

# Synopsis: Status and Trends of Fish Populations in the Siskiyou Region

Oregon Department of Fish and Wildlife

Presented by Jaimie Anthony on Jan. 9, 2019 to the Oregon Board of Forestry.

## *Siskiyou Landscape and Habitat*

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The Siskiyou Region is not perfectly aligned with delineations of major river basins or fish populations, but broadly the region includes most of the Middle and Upper Rogue basins and their major tributaries including the Applegate River and uppermost portions of the Illinois River basin. In addition, the Siskiyou Region includes a small portion of the Klamath River Basin (Jenny Creek).

There are several important points to consider about the conditions experienced by fish in this region. Relative to other coastal basins in Oregon, streams in this area flow through several different ecoregions, so anadromous and migratory species can experience diverse habitats and conditions through space and time. Anadromous fish populations in the Siskiyou Region also are more closely tied ecologically to those in Northern California than to other coastal basins in Oregon. Relative to more northerly coastal basins in Oregon, the Siskiyou Region tends to be warmer and drier (on an annual basis), and streams are generally characterized by steeper gradients. Erosive geology in some parts of the region can also cause sedimentation issues where the landscape is disturbed. Another substantial difference between the Siskiyou Region and other coastal basins in Oregon is the extent of the human footprint, including urban development and the extensive water infrastructure that is necessary to support agriculture in this warmer, drier region.

## *Siskiyou Fish Species*

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Native salmonid species in the Siskiyou Region include Chinook salmon (spring and fall run), coho salmon, steelhead (summer and winter run), coastal cutthroat trout, and redband trout (Jenny Creek population, Klamath basin). Although most of the available monitoring data pertains to native salmon and steelhead, stream habitats in the Siskiyou region also support other native species including green sturgeon, white sturgeon, speckled dace, smallscale sucker, Jenny Creek smallscale sucker (Jenny Creek, Klamath Basin), Pacific lamprey, and several species of sculpin.

## *Limiting Factors*

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Limiting factors for fish populations in the Siskiyou Region include stream temperatures, flow/water availability, habitat complexity and connectivity, and interactions with nonnative species. While these limiting factors are not unique to this region, some take on special importance here. For example, the Rogue River has a history of substantial fish kills associated with disease outbreaks when low flows and high temperatures coincide with high fish densities (i.e., spawning migration periods). One unique aspect of water management in the Rogue basin is the allocation of stored water to meet downstream needs of fish; water in Lost Creek Reservoir is used to help Chinook salmon migrate upstream safely (spring and fall) and improve rearing conditions in summer for juvenile steelhead. This management tool provides a means to at least partially address flow and temperature conditions in the mainstem Rogue, but cold water inflows from tributaries remain tremendously important.

Temperatures, instream water availability and the ability of fish to move among habitats at multiple life stages (i.e., fish passage) take on increased importance in the Siskiyou Region relative to other coastal basins with more widespread cool, perennial flows. Considerable progress has been made on fish passage in the Rogue Basin. In the last 15 years, over 20 dams have been removed, including three mainstem dams on the Rogue River, and passage has been improved at many other barriers. However, addressing the historical legacy of small dams and other barriers on smaller tributaries is an ongoing effort. In short, fish passage is not just a mainstem issue. It is important to consider life stages including juveniles, both upstream and downstream passage, and barriers on smaller tributaries.

Predation and interactions with non-native fish can also be important limiting factors for fish in the Siskiyou Region. For example, juvenile salmon and steelhead can be vulnerable to predation at passage blockages or when they become isolated in small pools due to low flows. Species like pikeminnow and reidside shiner that were not historically present in the Rogue basin can also compete directly with juvenile salmon and steelhead, especially when warm conditions provide them with an advantage over the native cold-water species.

Limiting factors associated with hatcheries and harvest are addressed through management of hatchery programs and harvest opportunity. Hatchery programs in the Siskiyou Region are relatively small and provide mitigation for lost production in historical spawning habitats that are now blocked by U.S. Army Corps of Engineers dams. Likewise, fisheries are conservatively managed to provide harvest opportunities that are consistent with conservation. For example, almost all tributaries to the Rogue River are closed to fishing within the range of anadromous fish, and no naturally-produced trout (cutthroat or juvenile steelhead) can be harvested.

Ocean conditions can also be a substantial limiting factor for anadromous fish populations. Ocean productivity cannot be directly influenced through management or restoration actions, but addressing freshwater limiting factors can help to provide resiliency during periods of poor ocean conditions and enhance the potential for population rebounds on the return of more favorable ocean conditions.

