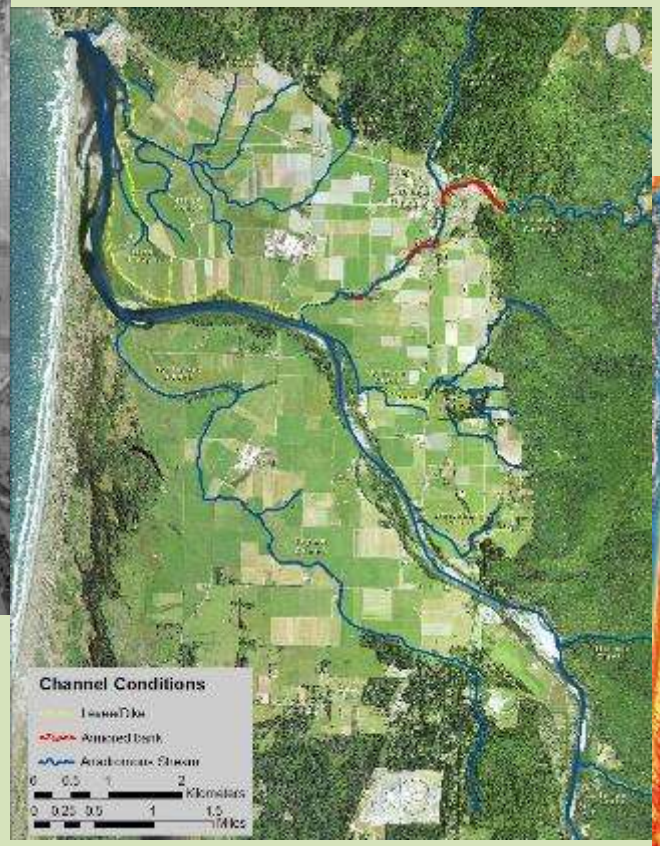


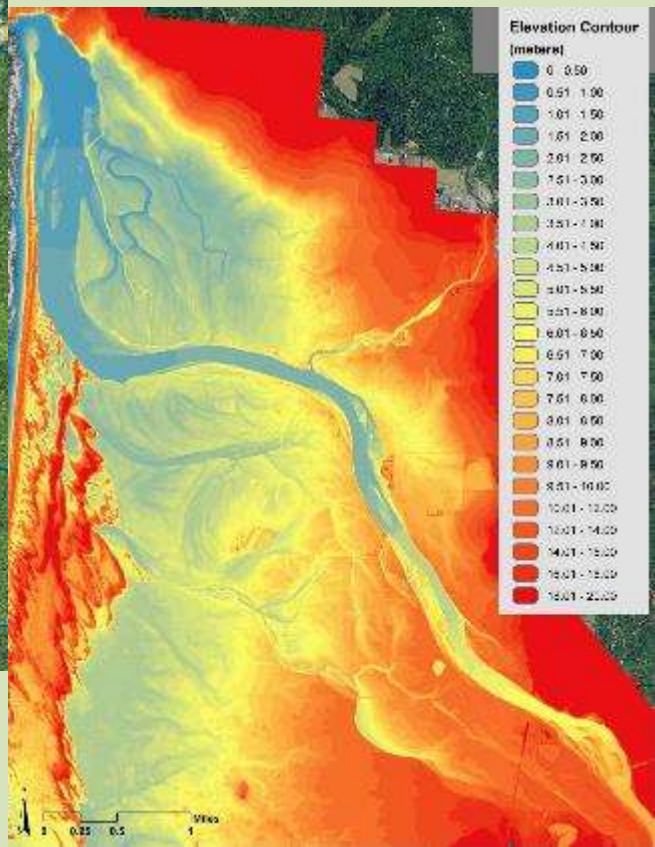
Crossings

Riparian Veg

Invasive Plants

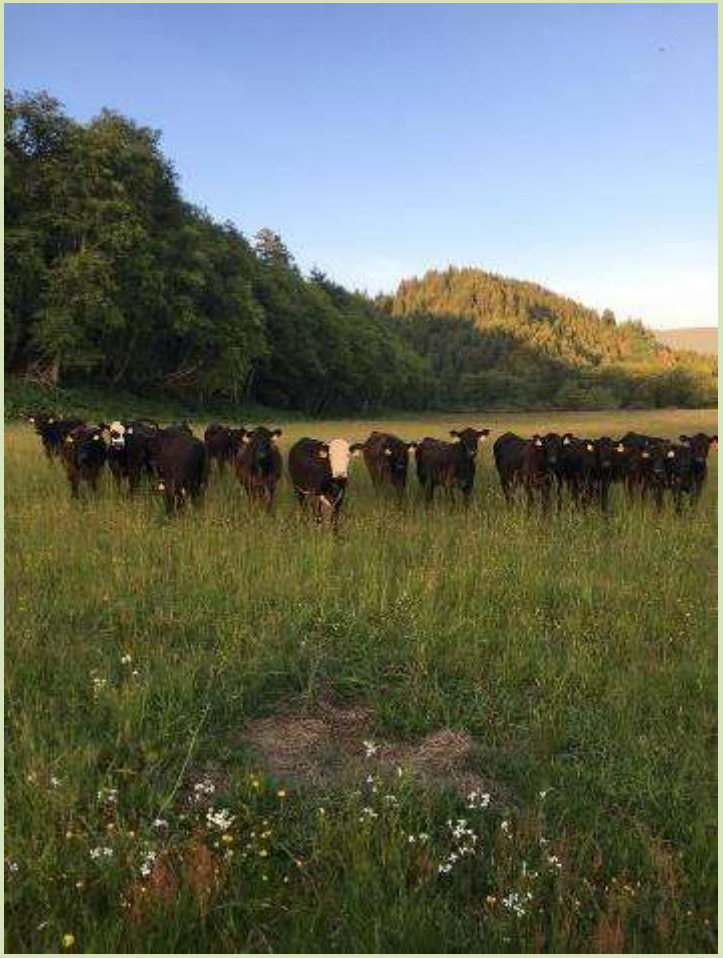
Channel Condition





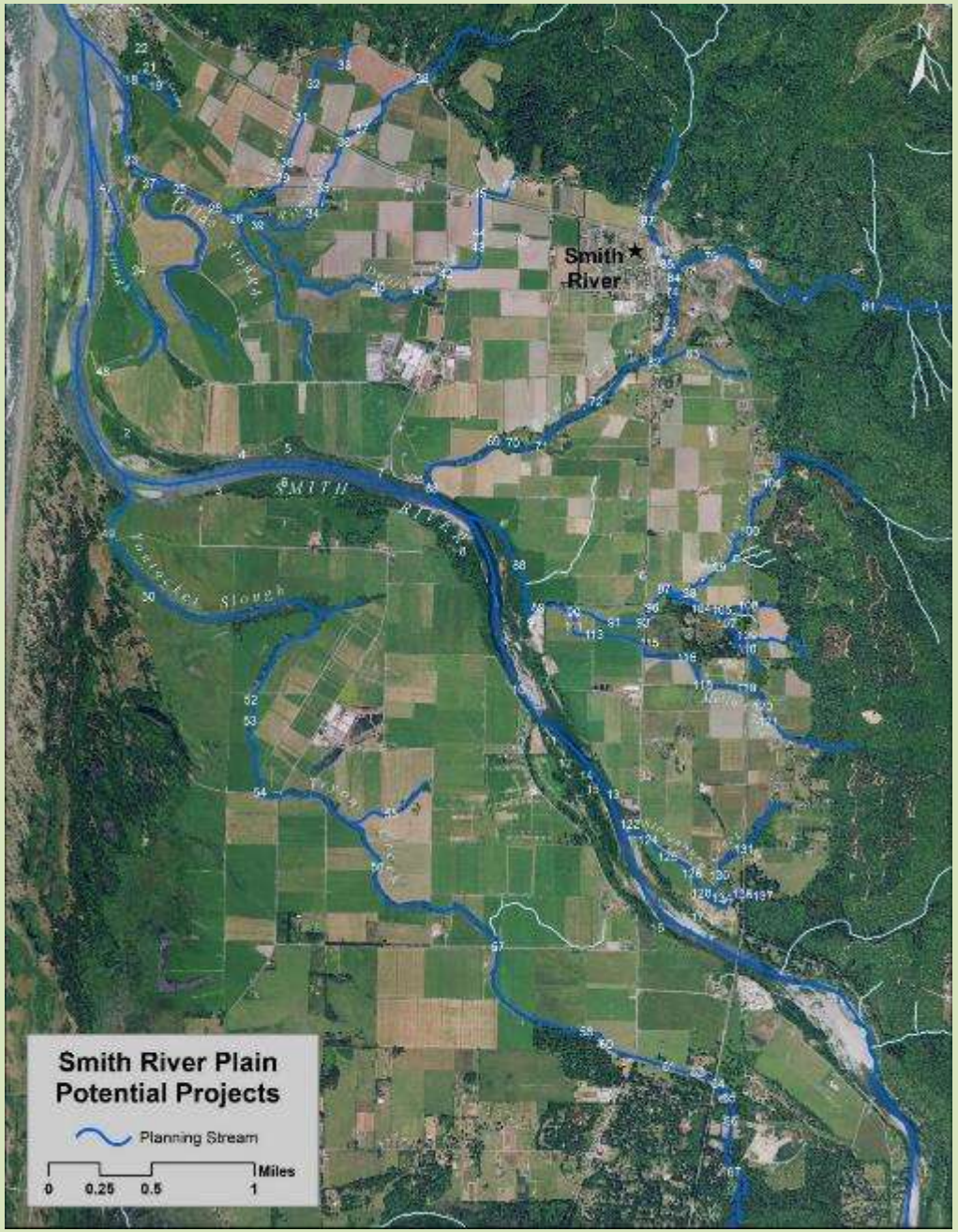
Landowner engagement

Opportunity to identify overlapping goals to improve habitats and working lands.



