

April 15, 2020 Sent certified mail 7018 2290 0001 7826 2180

Wilbur Ross, Secretary of Commerce  
1401 Constitution Avenue, N.W.  
Washington, DC 20230

Dear Secretary Ross:

Please accept attached petition for a rule to list the Southern Oregon and Northern California Coastal (SONCC) spring-run Chinook salmon (*Oncorhynchus tshawytscha*) as a threatened or endangered species under the Endangered Species Act. I was a co-petitioner for a 1995 petition to list populations of West Coast Chinook Salmon that included the Rogue River and Smith River spring Chinook populations. I commented on the failure of National Marine Fisheries Service to identify coastal spring run Chinook populations as distinct Evolutionary Significant Units. New published research now show this previous decision by NMFS was in error. I have a long standing interest in the conservation of spring Chinook salmon including the Rogue River Spring Chinook.

*Under 50 CFR 424.14(b), petitioners "must provide notice to the State agency responsible for the management and conservation of fish, plant, or wildlife resources in each State where the species that is the subject of the petition occurs. This notification must be made at least 30 days prior to submission of the petition. This notification requirement shall not apply to any petition submitted pertaining to a species that does not occur within the United States."*

*And 50 CFR 424.14(c)(9), states that a petition must contain copies of "the notification letters or electronic communication which petitioners provided to the State agency or agencies responsible for the management and conservation of fish, plant, or wildlife resources in each State where the species that is the subject of the petition currently occurs."*

I have provided timely notice to Oregon Department of Fish and Wildlife and California Department of Fish and Wildlife. See attached letter dated November 21, 2019 to Curt Melcher, Director Oregon Department of Fish and Wildlife. See attached letters dated November 21, 2019 and letter dated December 6, 2019 to Chalton H. Bonham, Director California Department of Fish and Wildlife.

Sincerely,

*Richard K. Nawa*

Richard K. Nawa  
P.O. Box 654  
Selma, OR 97538

Enc.:

- 1) SONCC Spring Chinook petition
- 2) Disc with pdf of petition and pdfs of some cited references
- 3) Letter dated November 21, 2019 to Director California Department of Fish and Wildlife
- 4) Letter dated December 6, 2019 to Director California Department of Fish and Wildlife
- 5) Letter dated November 21, 2019 to Director Oregon Department of Fish and Wildlife

*COPY WITH ENCLOSURES: ROBERT MARKLER (NMFS)*

# **Petition to List the Southern Oregon and Northern California Coastal ESU of Spring-Run Chinook Salmon (*Oncorhynchus tshawytscha*) under the Endangered Species Act**

## **Notice of Petition**

Richard K. Nawa is petitioning for a rule to list Southern Oregon and Northern California Coastal (SONCC) spring-run Chinook salmon (*Oncorhynchus tshawytscha*) as a threatened or endangered species under the Endangered Species Act. The petitioner submits this petition pursuant to § 553(e) of the Administrative Procedure Act ("APA"), 5 U.S.C. §§ 551-559 and § 1533(b)(3) of the Endangered Species Act, and 50 C.F.R. part 424.14, which grant interested parties the right to petition for issuance of a rule, and specifically to seek reconsideration of a prior determination where new information would lead a reasonable person conducting an impartial scientific review to conclude that delineation of a new ESU is warranted. The new spring run ESU would be identified within the National Marine Fisheries Service (NMFS) delineation of Southern Oregon and California Coastal Chinook Evolutionary Significant Unit (ESU) (Figure 1). Due to unresolved ESA petition for the Oregon Coast ESU of spring-run Chinook Salmon (Native Fish Society et al. 2019) and petition for the Upper Klamath-Trinity Rivers Chinook salmon ESU (83 FR 8411; Karuk Tribe and Salmon River Restoration Council 2017), the NMFS may want to use their discretion to delineate new ESUs. The SONCC Chinook ESU is situated between two Chinook ESUs with pending ESA decisions.

I also request the designation of critical habitat for SONCC spring Chinook concurrent with listing. Critical habitat should encompass all known and potential freshwater spawning and rearing areas, migratory routes, estuarine habitats, riparian areas, and essential near-shore ocean habitats.

I was a co-petitioner for a 1995 petition to list populations of West Coast Chinook Salmon that included the Rogue River and Smith River spring Chinook populations (ONRC and Nawa 1995). I also commented on the failure of NMFS to propose coastal spring run Chinook populations as distinct ESUs due to alleged lack of genetic discreteness (Myers et al. 1998). I have a long standing interest in the conservation of Rogue Spring Chinook.

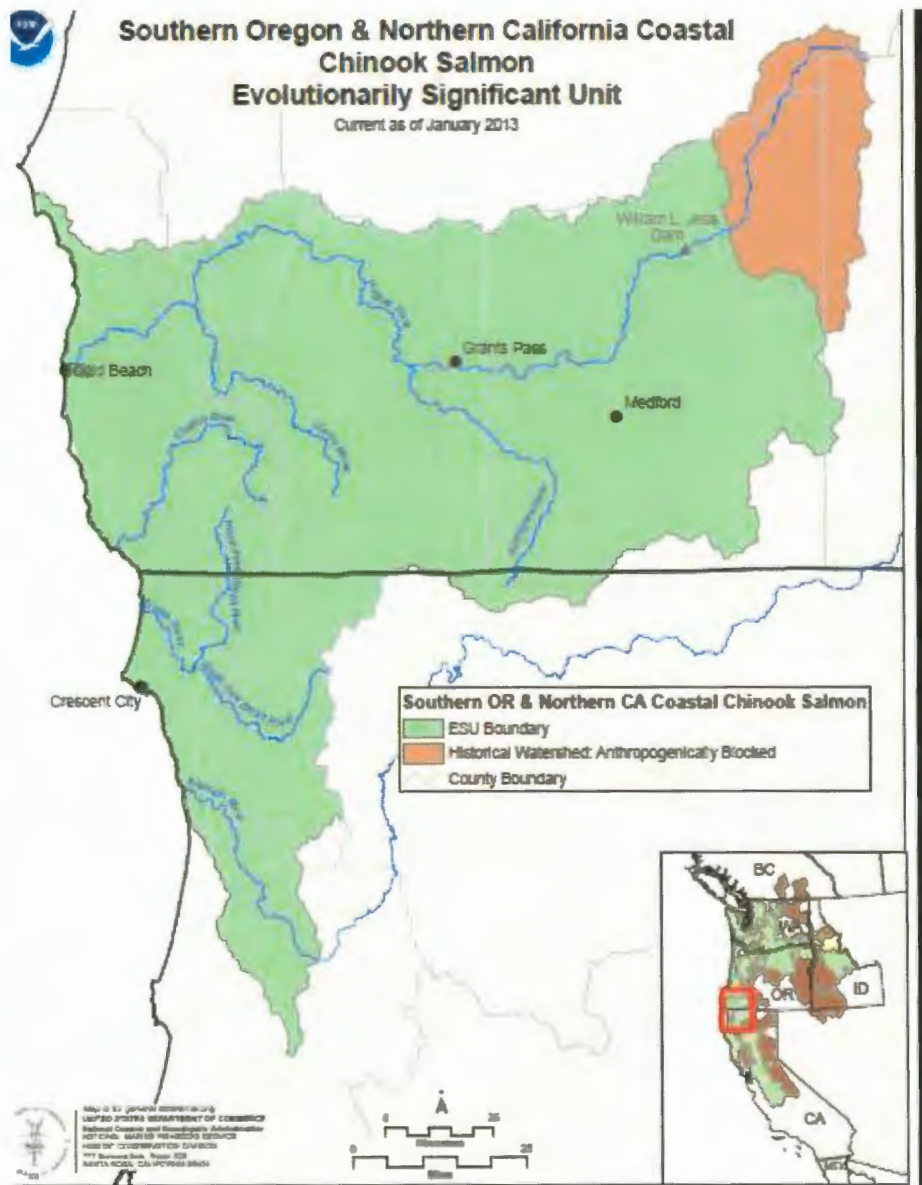


Figure 1. Southern Oregon and Northern California Coastal Chinook Salmon ESU.

With this document I am petitioning that Southern Oregon and Northern California Coastal spring-run Chinook Salmon, currently combined with fall-run Chinook, be evaluated for listing under the federal Endangered Species Act as separate from the fall-run Chinook component of the ESU.

A status review is warranted based on newly available information concerning the genetics and phylogeny of early (pre-mature) adult Chinook migration, the ongoing adverse effects of Lost Creek Dam operation, Cole Rivers hatchery operations, future effects of climate change on stream flow and water temperature, population data, continuing lack of sufficient genetic monitoring information and failure of regulatory mechanisms to ensure effective conservation of spring-run Chinook.

