

# Chapter 5 – Summary

## 5.1 Overall Summary

Bull trout were an historic component of the fish assemblage in the Clackamas River Subbasin, a major tributary in the Willamette River Basin. Once abundant and widely distributed throughout the subbasin, bull trout are now locally extirpated. Bull trout were listed as threatened under the ESA by the USFWS in 1998. The 2002 draft bull trout recovery plan specifies completing an assessment to determine the feasibility of reintroducing bull trout into the Clackamas River Subbasin. This assessment investigated that feasibility. This assessment does not evaluate all of the various factors and issues involved in contemplating a potential reintroduction. Instead, it focuses specifically on whether or not a reintroduction is possible (i.e., “Can it be done?”). This assessment examines four questions that were adapted from Epifanio et al. (2003):

1. Is there a high level of confidence that bull trout are no longer present that would serve as a natural gene bank?
2. Is there suitable habitat remaining, what conditions or stressors currently prevent bull trout from occupying suitable habitats, and have these been corrected?
3. Is suitable habitat expected reasonably to be recolonized through natural processes if conditions are improved?
4. Is a suitable or compatible donor population(s) available that can itself tolerate some removal of individuals?

This assessment does not attempt to determine, “Should a reintroduction be done?” or, “How should it be done?” These two latter questions can be addressed after a proposed action is developed amongst multiple agencies and stakeholders with full public involvement.

Bull trout historically occurred throughout much of the Clackamas River Subbasin prior to the post-European settlement era beginning after the mid-1800s. The CRBTWG has a high confidence that bull trout have been extirpated from the Clackamas River Subbasin because extensive sampling targeting bull trout occurred from the 1990s to 2004. The factors leading to the decline of bull trout began in the early 20<sup>th</sup> Century and extended into the 1970s. The primary factors for their decline include migration barriers from hydroelectric and diversion dams, direct and incidental harvest in the sport and commercial fisheries, targeted eradication with bounty fisheries, and habitat and water quality degradation from forest management and agricultural activities. A more detailed explanation of bull trout extirpation in the Clackamas River Subbasin is provided in Appendix B. The causative factors responsible for the decline of bull trout in the Clackamas River Subbasin are believed to be sufficiently remedied so as not to impede or negatively influence the success of a reintroduction effort.

Suitable habitat for bull trout was examined using a tiered approach. Bull trout require very cold water for spawning and rearing. The portion of the Clackamas River Subbasin providing suitable bull trout spawning and rearing habitat today is located in the Clackamas River mainstem and its tributaries in the headwaters of the subbasin upstream of the Collawash River confluence. This portion of the subbasin contains approximately 70 miles of suitable spawning and rearing habitat configured into six separate habitat patches. Habitat patches range in size, configuration, and condition. The most downstream habitat patch occurs along the mainstem Clackamas River known as Big Bottom. This unique and complex reach of the river provides suitable spawning and rearing habitat, and would also likely serve as an important foraging area for migratory adult and sub-adult bull trout. Other habitat patches occur either adjacent to or up to a maximum distance of approximately six river miles upstream into the headwaters of the subbasin.

Three evolutionary lineages of bull trout are found in the Columbia River Basin: Coastal, Snake River, and Upper Columbia River. The CRBTWG refined its review of potential donor stocks to the Lower Columbia River portion of the Coastal evolutionary lineage. The nearest five donor stocks for consideration come from the Willamette, Lewis, Hood, Klickitat, and Deschutes river basins. Each nearby donor stock is located a considerable distance away from the Clackamas River Subbasin and in many cases the presence of migration barriers makes natural recolonization highly unlikely.

After considering the information regarding the evolutionary lineage of bull trout, current demographic trends, connectivity, potential for gene flow, and expected levels of heterozygosity within bull trout local populations, two river basins contain local populations that likely have the necessary characteristics and associated low level of risk (both demographically and genetically) to serve as a donor stock for a reintroduction into the Clackamas River:

- **Lewis River Basin** – Two interacting local populations: Pine Creek and Rush Creek.
- **Lower Deschutes River Basin (Metolius River Subbasin)** – Three interacting local populations: Whitewater River; Jefferson, Candle, and Abbot River Complex; and Canyon, Jack, Heising, and Mainstem Metolius River Complex.

In addition, the synthesis of available data revealed three intermediate risk local populations: 1) the Mainstem McKenzie River Local Population in the Willamette River Basin (McKenzie River Subbasin), 2) the Warm Springs River Local Population in the Lower Deschutes River Basin and 3) the Shitike Creek Local Population in the Lower Deschutes River Basin. At higher risk and likely not suitable for serving as donor stocks are the following local populations: South Fork McKenzie River, Upper McKenzie River, Clear Branch, Hood River, Cougar Creek, and West Fork Klickitat River. Not only might there be an elevated level of concern in regard to negatively impacting the genetic fitness of these higher risk local populations, but it is likely that not enough individuals would be available to confer long-term persistence for the newly founded local population in the Clackamas River.

This assessment also investigated ecological interactions between bull trout and native and nonnative fish species. Nonnative brook trout can have significant negative effects on bull trout distribution and abundance. However, recent studies suggest that certain habitat variables play a strong role in determining the level of effect. Brook trout distribution is limited to one of the six suitable habitat patches where a bull trout reintroduction could take place. Brook trout are present in low abundance. For several decades, ODFW stocked high mountain lakes within the habitat patch with brook trout. Brook trout escaped via outflow tributaries connected to downstream suitable bull trout habitat reaches. ODFW no longer stocks brook trout in headwater lakes within the Upper Clackamas River Subbasin that contain tributary outlets to streams determined as suitable bull trout spawning and rearing habitat. As such, brook trout is not considered to be a significant factor that would affect the success of a reintroduction of bull trout into the Clackamas River.