Planning Results

- 137 projects
  - Riparian: 29
  - Channel complexity: 33
  - Passage: 63
  - Invasive Plant Removal: 8
  - Water Quality and Quantity: 4
- 8 basin wide recommendations



Prioritization - Ranking Criteria

Developed in partnership with technical team

Biological, Social, and Economic

Bradbury et al. 1995 and Beechie et al. 2008

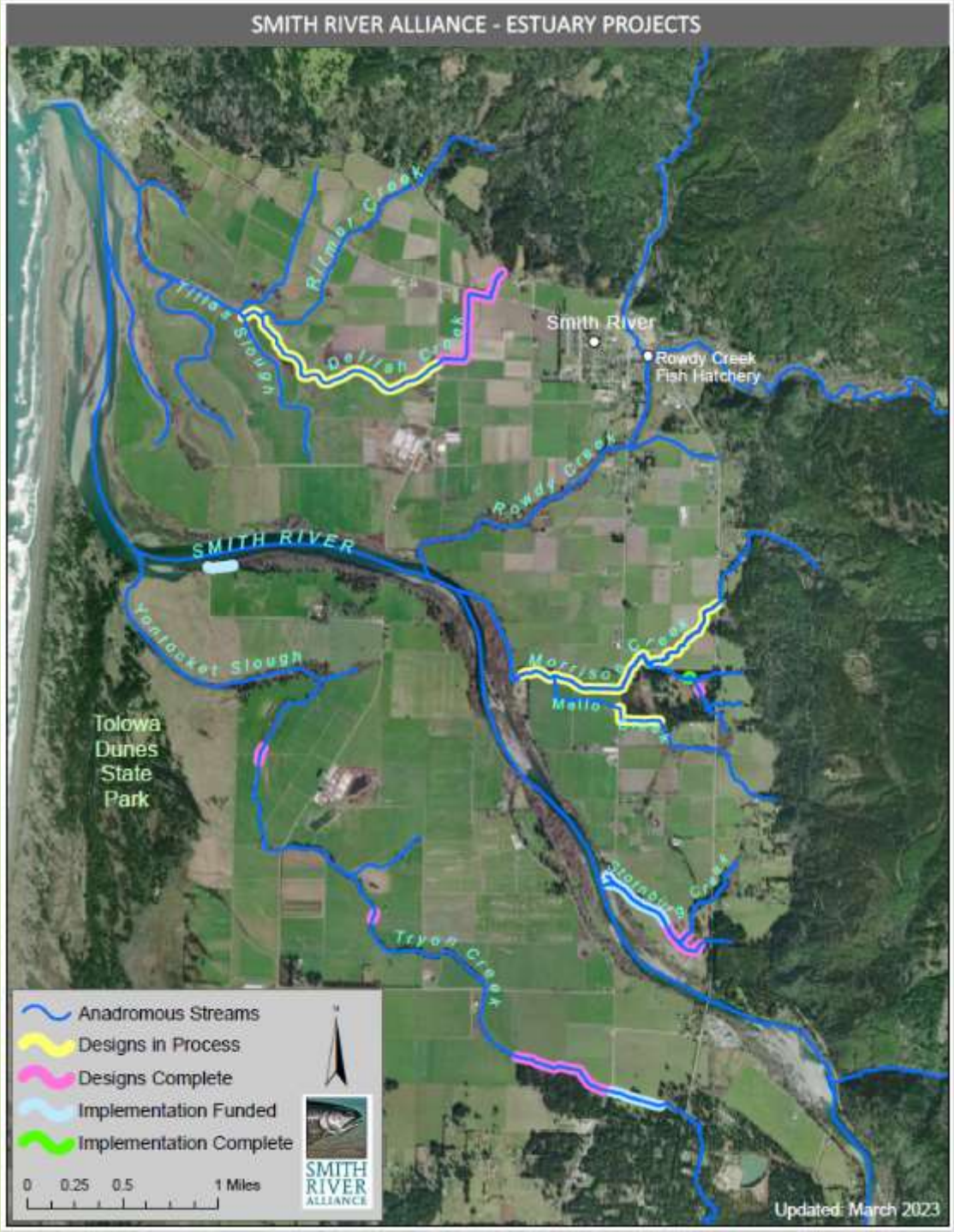
Restore natural function?

Minimize future maintenance needs?

Does the project have landowner support?

Since Planning Completed

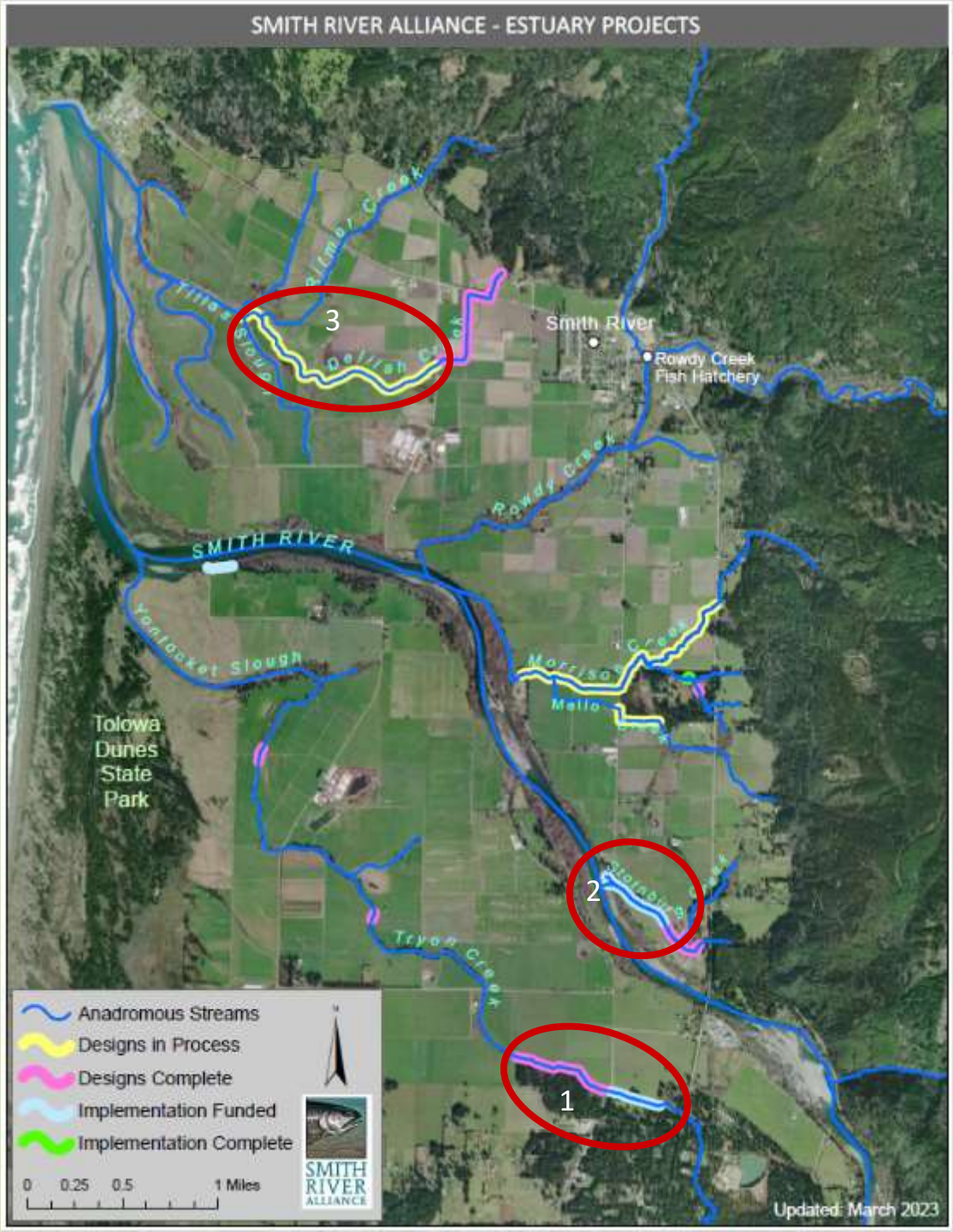
- 39 projects - initial planning and design
  - 12 multi-benefit projects
- 20 projects - 100% designs completed
  - 10 multi-benefit projects
- 7 projects advanced to implementation
  - 4 multi-benefit projects



Mutually Beneficial Restoration

Examples

1. Upper Tryon Creek
2. Lower Stotenburg Creek
3. Lower Delilah Creek



Example 1 - Upper Tryon Creek

Restore 0.83 miles of stream.

- Remove earthen berms to improve floodplain connectivity
- Improve fish passage
- Install large wood and alcoves
- Create an 85’ wide riparian buffer

Example 1 - Upper Tryon Creek

Reference reach upstream

- Natural meanders and a functional riparian corridor
- Instream and riparian complexity
- Maintains flows longer into dry season
- Cover and water quality for salmonids

Project Reach

- Straightened and confined
- Lacking complexity and riparian habitat.