Under 50 CFR 424.14(b), petitioners "must provide notice to the State agency responsible for the management and conservation of fish, plant, or wildlife resources in each State where the species that is the subject of the petition occurs. This notification must be made at least 30 days prior to submission of the petition. This notification requirement shall not apply to any petition submitted pertaining to a species that does not occur within the United States."

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I have provided timely notice to Oregon Department of Fish and Wildlife and California Department of Fish and Wildlife. See attached letter dated November 21, 2019 to Curt Melcher, Director Oregon Department of Fish and Wildlife. See attached letter dated November 21, 2019 and letter dated December 6, 2019 to Charlton H. Bonham , Director California Department of Fish and Wildlife.

I purposely delayed submission of this petition since January 2020 based on anticipation of new genetic analysis by Oregon Department of Fish and Wildlife. However, the ODFW has chosen not release their findings for my review so I am compelled to submit the petition without the ODFW genetic data currently being withheld from public review.

Contact information for the petitioner:

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Selma, OR 97538  
Email: richnawa@yahoo.com  
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## **Legal Background**

### Definition of Evolutionary Significant Unit

The Endangered Species Act (ESA) defines "species" to include "any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature." 16 USC§ 1533(16), see also California State Grange v. National Marine Fish, 620 F.Supp 2d 1111, 1121 (ED Cal 2008). The ESA does not define the term "distinct population segment." Grange at 1121.

In 1991 the National Marine Fisheries Service ("NMFS") promulgated its "Policy on Applying the Definition of Species under the Endangered Species Act to Pacific Salmon" or "Evolutionarily Significant Unit ("ESU Policy." (56 Fed.Reg.58612 (Nov. 20, 1991)). The ESU Policy provides that a population (or particular collection of populations) of Pacific salmonids is considered to be an ESU, and therefore considered for listing under the ESA, if it meets the following two criteria: 1). the population must be substantially reproductively isolated from other nonspecific population units; and 2). The population must represent an important component in the

evolutionary legacy of the species. Isolation does not have to be absolute, but it must be strong enough to permit evolutionarily important differences to accrue and to be evolutionarily maintained in different population units. The second criterion is met if the population contributes substantially to the ecological and/or genetic diversity of the species as a whole (Waples 1991). Grange at 1123-24. That is, the loss of the population(s) would constitute a material diminishment of the ecological or genetic diversity of the species as a whole. NMFS putatively considers all available lines of evidence in applying those criteria, including specifically data from DNA or genomic analyses ("... data from protein electrophoresis or DNA analysis can be very useful because they reflect levels of gene flow that have occurred over evolutionary time scales."), ESU Policy, 56 Fed. Reg. at 58518; see also Definition of "Species" Under the Endangered Species Act: Application for Pacific Salmon, NOAA Tech Memo NMFS F/NWC-194 (Waples 1991) at p.8 ("The existence of substantial electrophoretic or DNA differences from other conspecific populations would strongly suggest that evolutionarily important, adaptive differences also exist."). The ESU Policy is an interpretation by NMFS of what constitutes an ESA-listable "distinct population segment" (DPS), and is a "permissible agency construction of the ESA." Grange at 1124, citing *Alsea Valley Alliance v. Evans*, 161 F. Supp 2d 1154, 1161 (D.Or. 2001).

Waples and Lindley (2018) provide a discussion of genomics and conservation units. The authors provide opinions and speculation about the genetic basis of adult migration timing in pacific salmonids. A process for using genomics is described but the NMFS has made no official determination as to exactly how genomics could be used for ESU delineation.

#### Listing an ESU as an Endangered or Threatened DPS

When considering whether a species or subspecies, including an ESU, is endangered or threatened, NMFS must consider:

- i. The present or threatened destruction, modification, or curtailment of its habitat or range;
- ii. Overutilization for commercial, recreational, scientific, or educational purposes;
- iii. Disease or predation;
- iv. The inadequacy of existing regulatory mechanisms; or
- v. Other natural or manmade factors affecting its continued existence. 16 U.S.C. § 1533(a)(1).

The species shall be listed where the best available data indicates that the species is endangered or threatened because of any one, or a combination of, those five factors. 50 CFR § 424.11 (c). 9

### **Best available science (new information) now supports formal identification of the Southern Oregon and Northern California Coastal ESU of Spring-Run Chinook Salmon for ESA listing consideration.**

In 1998 the National Marine Fisheries Service (NMFS) reviewed the status of west coast Chinook salmon populations. Myers et al. 1998:112 states:

Adult run time has also long been used to identify different temporal "races" of Chinook salmon. In cases where the run-time differences correspond to differences between stream- and ocean-type fish (e.g. in the Columbia and Fraser River Basins), relatively large genetic differences (as well as ecological and life-history differences) can be found between the different runs. In most coastal areas, however, life-history and genetic differences between the runs are relatively



modest. Although many populations have some fraction of yearling migrants, all the coastal populations are part of the ocean-type lineage, and spring- and fall-run fish are very similar in ocean distribution patterns and genetic characteristics.

Myers et al. 1998:120 identified a Southern Oregon and California Coastal Chinook Salmon ESU. "The BRT [Biological Review Team] also considered arguments for the creation of separate fall- and spring-run ESUs in this and other coastal regions, but the consensus of the BRT was that this **was** not warranted."

New information discussed in NMFS 1999 caused the NMFS to propose splitting the Southern Oregon and California Coastal ESU into the current configuration.

"Based on a re-assessment of information relevant to the configuration of this ESU, NMFS concludes that the proposed Southern Oregon and California Coastal Chinook salmon ESU should be split into two ESUs: a Southern Oregon and Northern California Coastal Chinook salmon ESU, extending from Euchre Creek through the Lower Klamath River (inclusive), and a California Coastal Chinook salmon ESU, extending from Redwood Creek south through the Russian River (inclusive)." NMFS concludes that Chinook salmon in the revised Southern Oregon and Northern California Coastal Chinook salmon ESU are not presently in danger of extinction, nor are they likely to become so in the foreseeable future."  
64 FR 50404-05

New information strongly suggests that the 1998 BRT consensus to not create separate fall- and spring-run coastal Chinook Salmon ESUs was in error. Recently published studies (Prince et al. 2017; Davis et al. 2017; Narum et al. 2018; Thompson et al. 2018) demonstrate an underlying genetic basis for premature migration in salmonids (i.e. spring-run Chinook). The findings from these studies were not available when previous NMFS scientific reviews were made regarding Chinook salmon ESU identifications and status determinations (Myers et al. 1998, NMFS 1999, 64FR50404-05).

Prince et al. (2017) investigated the genomic and evolutionary basis of premature migration in Pacific salmon, compiling a set 250 Chinook samples from nine locations across five ESUs in California, Oregon, and Washington (including the Rogue River). These samples represent the few remaining watersheds with persistent and recognized premature migrating (i.e., spring- or summer- returning) populations. This study concluded that premature migration is strongly associated with the GREB1L genomic region across several populations of Chinook salmon and steelhead trout. Patterns of variation at this locus suggest that premature migration alleles arose from a single evolutionary event within each species and were subsequently spread to distant populations through straying and positive selection (Prince et al. (2017).

Prince et al. (2017) created a high-resolution genomic library from samples of spring- and fall-migrating adult Chinook and steelhead from several Pacific Northwest watersheds, including the Rogue River. The genomic libraries generated from individual fish were compared using a probabilistic framework to discover single nucleotide polymorphisms (SNPs). Prince et al. (2017) noted that although overall population structure was consistent with current DPS and ESU delineations, the sheer volume of genomic positions in their data (nearly 10 million) allowed a thorough and novel comparison of premature and mature migrating individuals. To carry out this comparison, they performed a genome-wide association study (GWAS), which revealed a single genomic region of strong association within and upstream of a gene called GREB1L. This result was then repeated in other populations. Prince et al. (2017) note that,

while the exact causative mechanism is unknown, this finding makes biological sense, since this gene is implicated in foraging and fat storage in mammals. In salmon, premature migrating Chinook have a significantly higher fat content than mature migrating salmon, consistent with the fact that early migrating fish typically must often ascend higher into watersheds to hold and spawn, and always remain longer in a non-feeding state in freshwater, thus require more stored energy. Additional analyses on the GREB1L region performed by Prince et al. (2017), and subsequently replicated by Narum et al. (2018), revealed two monophyletic groups corresponding to migration phenotype. All samples, regardless of watershed of origin, separated into the appropriate migratory clade. In other words, Prince et al. (2017) determined that all evaluated premature migrating individuals grouped together in the same monophyletic group. Thus, genetic differences in this single gene explain the difference between premature- and mature-migrating phenotypes. Narum et al. (2018) found that a genomic region including GREB1L and ROCK1 was strongly associated with phenotypes for premature migration among Chinook salmon populations in the upper Columbia River basin.