Bull trout coexisted with a multitude of other native fish species in the Clackamas River for thousands of years, likely feeding on a variety of different species. Historically, anadromous Pacific salmon were likely the most abundant fish in the subbasin and they probably comprised a significant portion of the bull trout diet. However, current abundance of anadromous salmon and steelhead in the subbasin is greatly reduced from historic levels. Bull trout, if reintroduced, may be more dependent upon other native species as a prey base, such as mountain whitefish and large-scaled suckers, both of which are present and abundant along with other potential prey such as dace, sculpin, northern pike minnow, and several species of trout. Available information on bull trout populations from other areas in the Lower Columbia River Basin suggest that, while possibly important, bull trout persistence is not dependent upon the presence of anadromous salmon.

Due to the multitude of variables that contribute to the mortality of juvenile Pacific salmon, including other fish and avian predators, the rate of bull trout predation on juvenile salmon and the potential effect of that predation are unquantifiable. Despite evidence that bull trout prey on juvenile anadromous salmonids when they are available, no data were found that suggests this predation is a factor in the status of salmon and steelhead across the hundreds of watersheds where they co-occur in the western United States. Although the abundance of Pacific salmon in the Clackamas River is reduced significantly from historical levels, the remaining native fish assemblage is assumed to be healthy. For these reasons, it is believed there is a sufficient forage base to support a bull trout reintroduction in the Clackamas River and further, that if reintroduced, predation on juvenile salmon would not likely negatively affect the status of salmon and steelhead populations in the subbasin.

In conclusion, the CRBTWG believes, based on this analysis, that a reintroduction of bull trout into the Clackamas River Subbasin is feasible because:

- There is a high level of confidence that bull trout have been locally extirpated.
- The causes for their decline have been sufficiently rectified.
- High quality habitat is available in sufficient amounts.
- Nearby donor stocks are unlikely to naturally recolonize the subbasin.
- Compatible donor stocks are available that can withstand extraction of individuals.

- Nonnative brook trout presence is restricted to a small portion of the suitable habitat and they occur in low abundance.
- A diverse and abundant fish assemblage would serve as a sufficient prey base.

## **5.2 Additional Areas for Consideration**

Several other factors need to be considered in the next steps of developing a proposed action for reintroduction. These include:

- Establishment of specific bull trout reintroduction goals and objectives.
- Identification of specific donor stock(s) to be used.
- Age class, duration, and quantity of individuals to be extracted from the donor bull trout stock(s).
- Method(s) of translocation to the Clackamas River.
- Fish disease screening.
- Specific location(s), timing, and habitat patch(es) for release of individuals.
- Additional management actions needed in order to ensure bull trout reintroduction success.
- Specific monitoring and evaluation criteria for the recipient and donor populations.

Once a proposed action is developed collaboratively with multiple agencies and stakeholders including public review and input, several other analyses would need to be completed. These include:

- Socio-economic impacts.
- Ecological affects to other native fish species present.
- Evaluation of the potential donor stock hybridization with brook trout.
- Endangered Species Act compliance by affected agencies and parties.
- Evaluation of achieving recovery goals identified in the Draft Bull Trout Recovery Plan (USFWS 2002) in the absence of an active reintroduction effort.

### 5.3 Adaptive Management: Monitoring and Evaluation Considerations

Many translocations of fishes have occurred over the past several decades. Translocation success varies by species and location. Simons et al. (1989) reported an 18 percent translocation success rate for Gila topminnow (*Poeciliopsis o. occidentalis*) in southern Arizona. Hendrickson and Brooks (1991) reported a 35 percent translocation success rate for 39 taxa of desert fishes in southwest North American. Harig et al. (2000) reported a 38 percent translocation success rate in the case of greenback cutthroat trout (*Oncorhynchus clarki stomias*) in Colorado. An 80 percent translocation success rate was reported for Gila trout (*O. gilae gilae*) in New Mexico by Propst et al. (1992). Hepworth et al. (1997) reported an 83 percent translocation success rate for Bonneville cutthroat trout (*O. clarki utah*) in southwestern Utah. In every instance, fisheries managers and decision makers implemented these translocation efforts with the very best intention. However, any one of a number of factors may have contributed to the uncertainty around a particular situation and ultimately led to a failed translocation attempt.

If a reintroduction of bull trout into the Clackamas River is to be undertaken, there will be a number of uncertainties even with this assessment. Ludwig et al. (1993) acknowledge that a great deal of uncertainty often faces decision makers when confronted with natural resource and fisheries management decisions. Given this, they recommend managers and decision makers “consider a variety of plausible hypotheses ..., (consider) a variety of possible strategies, favor actions that are robust to uncertainties, favor actions that are informative, probe and experiment, and monitor results ...”

Following the guidance from Ludwig et al. (1993) and employing an adaptive management approach offers the highest likelihood for ensuring success should a bull trout reintroduction effort be initiated. Establishing realistic goals with measurable objectives and specific benchmarks for achievement is imperative in developing a proposed action. Identifying the key areas of uncertainty would also be imperative in order to develop a robust monitoring and evaluation strategy for both the donor and recipient populations. Key information obtained from monitoring would shed light on the uncertainties identified and allow for necessary adjustments during implementation to ensure success. The CRBTWG encourages that knowledge learned during a bull trout reintroduction effort, if implemented, is shared within the fisheries management and scientific communities.