Working land benefits

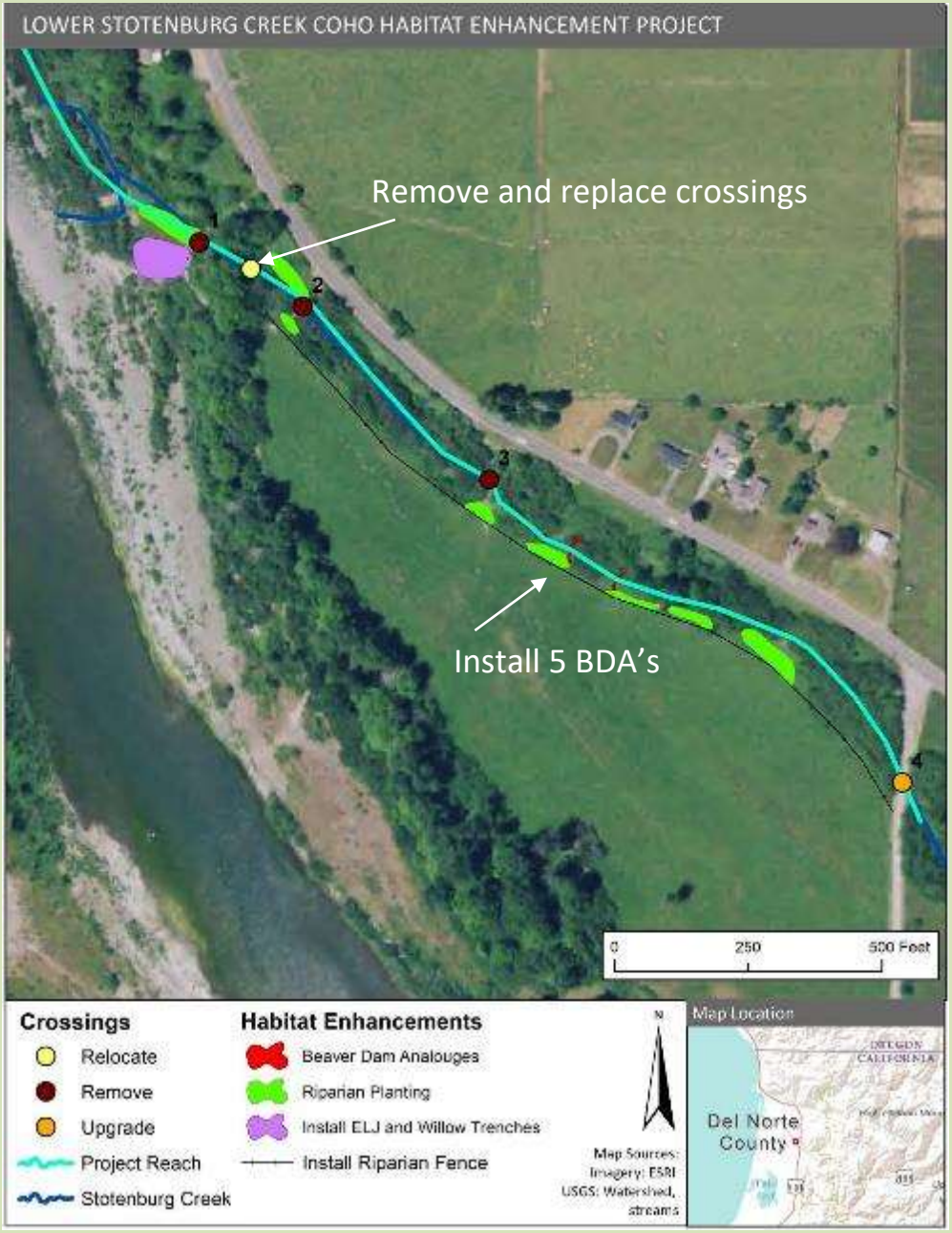
- Reduce field erosion
- Overland flows can re-enter channel

Example 2: Lower Stotenburg Creek

Restore 0.5 stream miles

<u>Habitat benefits</u>

- Improve fish passage
  - consolidate undersized failing crossings
- Install cattle fencing
- Install large wood, willow baffles, and 5 BDAs
- Beaver actively using system



Lower Stotenburg Creek

Improved access:

- Opportunity to consolidate 3 crossings into a single more functional crossing.

Example 3: Lower Delilah Creek

Reed canary grass - impacting habitat and land use

- 5,000 feet of stream with RCG present
- RCG grows into dense mats that limit fish passage and impact water quality
- Limiting grazing on nearby pastures

Example 3: Lower Delilah Creek

- 2020 pilot RCG removal project to support survey access and planning
- Identified 2,700 feet of channel within tidal influence
- Opportunity to maximize the use of salt water as a natural control for RCG

Lessons learned

Build trust and find common goals

- Long lead time
- Relationship building
- Partnerships
- Neighbor support
- Identify needs and land use benefits

Potential obstacles

- Long lead time
- Changes in ownership
- Grant and permitting requirements
- Cost inflation

Balance is needed to succeed

- Projects may require additional planning to advance.
- Creative problem solving and compromise are needed.
- Investment in relationship building is the glue throughout the entire process.

Conclusions

- Take time for landowners to understand data/requests/project timeline and voice opinions
- Landowners need to be informed about monitoring data and included in restoration planning. This provides an opportunity to find overlapping goals and objectives.
- Relationship building is key and takes time.
- Long-term watershed and population wide monitoring data needs to be more available to restoration groups.
- Life-history diversity – core and non-core populations and natal and non-natal habitats are important to population resilience.

Thank you

Photos: Kenneth & Gabrielle Adelman – California Coastal Records Project

LANDOWNERS

DEL NORTE RESOURCE CONSERVATION DISTRICT

Coastal Conservancy

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE

U.S. FISH & WILDLIFE SERVICE

NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION U.S. DEPARTMENT OF COMMERCE

Michael Love & Associates
Hydrologic Solutions

Stillwater Sciences

SHN

March 2021

Elk River as a Working Landscape

April 27, 2023

- Darren Mierau - CalTrout
- Bonnie Pryor - NHE
- Jeff Anderson - NHE
- Jay Stallman - Stillwater Sciences
- Katy Gurin - CalTrout

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“A working landscape is an area where humans work as responsible members of a natural ecosystem. Ideally, all of the people within a working landscape are balancing their own needs with the needs of **the environment.”**

https://ca.pbslearningmedia.org/resource/255ea21c-2339-4907-8c4a-791c1dab01aa/working-landscapes-basics/

(Grades: 3-5, 6-8)

*”**Conservation will ultimately boil down** to rewarding the private landowner who **conserves the public interest**.”*

-The River of the Mother of God: and other Essays

Aldo Leopold, 1934

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Four Key Considerations:

- Scale of Degradation
- Land Ownership
- Funding for Land Management
- Sustainability (= Resiliency)

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Scale of Degradation

- Elk River 303d Listing for Sediment Impairment 1998
- **25 years of Regulatory "Process" to define "scale of degradation"**
- RWB TMDL Finding:
  - **No "Assimilative Capacity" for new** Sediment
  - Nuisance Flooding
- Tetra-Tech Report (2015)
- Elk River Recovery Assessment (2018)

NCRWQCB Resolution R1-2016-0017

“The Regional Water Board has confirmed the water quality impairment due to sediment and sedimentation, confirmed exceedances of sediment-related water quality standards, developed indicators and numeric targets associated with hillslope stability and stream channel recovery, assessed and quantified the sources of sediment, confirmed a linkage between sediment discharges and exceedances of sediment-related water quality standards, established the current sediment loading capacity, and established the sediment load reductions that are necessary to meet water quality standards. Simultaneously, the Regional Water Board has developed a program of implementation for the Upper Elk River watershed that will implement the TMDL, including considerable public outreach and involvement.

(https://www.waterboards.ca.gov/northcoast/board_decisions/adopted_orders/pdf/2016/160512-0017_ElkRiverSedimentTMDL.pdf)

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Public vs Private Land Ownership

- Who owns the land?
- How much of the watershed is private/public?
  - Watershed Area = 37,312 acres (58.3 mi2)
  - Public = 13,428 acres; 36%
  - Stewardship Area = 1,857 acres
  - Public = 99 acres; 5%
  - To Meet 30x30 = +458 acres
- What other constraints?

Stewardship Program 2018-2020

- Two-year Program (just before covid!)
- ~45 landowners with river-adjacent property
- Extensive Meetings: 5 TAC; 28 Steering Comm; 25 Stakeholder; 37 landowners
- Outcome of Stewardship were landowner-supported Actions
- All Actions are voluntary!

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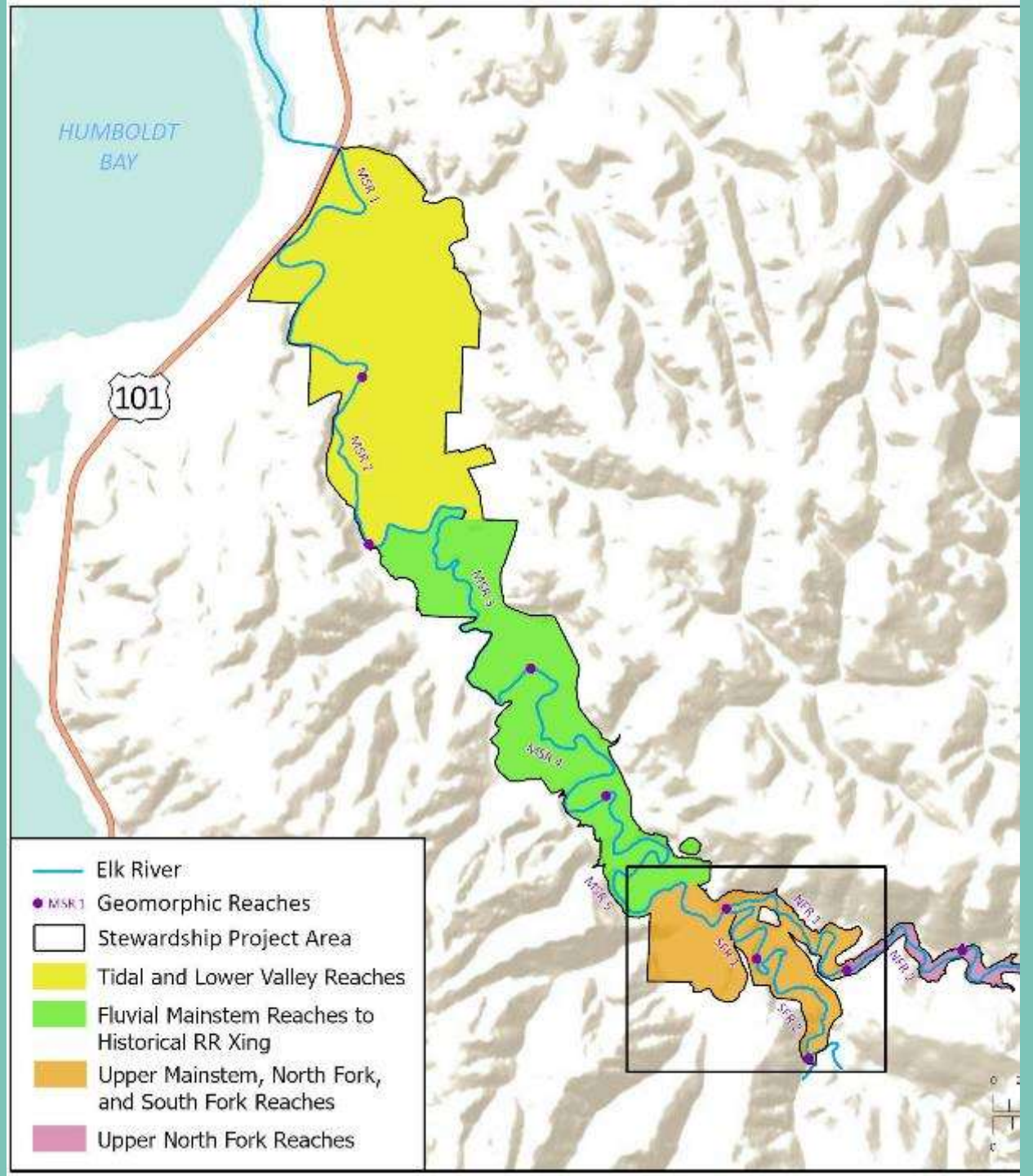
Program Costs and Funding Resources