Davis et al. (2017) genotyped Chinook salmon within the Siletz River, using multiple genetic markers to demonstrate that spring-run Chinook in the Siletz are genetically and phenotypically distinct from fall-run salmon in the same watershed. Davis et al. (2017) demonstrate that Chinook salmon life history variation and genetic differentiation is not limited to large river systems (e.g. Columbia River, Sacramento River) and can be found within smaller watersheds, such as the Smith River that straddles the Oregon/California border.

Davis et al. (2017) and Prince et al. (2017) caution that population structure described solely on the basis of divergence at one type of molecular marker, particularly presumably neutral ones, may fail to identify distinct populations that warrant separate management. Their findings strongly support and clearly illustrate this view. Prince et al. (2017) advise that conservation units that are devised without recognizing specific, key phenotypic traits that arise from single loci can result in the failure to protect evolutionarily significant variation that has substantial ecological and societal benefits. In the case of prematurely migrating Chinook salmon, this trait confers not only ecological and societal benefits, but also contributes importantly to the long-term adaptive capacity of the species as a whole.

New information (Prince et al. 2017; Davis et al. 2017; Narum et al. 2018; Thompson et al. 2018) also establishes that fall-run Chinook component of the ESU will not be able to demographically boost or re-establish spring-run life histories should the spring-run phenotype and its distinctive life history be extirpated. In this sense, the genotypic basis for premature migration meets at least two criteria of importance in ESU determination: 1) pre-mature confers a unique element of diversity to the species as a whole by way of gaining access to specialized habitats and greatly increasing species-level diversity of migration times 2) pre-mature migration reinforces its own distinct evolutionary lineage because access to habitats that results in an effective natural reproductive isolation of a substantial fraction of spring-run from the fall-run Chinook that co-occur in the same river systems. The genomic capacity for premature migration, and the dispersal into headwater habitats that it supports, also enhance the ecological diversity of Chinook salmon. For example, favorable spring flow conditions may become extremely valuable as mainstem rivers warm and are no longer suitable for late summer/ fall migration. Pre-mature migration buffers the species from summer ocean fishing mortality and summer/fall lower river/estuary marine mammal predation.

The presence of spring Chinook in headwater zones of basins could protect them in the face of catastrophic mortality events such as natural catastrophes or toxicant spills that could widely affect downstream-distributed fall Chinook populations (Good et al. 2008). By ascending

migration barriers, spring Chinook escape the presence of several other fish species. Hence they may be less vulnerable to potential pathogen outbreaks that spread horizontally among species, and less affected by interspecific competition for limited food and habitat. And in the face of future climate change, downstream habitats principally inhabited by fall Chinook in coastal rivers could become so warm and flow-depleted (Luce and Holden 2009; Isaak et al. 2012; Dalton et al. 2013) as to become marginally inhabitable by early fall spawning and rearing juvenile Chinook salmon, whereas habitat conditions for headwater-adapted salmonids might remain within tolerable limits (Crozier and Zabel 2006; Isaak and Rieman 2012; Muñoz et al. 2015). Early- and late-returning Chinook salmon also face different conditions in the marine environment, so may be affected much differently by effects of changes in marine currents and predation. Moore et al. (2014) identified early and late adult return timing as one of several life history variations that contributed to dampening fluctuations in population abundances and biomass via portfolio effects in steelhead populations in British Columbia. This observation constitutes a specific example of the “portfolio effect” of within-basin diversity that confers stability, spreads risk of stresses and threats, and sustains the productive capacity of salmon populations (Brennan et al. 2019).

In 2005, the Oregon Department of Fish and Wildlife (ODFW) conducted a review of Oregon native fish status (ODFW 2005). This review grouped populations by Species Management Unit (SMU), somewhat analogous to the ESU concept. ODFW (2005) examined coastal spring- and fall-run Chinook populations separately. SMUs are groups of populations from a common geographic area that share similar life history, genetic, and ecological characteristics. ODFW identified a Rogue Spring Chinook SMU that is within the NMFS Southern Oregon and Northern California Coastal Chinook ESU (ODFW 2005:38). The Rogue Spring Chinook SMU is limited to the Rogue River population in the upper Rogue River basin. Recently the ODFW discussed the new genetic information in an update to the Rogue Spring Chinook Conservation Plan (2019:38-40). In general the ODFW agreed with the findings of the new research and have completed additional genetic studies ca December 2019, however, the ODFW would not provide me any preliminary results from completed genetic studies through April 15, 2020 (Personal communication: emails and telephone calls to Dan Vandyke [ODFW] <Daniel.J.VanDyke@state.or.us>). To summarize: ODFW identified a distinct Rogue Spring Chinook SMU separate from Rogue Fall Chinook and have incorporated the new research findings into an updated conservation plan while the NMFS has failed to recognize the need to identify a distinct spring-run ESU separate from fall-run Rogue Chinook.

#### Human-Caused Threats that Eliminate the Spring-Run Phenotype also Eliminate the Genotype

Thompson et al. (2018) investigated the widespread and dramatic changes in adult migration characteristics of wild Chinook salmon caused by dam construction and other anthropogenic activities. They found an extremely robust association between migration phenotype (i.e., spring-run or fall-run) and a single locus. They documented that the phenotypic shift observed after recent dam construction is explained by dramatic allele frequency change at this locus. Modeling by Thompson et al. (2018) demonstrates that ongoing selection against the spring-run phenotype could rapidly lead to complete loss of the spring-run allele. This is particularly relevant to Rogue Spring Chinook. **Thompson et al. 2018 states: "Thus, our modeling demonstrates that selection strong enough to explain the rapid phenotypic and genotypic shifts could lead to loss of the [Rogue River] spring-run allele in a relatively short time. We conclude that, under continual selection against the spring-run**



**phenotype, the spring-run allele cannot be expected to persist unless recessive with respect to fitness."** (emphasis added).

An empirical analysis of populations that have already lost the spring-run phenotype reveals they are not acting as sustainable reservoirs of the allele. Analysis by Thompson et al. (2018) of ancient DNA suggests the spring-run allele was abundant in historical habitat that is expected to become accessible through a large-scale dam removal project in the Klamath River basin. Thompson et al. 2018 findings suggest that widespread declines and extirpation of the spring-run phenotype and allele will challenge reestablishment of the spring-run phenotype in this and future restoration projects. These results reveal the mechanisms and consequences of human-induced phenotypic change and highlight the need to conserve and restore critical adaptive variation before the potential for recovery is lost.

A main benefit of the spring-run phenotype is that it allows access to exclusive temporal and/or spatial habitat that is partially or wholly inaccessible, or in some cases, less suited to fall-run Chinook salmon (Thompson et al. 2018). These habitats are typically situated in headwater areas where groundwater moderates stream temperature and flow conditions, creating favorable egg incubation and rearing habitat. A significant trade-off imposed by the spring-run life history is reduced gametic investment (e.g., smaller egg size) because energy must be dedicated to maintenance and maturation during prolonged fasting while holding in freshwater (Thompson et al. 2018). The historical abundance and continued persistence of spring Chinook salmon populations testifies to the long-term adaptive value of this tradeoff by spring-run Chinook salmon in those watersheds it inhabits. A profound benefit to the species, the fisheries and ecological relationships that depend on the species is the spreading of ecological risk by increased spatial diversity, increased behavioral and life history diversity, increased productivity, and increased population size afforded by the presence of the spring-run form.

Human-caused habitat alteration and biological mismanagement drives permanent loss of the spring run genotypic variation (Thompson et al. 2018). This threatened genotypic variation must be considered as essential to the future persistence, evolution, recovery and productivity of the species as a whole.

## **Status**

### Rogue Spring Chinook

Nicholas and Hankin (1989) noted that, based on limited catch information, all Oregon coastal spring-run populations were smaller than fall-run and much smaller than historical population sizes. The ODFW website states:

Numbers of Rogue River wild spring Chinook have seriously declined during the last 20 years, and a conservation plan is now in place for these fish. Prior to the construction of Lost Creek Dam, an average of 28,000 wild spring Chinook were counted annually at Gold Ray Dam. Between 1997 and 2002, an annual average of just 5,100 wild spring Chinook were counted at Gold Ray Dam. In addition, the fish's life history has changed, with fewer early-returning, early-spawning wild spring Chinook present in the population. The decline and life history change is attributed to many factors, including construction and operation of Lost Creek Dam.

