Management Strategies and Actions (MSAs)
ODFW Draft Concepts

Rogue-South Coast Multi-Species
Conservation and Management Plan (RSP)

Stakeholder Team Meetings
April 29-30, 2020

Table of Contents

links to sections:

I. Other Species Strategies and Actions

Predation by pinnipeds (seals and sea lions) and birds (avian predators) is a source of mortality for all RSP species, but is not currently considered a primary or secondary limiting factor for any population. Predation or competition by non-native fish is considered a secondary limiting factor or potential limiting factor for several populations. Ongoing programs described below are designed to gather more information about pinniped and avian predation to better understand trends and possible impacts, as well as reduce pinniped-angler interaction in Rogue Bay. Proposed work in the Rogue basin is intended to reduce impacts of non-native fish as a limiting factor where possible.

Current and *Proposed* Programs					
Stratum	Area	Sea Lion Hazing	Pinniped Research	Avian Predation	Non-Native Fish
South Coast	Elk				
	Euchre Cr				
	Hunter Cr				
	Pistol				
	Lower Chetco				
	Upper Chetco				
	Winchuck				
	NF Smith				
	NADOTs				
Rogue	Lower Rogue R & Bay	**Rogue Bay Sea Lion Hazing**	**Pinniped Food Habit Study**	**Population Monitoring**	***Rogue Basin Monitoring and Removal Projects***
	Illinois				
	Middle Rogue				
	Applegate				
	Upper Rogue				
	Purpose (see additional details below)	Reduce pinniped and angler interaction during the fall chinook fishery, July to October.	Determine food habits of sea lions and other pinnipeds, including consumption of salmonids	Monitor seasonal changes in abundance of cormorants and other avian predators. Conduct food diet studies and potential impact on salmonids.	Angling mortality, targeted removal and monitoring of non-native minnows to reduce impact on native salmonids where feasible

A. Sea Lion Hazing

Background

The sea lion hazing program started in 2006 on the Rogue River as a combined effort of sport and commercial fishing guides, Port of Gold Beach, National Marine Fisheries Service, and ODFW. In 2005, the angling public estimated 50-75% of hooked fall Chinook were taken by sea lions. After the program was implemented, estimates of hooked fish taken dropped to 5%. The program has continued to be extremely successful and is currently managed by the Port of Gold Beach. The program uses a three-pronged approach: barriers on docks, hazing with non-lethal noise makers, and removal of easy food sources at cleaning stations.

Proposed Action

1. Continue to modify private cleaning stations so that fish carcasses are not disposed of in the estuary.

B. Pinniped Research

Background

The interaction of pinnipeds with fishery resources, commercial and sport fishing, and other human activities has a long history in the Pacific Northwest. Prior to implementation of the federal Marine Mammal Protection Act in 1972, seals and sea lions were killed for bounties offered by the states and were generally harassed or driven out of estuaries and rivers. These actions were taken because it was believed that pinnipeds had an overall negative effect on fish populations. Although these actions were not based on definitive scientific data, it was known that pinnipeds consumed many species of fish taken in sport and commercial fisheries, and thus competed directly with humans for those fishery resources.

Food habits of pinnipeds in the Rogue River were examined by Roffe and Mate (1984) and by Riemer and Brown (1997). Steller sea lion (*Eumetopias jubatus*) food habits on the south coast were reported in Riemer et al (2011). Other sites in Oregon where pinniped prey have been reported are at Netarts Bay (Brown and Mate 1983), and Coos Bay (Graybill 1981). More recent work on Pacific harbor seal (*Phoca vitulina richardsi*) food habits work has been conducted by ODFW in the Alsea River (Kvitrud et al. 2005; Wright et al. 2007), and by NMFS in the Umpqua River (Orr et al. 2004) and the Columbia River (Browne et al. 2002). These studies employed a variety of prey identification techniques, including surface feeding observations, stomach content analysis, genetics and examination of fecal samples.

Species present

Harbor seals haul out both in the estuary and at nearby Rogue Reef (2 miles NW of Gold Beach, Oregon). A smaller number of seals use the Pistol River where they haul out primarily at the mouth. Seals are found in Oregon year-round and they generally do not move far from haul-out areas. The population of harbor seals in Oregon appears to be stable to increasing (Brown et al 2005); the most recent population estimate (2014) based on ODFW aerial surveys was approximately 11,500 coast wide.

Steller sea lion abundance in the Rogue River area is greatest during the summer months (June-August), peaking in early July when large numbers of Steller sea lions are found on the breeding rookery at Rogue Reef (Pitcher et al. 2007; Wright et al. 2017). Coast wide the population of Steller sea lions is stable to increasing with Pitcher et al. (2007) reporting a growth of 2.5% annually.

California sea lion (*Zalophus californianus*) occur in the lower Rogue River, but the only local haul out is Rogue Reef. California sea lions are found primarily in Oregon waters from August through May and are almost exclusively males. Peak numbers occur in fall and spring as animals move along the coast to and from the breeding rookeries in southern California. California sea lions are considered to be at carrying capacity with a population size of 250,000.

Current Projects and Proposed Research

1. **South Coast Pinniped Food Habits.** The ODFW Marine Mammal Program re-instituted the collection of harbor seal scat on the south coast starting late December 2019 and is scheduled to continue through 2020. Sea lion scat is collected opportunistically during other offshore activities at Rogue Reef. The Rogue and Pistol rivers are the focus of this work because: 1) ODFW has extensive information on the salmonids occurring in these systems and is continuing to monitor their status; 2) previous work has been conducted with respect to pinnipeds and salmonids at Rogue River from 1995-1998 and can be used for comparison; 3) pinnipeds are present in high numbers in the Rogue estuary and are common in the lower river (Brown et al. 2005); and, 4) access to samples is available to researchers by land at both locations.

   To date, sixteen collections have been made in the Rogue River with a total of 308 scat collected (235 processed and 217 with prey remains). Ten collections have been attempted at Pistol River with a total of 35 scat collected and processed (32 with parts). Initial prey identified at both sites include Pacific lamprey, Pacific hagfish, squid and octopus species, Pacific tomcod, rockfish species, multiple flatfish species (Dover, slender, English, sanddab, Rex and additional species), and cusk-eel. To date the highest count of seals using the estuary was on 18 March with 278 seals (non-pups) recorded; pups were first observed on April 10, 2020. In the 1990s, a total of 1652 seal scat were collected opportunistically at two locations in the estuary (marina and mouth). Forty-one different prey items were identified from 1515 samples that contained identifiable prey remains including Pacific lamprey, salmonids, Pacific hagfish, Pacific whiting and flatfish species.

   A summary report for this project will include a list of prey consumed by Pacific harbor seals seasonally during 2020 and will be used as a comparison to the 1990s study. Prey species will be identified to the lowest taxonomic level possible. Salmonid bone can only be identified to genus without the use of genetics which is not currently part of this project. Haul out counts during the 2020 study period will also be included and compared to previous aerial and ground counts.

2. **Proposed Research**
   a. Conduct genetic work on recovered salmonid bones to identify to species of salmonids consumed by seals in the Rogue River.
   b. Continue project during 2021 to look at year to year variations in diet as ocean and river conditions change.
   c. Determine potential impacts to returning salmonids and other prey and focus future collections to evaluate these issues.
   d. Coordinate with Districts and hatchery managers to focus scat collection around hatchery releases to evaluate juvenile salmonid consumption.

C. Avian Predation

Background

Predation of juvenile salmonids by fish-eating birds has been implicated as a potential limiting factor for populations of anadromous salmonids across North America and Eurasia, particularly for those stocks that are declining as result of other causes, such as habitat degradation. However, the impacts of avian predation on abundance of salmonids available for harvest or spawning escapement remain unclear, largely because of the tremendous complexity associated with freshwater, estuarine, and marine food webs, and numerous complex factors that influence survival across the salmonid life cycle. Despite this uncertainty, avian management is ongoing at certain locations in the Pacific Northwest, but the intended benefits of these activities have been difficult to verify.

All fish-eating birds that occur in the Rogue Basin are protected under the federal Migratory Bird Treaty Act. In general, federal permits are required to "take" individuals for any purpose except during legal hunting seasons for certain species (i.e. mergansers).

Current Projects

1. **Avian Predation Research and Monitoring.** ODFW conducted a study of the double-crested cormorant diet in the lower Rogue River and estuary during 2013–2015 and estimated cormorants consumed <1%–2% of the total number of fall and spring Chinook smolts produced in the basin annually. Monitoring of abundance and distribution of fish-eating birds in the lower Rogue River has been ongoing since 2013. ODFW also conducts long-term monitoring of fish-eating birds across the Oregon Coast and participates in region-wide monitoring efforts.

D. Non-Native Fish

Background

ODFW considers non-native fish, primarily non-local minnows that have been introduced into the Rogue watershed, to be a limiting factor or potential limiting factor for several populations. Redside shiners and pikeminnow are native to other coastal rivers in Oregon, but not to the Rogue. Through competition, these species are considered a secondary limiting factor in the middle Rogue and Applegate River, and a possible limiting factor in the Illinois and upper Rogue. Through predation, pikeminnow are considered a possible limiting factor throughout the interior Rogue.

