State of California
Natural Resources Agency
Department of Fish and Wildlife

REPORT TO THE FISH AND GAME COMMISSION

EVALUATION OF THE PETITION FROM THE KARUK TRIBE AND THE SALMON RIVER RESTORATION COUNCIL TO LIST UPPER KLAMATH TRINITY RIVER SPRING CHINOOK SALMON (*ONCORHYNCHUS TSHAWYTSCHA*) AS THREATENED OR ENDANGERED

Prepared by
California Department of Fish and Wildlife

NOVEMBER 2018

I. Executive Summary

The Karuk Tribe and the Salmon River Restoration Council (Petitioners) submitted a petition (Petition) to the Fish and Game Commission (Commission) to list the Upper Klamath Trinity River Spring Chinook Salmon (*Onchorhynchus tshawytscha*) (UKTR Spring Chinook Salmon) as endangered pursuant to the California Endangered Species Act (CESA), Fish and Game Code Section 2050 et seq.

The Commission referred the Petition to the Department of Fish and Wildlife (Department) in accordance with Fish and Game Code Section 2073. (Cal. Reg. Notice Register 2017, No. 13-Z, 479.) Pursuant to Fish and Game Code Section 2073.5 and Section 670.1 of Title 14 of the California Code of Regulations, the Department has prepared this evaluation report for the Petition (Petition Evaluation). The Petition Evaluation is an evaluation of the scientific information discussed and cited in the Petition in relation to other relevant and available scientific information possessed by the Department during the evaluation period. The Department's recommendation as to whether to make UKTR Spring Chinook Salmon a candidate for listing under CESA is based on an assessment of whether the scientific information in the Petition is sufficient under the criteria prescribed by CESA to consider listing UKTR Spring Chinook Salmon as endangered or threatened.

After reviewing the Petition and other relevant information, the Department makes the following findings:

- Population Trend. The Petition contains sufficient information to indicate the overall trend for California populations of UKTR Spring Chinook Salmon is declining, with the most precipitous declines occurring in the southern portion of the species' range

- Range. The Petition contains a sufficient description of the UKTR Spring Chinook Salmon range in California, including evidence suggesting range contractions in the Klamath and Trinity watersheds. As noted in the petition, the construction of impassable dams in the upper Klamath and Trinity watersheds has severely restricted the amount available UKTR Spring Chinook Salmon habitat. Several dams on the upper Klamath River are being considered for removal in 2021 which would re-open historical UKTR Spring Chinook Salmon habitat.

- Distribution. The Petition contains a sufficient description of the historical and recent distribution of UKTR Spring Chinook Salmon populations in California,

indicating a reduction in distribution across the species' range, with the most extensive reduction occurring in the Klamath River Watershed.

- Abundance. The Petition contains a sufficient description of what is known about historical and recent abundance of UKTR Spring Chinook Salmon populations, indicating declines in abundance across the species' range, and extensive reductions in population size occurring within the Klamath River Watershed. The department does not concur with the conclusion in the petition that upper main stem Trinity River Spring Chinook Salmon populations are of 100% hatchery origin.

- Life History. The Petition contains a sufficient description of the life history of UKTR Spring Chinook Salmon based on the scientific information available for the species, showing some aspects may render UKTR Spring Chinook Salmon particularly vulnerable to natural and anthropogenic impacts.

- Kind of Habitat Necessary for Survival. The Petition contains a sufficient description of the types and conditions of habitats required for UKTR Spring Chinook Salmon survival, including the fact that it possesses a unique life history.

- Factors Affecting the Ability to Survive and Reproduce. The Petition contains sufficient information to suggest UKTR Spring Chinook Salmon are adversely affected by historical habitat damage and a number of on-going and future threats, such as habitat loss, climate change, disease, and water extraction that act together in threatening the species' continued survival.

- Degree and Immediacy of Threat. The Petition contains sufficient information to indicate impacts from some of the primary threats to the long-term survival of UKTR Spring Chinook Salmon will continue or potentially worsen in the future. However, potential dam removals on the upper Klamath River may help ameliorate some of the threats.