[https://www.dfw.state.or.us/fish/CRP/rogue\\_spring\\_chinook\\_conservation\\_plan.asp](https://www.dfw.state.or.us/fish/CRP/rogue_spring_chinook_conservation_plan.asp)

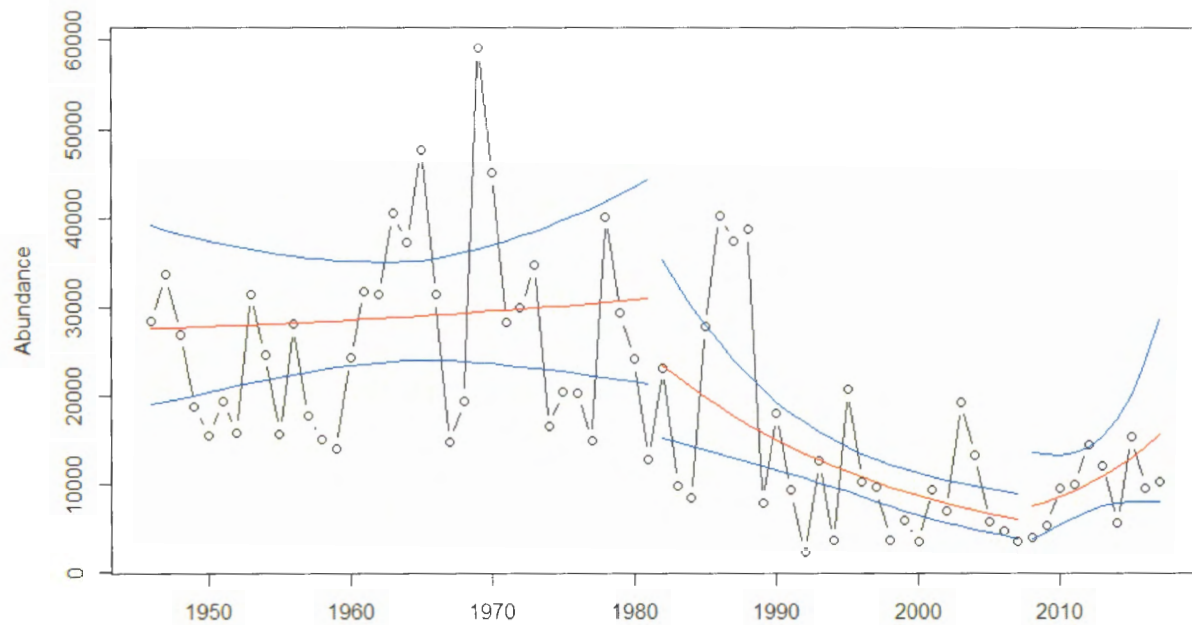


Figure 2. Abundance of NPCHS in the Rogue River above historical Gold Ray Dam site, 1946-2017. Red lines indicate trends before construction of William Jess Dam (1946-1980), after dam construction and before implementation of the Plan (1981-2007), and after Plan implementation (2008-2017). Trend lines, 95% credible intervals (blue lines), and statistical comparisons are based on geometric mean rate of inter-annual change. (excerpted from ODFW 2019)

Abundance data for Rogue Spring Chinook (Fig. 2) is confounded by the discovery of significant hybridization of the spring and fall runs due to dam construction. ODFW analysis (2019:38-40) generally agrees with the findings of UC Davis (Prince et al. 2017 and Thompson et al. 2018): “The UC Davis genetic analysis of samples from 2004 indicates that Spring Chinook counts at Gold Ray Dam included many heterozygous Chinook salmon with intermediate run timing.”

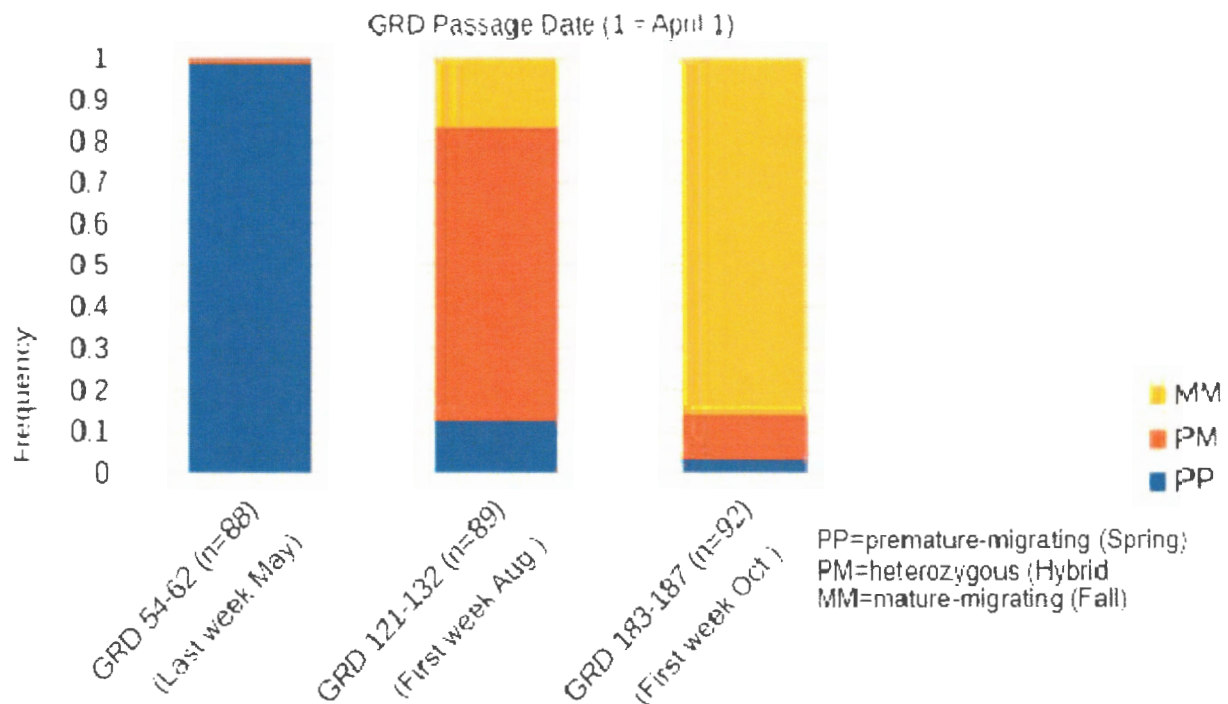


Figure 26. Genetic composition of Chinook passing Gold Ray Dam at three time periods in 2004. Fish are grouped based on their genotype at one location associated with run timing. (Excerpted from ODFW 2019:39)

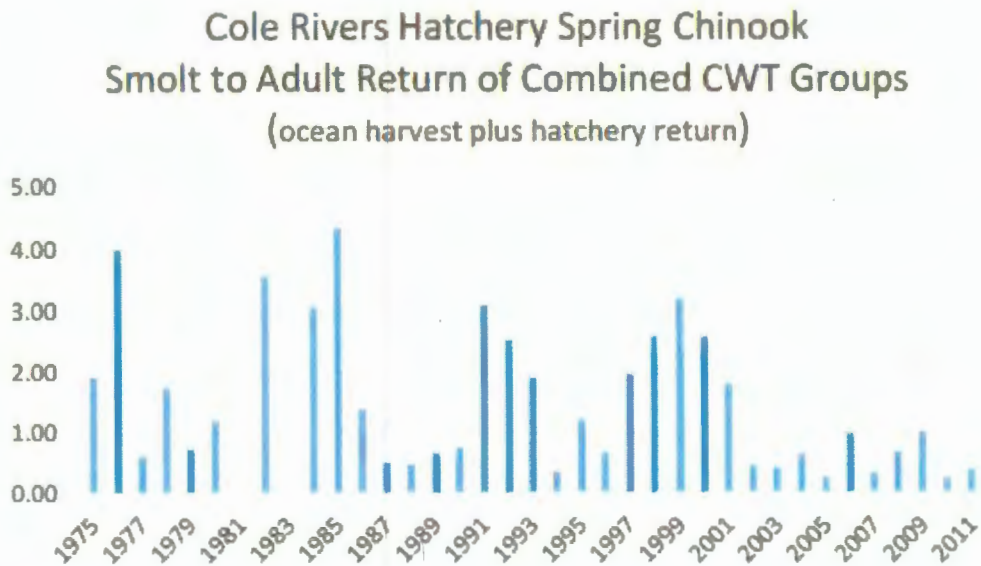
The degree of hybridization at the expense of dwindling spring Chinook has likely increased over the past 15 years. ODFW (2019:40) has initiated genetic monitoring: "With a new tool available for determining fall versus spring Chinook Salmon, ODFW initiated a study in 2016 to collect genetic information from carcasses of naturally produced Chinook Salmon during carcass surveys." While monitoring is certainly necessary, it cannot stabilize or reverse inevitable hybridization. The ODFW 2019 plan takes a 'wait and see' approach when Thomson et al. 2018 modeling indicates serious threats that will only worsen over time.