Proposed Projects and Actions

1. **Riparian protection and restoration.** Keeping streams cool is the primary action needed to address non-local minnows. Cooler water temperatures provide a competitive advantage to native fish like juvenile steelhead. This action will be addressed more thoroughly in the habitat section. ODFW habitat surveys will monitor trend in riparian shade over time.

2. **Middle Rogue monitoring and surveillance**. Oregon DEQ conducts a periodic electrofishing survey in the Middle Rogue as part of the National Rivers and Streams Assessment. The raft electrofishing survey has been conducted in 2008, 2013 and 2019. Over time this survey will provide fish

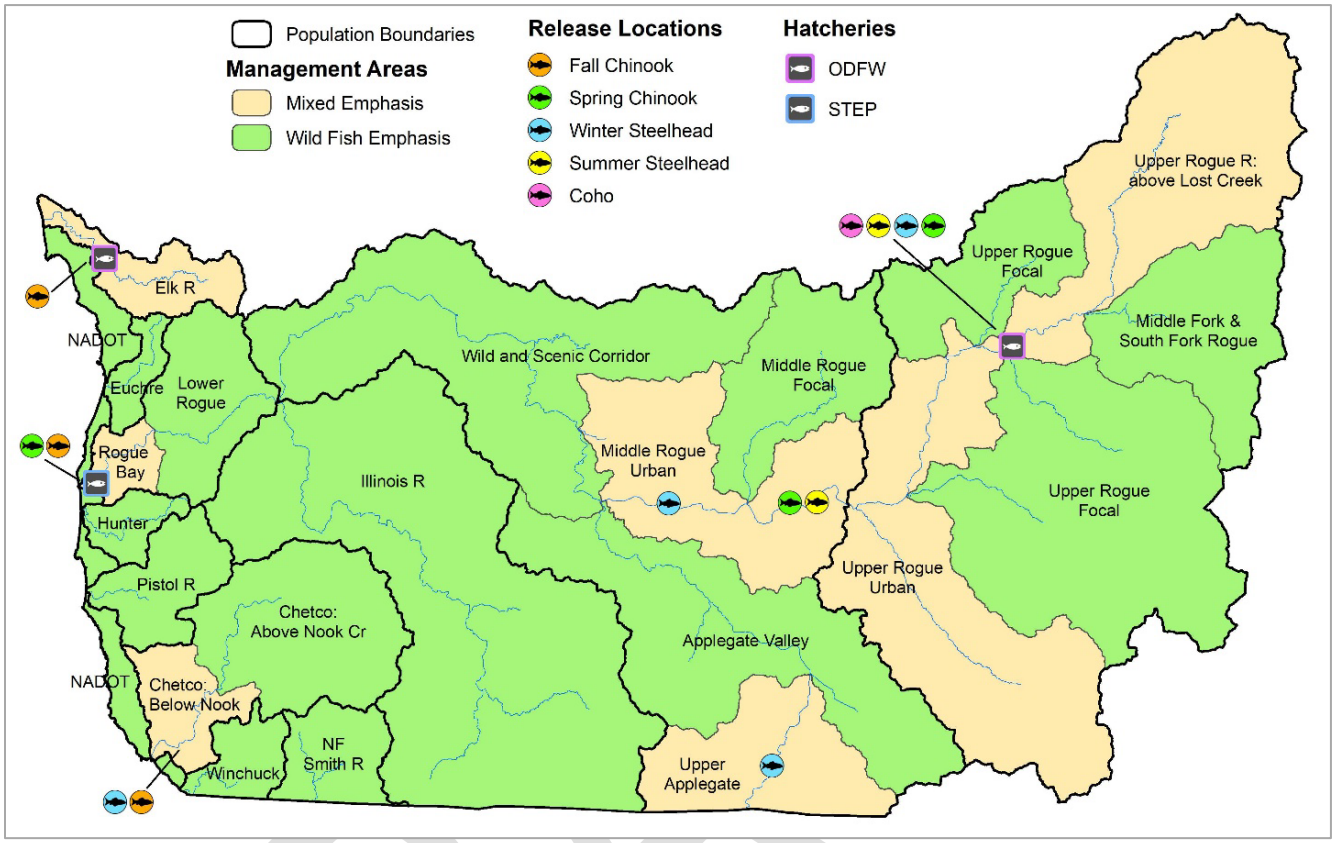
presence and trend data in a reach of the mainstem. The relative abundance of non-local minnows (shiners and pikeminnow) to juvenile steelhead will be used as an early indicator of largescale habitat decline favoring minnows over salmonids. The survey will also provide data on Klamath smallscale sucker presence and Pacific lamprey trend. ODFW plans to work with DEQ on the survey and ensure continuity of the survey.

3. **Pikeminnow fishing.** In 2019, ODFW initiated a pilot project to encourage non-local pikeminnow harvest and removal by anglers. A derby was organized to promote pikeminnow fishing in the middle Rogue, and prizes were awarded. Removal by anglers is an efficient, low cost option for managing the abundance of this non-local minnow through community involvement. Outreach for this action has emphasized the need to protect native suckers and to focus this on the Rogue only—no impact on native pikeminnow in the Umpqua. This is a management action in the *Rogue River Spring Chinook Salmon Conservation Plan*.

4. **Lower Jump off Joe Creek non-local minnow survey and removal**. ODFW plans a summer survey and collection of non-local minnows on lower Jump Off Joe Creek. The ratio of pikeminnows to shiners will be monitored, and minnows collected within the survey reach will be destroyed. Based on findings in a June 2019 survey to scope this project, the redside shiners are present in large numbers in lower Jump off Joe Creek and constitute the primary target for removal in this subbasin. This could be expanded to other streams through ODFW's STEP program.

5. **Applegate River raft electrofishing**. ODFW plans to test raft electrofishing for pikeminnow removal on the lower Applegate. Must not pose a threat to western pond turtles.

II. Hatchery Strategies and Actions



Hatchery Smolt Program Overview and Proposed Changes

Stratum	Population	Management Area	StW	StS	Coho	ChS	ChF
Coastal Stratum	Elk	Elk R					275,000
	Euchre	Euchre Cr					
	Hunter	Hunter Cr					
	Pistol	Pistol R					
	Chetco	Chetco R: below Nook Cr	50,000				200,000
		Chetco R: above Nook Cr					
	Winchuck	Winchuck R					
	NF Smith	NF Smith					
	NADOTs	NADOTs					
Rogue Stratum	Lower Rogue	Rogue Bay				78,000	90,000
		Lower Rogue					
	Illinois	Illinois R					
	Middle Rogue/ Applegate	Wild & Scenic Corridor					
		Middle Rogue Urban	20,000 to 35,000	37,000	25,000	91,000	
		Middle Rogue Focal					
		Applegate Valley					
		Upper Applegate	111,000 to 96,000*				
	Upper Rogue	Upper Rogue Urban	132,000	183,000	75,000	1,430,877	
		Upper Rogue Focal					
		Upper Rogue R: above Lost Creek					
		Middle Fork & South Fork Rogue					
		Total	313,000	220,000	75,000 to 100,000	1,599,877	565,000

Highlighted Cells = Program change proposed (details follow)

* Number of smolts released. Additional release of 24,000 pre-smolts above Applegate Dam will also continue.

A. Designate Wild Fish and Mixed Emphasis Areas

Proposed Action:

1. **Indicate where hatchery fish will (Mixed Emphasis Areas = MEA) and will not (Wild Fish Emphasis Areas = WFEA) be stocked (see map and table above)**
    a. Commission action will be required to add a hatchery program to a Wild Fish Emphasis Area or remove a hatchery program from a Mixed Emphasis Area
    b. WFEA pHOS (percent of hatchery fish on spawning grounds) < 10%
    c. MEAs may have higher pHOS, but will be managed to maintain population-scale pHOS below 10% (see Hatchery Proposal 2 below).
    d. temporally-limited, non-harvest hatchery programs (i.e., education, research, conservation/reintroduction programs) may occur in WFEAs

Rationale

Provides surety of management for both conservation and utilization interests

B. Establish Hatchery Management Targets and Limits

Proposed Action:

1. **Hatchery programs will be managed to meet smolt release targets in Hatchery Program Overview table above, as well as stay within limits and meet hatchery harvest/mitigation targets in the following table. Hatchery programs will also be managed to maintain pHOS (percent of hatchery fish on spawning grounds) below 10% in populations without hatchery releases.**

		Winter Steelhead			Summer Steelhead			Coho Salmon		
Stratum	Population	pHOS limit	Harvest target	Mitigation Target	pHOS limit	Harvest target	Mitigation Target	pHOS limit	Harvest target	Mitigation Target
South Coast	Elk R									
	Euchre Cr									
	Hunter Cr									
	Pistol R									
	Chetco R	10%[1]	1,000[1]	-	-	-	-	-	-	-
	Winchuck R									
Rogue	Lower Rogue R & Bay									
	Illinois R									
	M Rogue / Applegate	10%	-	2,000[2]	10%	-	-	10%	-	-
	Upper Rogue R	10%	-	2,000[2]	10%	-	500[3]	10%	-	500[4]

[1] pHOS limits evaluated as a multi-year running average to account for interannual variability and uncertainty in estimates. Details will depend on RME (see Section IV below). Harvest target based on 5-year average.