- Impacts of Existing Management. The Petition contains sufficient information to suggest that existing regulatory mechanisms and management efforts do not adequately protect UKTR Spring Chinook Salmon from impacts that threaten their long-term survival. However, the petition states incorrectly that the Spring Chinook Salmon life history type is not managed differently from UKTR Fall Chinook Salmon. The petition also incorrectly states Spring Chinook Salmon escapement is additive to Fall Chinook Salmon escapement in determining annual overall Chinook Salmon population levels and subsequent management.

- Suggestions for Future Management. The Petition contains sufficient scientific information on additional management actions that may aid in maintaining and increasing self-sustaining populations of UKTR Spring Chinook Salmon in California.

- Availability and Sources of Information. The Petition contains a 11-page bibliography of literature cited, the majority of which were provided to the Department.

- A Detailed Distribution Map. The Petition contains a sufficiently detailed map of the historical and contemporary distribution of UKTR Spring Chinook Salmon in California.

The petitioners are soliciting review for an endangered species determination of UKTR Spring Chinook Salmon based on new scientific genetic evidence. A previous petition and review of Chinook Salmon populations by the National Marine Fisheries Service (NMFS) in 2012, found listing of Spring Chinook Salmon was not warranted at that time because they were not found to be genetically distinct, and the composite of Chinook Salmon populations in the upper Klamath and Trinity basins were considered relatively robust. The NMFS review regarded Klamath basin Spring Chinook Salmon as a life history variant that evolved from polyphyletic origins that can re-evolve over time.

New scientific information has become available on the genetic structure of Klamath basin Chinook Salmon that may inform a new species determination. The Department believes the petition has merit and may be warranted on the basis that the Spring Chinook Salmon life history variant is at low population abundance and has limited distribution.

The discussion below focuses on analyses of the scientific information provided in the petition, as well as from scientific information the Department possesses, or has knowledge of, in regards to UKTR Spring Chinook Salmon populations.

In completing its Petition Evaluation, the Department has determined the Petition provides sufficient scientific information to indicate that the petitioned action may be warranted. Therefore, the Department recommends the Commission accept the Petition for further consideration under CESA.

II. Introduction

A. Candidacy Evaluation

CESA sets forth a two-step process for listing a species as threatened or endangered. First, the Commission determines whether to designate a species as a candidate for listing by determining whether the petition provides "sufficient information to indicate that the petitioned action may be warranted." (Fish & G. Code, § 2074.2, subd. (e)(2).) If the petition is accepted for consideration, the second step requires the Department to produce within 12 months of the Commission's acceptance of the petition a peer reviewed report based upon the best scientific information available that indicates whether the petitioned action is warranted. (Fish & G. Code, § 2074.6.) The Commission, based on that report and other information in the administrative record, then determines whether the petitioned action to list the species as threatened or endangered is warranted. (Fish & G. Code, § 2075.5.)

A petition to list a species under CESA must include "information regarding the population trend, range, distribution, abundance, and life history of a species, the factors affecting the ability of the population to survive and reproduce the degree and immediacy of the threat, the impact of existing management efforts, suggestions for future management, and the availability and sources of information. The petition shall also include information regarding the kind of habitat necessary for species survival, a detailed distribution map, and other factors the petitioner deems relevant." (Fish & G. Code, § 2072.3; see also Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1).) The range of a species for the Department's petition evaluation and recommendation is the species' California range. (*Cal. Forestry Assn. v. Cal. Fish and Game Com.* (2007) 156 Cal. App. 4th 1535, 1551.)

Within 10 days of receipt of a petition, the Commission must refer the petition to the Department for evaluation. (Fish & G. Code, § 2073.) The Commission must also publish notice of receipt of the petition in the California Regulatory Notice Register. (Fish & G. Code, § 2073.3.) Within 90 days of receipt of the petition, the Department must evaluate the petition on its face and in relation to other relevant information and submit to the Commission a written evaluation report with one of the following recommendations:

- Based upon the information contained in the petition, there is not sufficient information to indicate that the petitioned action may be warranted, and the petition should be rejected; or

- Based upon the information contained in the petition, there is sufficient information to indicate that the petitioned action may be warranted, and the petition should be accepted and considered.