#### *Fish Status and Trends of Fish*

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As previously mentioned, the boundaries of the Siskiyou Region do not always correspond to delineations of fish populations. Therefore, the status and trend information presented below will at times refer to information aggregated across multiple populations or data collected at spatial scales that are either larger or smaller than the extent of the Siskiyou Region.

*Chinook Salmon* – The Siskiyou Region supports Spring-run and Fall-run Chinook salmon. Both runs are managed under state conservation plans (ODFW 2007; ODFW 2013). Spring-run Chinook tend to enter the Rogue River in spring to early summer, holding over for up to eight months before spawning in the Upper Rogue basin below Lost Creek Reservoir. Conservation and management actions for spring Chinook salmon include habitat protection and restoration below William Jess Dam (Lost Creek Reservoir), reservoir management coordination (previously discussed), and managing predation, fishery and hatchery impacts. Counts of Spring Chinook at Gold Ray Dam on the Rogue River show a period of relatively stable abundance with a declining trend coinciding with the closure of William Jess Dam. Abundances have generally increased since implementation of the conservation plan (2008). Spring

Chinook salmon in the upper Rogue are achieving 2 of 3 of the measured desired status criteria described in the recovery plan (ODFW 2017).<sup>1</sup>

Fall-run Chinook salmon enter the Rogue River in late summer to fall, much closer to spawning. Conservation and management actions for fall Chinook salmon include habitat restoration, maintenance and enhancement, reservoir management coordination, and management of non-native species, predation and fishery impacts. The Rogue Aggregate populations, which roughly correspond to those in the Siskiyou Region, are achieving 3 of 4 of the measured desired status criteria described in the conservation plan (ODFW 2018).<sup>2</sup>

*Coho Salmon* – Coho salmon in the Siskiyou Region are a part of the Southern Oregon Northern California Coast (SONCC) Evolutionarily Significant Unit (ESU), which is listed as Threatened under the federal Endangered Species Act. Coho salmon were nearly extirpated from the Rogue basin by the late 1960s/early 1970s. Steep gradients and warm temperatures can limit coho salmon distribution in the region. Key restoration actions for recovering coho salmon in the Rogue include providing cooler water to increase survival further downstream and providing/restoring healthy riparian conditions.

Counts of wild adult coho salmon passing Huntley Park in the Rogue River have increased since the 1980s/1990s. Recent decreases in site occupancy of juvenile coho salmon during snorkel surveys coincide with recent drought and high temperatures in the basin but have not manifested as declines in adult counts at Huntley Park. ODFW is currently assessing status and trend of coho salmon in this region as a part of a Rogue/South Coast Multi-Species Management Plan (RSP, in progress).

*Steelhead* – Both summer-run and winter-run steelhead occur in the Siskiyou Region. Summer-run fish tend to enter the Rogue River between May and October and hold over before spawning in winter to spring, while winter-run steelhead enter the river much closer to spawning (November through April). These fish migrate extensively among small and large tributaries and the mainstem Rogue and are capable of using seasonally-available water for rearing and, in some cases, spawning. A unique aspect of steelhead in the Siskiyou region is the occurrence of the ‘half-pounder’ life history strategy, which is found only in Rogue River in Oregon and in a few Northern California basins. In this strategy, observed in most Rogue summer steelhead and many Rogue winter steelhead, these fish return to freshwater just a few months after going to sea as smolts. They then return to sea again in late winter before re-entering freshwater to spawn. This life history strategy contributes to the generally smaller size of

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<sup>1</sup> The Rogue Spring Chinook Recovery Plan identifies measurable criteria for assessing Rogue Spring Chinook. For each criterion, the plan identifies a desired status goal and conservation threshold that would trigger consideration of adaptive conservation measures. Criteria currently evaluated for Rogue Spring Chinook are abundance, spawner distribution and composition (hatchery impact). Rogue spring Chinook are meeting desired status goals for distribution and composition and are making progress toward the abundance goals. The most recent annual assessment does not indicate triggering of any conservation thresholds for Rogue Spring Chinook.