[2] Rogue hatchery winter steelhead programs mitigate for natural production lost to Corps dams. Mitigation goal 2,000 fish, best stated as mitigating for fishery impact of reduction of 2,000 wild steelhead in the basin. Rogue stock released at Cole Rivers Hatchery. Applegate stock released at Applegate trap at base of dam.

[3] Rogue hatchery summer steelhead program mitigates for natural production lost to William Jess Dam/Lost Creek Reservoir. Mitigation goal 500 fish, best stated as mitigating for fishery impact of reduction of 500 wild steelhead in the basin. Production increased by Governor's task force during period of low steelhead abundance in early 1990s.

[4] Rogue hatchery coho program mitigates for natural production lost to Corps dams. Mitigation goal 500 fish, best stated as mitigating for fishery impact of reduction of 500 wild coho the basin. Hatchery program considered an artificial reserve for conservation use if needed.

Current status: Hatchery management limits and targets. Based on best available information.

		Winter Steelhead			Summer Steelhead			Coho Salmon		
Stratum	Population	pHOS	Harvest	Mitigation Return	pHOS	Harvest	Mitigation Return	pHOS	Harvest	Mitigation Return
South Coast	Elk R									
	Euchre Cr									
	Hunter Cr									
	Pistol R									
	Chetco R	<10%[1]	1,146	-	-	-	-	-	-	-
	Winchuck R									
Rogue	Lower Rogue R & Bay									
	Illinois R									
	M Rogue / Applegate	<10%[2]	-	2,769	N/A	-	-	-	-	-
	Upper Rogue R	< 5%[3]	-	2,882	< 5%[3]	-	3,800	< 5%[4]	-	1,338

[1] Based on live fish observations in randomly selected spawning surveys, 2003-2015 (see table below). Average pHOS from spawning surveys was >10%, but most random surveys were in the lower portion of the basin (closer to hatchery release) due to access constraints. No hatchery fish were observed in surveys above SF Chetco and this portion of the basin accounts for over half of total spawning habitat. See Section IV below for proposed monitoring to improve observations of wild and hatchery steelhead on spawning grounds.

	All Chetco Surveys				Surveys above SF Chetco			
Year	# of Surveys	Marked StW	Unmarked StW	% Hatchery	# of Surveys	Marked StW	Unmarked StW	% Hatchery
2003	5	4	4	50%	0	-	-	n/a
2004	10	1	46	2%	1	0	1	0%
2005	9	9	73	11%	3	0	11	0%
2006	11	3	6	33%	2	0	3	0%
2007	6	7	16	30%	0	-	-	n/a
2008	3	0	3	0%	1	0	1	0%
2009	3	0	17	0%	1	0	3	0%
2010	4	0	5	0%	0	-	-	n/a
2011	4	0	1	0%	0	-	-	n/a
2012	3	0	1	0%	0	-	-	n/a
2013	4	0	9	0%	0	-	-	n/a
2014	2	0	0	n/a	0	-	-	n/a
2015	8	10	24	29%	0	-	-	n/a
Total	72	34	205	14%	8	0	19	0%
			Average	13%				

[2] Based on live fish observations in spawning surveys in the Applegate basin, 2003-2009 (see table below). Applegate release has been reduced in recent years.

Year	# of Surveys	Miles Surveyed	Marked StW	Unmarked StW	% Hatchery
2003	13	18	3	58	5%
2004	0	0	-	-	n/a
2005	11	13	4	27	13%
2006	9	11	1	14	7%
2007	7	8	3	38	7%
2008	6	6	2	7	22%
2009	3	6	0	2	0%
Total	49	62	13	146	8%
				Average	9%

[3] No recent estimate of pHOS, but long history of excellent homing in Cole Rivers production; spawned, reared and released in same water supply, and hatchery on mainstem at upper end of anadromy. Results from Elk Creek trap (major tributary near hatchery) indicated very low stray rates for summer and winter steelhead in the Upper Rogue (see table below).

	Summer Steelhead			Winter Steelhead		
Year	Marked StS	Unmarked StS	% Hatchery	Marked StW	Unmarked StW	% Hatchery
2001-02	6	469	1.3%	11	275	3.8%
2002-03	6	810	0.7%	6	467	1.3%
2003-04	17	1058	1.6%	2	260	0.8%
2005-06	16	578	2.7%	3	303	1.0%
2006-07	2	822	0.2%	10	348	2.8%
		Average	1.3%		Average	1.9%

[4] No recent estimate of pHOS, but long history of excellent homing in Cole Rivers production; spawned, reared and released in same water supply, and hatchery on mainstem at upper end of anadromy. Results from random spawning surveys in the Upper Rogue basin from 2002-2008 are shown in table below. Percent hatchery spawners is based on carcass fin-mark observations; n/a indicates inadequate sample size for pHOS determination. Release target was reduced from 225,000 smolts to 75,000 smolts in brood year 2013.

Year	# of Surveys	Survey Miles	pHOS
2002	18	17.3	6%
2003	22	21.4	7%
2004	18	18.5	0%
2005	-	-	-
2006	14	13.1	0%
2007	7	6.9	n/a
2008	5	5.3	n/a
		Average	3%

C. Chetco Winter Steelhead Acclimation

Background:

The Chetco winter steelhead hatchery program started in 1969. Current production is up to 50,000 steelhead smolts. Hatchery smolts are released in the Lower River either at Social Security Bar or Loeb State Park. All smolts receive an adipose clip to identify them as hatchery. An additional ventral clip has been added to brood year 2018 and 2019 to refine release strategies and monitor stray rates. Broodstock is collected from the Chetco River by anglers. The goal of the program is to collect up to 60 pairs of adult steelhead, but improved hatchery practices have allowed ODFW to reduce this number to less than 90 fish in most years. The program's goal is to incorporate at least 65% wild fish in the broodstock. Adults are transferred to Elk River Hatchery to mature and spawned. Angler-caught wild broodstock are live spawned at Elk River Hatchery and then transported back to the Chetco River and released. Juveniles are reared at Elk River Hatchery and released as 1-year old smolts the following spring into the Chetco River.

Proposed Action:

1. **Establish an acclimation site on the lower Chetco River (downstream of Loeb State Park).** An acclimation site would increase survival, possibly reduce straying, provide additional volunteer outreach, and improve catch rates. The acclimation site would be utilized for winter steelhead prior to release. Acclimation time frame February to early March.

D. Minimizing Risk While Replacing Lost Production with Rogue Hatchery Releases

Background:

While many hatcheries in Oregon are operated to augment fisheries, Cole Rivers Hatchery is almost exclusively a mitigation hatchery. Hatchery production is described as the "restitution" portion of the Rogue Basin Project approved by Congress, as described by the Corps of Engineers. The hatchery is operated by the Oregon Department of Fish and Wildlife to produce smolts to mitigate for the loss of and fishery provided by 13,020 spring chinook, 2,000 winter steelhead, 500 Coho salmon and 500 summer steelhead. Similar to studies conducted to allow ODFW to best advise the Corps how to meet its fishery requirements for dam operation, the Rogue Basin Project funded studies to facilitate best management practices for the operation of Cole Rivers Hatchery. A biologist worked on station for two decades to lead the studies.

1. **Previous studies on predation and competition, and additional review proposed**

   Background:

   Hatchery fish are not considered a primary or secondary limiting factor for Rogue populations, but hatchery smolts may pose some risk to naturally produce juveniles through predation and competition.

   For three years (1979-1981), ODFW collected stomach samples from post-release smolts collected in the river March 1-June 1. The hatchery fish primarily fed on insects, but some did eat fish. A total of 155 spring chinook smolts were collected, and 24/155 or 15% had fish parts in the stomach. At the time, hatchery spring chinook smolts were released in October, December and March. Thanks to this study, the December release was found to residualize and not migrate to sea quickly. That release was dropped. The March release, happening during peak emergence of wild spring chinook fry, was also dropped at the time.

For Coho and steelhead smolts the sample size was very small. All except one were captured in 1980, so this summary will focus on that year's results. For Coho, 3/6 smolts had fish parts in their stomachs, while for steelhead 1/7 contained fish parts. All Coho and steelhead smolts containing fish were collected the first 10 days in May. One conclusion was that naturally produced fry were too large for hatchery fish to consume by May 15th. Using many assumptions on top of a very small sample size led to an estimate of 177,000 fry consumed by hatchery steelhead smolts (370,000 steelhead smolts), and 57,139 fry consumed by Coho smolts (198,000 coho smolts). These estimates, if accurate, represent 3-7% of the spring chinook fry produced during those years (ODFW 2007). The primary anadromous species impacted by hatchery smolt predation would be mainstem spawning chinook salmon; spring chinook on the upper Rogue and fall chinook on the Applegate. Almost all naturally produced Coho and summer steelhead emerge in tributaries and not the mainstem, and the bulk of the winter steelhead are also spawning in tributaries. Predation by hatchery smolts is not considered to be a limiting factor for naturally produced Coho, steelhead or cutthroat trout in this plan, but cannot and will not be discounted.

A clear conclusion is that while hatchery smolts mostly feed on insects, they will consume naturally produced salmonid fry. One important consideration is the fact that the hatchery releases are replacing natural production that is no longer happening upstream of the dams. The naturally produced smolts would also have fed opportunistically on naturally produced fry.