- Outcome of Stewardship Program is the *Elk River Recovery Plan*
- **Introduced "Planning Areas"**
- Developed Regulatory Strategy
- Estimated Program Costs
- Presented to Agencies and Public

Stewardship Program Communications	$534,000
Design Data Collection	$640,000
Project Management and Administration	$1,816,000
Engineering and Revegetation Design, Permitting, and Construction Management	$8,814,000
Earthworks Construction and Revegetation	$29,343,000
Contingency (30% of Construction Costs)	$8,716,000
Compliance and Performance Monitoring	$2,419,000
TOTAL PROJECT COST	**$52,300,000**



Ecological vs Economic Sustainability

- **In "Working Lands" economic value of landscape is** integrated with ecological value
- In my view, the basic operation is to separate these two land uses
  - Re-balancing
- **It's a bargain with the landowners** - Leopold
  - All voluntary
  - ** Must provide them some benefit
  - Public funds provide private benefit, often to restore public trust
- Outcome is Rehabilitation /Restoration Designs
  - Ecological uplift is constrained by private land ownership

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Planning Area 1: Elk Tidal and Lower Valley Reaches

10% Design Process

- Baseline data collection - Existing Conditions Report
- PAC 1 meeting
- Landowner input
- Advanced conceptual designs
- PAC 2 and 3 field meetings
- Revise conceptual designs and modeling analysis
- Landowner review
- Draft 10% Design Report
- PAC 4 meeting
- Final Report -May 2023

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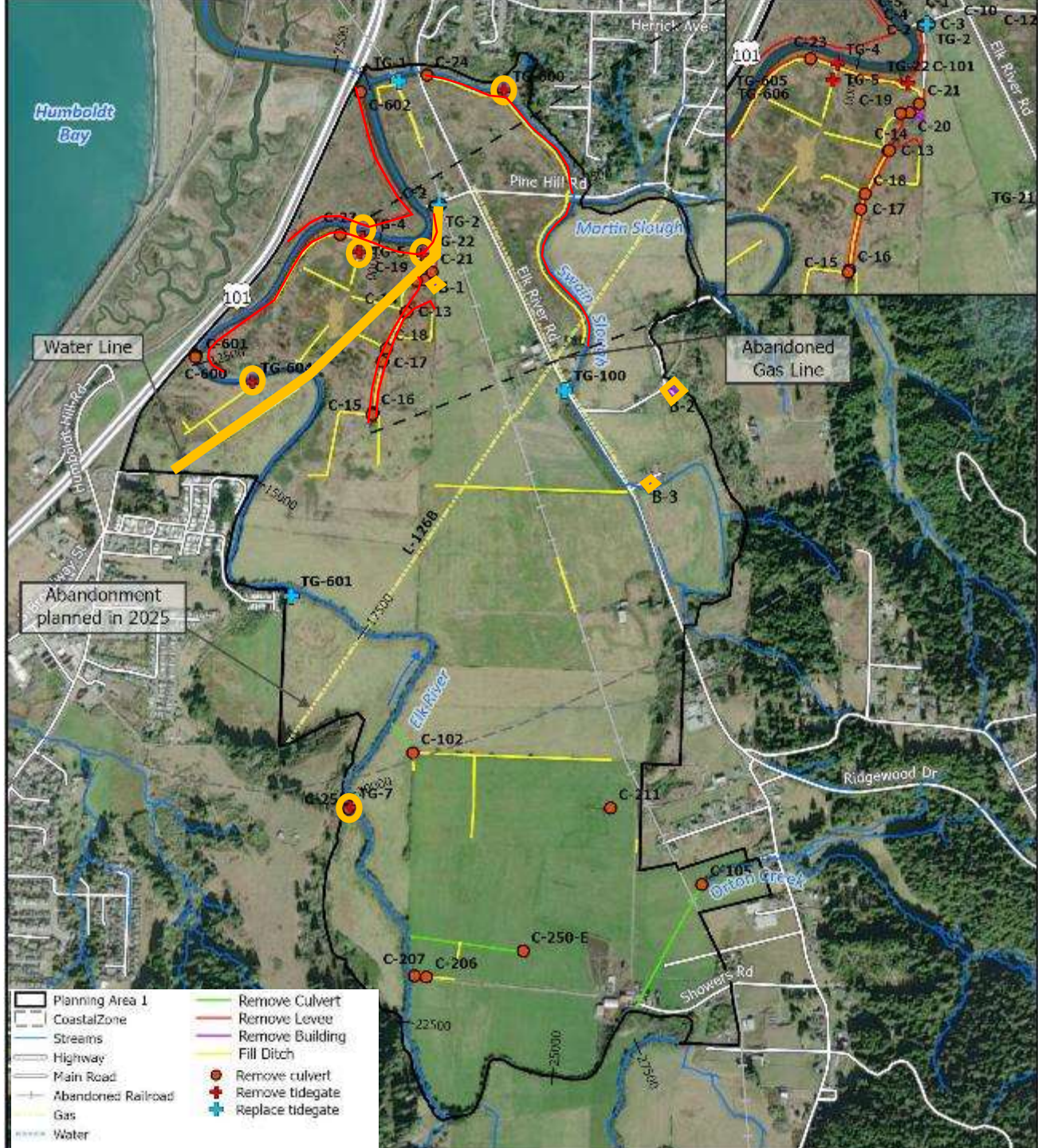
Summary of removed infrastructure

PA-1:

- 23 Culverts
- 6 Tide gates
- HCSD water line
- Sections of PG&E abandoned gas line (not shown)
- 23 Ditches
- 3 Buildings
- 6 Levees

ERWA:

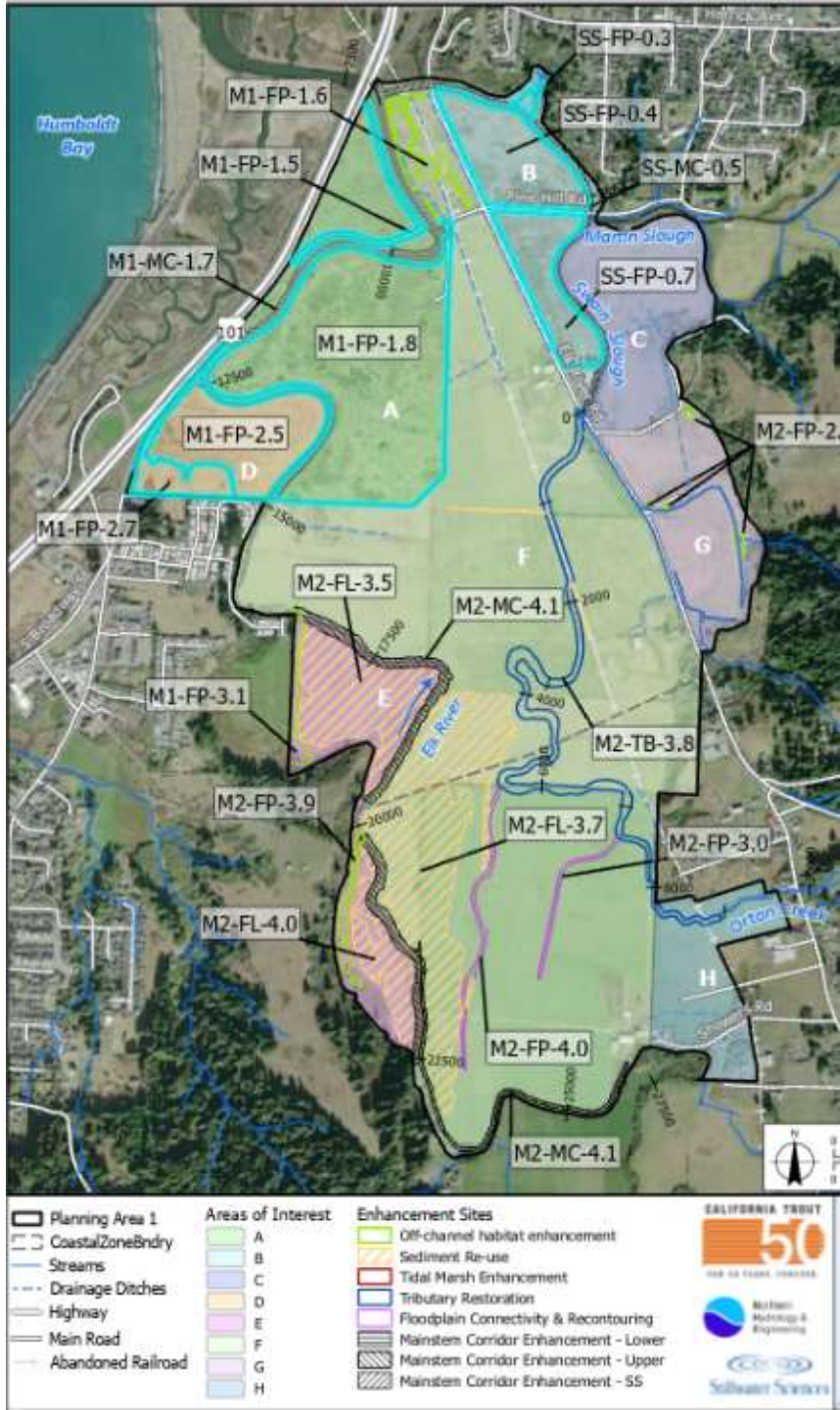
- 3 tide gates
- 10 culverts
- Fill ~9 ditches (~8,400ft)
- 1 building & fill pad (milk barn)