(Fish & G. Code, § 2073.5, subds. (a)(1), (a)(2).) The Department's candidacy recommendation to the Commission is based on an evaluation of whether or not the petition provides sufficient scientific information relevant to the petition components set forth in Fish and Game Code Section 2072.3 and the California Code of Regulations, Title 14, Section 670.1, subdivision (d)(1).

In *Center for Biological Diversity v. California Fish and Game Commission* (2008) 166 Cal.App.4th 597, the California Court of Appeals addressed the parameters of the Commission's determination of whether a petitioned action should be accepted for consideration pursuant to Fish and Game Code Section 2074.2, subdivision (e), resulting in the species being listed as a candidate species. The court began its discussion by describing the standard for accepting a petition for consideration previously set forth in *Natural Resources Defense Council v. California Fish and Game Commission* (1994) 28 Cal.App.4th 1104:

> As we explained in *Natural Resources Defense Council* [citation], "the term 'sufficient information' in section 2074.2 means that amount of information, when considered with the Department's written report and the comments received, that would lead a reasonable person to conclude the petitioned action may be warranted." The phrase "may be warranted" "is appropriately characterized as a 'substantial possibility that listing could occur.'" [Citation] "Substantial possibility," in turn, means something more than the one-sided "reasonable possibility" test for an environmental impact report but does not require that listing be more likely than not.[Citation]

(*Center for Biological Diversity*, *supra*, 166 Cal.App.4th at pp. 609-10.) The court acknowledged that "the Commission is the finder of fact in the first instance in evaluating the information in the record." (*Id.* at p. 611.) However, the court clarified:

> [T]he standard, at this threshold in the listing process, requires only that a substantial possibility of listing could be found by an objective, reasonable person. The Commission is not free to choose between conflicting inferences on subordinate issues and thereafter rely upon those choices in assessing how a reasonable person would view the listing decision. Its decision turns not on rationally based doubt about listing, but on the absence of any substantial possibility that the species could be listed after the requisite review of the status of the species by the Department under [Fish and Game Code] section 2074.6.

(ibid.)

B. Petition History

On July 22, 2018, the Karuk Tribe and Salmon River Restoration Council submitted the Petition to the Commission to list UKTR Spring Chinook Salmon as endangered or threatened under CESA. On July 23, 2018, the Commission referred the Petition to the Department for evaluation. This Petition Evaluation report was submitted to the Commission on July 22, 2018.

The Department evaluated the scientific information presented in the Petition as well as other relevant information the Department possessed at the time of review. The Department did not receive any information from the public during the Petition Evaluation period pursuant to Fish and Game Code Section 2073.4. Pursuant to Fish and Game Code Section 2072.3 and Section 670.1, subdivision (d)(1), of Title 14 of the California Code of Regulations, the Department evaluated whether the Petition includes sufficient scientific information regarding each of the following petition components to indicate that the petitioned action may be warranted:

- Population trend;
- Range;
- Distribution;
- Abundance;
- Life history;
- Kind of habitat necessary for survival;
- Factors affecting ability to survive and reproduce;
- Degree and immediacy of threat;
- Impacts of existing management;
- Suggestions for future management;
- Availability and sources of information; and
- A detailed distribution map.

C. Overview of UKTR Spring Chinook Salmon

Adult UKTR Spring Chinook Salmon enter fresh water before their gonads are fully developed and hold in cold water streams for 2-4 months before spawning. They enter the Klamath River estuary during spring and summer months, beginning in March and tapering off in July, with a peak between May and early June (Moffett and Smith 1950, Myers et al. 1998). A majority of late-entry fish are apparently of hatchery origin (Barnhardt 1994, NRC 2004). Leidy and Leidy (1984) noted adult Trinity River Spring Chinook Salmon migration continued until October. However, given this late-entry timing, it is unclear if these fish are sexually mature and capable of spawning with Spring Chinook Salmon adults already in the system. Because this late Spring type is limited to the Trinity River, it is possible these fish represent hybrid spring and Fall-run Chinook Salmon from hatchery stocks. Biologists at the Trinity River Hatchery (TRH) classified Chinook Salmon entering between September 3 and October 15, 2004, as UKTR Spring Chinook Salmon (CDFG 2006). However, entry timing into the hatchery was artificially delayed until early September, due to the fish ladder being closed. UKTR Spring Chinook Salmon have not been successfully held over for long periods of time in the hatchery due to space constraints and mortality (W. Sinnen, CDFW, pers. comm. 2013). Moffett and Smith (1950) noted that UKTR Spring Chinook Salmon migrated quickly through the watershed; more recent work (Strange 2005) has confirmed this rapid migration pattern in the Trinity River. While migration occurred throughout the day and night, there was a peak in movement during the two hours following sunset (Moffett and Smith 1950).