Recent changes to hatchery production have reduced risk in the upper Rogue. One benefit of the reduction of Coho hatchery production from 200,000 smolts to 75,000 smolts was a reduction in impacts in the upper Rogue. The production formerly used to produce Coho was reallocated to spring chinook production, primarily restarting a yearling release of spring chinook smolts in March. These smolts are released off station in Gold Hill below spring chinook spawning habitat and newly emerged spring chinook fry.

Changes to steelhead production has also taken place since the fry predation estimate. At least a portion of the summer steelhead release in the late 1970s were released as two years smolts (hatchery records unclear). Studies at Cole Rivers found that two-year-old summer steelhead tended to not migrate volitionally from rearing ponds. Yearling steelhead over 18 centimeters fork length at release migrated very well. Effective use of a warm water supply line allowed summer steelhead to be released as yearlings, which continues to this day. This may reduce post-release impacts from hatchery smolts. In addition, a portion of the summer steelhead release is now trucked downstream and released in Gold Hill.

Because of the inherent late spawn timing for winter steelhead in the middle and upper Rogue, a one-year-old smolt is extremely difficult to produce. The release during the time of the fry predation study was a two-year-old smolt. For many years in between, the production goal was 150,000 Rogue and Applegate smolts. An effort was made to release 60-90,000 as yearlings, with undersized fish being reared to a two-year-old smolt. That release was dropped in brood year 2000 and the production goal changed to 132,000 two-year-old smolts for each program.

Studies at Cole Rivers found that two-year-old winter steelhead migrate volitionally from rearing ponds if they are larger than 20 centimeters fork length. All winter steelhead smolts are hand sorted each March prior to release. Precocially mature smolts, a phenomenon with two-year-old smolts, are removed from production, along with small fish not expected to reach size at release goals. This grading may reduce post-release impacts from hatchery smolts. In addition, on the

Applegate, some of the hatchery winter steelhead release has been moved to acclimation releases in downtown Grants Pass, reducing impacts in the upper Applegate River.

Some steelhead residualize in the upper Rogue River based on angler catches in summer, and this is assumed to take place on the upper Applegate. This is not expected to result in additional fry predation after May 15 (as stated above), but could pose an impact due to competition with naturally produced steelhead in the river. Competition by hatchery smolts is not considered to be a limiting factor for naturally produced Coho, steelhead or cutthroat trout in this plan, but cannot and will not be discounted.

Proposed Actions:

a. ODFW will survey for the relative abundance of hatchery steelhead in the upper Applegate in summer.
b. ODFW will promote harvest of adipose fin-clipped rainbow trout in summer in the upper Rogue River.
c. ODFW will conduct a project to genetically test hatchery steelhead in the upper Rogue to determine composition by run type (summer vs. winter steelhead), and explore additional actions to minimize risk.

2. Broodstock management over time and additional actions proposed

Background:

Rogue hatchery broodstocks were developed from naturally produced Rogue fish that volitionally entered the hatchery (some Applegate winter steelhead were collected by various techniques), and during the intervening years, only those fish that volitionally entered the hatchery were included in the brood stock. The amount of domestication of the hatchery population is unknown. Cole M. Rivers Hatchery has been operational since 1973. Assuming that age 4 spawners dominated the brood stock, approximately 11 generations of families have been raised at the facility. Brood and spawning protocols were implemented to maintain historic run timing. Cole Rivers fish are spawned, incubated, reared, released on same water source. With hatchery located at the upstream end of current anadromous distribution, returning adults do not need to turn off on a tributary to reach the hatchery trap. These factors contribute to improved homing by hatchery returns.

Management of summer and winter steelhead at Cole Rivers

A fin clip for stock identification and tracking program performance was applied to steelhead reared and released from Cole Rivers Hatchery. A paired fin clip or maxillary clip was applied along with and adipose fin clip to a portion of the production each year. The stock identification clip, dropped in the mid-2000s, provided several insights. Strays were never high. Very few Applegate winter steelhead were ever seen in Cole Rivers Hatchery trap, and very few Rogue winter steelhead every showed up in the Applegate trap; perhaps a handful over decades.

The stock identification fin clip also facilitated separate management of an otherwise overlapping run of summer and winter steelhead. Similar to the year-round migration of steelhead in the river, steelhead enter the trap at Cole Rivers continuously, posing a risk of mixing of summer and winter steelhead during fish culture. The mark study confirmed a general difference in timing of return to the hatchery. Summer steelhead marks changed to winter steelhead sometime between the end of February and the middle of March. The broadscale shift takes place in a 10-14 day period.

Following mainstem dam removal, early portions of runs have shown a tendency for earlier arrival at Cole Rivers. But retired hatchery biologist Mike Evenson states that separation can be done visually as well. There tends to be a jump in size in winter steelhead, and the winter fish are bright and in much better shape than summer steelhead. ODFW believes that the summer and winter steelhead brood stock management has successfully maintained separation between the two run-types. A genetic study of the spring chinook broodstock in 2018 provided outstanding results, with over 80% of the fish selected for brood testing as homozygous for the spring run timing allele(s); and almost no fall chinook in the brood. A minor change in broodstock selection should reduce risk even further of including fall chinook in the spring chinook program.

Proposed Actions:

a. As funding and genetic capability allows, ODFW will test summer and winter steelhead broodstocks at Cole Rivers to determine run-type consistency.
b. Periodically collect wild winter steelhead broodstock from other areas of upper Rogue. Currently the wild fish component of the hatchery broodstock comes from unmarked fish that swim volitionally into the hatchery trap. Using volunteers in our Salmon Trout Enhancement Program, we propose to collect wild fish from upper Rogue tributaries as a broodstock stewardship measure. Current proposal for winter steelhead is 30 adults collected for infusion into hatchery winter steelhead brood every five years.

E. Increase Rogue Coho Release

Background:

The Rogue coho salmon hatchery program started in 1975. It was initiated to produce adult hatchery coho salmon in lieu of wild production lost to the construction of federal dams in the upper Rogue River basin. The program is also intended to be managed as an artificial reserve to retain future management options in the recovery of Rogue Basin coho; and provide monitoring opportunities for Rogue River coho related to ocean distribution and marine survival, as well as incidental harvest mortality of wild coho. Current production target is 75,000 coho smolts. The production target was lowered from 200,000 smolts to current level in 2013 (production was shifted to spring Chinook salmon). Hatchery smolts are released from Cole Rivers Hatchery. All smolts receive an adipose clip to identify them as hatchery. Adult hatchery coho salmon counts at Huntley Park and Cole Rivers Hatchery are used to estimate Rogue wild coho salmon abundance. Low hatchery returns reduce confidence in wild estimates and this has happened frequently in recent years.

Proposed Actions:

1. **Increase release target from 75,000 to 100,000 smolts**. A larger smolt release will provide additional angling opportunities and improve wild coho population estimates without significantly increasing risk to wild coho salmon populations.

2. **Move a portion of the release (25,000 smolts) downstream.** Increasing the coho smolt release from Cole Rivers Hatchery could increase predation on naturally produced Spring Chinook fry and other juvenile salmonids of the upper Rogue. Releasing the additional smolt production in the Gold Hill area (as currently occurs with summer steelhead) would reduce this risk.

F. Proposed Projects to Increase Hatchery Harvest or Natural Production with Community Involvement in Steelhead Programs

Background:

To improve harvest of mitigation hatchery production, Rogue steelhead community involvement projects are proposed. The projects provide an opportunity for volunteers to help improve existing hatchery programs. Both continuing and proposed enhancement/community involvement projects are listed below. Proposed projects will not be implemented without community support through volunteer assistance. Projects must be consistent with the HGMP and any other relevant plans. Changes to the hatchery production schedule requires approval of USACE. Smolts are not additional production, but shifts in the release location away from Cole Rivers Hatchery or the Applegate trap to improve angler access to hatchery returns.

Proposed Projects:

1. **Continuing Community Involvement Project: Winter steelhead (StW) hatchery smolt acclimation in Skunk Creek and Greens Creek**
    a. StW smolt acclimation (20,000 smolts) at Greens and Skunk creeks is being done to improve access for harvest and address fishery concerns in Middle Rogue. Reduced smolt release on Applegate near dam, instead released as Rogue stock in Grants Pass.

2. **Continuing Community Involvement Project: StW hatchery pre-smolt release above Applegate Reservoir**
    a. Marked StW hatchery pre-smolts (24,000 pre-smolts) are being released upstream of Applegate Reservoir to continue to explore restoring production above the dam. A previous project found that hatchery smolts released above the dam are able to migrate downstream and return as half pounders (captured at Huntley Park) and adults (captured at trap at base of Applegate Dam). May be possible to increase this release and/or release excess hatchery StW adults above reservoir. Restores marine nutrients to tributaries isolated by dam.