Tidal Marsh enhancement

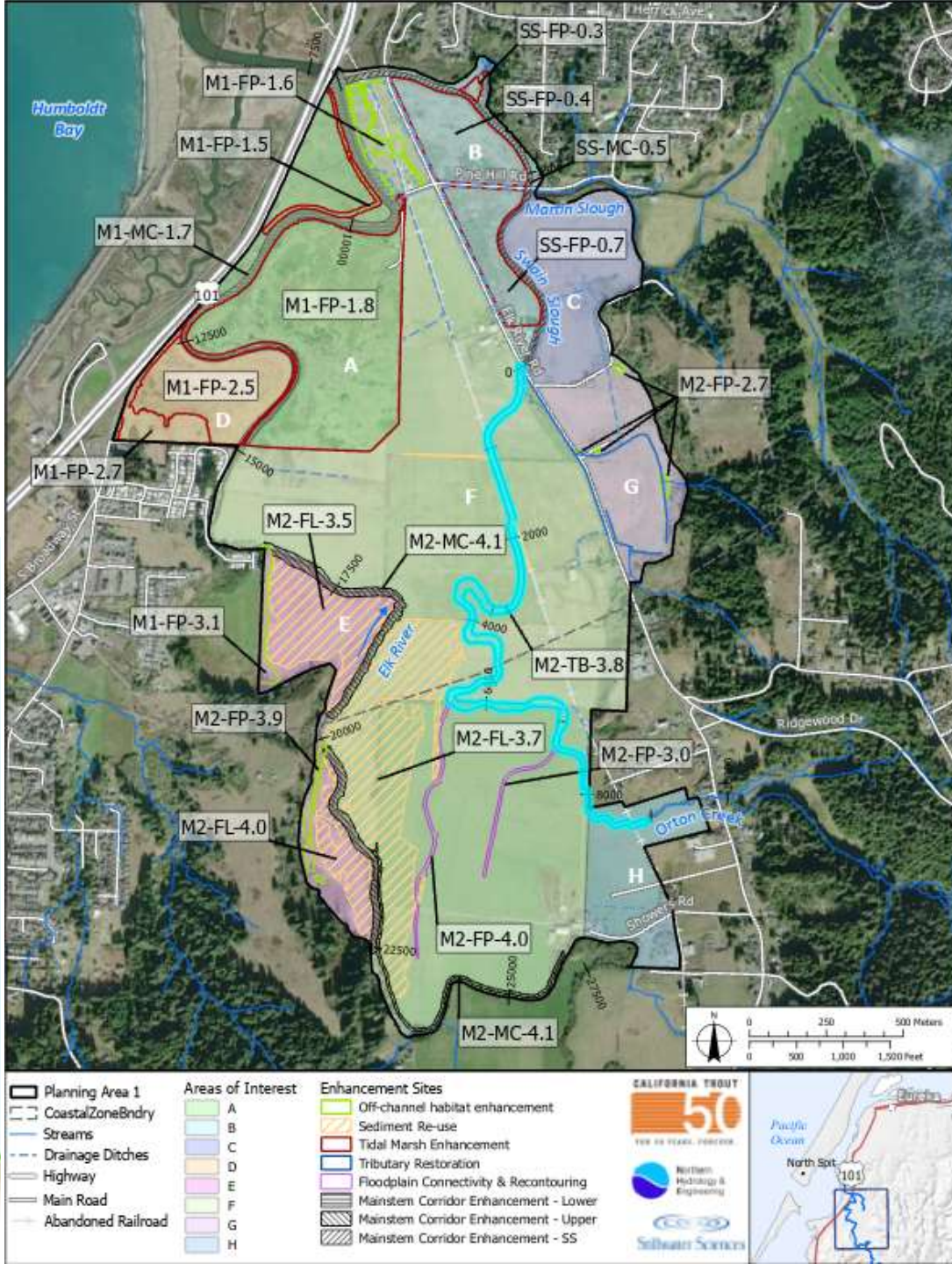
- Total area: 166 acres
  - Slough channels
  - Intertidal ponds
  - Salt marsh
  - Brackish wetlands
  - Wetland to riparian ecotone
  - Wetland to upland ecotone
  - Riparian
  - Coastal grasslands
  - Uplands

Eco-levee
- Transitional zone
- Slow storm surges
- Absorb floodwaters



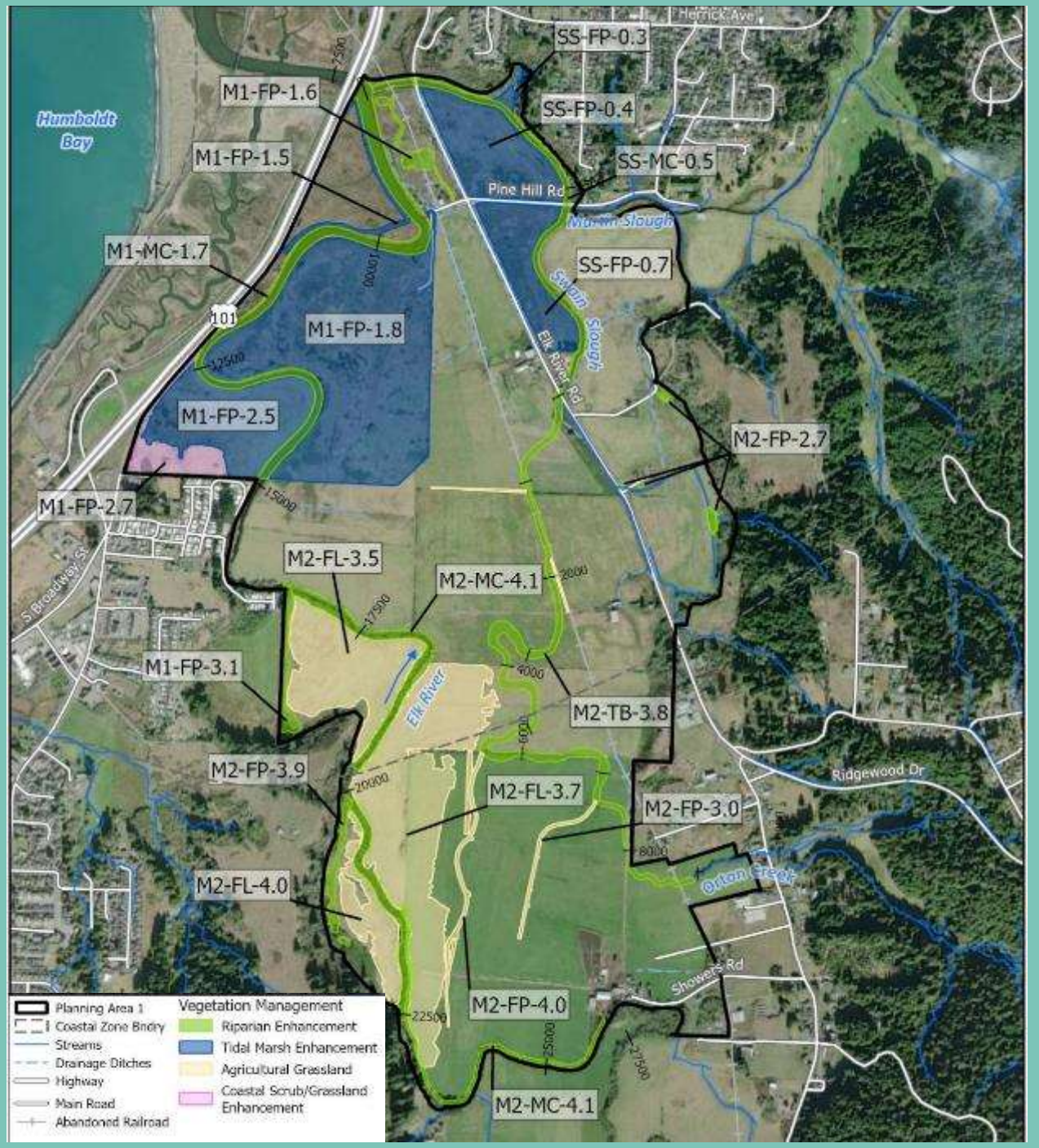
Tributary Restoration
Orton creek

Length of new stream channel: ~8,670 ft



Vegetation Enhancement Opportunities

- Increase diversity of native vegetation communities within degraded vegetation stands
  - Riparian forest
  - Estuarine and palustrine wetlands
  - Coastal meadow
- Protect, enhance, and expand habitats with special-status plant populations
- Nonnative Vegetation Management



Vision for Elk River

- Increase ecological resiliency and community health and safety
- Land acquisitions
- Sediment remediation
- Tidal marsh restoration and salmonid habitat rehabilitation
- Riparian habitat expansion
- Vegetation management

- Working Land protection and productivity

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The North Coast Coho Project

April 27, 2023

Twenty-four years of Watershed Restoration in Northern California Forests

TROUT UNLIMITED

www.tu.org

Trout Unlimited's - North Coast Coho Project

An unprecedented public-private partnership with significant and demonstrable results.