Spawning starts in mid-September in the Salmon River. UKTR Spring Chinook Salmon in the South Fork Trinity River begin spawning in late September, with a peak in mid-October (LaFaunce 1967). Trinity River spawning typically is 4-6 weeks earlier than that of Fall-run UKTR Spring Chinook Salmon in the same basin (Moffett and Smith 1950). Overlap between Fall and Spring Chinook Salmon spawning areas was historically minimal. In the South Fork Trinity River, the majority of UKTR Spring Chinook Salmon spawning occurred upstream of Hitchcock Creek, above Hyampom Valley, while Fall-run Chinook Salmon spawned below this point (LaFaunce 1967, Dean 1996). However, Moffett and Smith (1950) noted that spawning of the Fall and Spring fish overlapped in October on suitable spawning riffles between the East Fork and North Fork Trinity River, and that redd superimposition and hybridization may have occurred. In the Salmon River, overlap exists between spawning times of Fall and Spring Chinook Salmon, although redds constructed upstream of the confluence of Matthews Creek are predominantly those of UKTR Spring Chinook Salmon (Olson et al. 1992). Overall, spatial separation between the two runs in the Klamath-Trinity system occurs at approximately 518 m elevation.

UKTR Spring Chinook Salmon fry emerge from gravels from early winter (Leidy and Leidy 1984) until late-May (Olson 1996). With optimal conditions, embryos hatch after

40-60 days and remain in the gravel as alevins for another 4-6 weeks, usually until the yolk sac is fully absorbed. Before Lewiston Dam became the upper limit for migration on the Trinity River, emergence upstream of Lewiston began in early January. Moffett and Smith (1950) speculated these early fish were offspring of UKTR Spring Chinook Salmon. More recent reports (Leidy and Leidy 1984) suggest emergence begins as early as November in the Trinity River and December in the Klamath River, lasting until February.

Unlike most Spring Chinook Salmon populations north of the Klamath River (e.g., Columbia River), UKTR Spring Chinook Salmon do not consistently display "stream type" juvenile life histories, where juveniles spent at least one year in streams before migrating to the ocean (Olson 1996). Juvenile emigration occurs primarily from February through mid-June (Leidy and Leidy 1984). Natural-spawned juvenile UKTR Spring Chinook Salmon were not observed emigrating past Big Bar (river km 91) earlier than the beginning of June, with a peak in mid-July from 1997-2000 (USFWS 2001). In the Salmon River, two peaks of juvenile emigration have been observed: spring/early summer and fall. Snyder (1931) examined scales from 35 adult UKTR Spring Chinook Salmon and 83% displayed juvenile "ocean type" growth patterns, in which juveniles entered the ocean just a few months after emerging from the gravel. In the Salmon River, an otolith study (Sartori unpublished data) identified 31% of fall-emigrating juvenile Chinook Salmon as having similar growth patterns to Salmon River Spring Chinook Salmon, suggesting these were 'ocean-type' juveniles.

A central premise of the Petition is UKTR Spring Chinook Salmon are a distinct sub-species from UKTR Fall Chinook Salmon. Currently, the Department considers the NOAA Fisheries designation of Evolutionary Significant Unit (ESU) when evaluating petitions for listing under CESA, and the Commission has designated genetic groups of salmonids in California based on their status as ESUs. (*Cal. Forestry Assn. v. Cal. Fish and Game Com.* (2007) 156 Cal. App. 4th 1535.) NOAA Fisheries considers the UKTR Spring Chinook Salmon life history type as a part of the greater UKTR Fall Chinook Salmon ESU. However, the Petition presents new techniques in genetic analysis and subsequent findings that may indicate separation of the UKTR Spring Chinook Salmon from the UKTR Fall Chinook Salmon. The new methods, and conclusions derived from them, are currently being debated within the scientific community, and it is unclear if the central premise of the Petition is accurate.