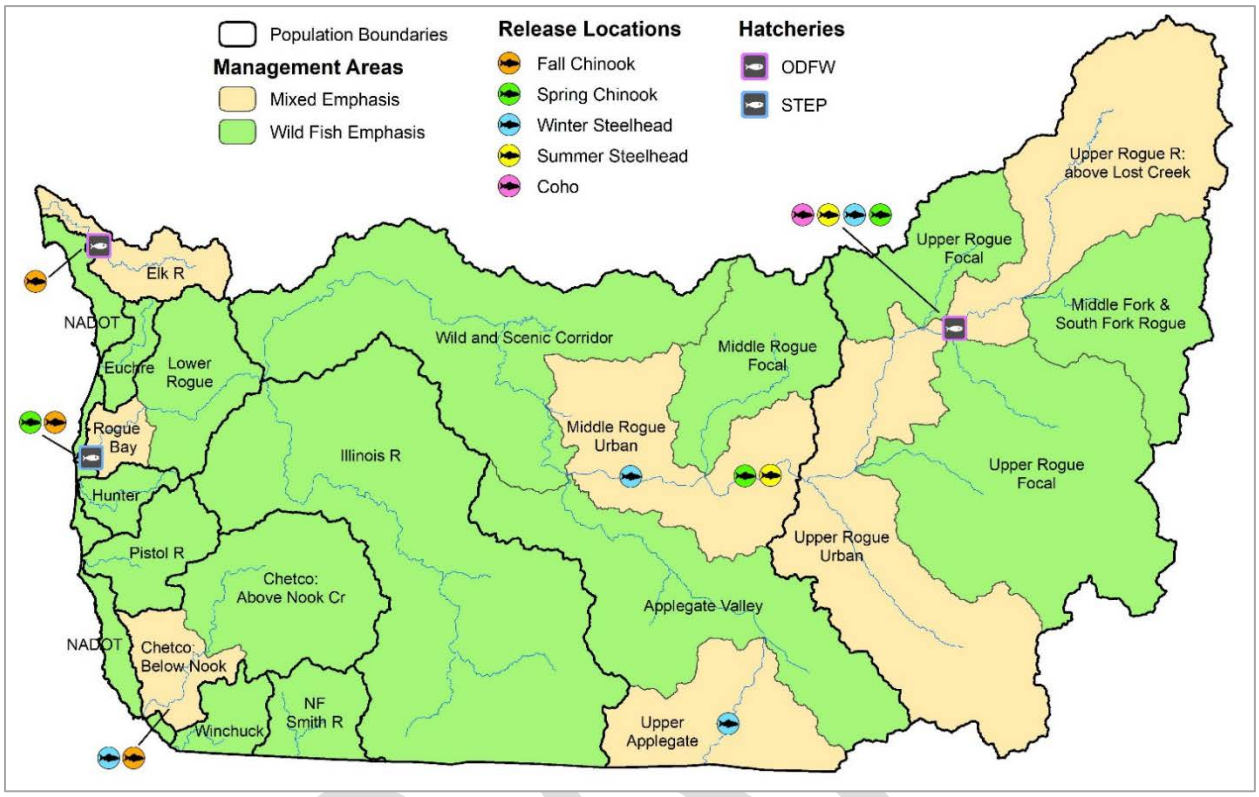
3. **New Community Involvement Project: StW hatchery smolt acclimation in Jump Off Joe Creek tributary**
    a. If a suitable site can be found, acclimate StW smolts to improve access for harvest and address fishery concerns in Middle Rogue. Reduces smolt release on Applegate near dam, instead released as Rogue stock in Jump Off Joe Creek. Requires approval by Corps of Engineers.
    b. 15,000 smolts (if successful, may increase with smolts from other acclimation sites).

4. **New Community Involvement Project: Releases of excess hatchery summer steelhead (StS) adults above barrier in Greens Creek**
    a. Releases excess hatchery StS adults (15-20 pair if available) in Greens Creek above barrier to gain additional production on annual basis. May require edit to HGMP.

5. **New Community Involvement Project: Releases of excess hatchery StS adults and StW smolt acclimation in Allen Creek**
    a. Release of excess hatchery StS adults (15-20 pair if available) in Allen Creek above barrier to gain additional production on annual basis. May require edit to HGMP.
    b. Back up site for StW smolt acclimation if Jump Off Joe Creek is not used (15,000 smolts).

6. **New Community Involvement Project: Releases of excess hatchery StS adults above Emigrant Dam and Lake**
    a. Release excess hatchery StS adults (up to 250 pair if available) in Emigrant Creek upstream of the dam to gain additional production on annual basis. Restores StS production to miles of habitat blocked by the dam. Restores marine nutrients to tributaries isolated by dam. May require edit to HGMP and Fish Health certification. May be possible in future to trap downstream migrants and release below the dam.

III. Fishing Strategies and Actions



Wild Fishing Overview and Proposed Changes

Stratum	Population	Management Area	StW	StS	Coho	CCT and/or Resident RBT	ChS	ChF
Coastal Stratum	Elk	Elk R	Retention	---	N	Retention	---	Retention*
	Euchre	Euchre Cr	Retention	---	N	Retention	---	N
	Hunter	Hunter Cr	Retention	---	N	Retention	---	Retention
	Pistol	Pistol R	Retention	---	N	Retention	---	Retention
	Chetco	Chetco R: below Nook Cr	Retention*	---	N	Retention	---	Retention*
		Chetco R: above Nook Cr	Retention	---	N	Retention	---	N
	Winchuck	Winchuck R	Retention	---	N	Retention	---	Retention
	NF Smith	NF Smith	N	---	N	Retention	---	N
	NADOTs	NADOTs	N	---	N	N	---	N
Rogue Stratum	Lower Rogue	Rogue Bay	Retention*	N*	N*	N	Retention*	Retention*
		Lower Rogue	Retention*	N*	N*	N	Retention*	Retention
	Illinois	Illinois R	Retention*	---	N	N	---	N
	Middle Rogue/ Applegate	Wild & Scenic Corridor	Retention*	N*	N*	N	Retention*	Retention
		Middle Rogue Urban	Retention*	N*	N*	N	Retention*	Retention
		Middle Rogue Focal	N	N	N	N	---	N
		Applegate Valley	N*	N	N	N	---	N
		Upper Applegate	N*	N	N	N	---	N
	Upper Rogue	Upper Rogue Urban	Retention*	N*	N*	N	Retention*	Retention
		Upper Rogue Focal	N	N	N	N	N	N
		Upper Rogue R: above Lost Creek	---	---	---	Retention	---	---
		Middle Fork & South Fork Rogue	---	---	---	Retention	---	---

Retention = wild harvest allowed in some portion of the management area (generally only in mainstem rivers)

N = no retention of wild fish, but angling may be allowed (catch-and-release, hatchery harvest, or other species)

--- = species not present in the Management Area

* = hatchery fish available for harvest

Highlighted Cells = Fishery change proposed (details follow)

A. Winter Steelhead Fishing Proposal

Background

Current regulations allow wild winter steelhead to be harvested in mainstem sections of select rivers and creeks in the area covered by the RSP (Elk R, Euchre Cr, Hunter Cr, Pistol R, Chetco R, Winchuck R, Rogue R, Illinois R). A wild steelhead bag limit of 1 fish per day/5 fish per year was in place from 2003-2018 in South Coast Stratum streams open to wild steelhead harvest, from 1997-2018 in the mainstem Rogue River, and from 2009-2018 in the Illinois River. These regulations were implemented following a period of intensive monitoring and a lengthy status review of Klamath Mountains Province (KMP) steelhead (the federal designation for steelhead in the SMU). A variety of other protective measures for steelhead were also implemented, including the closure of nearly all Rogue tributaries to fishing to protect juvenile steelhead, and no wild harvest in smaller direct ocean streams. In response to a 2018 petition to end wild steelhead harvest in SW Zone streams, the Oregon Fish and Wildlife Commission (OFWC) reduced the wild steelhead bag limit to 1 per day/3 per year in SW Zone streams open to harvest as an interim measure while ODFW staff developed a multi-species conservation and management plan. The 1 per day/3 per year bag limit for wild winter steelhead was implemented in 2019 and 2020.

Proposal Description

The proposed wild winter steelhead harvest management framework is designed to meet the following criteria:

- Responsive to poor returns due to ocean conditions and downward trends due to deteriorating freshwater conditions (i.e., climate change)
- Maintains opportunity
- Manages based on data and impact limits
- Provides accurate data on steelhead harvest through mandatory reporting
- Tracks overall participation in the fishery, including catch and release angling
- Manages based on limiting factors for winter steelhead
- Addresses social concerns

Details

The proposed management framework has five components, some of which have multiple options for consideration.

Winter Steelhead Proposal Table of Contents

1. NEW Special authorization required to fish for steelhead

Option 1.1**:** A *Steelhead Endorsement* is required for all anglers fishing for winter steelhead during the season in open locations from the Sixes River to the Winchuck River.

a. additionally, a *Wild Steelhead Harvest Card* is required to harvest wild steelhead and would be distributed with endorsement if requested at purchase. Daily license holders receive one wild harvest card for year.
b. this is the only option that provides insight into, and possible direct control mechanisms for, catch-and-release-only anglers.

Option 1.2**:** A *Wild Steelhead Harvest Card* is required to harvest wild steelhead in open areas from the Sixes River to the Winchuck River. Anglers who do not intend to harvest wild steelhead would not have to purchase card.

For both options:

a. Cost the same for residents and non-residents and annual and daily licenses; daily license holders only pay once annually and receive one wild harvest card for year
b. Wild steelhead harvest would be recorded on card and not on Combined Angling Tag
c. Net proceeds dedicated to RSP monitoring
d. Implementation may require changes to ODFW's Electronic Licensing System (ELS)

2. NEW Mandatory reporting of wild steelhead harvest

a. Anglers selecting paper tagging would be required to return *Wild Steelhead Harvest Card* before purchasing endorsement/card the following year.
b. Current wild harvest opportunity would be changed to begin on or after January 1st to simplify regulations, receive harvest data prior to following season, and facilitate enforcement.