Where We Work

TU partners manage more than 900,000 acres of land

Photo Credit: Leslie Elias

Landowners

SOPER-WHEELER CO. LLC
TREE FARMING SINCE 1904

CALIFORNIA STATE PARKS

CAL FIRE

FOREST SERVICE
US
DEPARTMENT OF AGRICULTURE

USAL REDWOOD FOREST CO.

MENDOCINO • HUMBOLDT
Redwood Companies

GREEN DIAMOND

THE CONSERVATION FUND

Redwood Timber Company

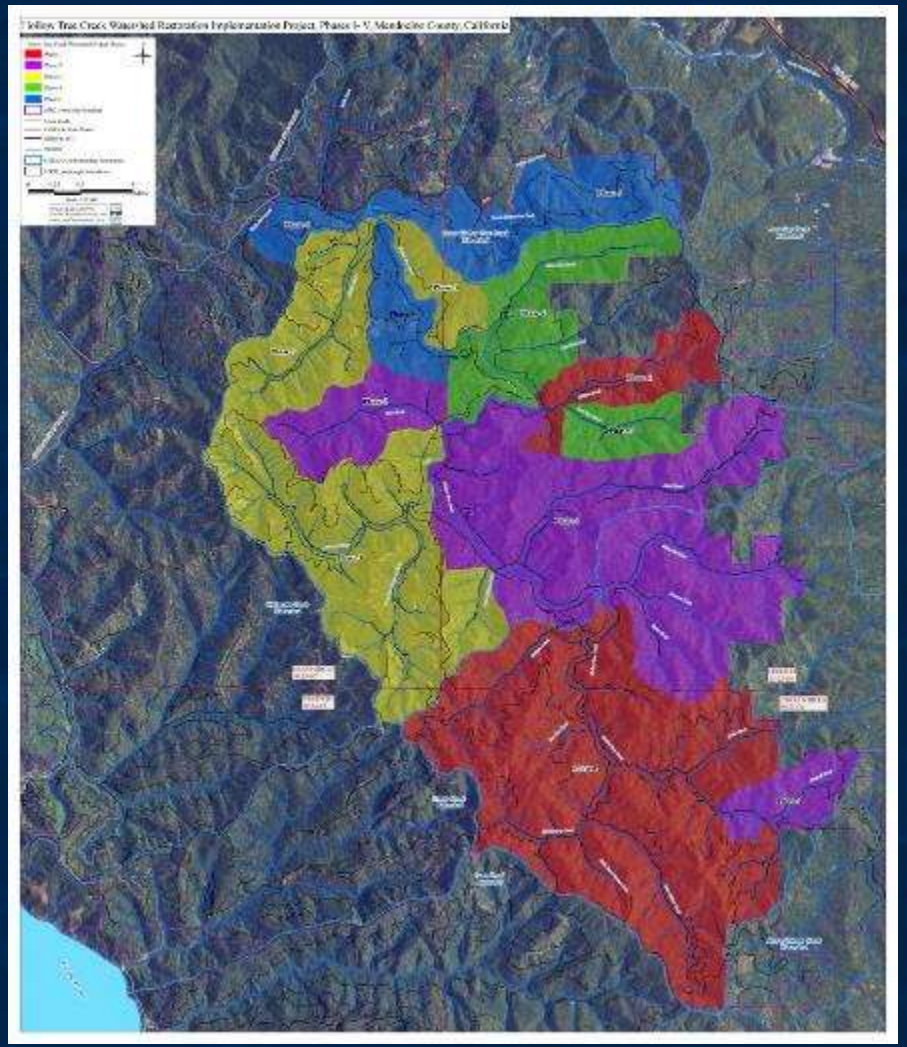
Legacy Timber Impacts

Standley Creek, South Fork Eel River - 1970

- Extensive Road and Skid Trails
- Fish Passage Barriers
- Altered Hydrologic Network
- Altered Sediment Supply
- Even Aged Timber Extraction
- Riparian Impacts
- Water Quality Impairments

Watershed Scale Phased Restoration

- Establish Technical Advisory Groups
- Assessment/Designs
- Permits/Construction – multiple phases
- Monitoring



Addressing Sediment and Legacy Roads

Sediment Reduction

569 Miles of road treated

710,946 Cubic yards of Sediment

~71, 000 dump trucks of sediment

Instream Habitat Enhancement

130 Miles of Stream Treated

7,366 Pieces of Wood Added

2,746 Sites

Working with Timber Operators and Professional Foresters

Accelerated Recruitment

Whole Tree Augmentation

South Fork Ten Mile River

The Nature Conservancy

Engineered Wood

Grade Control

Log Deflector

Apex Jam

Venturi

Hard Anchors

Fish Passage Improvement

Bridge Installation, Navarro River

- 14 Major Barriers Removed
- 70 Miles of Access Restored
- Stream Crossings 1,441 upgraded/decommissioned

Dam removal, Noyo River

Mendocino Railway Fish Passage

Restoring Off Channel & Alcove Habitat

Designed, Permitted, and Implemented in One Year (2018)

Lawrence Creek, Van Duzen River

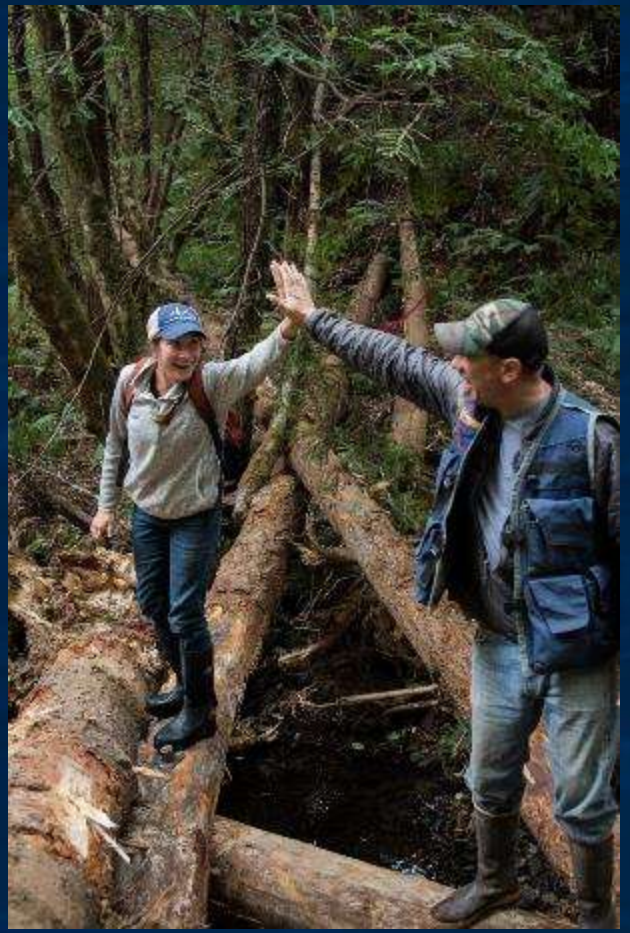

TLC200 2023/01/05 13:24:04


TLC200 2023/01/05 13:33:34

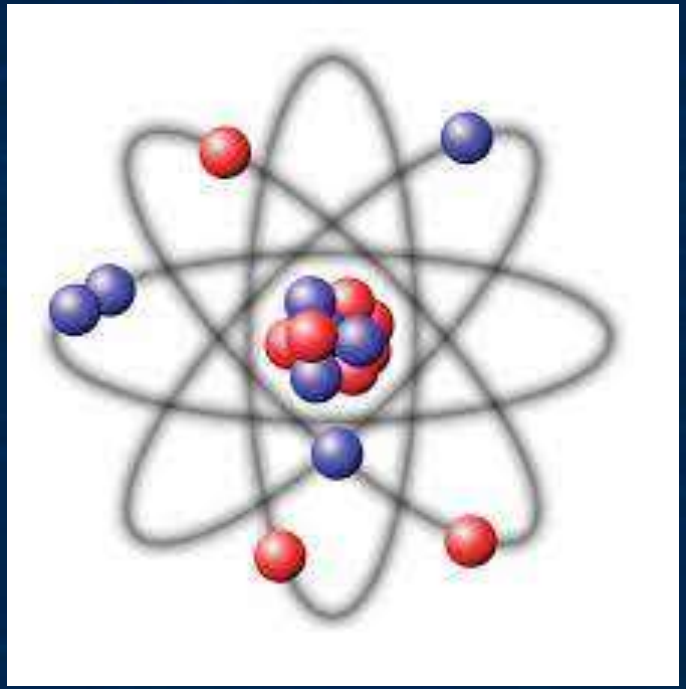
Low Tech Process Based Restoration

Flynn Creek,
Navarro River

Collaborative Efforts



Are Key to Recovery Success



Lessons Learned

- Build Trust
- Be Patient and Flexible
- Find Common Goals
- Leverage Resources and Expertise

Recovery is Possible

2015/16 Population - Noyo River

Estimate of Ocean Returning Fish	COHO *Oncorhynchus kisutch* 	CHINOOK *Oncorhynchus tshawytscha* 	STEELHEAD *Oncorhynchus mykiss* 
What We Have	5,112	0	318
What We Need	4,000	2,200	3,200

Questions ?

www.northcoastcohoproject.org

Anna Halligan, NCCP Project Director

PO Box 1966, Fort Bragg, CA 95437

707 234 4003

ahalligan@tu.org

www.tu.org

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Garcia Estuary Enhancement Project