The ODFW 2019:8 state that "Since adoption of the [2007] Plan, current status for abundance (10-year average) has increased from 7,596 NPCHS in 2007 to 9,663 NPCHS in 2017 (Table 1)" and imply that somehow the Plan was responsible for increases of NPCHS and spawning observed in early September. An alternative explanation is that the removal of 3 dams during 2008-2010 (ODFW 2019:21) has provided for more rapid upriver ascent of heterozygous Chinook and even homozygous fall-run fish.<sup>1</sup> Large numbers of heterozygous Chinook passed Gold Ray in August 2004 and undoubtedly spawned with homozygous spring Chinook (Fig. 26 above).

<sup>1</sup> "Between 2008 and 2010, three older dams were either notched or removed from the mainstem Rogue. Gold Hill Dam (rivermile 121) was removed in 2008, Savage Rapids (rivermile 107) was removed in 2009, and Gold Ray Dam (rivermile 126) was removed in 2010. For the first time in decades, native migratory fish on the Rogue have free passage along 157 miles of river below the velocity barrier at Cole Rivers Hatchery."

These unwanted upriver spawners enjoy artificially augmented August/September flows that are disadvantageous to NPCHS due to subsequent reduced flows and NPCHS redd dewatering (ODFW 2019:16-19).

The ODFW 2019:3 states: “Finally, although the abundance of NPCHS has increased since adoption of the *Rogue Spring Chinook Salmon Conservation Plan*, hatchery returns have not met expectations in recent years.”



**Figure 1.12-1. Cole Rivers Hatchery spring Chinook Salmon smolt to adult return over time.**

Figure excerpted from ODFW 2016. Smolt to adult return for hatchery fish has been below 1% since 2002. Many years are below 0.3%. Smolt to adult percent for natural fish is also probably very low in recent decades but no ODFW data could be found.

#### Smith River (CA) Spring Chinook

Smith River spring Chinook snorkel counts indicate significant declines since peak counts in 1996 (Hanson 2018).



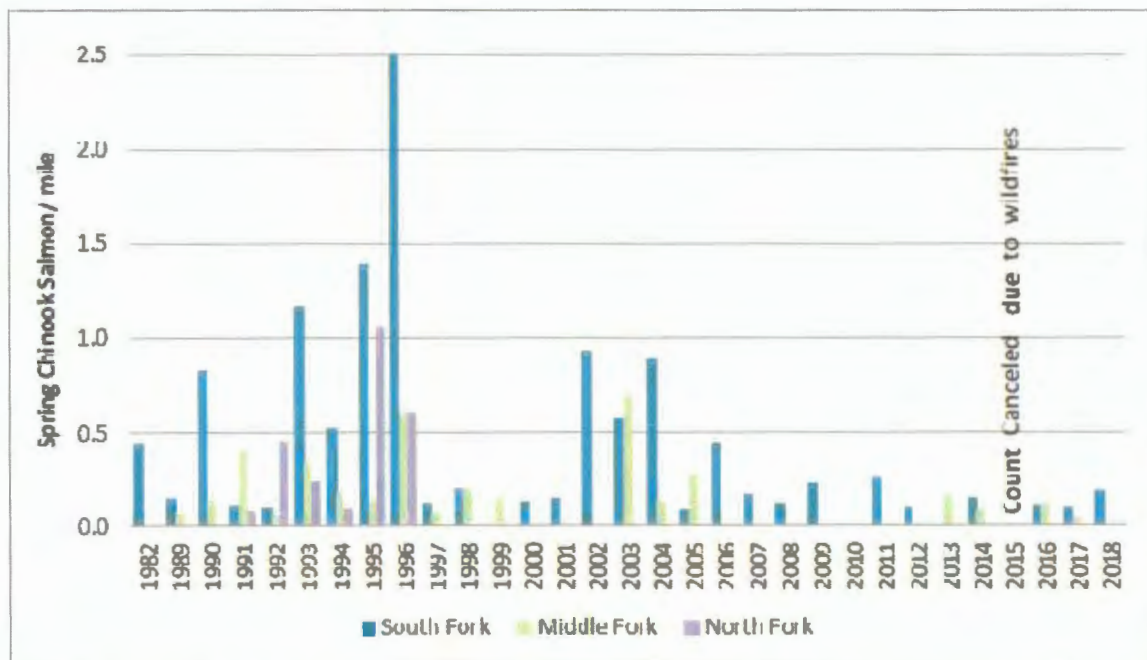


Figure 10. Density of adult Spring Chinook Salmon based on total counts per mile surveyed along the South Fork, Middle Fork and North Fork of the Smith River during surveys conducted from 1982 to 2018. Surveys were not conducted on all forks every survey year, refer to Appendixes A, B, and C.

Figure 10 is excerpted from Hanson 2018:14. Live adult densities of  $<0.3/\text{mile}$  for the past ten years clearly indicate the population is threatened with extinction.

## Threats to the Species

Current threats can be characterized into 5 main categories: (1) Present or threatened destruction, modification, or curtailment of its habitat or range; (2) Overutilization for commercial, recreational, scientific, or educational purposes; (3) Disease or predation (4) Inadequacy of existing regulatory mechanisms and (5) Other natural or anthropogenic factors affecting its continued existence( See NMFS 1998).

## Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

### Rogue River Spring Chinook

Lost Creek Dam resulted in significant long term declines due to loss of spawning habitat, unfavorable flow regimes for egg incubation and unfavorable temperature modifications for egg incubation. Declining spring Chinook are being hybridized with fall-run Chinook due to artificially enhanced summer low flows designed to favor fall run fish. The two races were once spatially separated but now fall-run Chinook and/or heterozygous Chinook can spawn upstream of RM 120 in spring Chinook spawning habitat previously not used by fall-run fish. Ironically the purpose of the enhanced summer flows from the dam is to benefit Chinook salmon by reducing susceptibility to disease (ODFW:2019:20).



After adjusting for changes in age selective harvest, studies found that about 50% of NPCHS produced before the dam matured at age five. After dam construction, about 50% of NPCHS matured at age four. (ODFW 2019:13)

Post-dam stream temperature regimes have reduced egg-to fry survival. . Incubating eggs are often washed out of gravel or exposed to high turbidity due to extended dam releases to control floods. Logging and road building has increased fine sediment of spawning habitat as identified in previous status reviews and recovery plans for SONCC coho salmon. Big Butte Creek, Elk Creek, Trail Creek and Little Butte Creek spew large amounts of fine sediment into the Spring Chinook spawning areas (Nawa 2019).

#### Smith River Spring Chinook

Logging, mining, and roads have adversely affected habitat as described in previous status reviews and recovery plans for SONCC coho salmon. Habitat enhancement efforts have failed to reverse downward population trends.

## **Overutilization for Commercial, Recreational, Scientific, or Educational Purposes**

#### Harvest

SONCC spring Chinook are taken in commercial and recreational fisheries occurring off the coast of Oregon and California. These fisheries are conducted without management to limit the impact to declining SONCC spring Chinook populations.

ODFW 2007:54 states: "For the purposes of this conservation plan, the harvest rates of NPCHS in the ocean fisheries can be assumed to average about 15% for the foreseeable future."

ODFW 2019:30 states "From January 1 through May 31 each year, anglers may only keep adipose fin-clipped hatchery spring Chinook Salmon (HCHS) on the Rogue. Angling opens to wild harvest at various sections of the river after the early run fish have passed. In the river downstream of Fishers Ferry Boat Ramp (Figure 19), anglers may harvest wild spring Chinook beginning June 1 **after early run fish have moved upstream**. Between Fishers Ferry Boat Ramp and the Dodge Bridge boat ramp, anglers may harvest wild spring Chinook beginning July 1 **after early run fish have moved upstream**. Upstream of Dodge Bridge the fishery does not open to wild harvest. Early run fish are holding throughout spring and summer in the deep pools located upstream of Dodge Bridge."

Despite these purported low harvest rates, the wild Rogue Spring-run Chinook are not meeting the escapement goal and homozygous fish are likely declining.

Anecdotal information suggests that poaching may be a factor for reducing Smith River spring Chinook,

## **Disease or Predation**

ODFW 2019:20 states: "When hot weather overlaps low river flows at a time when adult fish abundance is high in the Rogue, disease spreads quickly. The primary cause is a bacterium, *Flexibacter columnaris*. Thousands to tens of thousands of fish have been lost in past disease

outbreaks during early 1990s. "At the present time, *Columnaris* is believed to pose the greatest risk to NP CHS in the Rogue SMU." ODFW 2007:40-41:

ODFW works with OWRD and USACE to release water from Lost Creek Reservoir to minimize pre-spawning mortality in adult Chinook."

See discussion in Artificial Propagation/Hybridization on p. 19 of this petition for a discussion of disease at Cole Rivers Hatchery and predation of juvenile spring Chinook by hatchery fish.