III. Sufficiency of Scientific Information to Indicate the Petitioned Action May Be Warranted

a. Population Trend

i. Scientific information in the petition

The information regarding both population trends and abundance are contained in the "Population Trend" section of the Petition (pages 5- 11). The scientific literature regarding population trends and abundance in the Petition are dated, however they are applicable to the Petition assertions, particularly in regard to historical versus present abundance.

The information demonstrates there has been a decline in UKTR Spring Chinook Salmon abundance, and that the declining trend continues, particularly in several sub watersheds (i.e. South Fork Trinity River and Salmon River,) outside of hatchery influence/support.

ii. Other relevant scientific information

The Department maintains a table of Klamath basin Spring Chinook Salmon run-size (harvest and escapement) collated from basin partners and collaborators. The table, though not populated with all potential UKTR Spring Chinook Salmon data, indicates that contemporary abundance of UKTR Spring Chinook Salmon has fluctuated between 1980 and 2017. Run estimates have ranged between 1,945 and 69,007 fish, averaging 21,339 in this time series. The most recent ten-year average is 16,335 fish. The majority of UKTR Spring Chinook Salmon spawners are now located in the upper Trinity River and at Trinity River Hatchery.

The Department does not concur with the statement on page 7, "Trinity River Hatchery releases over one million juvenile spring-run Chinook Salmon every year and apparently all spawners in the main stem Trinity are of hatchery origin (NRC 2004)". The Department has been monitoring UKTR Spring Chinook Salmon runs in the upper Trinity River since 1977. Monitoring results indicate 19% to 60% of returning UKTR Spring Chinook Salmon are of natural origin (Kier et al, 2018). The average naturally produced component above Junction City Weir is approximately 40%.

The upper Trinity River Spring Chinook Salmon population is still relatively robust, although heavily supported by hatchery production. However, because there is a substantial number of individuals there is good potential that the population contains a reservoir of genetic diversity.

Emerging science, particularly in the field of genetics, may shed important light on whether UKTR Spring Chinook Salmon are life history variants of the larger Chinook Salmon complex or in fact a separate species.

iii. Conclusion

The UKTR Spring Chinook Salmon life history variant has declined in abundance from historical times (pre-anthropogenic influences). Contemporary population trends also

are on the decline, particularly in natural sub basins such as the South Fork Trinity and Salmon Rivers.

b. Range

i. Scientific information in the Petition

The information regarding range are described on pages 12-13 of the Petition. The scientific literature regarding range and distribution in the Petition is dated, however it is applicable to the Petition's assertions regarding historical versus present range.

The information in the Petition demonstrates there has been a decline in UKTR Spring Chinook Salmon geographic range in the Klamath Basin mostly associated with the construction of main stem and tributary dams that limit historical distribution.

One can infer the UKTR Spring Chinook Salmon life history type has a limited current range due to insufficient suitable habitat. However, the current upper Trinity River main stem population, though influenced by hatchery production, has maintained or possibly increased its range below Lewiston dam from historical times. This is in part due to augmented flow and temperature management designed to protect upper Trinity River Spring Chinook Salmon life history types. Additionally, recent snorkel surveys have identified increased numbers of UKTR Spring Chinook Salmon holding in the New River, North Fork Trinity River, and Canyon Creek (US Forest Service, unpublished data). It is unknown if these fish spawn in these tributaries at this time.

ii. Other relevant scientific information

The Department maintains a table of Klamath basin Spring Chinook Salmon run-size (harvest and escapement) collated from basin partners and collaborators. The table, though not populated with all potential UKTR Spring Chinook Salmon data, indicates the range of upper Trinity River Spring Chinook Salmon life history may be increasing, and the upper Trinity River Spring Chinook Salmon population may serve as a reservoir for expansion into suitable habitats that are in proximate areas, such as the New River, North Fork Trinity River, and Canyon Creek.

iii. Conclusion

The Spring Chinook Salmon life history variant has declined in distribution and range from historical times (pre-anthropogenic influences). Contemporary range trends are mixed. Some populations appear to be shrinking in range (South Fork Trinity River and the Salmon River), while others, particularly the New River may be experiencing expansion. However, in total the historical range of the Spring Chinook Salmon life history variant has been reduced due to several basin dams which block access to historical habitat.