And TNC's Approach to Restoration on the Mendocino Coast

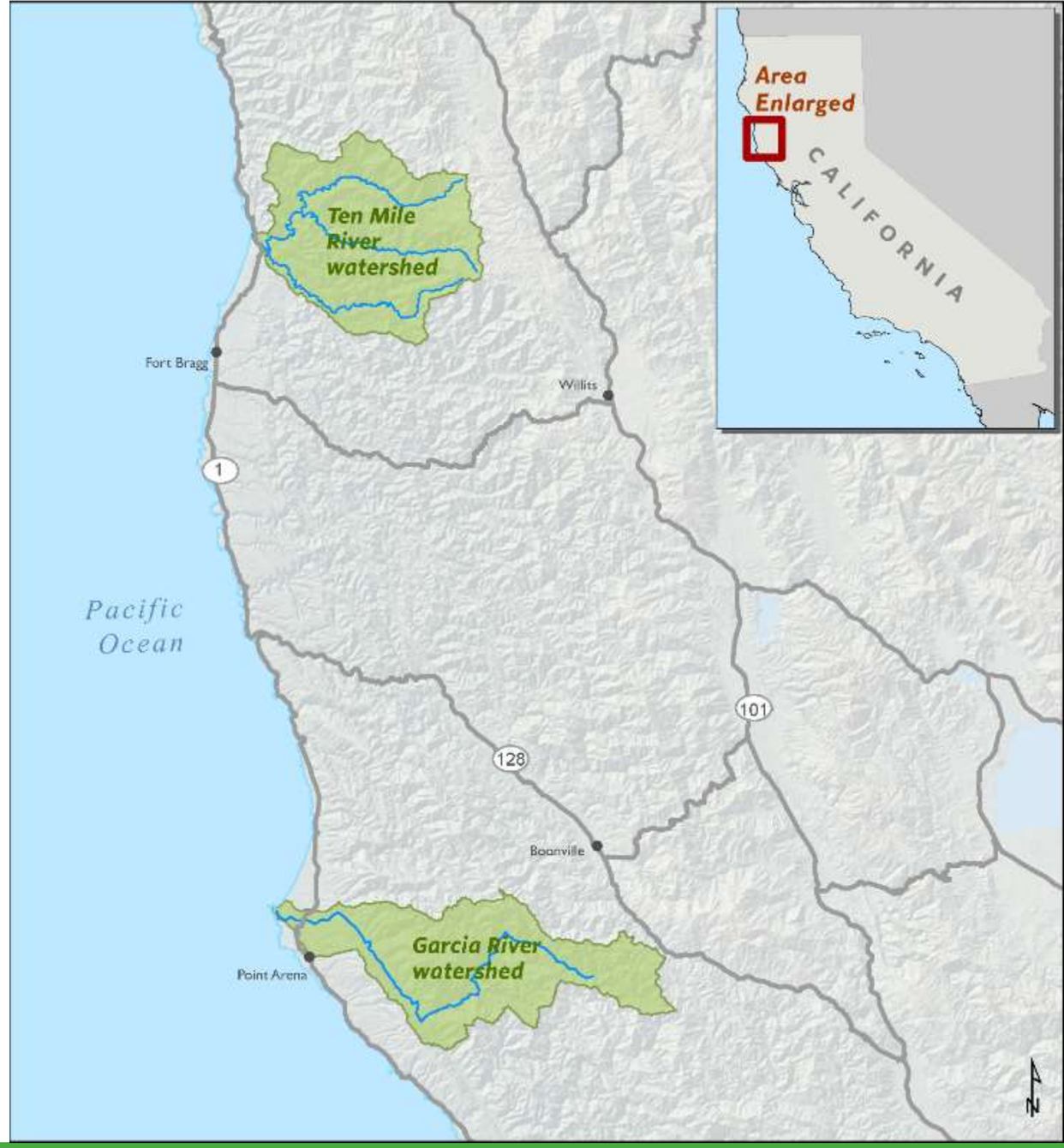
SRF 2023

PETER VAN DE BURGT, TNC
LAUREN HAMMACK, PCI

PRUNUSKE CHATHAM, INC.

TNC & North Coast

- Salmon-centric, two focal areas:
  - Garcia
  - Ten Mile
- **Conservation Easements** as a primary tool, for both land protection and active restoration
- Goal: work with landowners to **create salmon strongholds in target watersheds**



Ten Mile River

Smith Ranch Easements

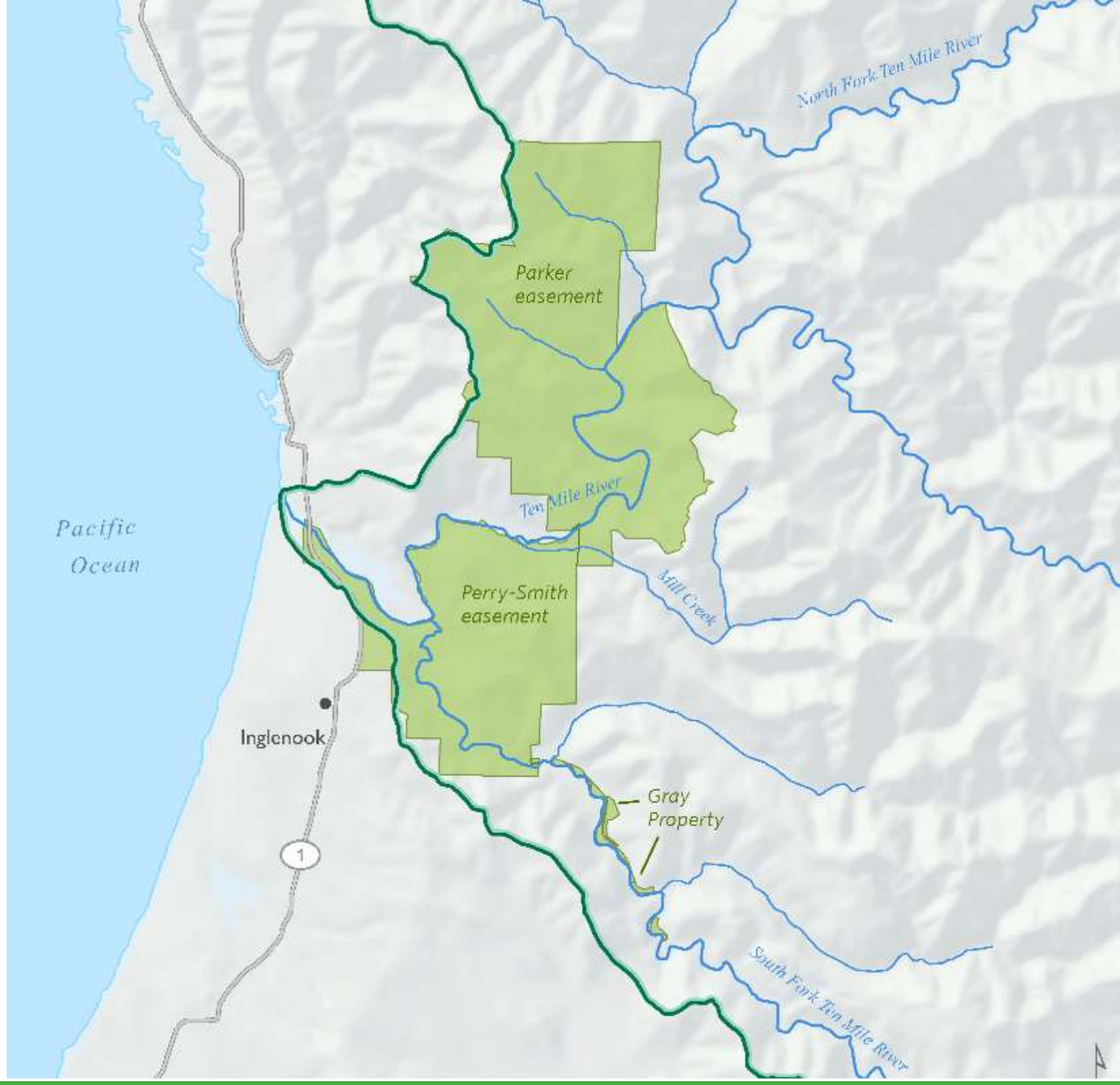
- 2014
- 1,257 acres
- 2 mi of S. Fork and 2 mi of Mainstem

Parker Easement

- 2016
- 2,554 acres
- 3 mi of Mainstem

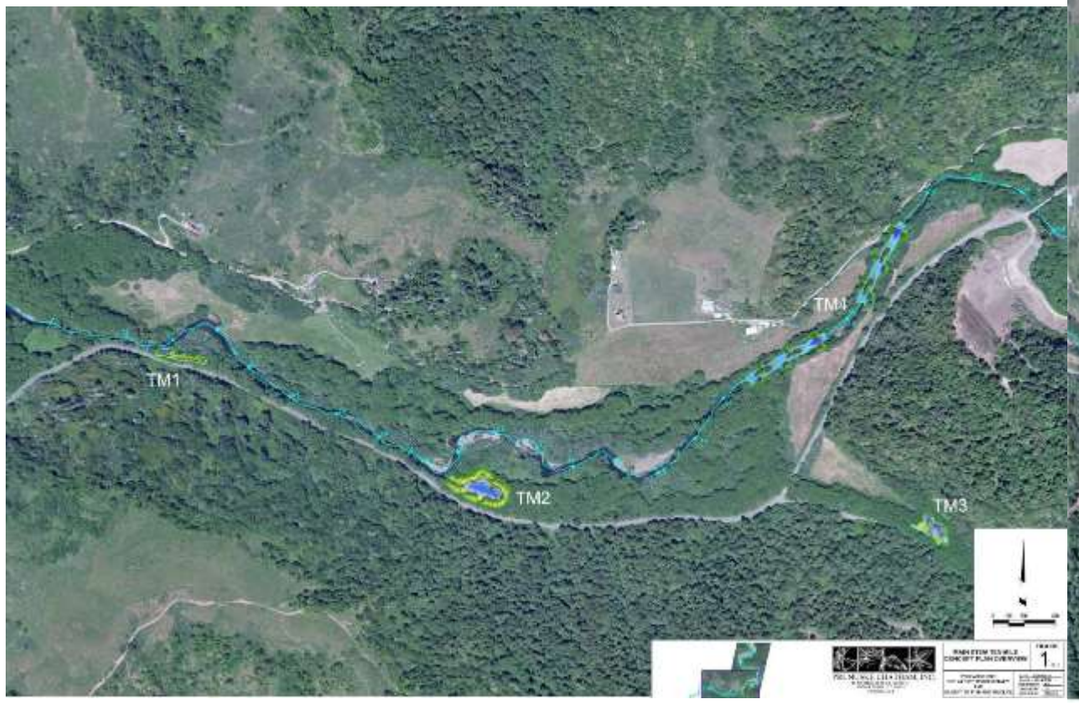
Gray Parcels (Fee)

- 2022
- 42 acres
- 2 mi of South Fork



Affirmative Rights

3.1. Preserve; Protect and Restore. The Conservancy may preserve, protect, identify, monitor, survey, enhance, and restore in perpetuity the Conservation Values including the right to implement riparian and aquatic restoration projects along the South Fork and main stem of the Ten Mile River.


