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# Re-introduction of bull trout to the Clackamas River, Oregon, U.S.A.

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## Introduction

Bull trout (*Salvelinus confluentus*) is a species of char native to the northwestern United States and British Columbia. They are commonly associated with cold, clean water in complex stream habitats. Populations have been negatively affected by several factors including habitat degradation, barriers to migration, and the introduction of non-native fishes (Rieman & McIntyre, 1993). In 1999, due to the magnitude of population decline across their native range, bull trout were listed as threatened in the United States under the Endangered Species Act (64 FR 58910).

The Willamette River in northwestern Oregon is a major tributary of the lower Columbia River. Bull trout were historically present in five of the major tributaries of the Willamette River that drain the Cascade mountain range, but by 1990 bull trout remained extant in only one. Several efforts to re-introduce bull trout to areas of extirpation are currently underway within the Willamette River Basin, including in the Middle Fork Willamette River where re-introduction has been ongoing since 1997, and the Clackamas River - the subject of this case study - where a re-introduction was initiated in 2011.

## Goals

- Goal: A self-sustaining population of 300 - 500 spawning adults in the Clackamas River by 2030 that contributes to the conservation and recovery of bull trout in the Willamette River Basin and to overall recovery criteria outlined in the species' draft recovery plan (USFWS, 2002).

**Bull trout (*Salvelinus confluentus*)**
**© Joel Sartore/National Geographic Stock with Assistance from Wade Fredenberg, USFWS**

## Success Indicators

- Indicator 1: Survival, retention and rearing of translocated bull trout in the receiving habitat.
- Indicator 2: Maturation and successful reproduction by translocated bull trout in the receiving habitat.
- Indicator 3: Maturation and successful reproduction by offspring of bull trout translocated to the Clackamas River.
- Indicator 4: No demographic or genetic impacts to the wild donor stock from the removal of individuals for the Clackamas re-introduction.
- Indicator 5: No population level impacts to co-occurring Pacific salmon in the Clackamas River.

## Project Summary

**Feasibility:** Restoring bull trout to historic habitat is a major recovery goal in the species' draft recovery plan (USFWS, 2002) and it is particularly relevant to habitats in the western portion of the species' range due to the reduction in distribution. To address reduction of the species distribution, the Willamette Basin portion of the bull trout draft recovery plan called for a re-introduction feasibility assessment for the Clackamas River. In 2004, an interagency working group comprised of state, federal and private organizations initiated the feasibility assessment. The assessment focused on biological feasibility rather than social or economic feasibility, or implications to other species. In addition, the feasibility assessment did not address whether or not a re-introduction should be done or how it should be done.

The feasibility assessment examined four questions 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?

The feasibility assessment, finalized in 2007 (Shively *et al.*, 2007) concluded there was a high level of confidence that bull trout were extirpated from the Clackamas River and that factors leading to their extirpation had been largely ameliorated. The feasibility assessment further concluded that there was sufficient high quality habitat available and forage base to support a re-introduction, and that the limited presence of non-native brook trout was not a substantial threat. Several suitable donor stocks were identified that could support, with low population risk, the extraction of individuals for translocation to the Clackamas River. Finally, nearby extant populations were determined to be unlikely to naturally recolonize the Clackamas River due to geographic distance and isolation due to migratory barriers. Dunham *et al.* (2011) provides a summary

of our approach to assessing the feasibility of re-introduction in the Clackamas River.

Mainstream Clackamas River, Oregon

In 2008, Federal, State and Tribal resource managers in the Clackamas River Basin recommended development of a joint state/federal action with the re-introduction to occur under the experimental nonessential population designation under section 10(j) of the Endangered Species Act (ESA). The less restrictive "experimental" classification, added to the ESA by the United States Congress in 1982, is meant to provide flexibility in implementing recovery actions and improve public receptiveness to restoring ESA-listed species to areas they previously inhabited. This classification exempts anyone who accidentally kills or harms the listed species from prosecution for violating the take provisions of the law. Experimental classification for our reintroduction project was favored over other administrative pathways due to the reduced regulatory burden on public and private land, and management flexibility of the bull trout population in light of concerns expressed by stakeholders during project scoping regarding private hydropower operations and impacts to threatened Pacific salmon.

**Implementation:** The re-introduction, initiated in July 2011, will be an adaptively-managed 20-year project, split into three phases of equal length. We anticipate phase one will be the primary translocation and learning phase, whereas phase two and three will refine the implementation strategy based on phase one monitoring and evaluation. Consistent with the adaptive management approach for the project, we will continue translocating individuals until either: (1) an evaluation of the program shows the goal of the project has been met, or is on a trajectory to be met through natural reproduction based on monitoring and evaluation; (2) mid-process outcome evaluation suggests the re-establishment of bull trout is unlikely (i.e., the project is not showing success); or (3) monitoring and evaluation indicates unacceptably high population level impacts are occurring to federally listed Pacific salmon in the Clackamas River.

Project costs and the relative abundance of a suitable donor stock within the lower Columbia River in the Deschutes River drainage led the implementation team to favor direct transfer of wild donor stock over other alternatives such as artificial propagation or captive rearing of wild juvenile bull trout. To maximize our ability to learn from this project, our implementation strategy includes the direct

Project partner tour

translocation of various life stages of donor stock (initially juvenile, sub-adult and adult) consistent with project numerical goals and in proportion to donor availability. During phase one, approximately 60 adults and sub-adults, and up to 1,000 juvenile bull trout will be translocated annually to suitable habitat identified during the feasibility phase of the project.

**Post-release monitoring:** The monitoring and evaluation program has three major goals: (1) monitor and evaluate the effectiveness of bull trout re-introduction; (2) monitor and evaluate donor population status; and (3) monitor and evaluate impacts to Pacific salmon.

## Major difficulties faced

- Addressing uncertainty regarding potential impacts of the re-introduction on the riverine food web, particularly impacts to threatened Pacific salmon from bull trout predation and competition.
- Challenge in securing sufficient project funding, particularly for monitoring and evaluation.

## Major lessons learned

- Key to moving this project forward was the formation early on of an interagency manager's group that would meet quarterly to assess progress and to provide guidance and decision making for the project's technical committees.
- Another key element was a strong partnership and clear dedication and support for the project from the three key project partners; U.S. Fish and Wildlife Service, U.S. Forest Service, and the Oregon Department of Fish and Wildlife.
- The peer-reviewed Clackamas Bull Trout Re-introduction Feasibility Assessment was a significant undertaking, but this step provided the majority of the science needed to support the project through the regulatory and administrative processes.
- Coordination early and often with our Native American Tribal partners (Confederated Tribes of the Warm Springs Reservation of Oregon) was a key to gaining Tribal support for the project and the utilization of Deschutes River Basin donor stock, which the Tribes co-manage along with the State of Oregon.

- To address scientific uncertainty on several key issues including suitability and availability of a donor stock, and potential impacts from the re-introduction on threatened Pacific salmon, two science workshops were organized by the U.S. Fish and Wildlife Service. The information from these workshops was critical in informing the development of the project and in providing additional science to support regulatory and administrative processes.

## Success of project

The re-introduction of bull trout to the Clackamas River, Oregon, was initiated in July 2011 and thus it is too early to provide an assessment of success.

**Reason(s) for success/failure:**
n/a

**Disclaimer**
''The findings and conclusions in this article are those of the author(s) and do not necessarily represent the views of the U.S. Fish and Wildlife Service.''

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