3. NEW Manage wild harvest limits annually on a sliding scale

Option 3.1: Manage wild harvest through sliding scale bag limits

a. Three tiers:
    - Low: Catch & Release
    - Medium: 1 fish per day/3 fish per year
    - High: 1 fish per day/5 fish per year

Option 3.2: Manage harvest through sliding scale quota (harvest cap)

a. Wild steelhead harvest would end in a stratum when harvest quota reached
b. Requires annual creel or accurate extrapolation of ELS e-tagging data (potentially based on data from mandatory reporting of paper tags; may require several years to develop)

Option 3.3: Manage harvest through sliding scale limited entry

a. Anglers would apply pre-season for a pre-determined number of permits based on sliding scale; very similar to controlled hunts for deer and elk
b. Could include a second draw after January 1
c. Purchase of an annual fishing license would be required to apply
d. Applications could be for separate areas (e.g. Elk/Sixes, Rogue, Chetco)

For all options:

a. South Coast Stratum and Rogue Stratum would be managed separately
b. Can be implemented with *Steelhead Endorsement* or *Wild Steelhead Harvest Permit*
c. Same sliding scale triggers would determine harvest tier (see below)
d. After the first five years of implementation, an assessment will be conducted to determine if tier limits need to be modified.

The following tables present sliding scale metrics and thresholds for the South Coast Stratum and Rogue Stratum. Tier limits that would be applied to harvest are described above for each of the different management options (bag limits, quota, or limited entry approaches). Additional details about the sliding scale are provided below, including an example based on bag limit approach.

South Coast Stratum		**Marine Indicator** *Rogue Hatchery Half-Pounder Return Rate (Return Year – 2)*		
		Return Rate ≤ 4%	4% < Return Rate < 12%	Return Rate ≥ 12%
Juvenile Abundance *Steelhead parr (age-1+) abundance index based on surveys in wadeable streams in South Coast Stratum (Return Year – 3)*	Index ≤ 40,000	Low Tier	Low Tier	Low Tier
	40,000 < Index < 80,000	Low Tier	Medium Tier	Medium Tier
	Index ≥ 80,000	Medium Tier	High Tier	High Tier

Rogue Stratum	**Wild Half Pounders** *Huntley **Unexpanded** Count* *(Average of Return Year – 2 and Return Year – 3)*		
	Count ≤ 400	400 < Count < 1,000	Count ≥ 1000
	Low Tier	Medium Tier	High Tier

- The South Coast Stratum sliding scale varies according to expected strength of adult return based on juvenile steelhead abundance (index of abundance of age-1+ steelhead parr) and an indicator of marine conditions during the initial ocean rearing period (hatchery half-pounder return rate). The hatchery half-pounder return rate is calculated by dividing hatchery half-pounder abundance at Huntley Park by the total release of hatchery summer and winter steelhead smolts in the Rogue basin in the same year. Research on other steelhead populations has shown that adult returns are correlated with juvenile production in freshwater (Ward and Slaney 1988) and marine conditions during the ocean rearing period (Smith and Ward 2000, Welch et al. 2000). Furthermore, growth and survival during the first summer and fall steelhead spend at sea are correlated with overall marine survival (Friedland et al. 2014). Additional research is needed to better understand and quantify these relationships for wild steelhead in Oregon (see Research and Monitoring MSAs below). The Rogue hatchery half-pounder return rate is an interim metric that is correlated with oceanographic indicators (e.g. upwelling) often associated with marine survival of anadromous salmonids. The hatchery half-pounder return rate is also positively correlated with adult hatchery winter steelhead returns two years later.

- The Rogue Stratum sliding scale is based on a single metric (wild half-pounder abundance at Huntley Park) which has historically correlated strongly with subsequent adult returns to the Upper Rogue (Gold Ray Dam Count). A two-year running average of half-pounder abundance has the strongest correlation with adult returns, likely due to life history diversity of Rogue winter steelhead (see ODFW 1990). Wild half-pounder abundance likely reflects juvenile steelhead production and early marine survival, and so is used as a single combined metric for the Rogue sliding scale.

- Sliding scale applies to wild harvest; does not affect hatchery harvest or wild catch-and-release.

- Other metrics may be incorporated into forecast models through time based on new monitoring data and analyses to improve accuracy and precision and applicability to specific populations

- Desired and Critical Metrics MSAs (in development) indicate times when sliding scale limits are superceded by other management based on wild fish status

The following table shows actual bag limits implemented in 2005-2020, harvest categories that would have been implemented under the sliding scale described above, and the percentage of years in each category from 2005-2020.

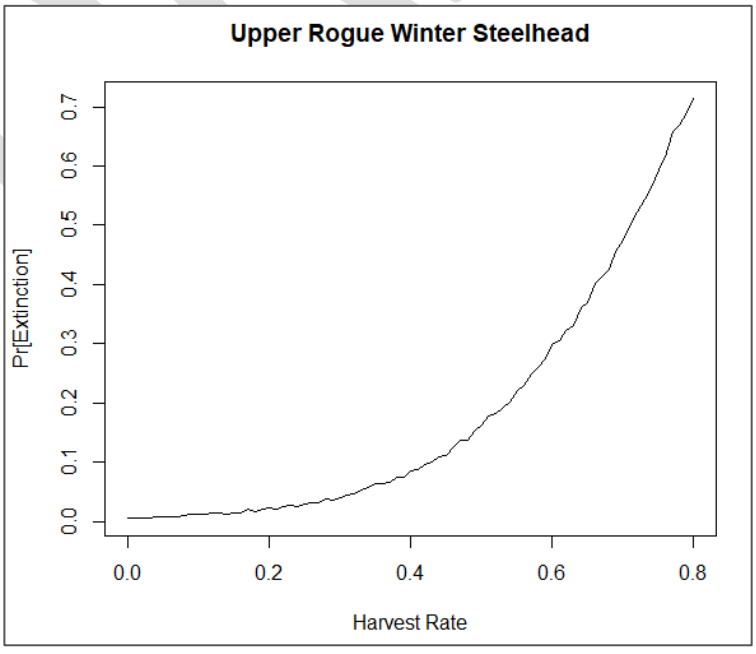
Return Year	Bag Limit	South Coast Stratum			Rogue Stratum	
		Juvenile Abundance (Return Yr – 3)	Hatchery Half-Pounder Return (Return Yr – 2)	**Sliding Scale Category**	Wild Half-Pounders (Return Yr – 2&3)	**Sliding Scale Category**
2005	1/5	High	Medium	**1/5**	Medium	**1/3**
2006	1/5	Medium	Medium	**1/3**	Medium	**1/3**
2007	1/5	Medium	Medium	**1/3**	Medium	**1/3**
2008	1/5	Medium	Medium	**1/3**	Medium	**1/3**
2009	1/5	Medium	Low	**C&R**	Low	**C&R**
2010	1/5	High	High	**1/5**	Low	**C&R**
2011	1/5	Medium	Medium	**1/3**	Medium	**1/3**
2012	1/5	Medium	Medium	**1/3**	Medium	**1/3**
2013	1/5	Medium	Low	**C&R**	Low	**C&R**
2014	1/5	Medium	Medium	**1/3**	Low	**C&R**
2015	1/5	Medium	High	**1/3**	High	**1/5**
2016	1/5	High	High	**1/5**	High	**1/5**
2017	1/5	Medium	Medium	**1/3**	High	**1/5**
2018	1/5	Low	Medium	**C&R**	Medium	**1/3**
2019	1/3	Medium	High	**1/3**	High	**1/5**
2020	1/3	High	High	**1/5**	High	**1/5**
C&R: 0%		**C&R: 19%**			**C&R: 25%**	
1/3: 12.5%		**1/3: 56%**			**1/3: 44%**	
1/5: 87.5%		**1/5: 25%**			**1/5: 31%**	

4. **NEW Regulation changes to facilitate management, reduce harvest, and address social and conservation concerns**
    a. Anglers on South Coast streams may no longer fish in open steelhead locations once a wild steelhead is caught and harvested (kept) in a day ("rack rods", "one and done").

    b. Wild steelhead harvest opportunity begins on January 1st in locations open to harvest (February 1st for mainstem Rogue River above Hog Creek Boat Ramp).

    c. Modification of angling regulations beyond the sliding scale to address critical conservation needs on a population-specific basis will still be utilized. Reducing risk from harvest may be accomplished by any feasible regulation changes, including, but not limited to, revising the sliding scale, implementing harvest or catch quotas/limits, limiting harvest tags or endorsements, managing in-season based on CPUE, adjusting the open locations or season, or modifying other angling regulations.