TM1
TM1
TM2
TM3


TM13
TM12
TM9
TM4
TM7
TM10
TM11
TM8
TM6
TM5


SF20
SF19
SF2
SF1
SF18
SF3
SF10
SF15
SF14
SF13
SF8
SF7
SF12
SF4
SF11
SF17
SF16
SF6
SF5

South Fork Ten Mile Phase 1a - 2018


CAT
CAT
314E

South Fork Ten Mile Phase 1b - 2020

Mainstem Ten Mile Phase 1 - 2021


CAT

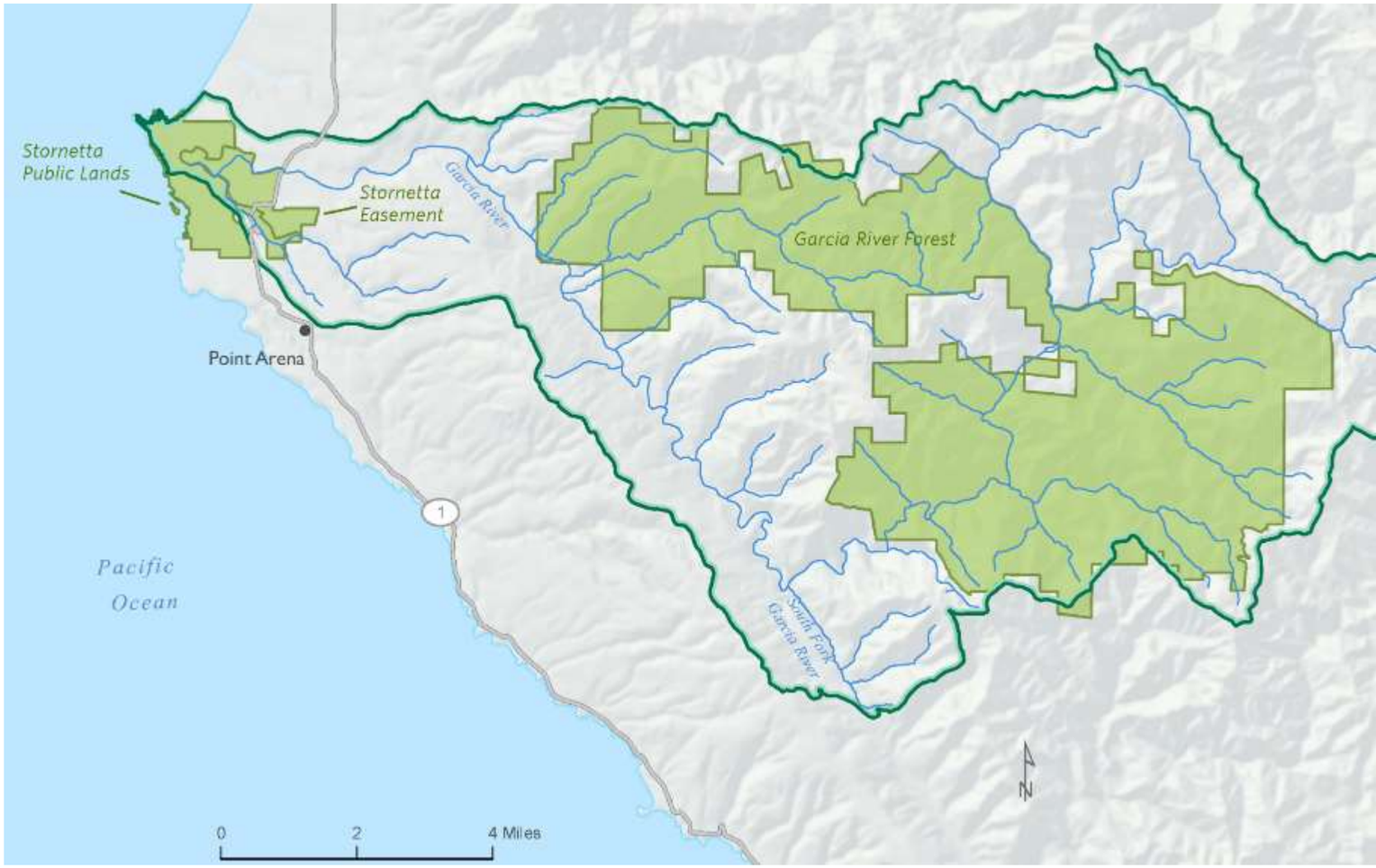
Garcia River

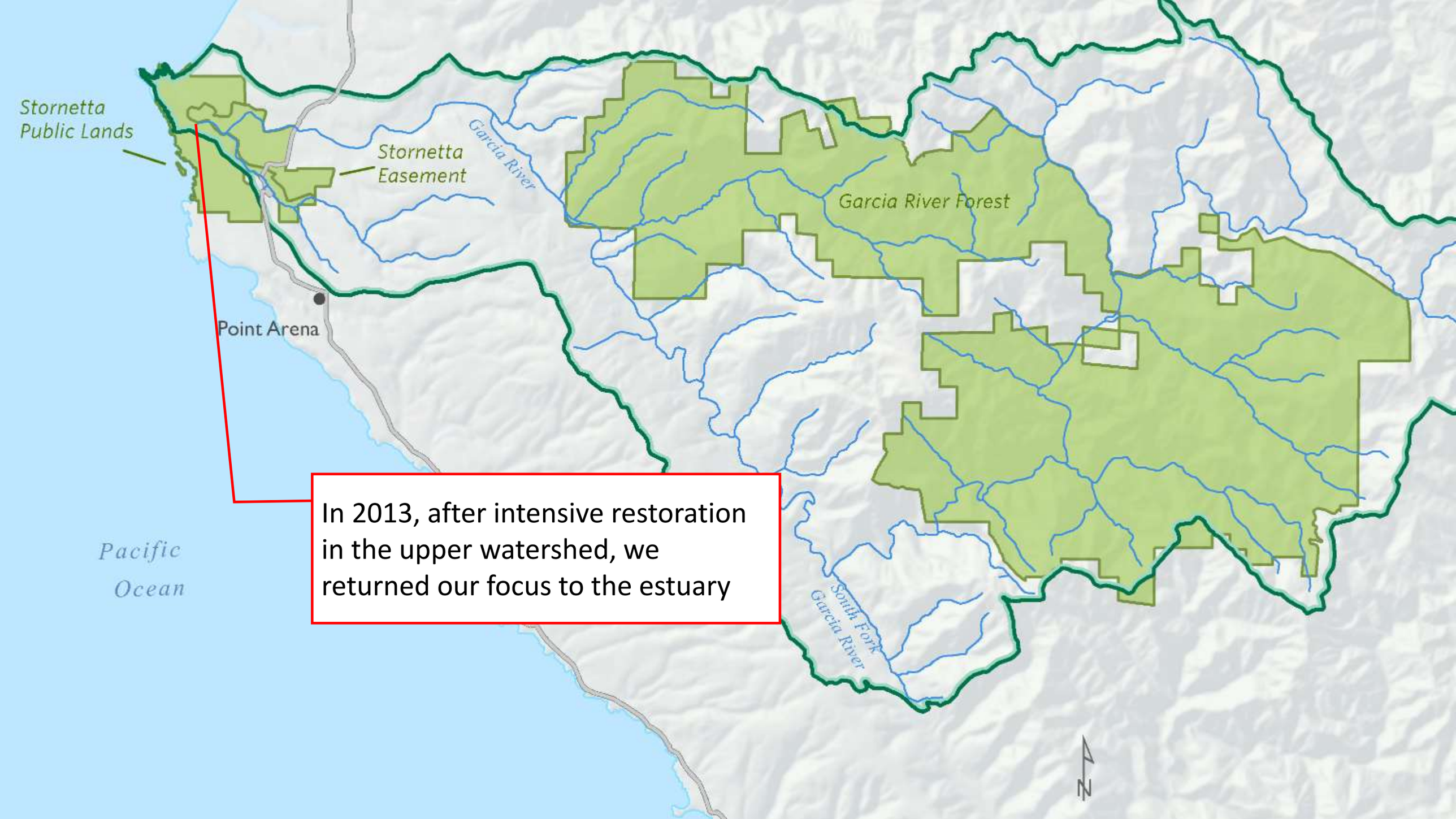
Stornetta Lands

- 2004
- 1,210 acres fee title, 579 CE
- Owned by BLM

Garcia River Forest

- 2004
- 23,780 acres
- Owned by TCF, TNC holds a CE




Stornetta
Public Lands
Stornetta
Easement
Garcia River
Garcia River Forest
Point Arena
Pacific
Ocean
South Fork
Garcia River
N
In 2013, after intensive restoration in the upper watershed, we returned our focus to the estuary

Garcia Estuary Project Overview

FRGP

- 2015 – 2018: Habitat Enhancement Plan & Initial Design

CRP

- 2018 – 2021: Design, permitting, NEPA/CEQA & fundraising

FRGP

- 2022: Construction

Prop 1

- 2022 – Present: Monitoring & Adaptive Management

Landowner Coordination

Project Goal

Create sufficient winter and spring rearing habitat in the middle estuary to support up to 54,000 juvenile coho, which is what is needed to reach a 49% recovery goal and provide winter rearing habitat commensurate with the watershed's summer rearing capacity (per Stillwater Sciences, 2013). By our estimation, this project could provide winter/spring habitat for approximately 68,000 coho juveniles.