## Inadequacy of Existing Regulatory Mechanisms

### Oregon Native Fish Conservation Policy

ODFW 2007:4 states: "Conservation plans are to be developed for each Species Management Unit of native fish in the state of Oregon, as outlined by the Native Fish Conservation Policy. This policy was adopted by the Oregon Fish and Wildlife Commission in 2003 in order to ensure the conservation and recovery of native fish in Oregon."

The status and viability of Rogue Spring Chinook is analyzed in ODFW 2005a, 2005b. ODFW 2005a states: "The [Rogue Spring Chinook] population passed all criteria except for reproductive independence resulting indicating the near-term sustainability of the SMU is potentially at risk. From 1995-2002 hatchery fractions among natural spawners exceeded 10% in every year."

ODFW 2005b: stated that "Hybridization has not been identified as an issue for Rogue spring Chinook."

A comprehensive Rogue Spring Chinook Salmon Conservation Plan (ODFW 2007) was adopted in 2007 to address "reproductive independence" and other factors known or suspected to be causing declines. The 2007 conservation plan complements *The Oregon Plan for Salmon and Watersheds. The 2007 Plan and annual progress reports about plan implementation are found at [https://www.dfw.state.or.us/fish/CRP/rogue\\_spring\\_chinook\\_conservation\\_plan.asp](https://www.dfw.state.or.us/fish/CRP/rogue_spring_chinook_conservation_plan.asp)*

The 2007 plan p. 38 states:

Overlap in spawning time and spawning distribution also indicates that the spring and fall races of NP CHS may have hybridized to some unknown degree. Genetic assessments indicated that NP CHS that passed Gold Ray Dam in late July and early August differed from counterparts that passed in late September and early October (see **SPECIES MANAGEMENT UNIT AND CONSTITUENT POPULATIONS**, page 10). If hybridization has occurred to a significant level, naturally produced Chinook that pass Gold Ray Dam from the middle of August through the middle of September may exhibit mixed genetic characteristics of late run NP CHS and early run NP CHF. This question has been identified as a topic to be addressed by future research (see **Research Needs**, page 83).

ODFW suspected hybridization was occurring but genetic analysis of the 2004 run year found no differences between early and later migrating spring Chinook ODFW 2007:12. Ten years

later research by Thomson et al. (2018) using more sophisticated genetic techniques found substantial hybridization in the 2004 run year. The ODFW updated the Rogue Spring Chinook Conservation Plan in 2019 to report these findings about hybridization (ODFW 2019:38-40). The degree of hybridization at the expense of dwindling spring Chinook has likely increased over the past 15 years. ODFW (2019:40) has initiated additional genetic monitoring: "With a new tool available for determining fall versus spring Chinook Salmon, ODFW initiated a study in 2016 to collect genetic information from carcasses of naturally produced Chinook Salmon during carcass surveys."

While genetic monitoring is certainly necessary, it cannot stabilize or reverse inevitable increases of heterozygous fish. The ODFW 2019 plan takes a risky 'wait and see' approach when Thomson et al. 2018 modeling indicates serious threats that will only worsen over time. The 2019 plan provides no standards for acceptable proportions of the native Chinook population to be heterozygous. Neither the ODFW 2019 plan nor the Hatchery and Genetic Management Plan provide safeguards for the potential of hybridization from artificial production at the Cole Rivers Hatchery or genetic monitoring of hatchery spawners. The ODFW 2019 Plan fails to discuss Lost Creek Dam releases that promote hybridization or provide possible remedies. The ODFW Conservation Plan for Fall Chinook Salmon in the Rogue Species Management Unit fails to discuss the potential for hybridization with spring-run fish due to enhanced summer flows (ODFW 2013). The Native Fish Policy and 3 related management plans have failed to assure viability of Rogue Spring Chinook into the foreseeable future. The Plans seek to manipulate ecological, biological and social parameters to attain desired numeric goals at the expense of the spring Chinook's natural adaptive capacity and diverse qualitative attributes (See Frissell et al. 1997).

### Oregon Endangered Species List

Rogue spring Chinook are not protected as threatened or endangered under the Oregon state Endangered Species Act.

### Oregon Sensitive Species List

The Rogue Species Management Unit/ESU is listed as a state "sensitive species" (ODFW 2017). This designation does not provide any regulatory or substantive protection for the species.

### Oregon State Forest Practices Act: Forest Management and Regulation on Private Lands

Logging and management of riparian areas on private forest lands in watersheds upstream of the range of Rogue spring-run Chinook salmon is regulated by the Oregon Forest Practices Act ("OFPA") and Forest Practice Rules (ORS 527.610-527.785). The OFPA shares responsibility for managing the state's forestlands between ODF, the state forester, and the Oregon State Board of Forestry. The Board promulgates Forest Practice Regulations (FPRs), which direct the foresters to "actively manage" state forestlands and make available a "sustainable and predictable production of forest products" to realize the lands' "greatest permanent value" (see generally OAR 629-035-0020; 629-035-0020(2)).

In pursuit of the "greatest permanent value" on state forestlands, state and district foresters emphasize timber production over protection of salmon and other native wildlife. For example,

the FPRs require the state forester to authorize logging on “any silviculturally capable lands” unless prohibited by “a legal or contractual obligation” or unless he determines that another use will be “more consistent” with the greatest permanent value (see OAR 629-035-0050(3)(A)). The FPRs allow the state forester to authorize timber sales, including clear-cutting, as well as road construction, on “erosion-prone” slopes (OAR 629-630-0150(1)-(3); 629-623-0400; 629-623-0800; 629-625-0100). The FPRs do not set additional standards to protect salmon and their freshwater habitats from sedimentation caused by landslides (OAR 629-623-0700). The FPRs allow road construction and reconstruction on “very steep slopes” (OAR 629-623-0050(2)), high landslide hazard locations (OAR 629-625-0100(3)), and/or “where there is an apparent risk of road-generating materials entering waters of the state” (OAR 629-625-0100(2)(a)). The FPRs permit logging activities without any effort by operators to leave large woody debris in fish-bearing streams to improve stream complexity for salmon (see OAR 629-640-0110, acknowledging that many fish-bearing streams “currently need improvement” because “they lack adequate amounts of large woody debris in channels, or they lack other important habitat elements”).

These FPRs require the establishment of riparian management areas on perennial streams that are within or adjacent to forestry operations. The riparian protection widths vary from 10 to 100 feet depending on the stream classification, with fish-bearing streams having wider riparian protections than streams that are not fish-bearing. Although the Oregon Forest Practices Act and the Forest Practice Rules generally have become more protective of riparian and aquatic habitats over time, the National Marine Fisheries Service states that significant concerns remain over their ability to adequately protect water quality and salmon habitat (NMFS 2011, NMFS 2014). In particular, the widths of riparian protections are not sufficient to fully protect riparian functions and stream habitats. Timber operations allowed within riparian management areas often degrade stream habitats. Timber operations on high-risk landslide sites may result in excessive sedimentation of streams; and watershed-scale effects are not accounted for (NMFS 2011, NMFS 2014). On some upper Rogue streams (e.g. Big Butte Creek) forestry operations conducted in compliance with the Act are likely to reduce stream shade, slow the recruitment of large woody debris, and add fine sediments (NMFS 2011). Another major failing of the Oregon Forest Practices Act is the failure to place limitations on cumulative watershed effects, so that the high road density on private forest lands in the upper Rogue watershed is unlikely to decrease (NMFS 2011). NMFS (2011, 2014) concluded that the Oregon Forest Practices Act may not adequately protect Oregon coast coho salmon habitat. Thus it is also unlikely to adequately protect Rogue spring-run Chinook salmon habitat.

Talberth and Fernandez (2015) evaluated the failures of the Oregon Forest Practices Act in limiting the rate of harmful clearcutting. They found that the Act has inadequate forest diversity standards, inadequate water resource protection standards, and inadequate enforcement and public participation. The Oregon Forest Practices Act allows a rate of logging above the rate of forest regrowth; permits clearcuts for which the timing, size and placement allow forest fragmentation and reduce forest cover; and does not have adequate standards for retention of “biological legacies” such as residual trees, snags, and downed logs (Talberth and Fernandez 2015). As far as water resource protection, the Oregon Forest Practices Act does not provide no-cut buffers along all streams and stream courses adequate to protect water quality, temperature, and flow, nor to provide habitat and migration corridors for fish and wildlife species that depend on aquatic ecosystems; and clearcutting is allowed in watersheds that provide cold water fish habitat and on steep, unstable soils prone to landslides (Talberth and Fernandez 2015). Authority of the State Forester to approve or disapprove of major logging operations was rolled back in 2003 to help shield timber companies and the State Forester from lawsuits over endangered salmon and other imperiled species. The Oregon Department of Environmental

Quality is not empowered to disapprove logging operations that adversely affect water resources.

