Part 1. Planning Pacific Salmon and Steelhead Reintroductions
Aimed at Long-Term Viability and Recovery

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Planning Pacific Salmon and Steelhead Reintroductions Aimed at Long-Term Viability and Recovery

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Abstract
Local extirpations of Pacific salmon Oncorhynchus spp. and steelhead O. mykiss, often due to dams and other stream barriers, are common throughout the western United States. Reestablishing salmonid populations in areas they historically occupied has substantial potential to assist conservation efforts, but best practices for reintroduction are not well established. In this paper, we present a framework for planning reintroductions designed to promote the recovery of salmonids listed under the Endangered Species Act. Before implementing a plan, managers should first describe the benefits, risks, and constraints of a proposed reintroduction. We define benefits as specific biological improvements towards recovery objectives. Risks are the potential negative outcomes of reintroductions that could worsen conservation status rather than improve it. Constraints are biological factors that will determine whether the reintroduction successfully establishes a self-sustaining population. We provide guidance for selecting a recolonization...
Purpose

- Framework for planning reintroductions designed to promote recovery.
Planning Concepts to Consider:

- **Benefits** – Biol. improvements towards recovery
- **Risks** – Potential negative outcomes for existing pops
- **Constraints** – Biol. factors that will challenge and ultimately determine success
Major Reintroduction Risks

- Evolutionary
- Demographic
- Ecological
- Disease
Constraints

- Barriers
- Habitat quality
- Migratory and ocean survival
- Harvest
- Species interactions
- Changing environment

- Non-Biological
  - Social
  - Legal
  - Financial
Recolonization strategies

- Natural colonization
- Transplanting (adult spawners)
- Hatchery releases (of juveniles)
Is there a reasonable likelihood of natural colonization from a nearby spawning area or population?

- Yes
  - Natural colonization

- No
  - What is the origin of the most genetically and ecologically similar source population?

How to choose a recolonization strategy
How to choose a recolonization strategy

Is there a reasonable likelihood of natural colonization from a nearby spawning area or population?

- Yes: Natural colonization
- No: What is the origin of the most genetically and ecologically similar source population?
  - None: all potential sources have unacceptable risks
  - Hatchery stock
  - Naturally spawning

No action
Is there a reasonable likelihood of natural colonization from a nearby spawning area or population?

Yes

Natural colonization

No

What is the origin of the most genetically and ecologically similar source population?

None: all potential sources have unacceptable risks

No action

Hatchery stock

Are the evolutionary and ecological risks of hatchery breeding acceptable?

No

Transplant hatchery adults

Yes

Release hatchery produced juveniles

Naturally spawning
Is there a reasonable likelihood of natural colonization from a nearby spawning area or population?

- Yes: Natural colonization
- No: What is the origin of the most genetically and ecologically similar source population?
  - None: all potential sources have unacceptable risks
    - No action
  - Hatchery stock
    - Are the evolutionary and ecological risks of hatchery breeding acceptable?
      - No
        - Transplant hatchery adults
      - Yes
        - Release hatchery produced juveniles
  - Naturally spawning
    - Can the donor group sustain take for reintroduction?
      - Yes
        - Transplant natural population
      - No
Is there a reasonable likelihood of natural colonization from a nearby spawning area or population?

- **Yes**
  - Natural colonization

- **No**
  - What is the origin of the most genetically and ecologically similar source population?
    - Naturally spawning
      - Can the donor group sustain take for reintroduction?
        - Yes
          - Transplant natural population
        - No
          - Transplant hatchery adults
    - Hatchery stock
      - Are the evolutionary and ecological risks of hatchery breeding acceptable?
        - Yes
          - Release hatchery produced juveniles
        - No
          - No action
    - None: all potential sources have unacceptable risks
      - No action
Source Population(s)

- Similar life history, morphology, and behavior traits.
- Similar genetic lineage (not out of ESU)
- If hatchery, preference to integrated programs of short duration.
Source Population(s)

- Can the source afford reductions?
- Post reintroduction meta-population dynamics
  - Effects of reintro strays on downstream populations
  - Effects of losing natural spawners (pioneers into the new habitat)
Conclusions

- Framework focused on ESA but works whenever conservation is an objective.
- Monitoring is critical for determining success.
- It is a long-term strategy.
- Does not include other objectives (e.g., harvest, nutrients).

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