c. Distribution - See "Range" section above

d. Abundance – See "Population Trend" section above

e. Life History

i. Scientific information in the petition

The information regarding life history is listed in pages 13 -19 of the Petition. The scientific literature regarding life history are adequate, however the petition contains some contradictory or un-substantiated literature/statements regarding age at emigration, adult return age, spawn timing, etc. The information demonstrates there is life history differentiation between Spring and Fall Chinook Salmon in the Klamath basin.

The UKTR Spring Chinook Salmon life history type has differences in river entry time, spawning location, and spawn timing as compared to the Fall Chinook Salmon life history type. There are also potential differences in juvenile life histories between the two, with UKTR Spring Chinook Salmon life history variants more prone to rear in freshwater for longer times prior to emigration.

ii. Other relevant scientific information

The most recent federal Endangered Species Act (ESA) listing review of Klamath basin Spring Chinook Salmon (NOAA, FR Doc. 2012-7879) found UKTR Spring Chinook Salmon were a life history variant and not a separate species defined by monophyletic origins. This review concluded the UKTR Spring Chinook Salmon life history variant could re-evolve over time. New genetic literature since this finding (Prince et al.) is the primary basis for petitioner's re-submittal to NOAA, and first submittal to the Commission, of Petition to list UKTR Spring Chinook Salmon as threatened or endangered. The Prince et al. paper concludes UKTR Spring Chinook Salmon are a separate distinct species based on new genetic information. The authors of the paper assert their new genetic data is associated with monophyletic origins for the species based on their findings of genome structure and its association with the "pre-mature" migration phenotype. This new information is still being disseminated and reviewed, has not been universally accepted by the scientific community, and there is uncertainty in the scientific literature regarding the use of trait specific genomic data to define species (Waples 2018).

Emerging science, particularly in the field of genetics, may shed important light on whether UKTR Spring Chinook Salmon are life history variants of the larger Chinook Salmon complex, or a separate ESU.

iii. Conclusion

The UKTR Spring Chinook Salmon life history variant has declined in abundance from historical times (pre-anthropogenic influences). Contemporary population trends also are on the decline, particularly in natural sub basins such as the South Fork Trinity and Salmon Rivers.

f. Kind of Habitat Necessary for Survival

i. Scientific information in the petition

The information regarding necessary habitat is found in pages 16-19 of the Petition. The scientific literature regarding the habitat necessary for survival appear adequate.

The information demonstrates adequate cold or cool water habitat, along with adequate dissolved oxygen levels, deeper pools for holding adults, and appropriate spawning gravel are necessary life history habitat components.

One can infer that habitat for the UKTR Spring Chinook Salmon life history type has declined in the Klamath basin, particularly in several sub watersheds (South Fork Trinity River and Salmon River). The loss of habitat upstream of main stem dams on the Klamath and Trinity River is also a major factor in the decline of UKTR Spring Chinook Salmon habitat.

ii. Other relevant scientific information

The Department has documented UKTR Spring Chinook Salmon occupy non-traditional habitat in the Trinity River. Census data indicate UKTR Spring Chinook Salmon migrate, occupy, and spawn in the main stem Trinity River from the current uppermost limit of anadromy (Lewiston Dam) downstream to the North Fork Trinity River. Historically, this habitat was occupied primarily by Fall Chinook Salmon.

iii. Conclusion

UKTR Spring Chinook Salmon life history can be expressed in areas of the Klamath basin that have adequate migration, holding areas, spawning flows, and temperature regimes.

g. Factors Affecting the Ability to Survive and Reproduce

i. Scientific information in the petition

The information regarding this factor is presented in pages 19-34 of the Petition. This section thoroughly describes many historical and present threats affecting UKTR Spring Chinook Salmon ability to survive and reproduce. The threats listed include main stem dams, water withdrawals, disease, past logging, and suction dredging practices. This demonstrates there are historical and on-going factors that limit all anadromous salmonids ability to survive and reproduce and UKTR Spring Chinook Salmon may be the most vulnerable due to their early migration timing and need for adequate cool water for holding. It is reasonable to assume Spring Chinook Salmon are affected by the negative factors presented in the Petition.