### 1997 Oregon Coastal Salmon Restoration Initiative

The Oregon Coastal Salmon Restoration Initiative, also known as the Oregon Plan for Salmon and Watersheds, was submitted by the state of Oregon to NMFS 1997, in an attempt to head off listings of salmon under the ESA. The Oregon Plan principles have no additional regulations or changes in existing law. It relies on voluntary efforts from local landowners organized through local watershed councils and industry trade or landowner associations. The Oregon Plan was intended to be “ground-up” with local watershed councils securing stakeholder buy in and proposing projects, and state agencies providing support rather than control.

### Federal National Environmental Policy Act

The National Environmental Policy Act (NEPA) (42 U.S.C.4321-4370a) requires federal agencies, including the U.S. Forest Service and U.S. Bureau of Land Management, to consider the effects of management actions on the environment. The NEPA process requires these agencies to describe a proposed action, consider alternatives, identify and disclose potential environmental impacts of each alternative, and involve the public in the decision-making process. However, a NEPA analysis does not prohibit these agencies from choosing project alternatives that may adversely affect SONCC Chinook salmon or their habitats. As a result, the NEPA process often results in the disclosure of impacts but affords little to no protections. The agencies must analyze the impacts of their actions on the species, but are not required to select alternatives that avoid harm to spring Chinook. Federal land management agencies regularly plan timber sales, maintain and utilize roads, and conduct other actions that potentially harm SONCC spring Chinook. The adverse impact is generally due to sedimentation of streams and increased stream temperatures.

The adverse impacts from the operation of the Cole Rivers Hatchery has not received a hard look via the NEPA. For example, possible increased straying from trucking smolts to the estuary has not been disclosed to the public via NEPA. Since the Cole Rivers Hatchery is federally funded its operation must comply with NEPA but has failed to do so.

### Federal Endangered Species Act.

SONCC spring-run Chinook salmon are on the federal sensitive species list but not currently protected under the federal Endangered Species Act. The Act offers potential protections through Habitat Conservation Plans (HCP) which cover non-listed species, but there are no Habitat Conservation Plans under the U.S. Endangered Species Act that cover SONCC spring-run Chinook salmon. Potential Endangered Species Act protection could be through co-occurrence with other listed species such as SONCC ESU coho salmon, marbled murrelet, and northern spotted owl, and their designated critical habitat. ESA listing of SONCC coho has resulted in some improved habitat protections on state, federal, and private forest lands but there is little evidence to date that habitat restoration and protection have been effective enough to lead to recovery of coho salmon populations in this ESU. Some actions intended to benefit listed coho salmon could also benefit spring-run Chinook in the same watersheds, but conservation actions appear insufficiently effective to produce consistent population increases



or recovery of either species. Habitat protection/enhancement would not address the loss of SONCC spring run due to hybridization.

Production of coho salmon and other species continues at Cole Rivers hatchery even though it has direct and indirect adverse impacts on SONCC coho and SONCC Chinook.

#### Federal National Forest Management Act

Under the National Forest Management Act, the Forest Service is required to “maintain viable populations of existing native and desired nonnative vertebrate species” (36 C.F.R. §219.19). As with NEPA, this requirement does not prohibit the Forest Service from carrying out management actions and projects that harm species or their habitat, but merely states that “where appropriate, measures to mitigate adverse effects shall be prescribed” (36 C.F.R. §219.19(a)(1)). This clause does little to limit long term impacts to SONCC spring Chinook habitat from Forest Service management actions such as logging, road-building, mining and OHV use.

#### Federal Northwest Forest Plan

The 1994 Northwest Forest Plan is a coordinated ecosystem management strategy for federal lands administered by the Forest Service. The Northwest Forest Plan established a system of federal reserves interspersed with matrix forestlands where timber harvest and other commodity production are given priority. Reserves were designed to provide large blocks of habitat for northern spotted owls and management on reserved lands generally attempted to protect species associated with older forests. The Aquatic Conservation Strategy (ACS) of the Northwest Forest Plan protects native fish and their habitat. The Aquatic Conservation Strategy has ten objectives for fish habitat that are met through associated Standards and Guidelines. The Aquatic Conservation Strategy included designation of riparian management zones, activity-specific management standards, watershed assessments, watershed restoration, and identification of key watersheds. Mixed ownership in the upper Rogue prevents it from being effective. Smith River Spring Chinook have had the full benefit from the NW Forest Plan but have declined from a peak of about 2.5 fish per mile in 1996 to less than 0.3 fish per mile during the past 10 years.

#### Federal Clean Water Act

The Clean Water Act (CWA) establishes the basic structure for regulating the discharge of pollutants into U.S. waters, and for regulating quality standards of U.S. surface waters. Under the CWA, the U.S. Environmental Protection Agency (EPA) implements pollution control programs and sets wastewater standards for industry and water quality standards for all contaminants in surface waters. The CWA also provides federal funding to restore habitat, clean up toxic pollutants and reduce run-off from farms and cities.

Under Section 404 of the CWA, discharge of pollutants into waters of the U.S. is prohibited absent a permit from the U.S. Army Corps of Engineers. Theoretically the CWA should provide some protection for stream and estuarine habitats used by spring-run Chinook. However, implementation of the CWA, and the Section 404 program in particular, has fallen far short of Congress’s intent to protect water quality (e.g., see Morriss et al. 2001). The EPA is also underfunded for addressing widespread pollution problems; and the Trump’s administration’s proposed EPA budget cuts the agency by 31 percent from \$8.2 billion to \$5.7 billion. Best

Management Practices designed to reduce logging sediment are not effectively implemented, resulting in significant sediment discharges into streams.

## Other Anthropogenic or Natural Factors

### Artificial Propagation/Hybridization

All hatchery production at the Cole Rivers Hatchery is for the purpose of augmenting commercial and recreational fisheries. The Hatchery has no conservation purposes. The Cole Rivers Hatchery poses significant risks to the future viability of Rogue Spring Chinook (Satterthwaite and Carlson 2015) .

#### a. Competition

An average of 1.6 million CHS are raised annually at Cole M. Rivers Hatchery. These fish are released directly into the Rogue River during the period of August through October. Cole M. Rivers Hatchery began operation in 1973, and also releases coho salmon, summer steelhead, and winter steelhead directly into the Rogue River. These releases result in increased competition between naturally produced spring Chinook and the more abundant artificially produced fish. Some of the Rogue Spring Chinook declines since the construction of Lost Creek Dam are due to massive artificial salmon/steelhead releases. Instead of reducing releases, the ODFW has recently increased hatchery releases of hatchery spring Chinook thus increasing competition (ODFW 2019).

#### b. Predation

Artificially produced coho and steelhead consume naturally produced Chinook. ODFW 2007:39-40 states:

"Surveys conducted during 1979-81 indicated that both species preyed upon fry of NP CHS. Based on significant assumptions, the annual number of fry consumed by steelhead of hatchery origin may have ranged between 134,000 and 218,000, while the number of fry consumed by Coho salmon of hatchery origin may have ranged between 29,000 and 57,000 (Evenson et al. 1981). These estimates, if accurate, represent 3-7% of the CHS fry produced during those years."

#### c. Disease

The hatchery is a known source of disease. ODFW 2007:40-41:

"*Columnaris* was detected in resident fish in Lost Creek Lake and in juvenile Chinook salmon held in the reservoir, but was not detected in reservoir water or reservoir outflow (Amandi et al. 1982). Among the various water bodies sampled, pathogen concentrations were greatest in the outflow from Cole M. Rivers Hatchery. CHS in the hatchery were also found to be infected with the disease. "At the present time, *Columnaris* is believed to pose the greatest risk to NP CHS in the Rogue SMU."

#### d. Genetics/Hybridization

The fitness of the Rogue Hatchery Spring Chinook has undoubtedly deteriorated greatly since its inception (Araki 2008).

ODFW 2005a states: "The population passed all criteria except for reproductive independence resulting indicating the near-term sustainability of the SMU is potentially at risk. From 1995-2002 hatchery fractions among natural spawners exceeded 10% in every year." More recently ODFW 2019:11 reports: "The percentage of hatchery fish among spring Chinook spawning naturally in the Rogue River was only 1% in 2017, and has average 5% over the last 10 years. These values are far below the desired status identified in the Plan, and have dropped substantially from the percentage of hatchery spawners at the time the Plan was adopted (Table 1)." While this is encouraging, it begs the question about the genetic origin of the spawners? Are they homozygous, heterozygous or both? Unfit hatchery spring Chinook and/or heterozygous hatchery fish are spawning in the river with natural homozygous spring Chinook causing genetic degradation. Genetic monitoring results are pending but flow factors that provided spatial separation of the races are not being restored.