5. **NEW Adaptively manage to not exceed harvest limits**
    a. Proposed harvest rate limit: modeling based on stock-recruit information for the Upper Rogue winter steelhead population indicates that harvest rates below 20% have a very small effect on extinction risk (see figure below). Similar modeling for the North Umpqua winter steelhead population indicated that harvest did not significantly increase extinction risk until the harvest rate exceeded 50% (ODFW 2014). Given uncertainty about how these results might apply to RSP winter steelhead populations, **steelhead harvest rates will be adaptively managed to remain below 15% for all populations.** Due to environmental conditions (e.g. winter flows) and differences in fishery intensity between populations, this approach is expected to maintain harvest rates below 10% for most populations.



b. Harvest rates are intended to be calculated annually and evaluated based on a 5-year running average, but this information is partially or completely dependent on new monitoring and data (as proposed in the Research and Monitoring MSAs); absent the new monitoring and data, ODFW will manage conservatively based on improved harvest estimates and other indicators of population status.

c. The table below presents the best available information about wild winter steelhead harvest rates under past regulations (1 per day/5 per year bag limit; see footnotes for details).

Stratum	Population	km StW Habitat	Average Post-Harvest Wild Spawners (range)	Average Wild StW Harvest (range)	Average Harvest Rate (range)	Catch-and-Release Effort
South Coast	Elk R	111	**1,812** (1,159-2,860)	**150** (22-232)	**9%** (1%-17%)	n/a
	Euchre Cr	45	**788** (531-1,154)	**3** (0-8)	**<1%** (0%-1%)	n/a
	Hunter Cr	33	**555** (366-812)	**26** (4-42)	**5%** (1%-8%)	n/a
	Pistol R	85	**1,472** (985-2,152)	**41** (20-70)	**3%** (1%-4%)	n/a
	Chetco R	317	**4,791** (3,282-7,501)	**829** (547-1,258)	**15%** (9%-20%)	**1,100**[4]
	Winchuck R	101	**1,753** (1,205-2,584)	**43** (4-91)	**2%** (0%-4%)	n/a
	Stratum Total	691	**11,170**[1] (7,535-17,063)	**1,093**[3] (821-1,591)	**9%** (5%-13%)	n/a
Rogue	Lower Rogue & Bay	116	-	-	-	n/a
	Illinois R	741	-	-	-	n/a
	M Rogue/Applegate	1,147	-	-	-	n/a
	Upper Rogue R	534	**5,678** (2,982-7,780)	**562** (211-917)	**9%** (7%-11%)	n/a
	Stratum Total	2,538	**18,612**[2] (13,929-24,065)	**1,196**[3] (952-1442)	**6%** (4%-8%)	n/a

[1]South Coast Stratum wild winter steelhead spawner estimates (after harvest) are based on redd counts in a limited number of randomly selected spawning surveys in 2005-2008, 2010, and 2013-2014. Abundance estimates have large confidence intervals (high uncertainty) in all years due to low survey effort. Estimates for 2009, 2011-12, and 2015 were excluded due to small sample size, very low precision, or both. Wild steelhead spawner estimates for individual populations are based on annual steelhead return for the stratum and the proportion of total stratum steelhead habitat (stream km) in each basin.

[2]Rogue stratum wild winter steelhead spawner estimates are based on Gold Ray Dam counts and redd counts in a limited number of spawning surveys in the Rogue basin below Gold Ray Dam in 2005-2009. Survey-based wild abundance estimates have large confidence intervals (high uncertainty) due to low survey effort. Gold Ray Dams counts were consistently below the long-term average in these years. Based on historical estimates of the proportion of Rogue steelhead returning to the Upper Rogue versus the rest of the basin (ODFW 1990), average wild steelhead abundance in the Rogue basin is likely significantly higher than the estimate presented here. Spawner estimates (post fishery) for the Upper Rogue are based on Gold Ray Dam counts and harvest estimates above Gold Ray Dam.

[3]Wild winter steelhead harvest estimates are based on harvest card expansions for return years corresponding to wild spawner estimates. Harvest estimates for the Upper Rogue include harvest in the lower and middle Rogue, and assume that fish are harvested roughly in proportion to abundance (using km of steelhead habitat as a relative abundance indicator). Harvest card estimates for the Chetco River in the 2011-12 and 2012-2013 run years were within 30% of harvest estimates determined through creel surveys, with no clear positive or negative bias.

[4]Average number of wild winter steelhead caught and released annually based on creel surveys in the Chetco River during the 2011-12 and 2012-2013 run years. Research in British Columbia estimated catch and release mortality for winter steelhead at ~4% based on over 200 radio-tagged steelhead monitored from capture to spawning (Nelson et al. 2005).

B. Coho Salmon Fishing Proposal

Background:

The coho salmon fishery on the Rogue has been a mark-selective fishery since 1994 (only adipose-clipped coho may be harvested). A creel survey was conducted in 1998 and 1999 to verify that a mark-selective fishery would be consistent with NOAA requirements.

Proposed Actions:

1. **ODFW will begin a process working collaboratively with NOAA to identify a framework that would allow a limited opportunity for wild coho harvest.**

   This opportunity would require a forecast to be developed and only be provided during high abundance years. Harvest caps would account for expected hooking mortality during the current mark selective fishery in the estuary.

2. **ODFW will develop and implement an outreach project to improve fish handling and fishery stewardship, and reduce hooking mortality.**

Rationale:

a. wild coho salmon could support limited harvest in high abundance years if status improves
b. current population monitoring and hatchery returns could be combined with ocean indicators to forecast returns

c. reducing hooking mortality will lower fishery impact on recovering wild populations and could provide more opportunity for directed harvest

C. Summer Steelhead

No changes in harvest regulations are proposed for wild summer steelhead in the Rogue basin. Hatchery summer steelhead provide ample harvest opportunity throughout the Rogue River that is complemented by catch and release opportunity for wild summer steelhead.

Summer steelhead are considered a sensitive species in the Rogue watershed. Whereas winter steelhead populations are anchored by intact habitat on federal forest land, summer steelhead spawning tends to be concentrated in small streams/watersheds where rural residential development is also concentrated. Living were people want to live poses additional risk to sustainable production of summer steelhead. Summer steelhead also specialize by spawning in streams that dry up naturally in summer, making this run even more susceptible to excessive water diversion and fish passage barriers that block movement between spawning tributaries and mainstem habitats (movement that is required to allow these fish to reach smolt size—a need for all Rogue steelhead). ODFW believes that stewardship of summer steelhead is best accomplished by a mark selective fishery at this time.

D. Cutthroat Trout

No changes in harvest regulations are proposed for coastal cutthroat trout, although the RSP current status assessment indicated low conservation risk for all populations, which could likely sustain higher harvest rates. ODFW's 2019 Rogue-South Coast Angler Survey included three questions about potential changes in cutthroat trout angling regulations:

1) opening some tributaries of the Rogue currently closed to fishing
2) increasing bag limits in South Coast Stratum streams currently open to trout fishing
3) changing cutthroat trout harvest size regulations to protect sea-run cutthroat trout.

Opinions were split on these proposals, with slightly more opposition than support for all three. Angler survey results indicated that fishery participation is low, but fishing experience tended to be rated relatively high (although not for sea-run cutthroat specifically).

In the middle and upper Rogue, fluvial cutthroat trout populations were showing signs of increasing abundance prior to mainstem dam removal based on angler reports and Elk Creek trap data. Mainstem dam removal now allows free passage of cutthroat trout throughout the mainstem as needed. In the near term at least, cutthroat trout abundance is expected to increase. An expanding cutthroat trout population may provide some control of non-local minnow populations. It is also possible that the population in the upper Rogue could reach a level that cutthroat trout predation will impact a spring chinook population that is trying to persist in artificially truncated habitat. As time and funding allows, ODFW may undertake a project to study food habitats of cutthroat trout within the range of spring chinook habitat.

IV. Research and Monitoring Strategies and Actions

Current Monitoring					
Stratum	Population	River Seine	Fall Spawning Surveys	Juvenile Surveys	Habitat
South Coast	Elk	---	Standard surveys	Annual random site surveys by stratum	Annual random site surveys by stratum
	Euchre Cr				
	Hunter Cr				
	Pistol				
	Chetco				
	Winchuck				
Rogue	Lower Rogue	Huntley Park	---	Annual random site surveys by stratum	Annual random site surveys by stratum
	Illinois				
	Middle Rogue/Applegate				
	Upper Rogue				
	Field Staff	1 lg crew	2 crews	3 crews	
	Purpose	status/trend; Ch mngmnt	ChF mngmt; CO trend in Elk River	status/trend	instream physical status/trend
	Species/Timing	ChF, CO, StS, ½-lb	ChF, CO	CO, St, CCT	summer

Proposed Monitoring						
Stratum	Area	River Seine	Count Station^	Fall Spawning Surveys	Winter Spawning Surveys^	Summer Snorkel/Habitat Surveys
South Coast	Elk			Standard surveys	X2	X1, snorkel surveys + temperature/flow monitoring
	Euchre Cr				X2	
	Hunter Cr				X2	
	Pistol				X2	
	Lower Chetco		Sonar		X1	
	Upper Chetco					
	Winchuck				X2	
	NF Smith					X2
	NADOTs					X2
Rogue	Lower Rogue R & Bay	Huntley Park			X2	X1, rotating basin habitat surveys + temperature/flow monitoring + coho index surveys
	Illinois				X2	
	Middle Rogue				X2	
	Applegate				X2	
	Upper Rogue				X1	
	Field Staff	1 lg crew	1 crew	2 crews	1 crew + District	2 crews
	Purpose	StW harvest mngmt trigger; StS status; CO forecast for harvest mngmnt; ChF mngmnt	establish count for harvest rate, forecast, status	ChF mngmt; CO trend in Elk River	pHOS mngmnt triggers; confirm ½ -lb/Upper Rogue rltn holds	StW harvest mngmt trigger; DCMs; guide restoration, protection; assess progress, long-term status/trend;
	Species/Life Stage	Adult ChF, CO, StS, ½-lb	Adult StW	Adult ChF, CO	Adult StW, Pacific Lamprey	Juvenile StW, CO, CCT

^ New work requiring funding, or program shifts from other parts of the state

X1 = annual surveys

X2 = inter-annual surveys by population (≤ every 10 yrs rotation frequency)

Proposed New Research and Monitoring:

To complete all of the efforts outlined in this section, ODFW will need additional staff or a shift in the priorities of current staff, additional funding, and coordination with other entities. Prioritization of evaluation and research needs will be completed by ODFW after adoption of the final version of this conservation plan, as priorities are dependent upon the adopted suite of management strategies. As the adaptive management process begins with this plan, it is likely that additional monitoring, evaluation and research needs will be identified in future years.