The Department possesses information (Kier et al, 2018) that demonstrates UKTR Spring Chinook Salmon can successfully migrate, rear, and spawn in the main stem Trinity River, an area that was historically occupied by Fall Chinook Salmon.

The Department has found the Petition section labeled “Overexploitation” has factual errors. Page 32 of the Petition makes the statement:

> “managing agencies do not treat UKTR Spring Chinook differently from UKTR Fall Chinook, UKTR Spring Chinook are taken legally in commercial and sport fisheries (Moyle) et al, 2008). Harvest rates are defined based on combined spring- and fall-run numbers of both hatchery and natural origins; therefore, the dwindling populations of Spring Chinook, especially wild-spawning populations are particularly vulnerable to being overfished under current management (Bilby et al 2005)”.

The last part of this section contends UKTR Spring Chinook Salmon are counted as part of annual Fall Chinook Salmon projections. This is incorrect, as UKTR Spring Chinook Salmon are not counted as part of Klamath Basin fall Chinook Salmon projections (Pacific Fishery Management Council 2018). In-river UKTR Spring Chinook Salmon are generally managed differently and with more conservation elements. Daily bag and possession limits are generally less than Fall Chinook Salmon, and two in-river harvest closures, the upper Klamath River above Wietchpec and the lower Trinity River below the South Fork Trinity River (2018-19 California Supplement Sport Fishing Regulations), afford greater protection to UKTR Spring Chinook Salmon. These closures were put in place to protect migrating UKTR Spring Chinook Salmon from in-river recreational harvest. The two closures are not in affect during the Fall Chinook Salmon migration window. Additionally, no harvest of Chinook Salmon is allowed in any tributary to the Klamath and Trinity Rivers.

The Department is currently managing UKTR Spring Chinook Salmon in a generally more conservative manner than the more abundant UKTR Fall Chinook Salmon.

ii. Conclusion

There are a number of factors affecting all anadromous life history types in the Klamath basin, some historical (loss of habitat above dams, dredging and mining,) and some contemporary (water management, disease, nutrient loading, water temperature). These factors will continue to be problematic for all anadromous salmonids, including UKTR Spring Chinook Salmon.

h. Degree and Immediacy of Threat

i. Scientific information in the petition

The Petitioner refers discussion to the population trend section, see the Department analysis in that section.

ii. Other relevant scientific information

The Petition refers discussion to the population trend section, see the Department analysis in that section.

iii. Conclusion

The Petition refers discussion to the population trend section, see the Department analysis in that section.

i. Impact of Existing Management Efforts

i. Scientific information in the petition

The Petition lists the impact of existing management efforts in pages 34-38. Several federal and state management entities and plans that concern habitat or fish management in the Klamath Basin are referenced. Cited plans and agency responsibilities include the U.S. Forest Service (NEPA, Northwest Forest Plan, National Forest Management Act); National Marine Fisheries Service (Environmental Species Act); Bureau of Land Management, Federal Energy Regulatory Commission, State Regulatory mechanisms (TMDL, mining, California Forest Practice Rules, harvest management).

From these plans the Petition makes the interpretation that individually, and as a whole, the existing regulatory framework is inadequate to protect UKTR Spring Chinook Salmon, and incorrectly states Spring and Fall Chinook Salmon are managed as one unit.

The information in the Petition demonstrates there are many management plans and agencies responsible for habitat protection or fishery management in the Klamath basin. Further analyses will be necessary to determine if current management plans or agency management is adequate for the protection of UKTR Spring Chinook Salmon. Due to the large number of management agencies and plans it is possible that not all agencies or plans have received due consideration/review.

ii. Other relevant scientific information

The planned removal of mainstem dams on the Klamath River in 2021 will facilitate recovery of UKTR Spring Chinook Salmon habitat, and possible reintroduction of UKTR Spring Chinook Salmon into areas where they have been previously extirpated from. The Oregon Department of Fish and Wildlife has developed a draft plan for reintroduction and monitoring of UKTR Spring Chinook Salmon, and the Department has had initial review of the plan. In addition, the Department has implemented regulations designed to protect UKTR Spring Chinook Salmon in the Klamath basin. This demonstrates there is on-going management designed to protect UKTR Spring Chinook Salmon separately from the more abundant UKTR Fall Chinook Salmon.