<sup>2</sup> The Rogue Fall Chinook Conservation Plan identifies several attributes for assessing Rogue fall Chinook. For each, the plan identifies a desired status goal and conservation threshold that would trigger consideration of adaptive conservation measures. Criteria currently evaluated for Rogue fall Chinook are abundance, age structure, spawning timing and composition (hatchery impact). Rogue fall Chinook are meeting desired status goals for abundance, timing and composition, and progress is being made toward the age structure goal. The most recent annual assessment does not indicate triggering of any conservation thresholds for Rogue Fall Chinook.

steelhead in the Rogue basin relative to elsewhere in Oregon, and half-pounders support a popular fishery in the lower and middle Rogue River.

Rogue steelhead typically spend 1 to 3 years (occasionally up to 4 years) in freshwater before their first ocean entry as a smolt. This protracted period of freshwater residence coupled with their extensive movements, diverse habitat usage, and seasonal flow/temperature limitations make protecting and restoring fish instream flows, stream temperatures and passage key issues for steelhead. Harvest of wild steelhead is also conservatively managed. Wild summer steelhead are protected from direct harvest as juveniles and adults; wild winter steelhead are protected from direct harvest as juveniles, with limited seasonal harvest opportunity for adults.

Rogue winter steelhead are thought to be healthy; over 70 years of adult counts at Gold Ray Dam on the Rogue River show a long-term stable trend that is comparatively rare to see. These counts represent winter steelhead using habitat in the upper Rogue basin (~25% of the winter steelhead habitat in the Rogue basin). Estimates of summer steelhead adults at Huntley Park have been relatively stable with a recent uptick that is encouraging given a protracted El Niño, drought conditions, and high summer temperatures in recent years. Similarly, the abundance of half-pounders at Huntley Park in recent years has included some of the highest counts on record. Despite generally poor conditions in the ocean and freshwater, both half pounders and summer steelhead appear to be faring better than in earlier periods of challenging conditions (e.g., early 1990s).

ODFW is assessing status and trend of steelhead in this region as a part of the RSP, currently in development.

*Coastal Cutthroat Trout* – Cutthroat trout in the Siskiyou Region are a part of the Southern Oregon Coastal Cutthroat Trout Species Management Unit (SMU). These fish exhibit a broad range of life histories, including anadromous, adfluvial, fluvial, and resident forms. Coastal cutthroat trout occupy a diverse range of habitats, with some life histories moving considerable distances through their lives. Though most monitoring of coastal cutthroat trout in the Siskiyou region is ancillary to monitoring for other species, the coastal cutthroat are regularly observed, tend to be broadly distributed, and site occupancy has been stable through time.

ODFW is assessing status and trend of cutthroat trout in this region as a part of the RSP, currently in development.

*Redband Trout (Jenny Creek)* – The Jenny Creek redband trout population is one of ten populations comprising the Upper Klamath Redband Trout SMU. In the 2005 Native Fish Status Assessment (ODFW 2005), the Jenny Creek population passed all evaluation criteria excluding distribution and reproductive isolation. This population is isolated above a barrier falls located near the California-Oregon border, and this isolation potentially exposes the population to genetic concerns and increased vulnerability for extinction should populations become small.

### *Thermal Complexity*

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Fish experience a thermal landscape that is more diverse than the metrics often used to characterize it. Attributes like magnitude, ranges, frequency of warm or cool periods, duration of those events, rates of change and the distribution of temperatures across space and time are all important. These attributes of the thermal regime influence expression of life history attributes and how fish use habitats within a

stream network. Complexity in thermal regimes can impart diversity, which can in turn promote stability and resilience. One example of fish detecting and using thermal diversity is adult Chinook in the mainstem Rogue aggregating in the cold-water of a tributary mouth during warm summer conditions. Fish use and depend on the thermal diversity of the stream network. This again illustrates the importance of habitat connectivity to cold-water fish populations in relatively warm, dry ecoregions.

### *Looking Forward*

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Climate change is already challenging coldwater fish in the Siskiyou Region. Successive years of drought and some of the warmest summers on record exemplify recent challenges and portend difficult conditions in the future. Modelled stream temperature projections (e.g., Isaak et al. 2017) can provide a window to the scope of potential changes across the landscape and its stream networks. A warmer future amplifies the importance of efforts to protect and restore cold water resources and to ensure that fish have access to them where and when they occur in the stream network.

While anadromous fish populations in the Siskiyou Region are thought to be less abundant than they were historically, much progress has been made as a result of significant effort and investments by Oregon, its federal partners, watershed councils, citizens, anglers, and others. Protecting this investment will require continued work to address legacy issues and to provide the resiliency necessary to meet the challenge of a changing climate.

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