Harvest monitoring

- Conduct a statistical creel survey after plan adoption to determine current baseline for catch and effort in the Chetco River and Rogue River fisheries. Use creel data to validate harvest data collected through ODFW's Electronic Licensing System (ELS). Additional creel surveys may be conducted in future years to validate and refine ELS harvest estimates. Project contingent on funding.

- Investigate options for using ELS to collect angler effort and catch data (fish harvested and released) to calculate catch per unit effort (CPUE) as an index of abundance for steelhead (winter and summer).

Habitat Monitoring

- Establish a network of flow and temperature monitoring sites in both strata.

- Identify environmental indicators of freshwater rearing conditions (e.g. flow, temperature) and marine productivity (e.g. temperature, upwelling) that can improve forecasts of adult returns (winter steelhead, summer steelhead, and coho salmon) and/or trigger additional conservation measures. Look for opportunities to share resources and data with California.

- conduct physical habitat surveys within population areas, rotating between population areas annually

- Continue surveys for dam removal effectiveness monitoring to support continued barrier removal, along with similar project-related monitoring. Look for opportunities for synergy with population monitoring. This may be the primary role for volunteers in ODFWs Salmon Trout Enhancement Program (STEP).

Winter Steelhead

- Establish sonar counting station in the lower Chetco River for winter steelhead. Investigate techniques for determining wild/hatchery ratio among steelhead counted with sonar.

- Conduct spawning surveys in an Upper Rogue sub-population to estimate spawner escapement. Track relationship with Huntley Park half-pounder count to validate sliding scale criterion. Alternately, conduct pilot project using sonar, most likely on Elk Creek.

- Conduct annual winter steelhead spawning surveys in the lower Chetco basin to determine pHOS. Investigate effectiveness of snorkel survey methods for evaluating pHOS.

- Conduct winter steelhead spawning surveys in other South Coast stratum populations (non-Chetco) on a rotating basis to estimate abundance and pHOS.

- Investigate new genetic techniques for estimating effective population size and genetic diversity as indicators of population status. Look for opportunities to share resources and data with California portion of Klamath Mountains Province DPS.

- Determine proportion of summer and winter steelhead among wild half-pounders captured at Huntley Park using genetic methods.

Summer steelhead

- Investigate possibility of genetically assigning wild adult summer steelhead captured at Huntley Park to populations within the Rogue Basin. If successful, implement annual tissue collection from wild summer steelhead adults at Huntley to apportion abundance estimate among populations.

Coho Salmon

- Investigate possibility of genetically assigning wild adult coho salmon captured at Huntley Park to populations within the Rogue Basin. If successful, implement annual tissue collection from wild adult coho at Huntley to apportion abundance estimate among populations. Alternatively, conduct radio tag study of adult wild coho at Huntley to determine contribution of different populations to total estimate.

- Investigate assumptions underlying Huntley Park coho estimates by applying mark (e.g. opercle punch, floy tag) to hatchery coho at Huntley and recording marked fish at Cole Rivers Hatchery.

- Investigate new genetic techniques for estimating effective population size and genetic diversity as indicators of population status. Look for opportunities to share resources and data with California portion of SONCC ESU.

Cutthroat Trout

- Modify snorkel survey data collection methods in the South Coast Stratum to identify and enumerate sea-run cutthroat trout. Track counts as an index of abundance and potential indicator of status.

V. References

Brown, R. F., and B. R. Mate. 1983. Abundance, movements and feeding habits of the harbor seal, *Phoca vitulina*, at Netarts and Tillamook bays, Oregon. Fishery Bulletin 81:291-30

Brown, R. F., B. E. Wright, S. D. Riemer, and J. Laake. 2005. Trends in abundance and status of harbor seals in Oregon: 1977-2003. Marine Mammal Science 21:657-670.

Browne, P., J. L. Laake, and R. L. DeLong. 2002. Improving pinniped diet analyses through identification of multiple skeletal structures in fecal samples. Fishery Bulletin 100:423- 433.

Friedland, K. D., B. R. Ward, D. W. Welch, and S. A. Hayes. 2014. Postsmolt growth and thermal regime define the marine survival of steelhead from the Keogh River, British Columbia. Marine and Coastal Fisheries 6:1-11.

Graybill, M. R. 1981. Haul out patterns and diet of harbor seals, *Phoca vitulina*, in Coos County, Oregon. M.S. Thesis, University of Oregon.

Kvitrud, M. A., S. D. Riemer, R. F. Brown, M. R. Bellinger, and M. A. Banks. 2005. Pacific harbor seal (*Phoca vitulina*) and salmon prey: genetics presents hard numbers for elucidating predator-prey dynamics. Marine Biology 147: 1459-1466.

Nelson, T. C., M. L. Rosenau, and N. T. Johnston. 2005. Behavior and survival or wild and hatchery-origin winter steelhead spawners caught and released in a recreational fishery. North American Journal of Fisheries Management 25:931-943.

ODFW. 1990. *Effects of Lost Creek Dam on Winter Steelhead in the Rogue River. Phase II Completion Report*. Oregon Department of Fish and Wildlife, Portland, OR. Available at: https://www.dfw.state.or.us/fish/local_fisheries/rogue_river/docs/StW_phase_II_completion_report.pdf

ODFW. 2007. *Rogue Spring Chinook Conservation Plan.* Oregon Department of Fish and Wildlife, Salem, OR. Available at: http://www.dfw.state.or.us/fish/CRP/rogue_spring_chinook_conservation_plan.asp

ODFW. 2014. *Coastal Multi-Species Conservation and Management Plan*. Oregon Department of Fish and Wildlife, Salem, OR. Available at: http://www.dfw.state.or.us/fish/CRP/coastal_multispecies.asp

Orr, A. J., A. S. Banks, S. Mellman, H. R. Huber, and R. L. DeLong. 2004. Examination of the foraging habits of Pacific harbor seal (*Phoca vitulina richardsi*) to describe their use of the Umpqua River, Oregon and their predation on salmonids. Fishery Bulletin 102:108-11

Pitcher, K. W., P. F. Olesiuk, R. F. Brown, M. S. Lowry, S. J. Jeffries, J. L. Sease, W. L. Perryman, C. E. Stinchcomb, and L. F. Lowry. 2007. Abundance and distribution of the eastern North Pacific Steller sea lion (*Eumetopias jubatus*) population. Fishery Bulletin 107:102–115.

Riemer, S. D. and R. F. Brown. 1997. Prey of pinniped at selected sites in Oregon identified by scat (fecal) analysis, 1983-1996. Oregon Department of Fish and Wildlife Technical Report # 97-6-02, 34 pp.

Riemer, S. D., B. E. Wright, and R. F. Brown. 2011. Food habits of Steller sea lions (*Eumetopias jubatus*) off Oregon and northern California, 1986-2007. Fishery Bulletin 109:369-381.

Roffe, T. J., and B. R. Mate. 1984. Abundances and feeding habits of pinnipeds in the Rogue River, Oregon. Journal of Wildlife Management 48:1262-1274.

Smith, B. D., and B. R. Ward. 2000. Trends in wild adult steelhead (*Oncorhynchus mykiss*) abundance for coastal regions of British Columbia support the variable marine survival hypothesis. Canadian Journal of Fisheries and Aquatic Sciences 57:271-284.

Ward, B. R., and P. A. Slaney. 1988. Life history and smolt-to-adult survival of Keogh River steelhead trout (*Salmo gairdneri*) and the relationship to smolt size. Canadian Journal of Fisheries and Aquatic Sciences 45:1110-1122.

Welch, D. W., B. R. Ward, B. D. Smith, and J. P. Eveson. 2000. Temporal and spatial responses of British Columbia steelhead (*Oncorhynchus mykiss*) populations to ocean climate shifts. Fisheries Oceanography 9:17-32.

Wright, B. E., S. D. Riemer, R. F. Brown, A. M Ougzin, and K. A. Bucklin. 2007. Assessment of harbor seal predation on adult salmonids in a Pacific Northwest estuary. Ecological Applications 17:338-351.

Wright, B. E., R. F. Brown, R. L. DeLong, P. J. Gearin, S. D. Riemer, J. L. Laake, and J. L. Scordino. 2017. Survival rates of Steller sea lions from Oregon and California. Journal of Mammalogy 98:885-894.