iii. Conclusion

There are a number of management agencies and management plans that should afford some level of protection to anadromous fishery resources in the Klamath basin. The Petition contends the management agencies and associated watershed, fishery, and environmental plans are inadequate to protect UKTR Spring Chinook Salmon.

j. Suggestions for Future Management

i. Scientific information in the petition

The Petition presents suggestions for future management on pages 38-40. A variety of alternatives are offered, including Klamath dam removal, special protection zones, limiting agricultural use of water supplies, habitat improvements, develop modeling and restoration plans, hatchery investigations, fishery management, implementing partnerships, and others.

The suggestions for future management are potential alternatives that could be considered, and in some cases have already been implemented (a suction dredge ban). Some of the suggested actions are currently in progress (habitat restoration, hatchery evaluations) and most of the actions will require agency/tribal/NGO coordination (restoration plans, harvest plans, refuge development, FERC relicensing). The Petition suggestions for future management are valid, and will require multiple state and federal agency, as well as tribal and other partner coordination.

ii. Other relevant scientific information

Any future management of anadromous fish stocks, particularly in regard to harvest management, will need to be fully vetted through the Pacific Fishery Management Council. This agency is responsible for managing interstate marine fisheries. Additionally, future management of in-river Klamath fisheries will require explicit involvement and participation by basin tribes to be effective. A variety of future management options may be more protective of anadromous fish stocks than is currently employed. If future management actions are pursued it will be incumbent on the Department and other management agencies to review the literature for prioritizing and implementing desired actions.

iii. Conclusion

The petition demonstrates there are known habitat restoration, water quality and distribution management, fishery regulation, and other protection mechanisms that may be beneficial to UKTR Spring Chinook Salmon life history requirements.

k. Detailed Distribution Map

A Spring Chinook Salmon distribution map is located on page 41 of the Petition. The map displays distribution of UKTR Spring Chinook Salmon in both the pre- and post-

dam eras. The legend for the map indicates historic presence, wild populations, wild in very low numbers and hatchery populations. One must infer from this map that UKTR Spring Chinook Salmon adult migration and spawning, and juvenile rearing/migration locations, are combined in the distribution detail related to the legend since UKTR Spring Chinook Salmon are not known to utilize lower Klamath and lower Trinity River habitat for spawning.

The Department does not concur with the map assessment that the mainstem Trinity River only contains hatchery produced UKTR Spring Chinook Salmon. As stated previously in this review the Department has documented natural production of UKTR Spring Chinook Salmon in the upper Trinity River.

IV. **Recommendation to the Commission**

Pursuant to section 2073.5 of the Fish and Game Code, the Department has evaluated the Petition on its face and in relation to other relevant information the Department possesses or received. In completing it's petition evaluation, the Department finds there is sufficient scientific information to indicate that the petitioned action may be warranted, and recommends the Commission accept and consider the Petition.

References

Pacific Fishery Management Council. 2018. Preseason Report III: Council Adopted Measures and Environmental Assessment Part 3 for 2018 Ocean Salmon Fishery Regulations:RIN 0648-XD843

Kier, Mary Claire, J. Hileman, and Ken Lindke. 2018. Annual Report. Trinity River Basin Salmon and Steelhead Monitoring Project: Chinook and Coho Salmon and Fall-run Steelhead Estimates Using Mark-recapture Methods, 2017-18 Season. Available from CDFW.

FR Doc. 2012-7879. Listing Threatened and Endangered Species; 12 month Finding on a Petition to List Chinook Salmon in the Upper Klamath and Trinity River Basins as Threatened or Endangered Under the Endangered Species Act.

CDFW. 2017. Klamath Basin Spring Chinook Salmon Spawner Escapement, River Harvest, and Run-size Estimates 1980 – 2017. Table available from CDFW.

Waples, Robin S., Steven T. Lindley. 2018. Genomics and conservation units: The genetic basis of adult migration timing in Pacific salmonids. Evolutionary Applications 2018;1-9