The potential exists for unintentional hybridization between spring and fall-run Chinook or the artificial breeding of heterozygous Chinook with homozygous spring Chinook. Kinzinger et al. (2008) documented the negative impacts of hybridization between spring and fall Chinook returning to the Trinity River, California:

Also, if hybrids have fitness similar to that of the parental taxa and if hybridization is sustained (e.g., via inadvertent hatchery matings or in-river hybridization), then a hybrid swarm would eventually become established (Epifanio and Philipp 2001). This suggests that the assortative mating procedures used at TRH can reduce the rate of introgression between the two groups but are insufficient for preventing their loss via hybridization if the mechanism that led to their divergence is no longer operating.

This means that even if artificial production at Cole Rivers Hatchery is restricted to homozygous spring fish, a hybrid swarm could become established if historic summer low flow regimes are not restored.

Significant hybridization between spring-run and fall-run Chinook salmon is a major, imminent man-made threat to the spring run populations. The genotypic and phenotypic distinctiveness of the spring-run Chinook salmon can be modified when natural or man-made factors allow or force interbreeding between spring- and fall-run Chinook that were formerly separated by time or place of spawning. Most commonly, such interbreeding is forced by dams, diversions, or other habitat changes that block historical migration paths (Thompson et al. 2018), but can also be forced by intentional or unintentional crossing of the two ecotypes in hatcheries (Kinzinger et al. 2008). The result is intermediate phenotypes that typically migrate later than the indigenous spring-run fish, but earlier than the fall run. Such intermediate phenotypes are almost certainly maladapted to long-term survival in natural habitats, consistent with their absence from indigenous wild Chinook salmon populations (Thompson et al. 2018). Therefore such interbreeding likely harms both the early- and late-returning parent stocks both ecologically and genetically. The breach of evolutionary continuity particularly endangers spring-run

Chinook because most populations are already reduced to small population sizes with low or non-increasing productivity which makes them vulnerable to local extinction from endogenous as well as exogenous factors (e.g. Smith River Spring Chinook).

### Ocean Conditions

Coded wire tag data indicate SONCC spring Chinook migrate in the Ocean off the Oregon and Northern CA coast. Ocean conditions in the Pacific Northwest exhibit patterns of recurring, decadal-scale variability (including the Pacific Decadal Oscillation and the El Nino Southern Oscillation), and correlations exist between these oceanic changes and salmon abundance in the Pacific Northwest (Stout et al. 2011). It is also generally accepted that for at least 2 decades, beginning about 1977, marine productivity conditions were unfavorable for the majority of salmon and steelhead populations in the Pacific Northwest, but this pattern broke in 1998, after which marine productivity has been quite variable (Stout et al. 2011). NMFS (2011) was concerned about how prolonged periods of poor marine survival caused by unfavorable ocean conditions may affect the population viability parameters of abundance, productivity, spatial structure, and diversity for salmonids. Although salmon have persisted through many favorable-unfavorable ocean/climate cycles in the past, much of their freshwater habitat was in good condition that buffered the adverse effects of ocean variability on population abundance and productivity. It is uncertain how SONCC spring Chinook populations will fare in periods of poor ocean survival when their freshwater, estuary, and nearshore marine habitats are degraded (Stout et al. 2011).

### Climate Change

Throughout the life cycle of Oregon coast salmonids, there are a numerous potential effects of climate change (Stout et al. 2011; Wainwright and Weitkamp, in review). The main predicted effects in terrestrial and freshwater habitats include warmer, drier summers, reduced snowpack, lower summer flows, higher summer stream temperatures, and increased winter floods, which would affect salmonids by reducing available summer rearing habitat, increasing potential scour and egg loss in spawning habitat, increasing thermal stress, and increasing predation risk (NMFS 2011). In estuarine habitats, the main physical effects are predicted to be rising sea level and increasing water temperatures, which would lead to a reduction in intertidal wetland habitats, increasing thermal stress, increasing predation risk, and unpredictable changes in biological community composition (NMFS 2011). In marine habitats, there are a number of physical changes that would likely affect salmonids, including higher water temperature, intensified upwelling, delayed spring transition, intensified stratification, and increasing acidity in coastal waters (NMFS 2011). Of these, only intensified upwelling would be expected to benefit coastal-rearing salmon; all the other effects would likely be negative (NMFS 2011). Projected changes in regional climatic and weather patterns due to global climate change will have negative effects on aquatic ecosystems and salmonids (ODFW 2014). Long-term warming trends and increasing weather variability in the Pacific Northwest will result in more frequent events (e.g., droughts, intense precipitation, and periods of unusually warm weather) that were considered extreme during the twentieth century, and the magnitude of these events may also exceed recent historical levels (Reiman and Isaaks 2010). Although the rain-dominated hydrology of the Rogue and Smith Rivers are not projected to experience the same magnitude of change in temperatures and flows as other portions of the Pacific Northwest (Beechie et al. 2012), coastal Oregon salmonid populations will likely be exposed to lower

summer base flows, higher summer-fall water temperatures, and greater stochasticity in hydrology due to changes in precipitation and runoff patterns (ODFW 2014). Although it is not clear how global climate change will affect salmon in the ocean environment, some modeling efforts suggest that warmer air temperatures are likely to increase ocean stratification, which in the past has coincided with relatively poor ocean habitat for most Pacific Northwest salmon (CIG 2004). Since SONCC are limited to coastal OR/CA they will likely be the first to suffer significant impacts from climate change as compared to north migrating Chinook ESUs.

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November 21, 2019

Curt Melcher,  
Director Oregon Department of Fish and Wildlife  
4034 Fairview Industrial Drive SE  
Salem, Oregon 97302

Dear Director Melcher,

With this letter I am notifying the Oregon Department of Fish and Wildlife of my intent to submit to the Secretary of Commerce a petition to list the Southern Oregon and Northern California Coastal Evolutionary Significant Unit of Spring-Run Chinook Salmon (*Oncorhynchus tshawytscha*) under the Endangered Species Act. I am providing you this notification as required by 50 CFR 424.14(b).

Sincerely,

*Richard K. Nawa*

Richard K. Nawa  
PO Box 654  
Selma, OR 97538

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December 6, 2019

Charlton H. Bonham  
Director California Department of Fish and Wildlife  
P.O. Box 944208  
Sacramento, CA 94244-2090

Dear Director Bonham ,

With this letter I am notifying the California Department of Fish and Wildlife of my intent to submit to the Secretary of Commerce a petition to list the Southern Oregon and Northern California Coastal Evolutionary Significant Unit of Spring-Run Chinook Salmon (*Oncorhynchus tshawytscha*) under the Endangered Species Act. I am providing you this notification as required by 50 CFR 424.14(b).

Sincerely,

*Richard K. Nawa*

Richard K. Nawa  
PO Box 654  
Selma, OR 97538

COMPLETE THIS SECTION	COMPLETE THIS SECTION ON DELIVERY
<ul style="list-style-type: none"><li>■ Complete items 1, 2, and 3.</li><li>■ Print your name and address on the reverse so that we can return the card to you.</li><li>■ Attach this card to the back of the mailpiece, or on the front if space permits.</li></ul>	<p>A. Signature <input checked="" type="checkbox"/> Agent <input type="checkbox"/> Addressee</p> <p>B. Received by (Printed Name) C. Date of Delivery</p> <p>D. Is delivery address different from item 1? <input type="checkbox"/> Yes If YES, enter delivery address below: <input type="checkbox"/> No</p>
<p>1. Article Addressed to:</p> <p>DIRECTOR California DEPT. Fish + Wildlife PO BOX 944208 SACRAMENTO, CA 94244-2090</p>	<p>3. Service Type</p> <p><input type="checkbox"/> Adult Signature <input type="checkbox"/> Adult Signature Restricted Delivery <input type="checkbox"/> Certified Mail® <input type="checkbox"/> Certified Mail Restricted Delivery <input type="checkbox"/> Collect on Delivery <input type="checkbox"/> Collect on Delivery Restricted Delivery</p> <p><input type="checkbox"/> Priority Mail Express® <input type="checkbox"/> Registered Mail™ <input type="checkbox"/> Registered Mail Restricted Delivery <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> Signature Confirmation™ <input type="checkbox"/> Signature Confirmation Restricted Delivery</p>
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November 21, 2019

Charlton H. Bonham  
Director California Department of Fish and Wildlife  
P.O. Box 944209  
Sacramento, CA 94244-2090

Dear Director Bonham , .

With this letter I am notifying the California Department of Fish and Wildlife of my intent to submit to the Secretary of Commerce a petition to list the Southern Oregon and Northern California Coastal Evolutionary Significant Unit of Spring-Run Chinook Salmon (*Oncorhynchus tshawytscha*) under the Endangered Species Act. I am providing you this notification as required by 50 CFR 424.14(b).

Sincerely,

*Richard K Nawa*

Richard K. Nawa  
PO Box 654  
Selma, OR 97538

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