The HSRG and Hatchery Reform in the Pacific Northwest:

Hatchery Scientific Review Group

Outline of topics

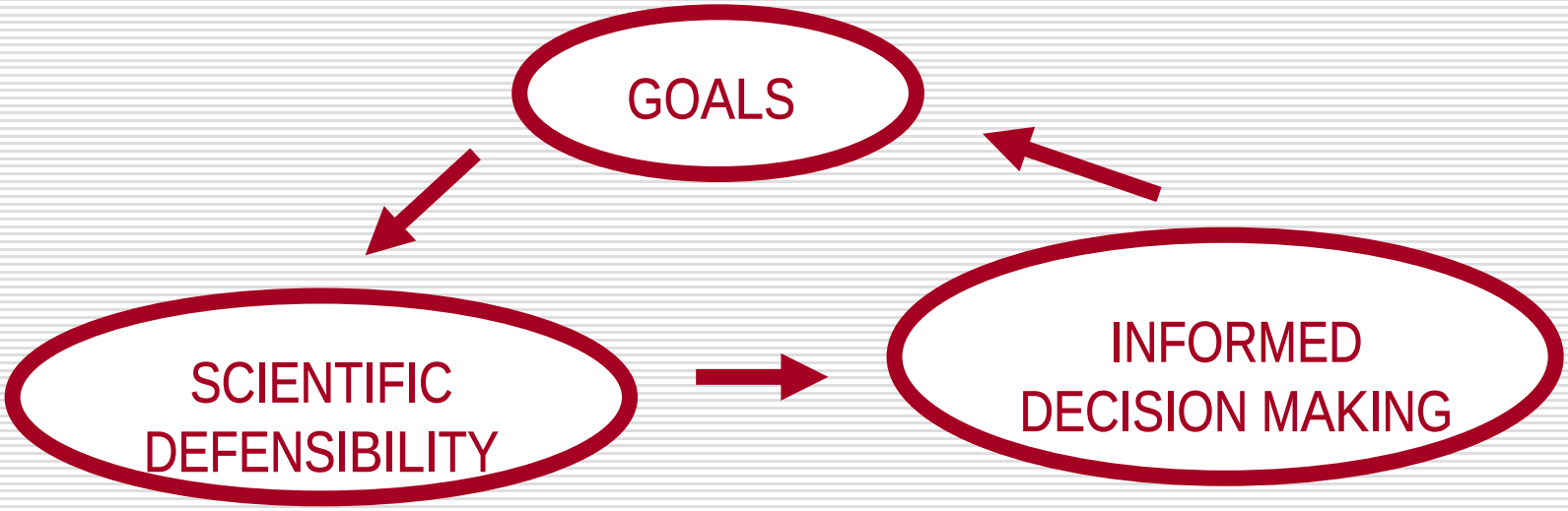
- 1) What is Hatchery Reform?
- 2) History of HSRG
- 3) Review of basic framework
- 4) Clarification on selected points

The Hatchery Reform Project is a systematic, science-driven review of hatchery programs to achieve two goals:

1. Helping to conserve naturally spawning populations

2. Supporting sustainable fisheries. (Both commercial and recreational)

Principles
for Hatchery Management



HSRG and the “4” H’s

- Hatcheries- HSRG foundation and recommendations are to address this “H”, with some overlap in the Harvest “H” as it relates to reducing pHOS and increasing benefits.
- Harvest-Selective fishing can reduce pHOS and increase benefits.
- Habitat- locally adapted fish make better use of existing or new habitat.
- Hydro-

In the Beginning:

- 1999- Science Advisory Team- Can hatcheries operate in the face of ESA?
- 2000- Funding for HSRG supplied by Congress.
- 2004- Puget Sound and Coastal WA review complete.
- 2005- Initial version of AHA developed.
- 2009- Columbia River Basin Review complete.

More Recent History:

- 2012- Detailed review of Elwha Chinook HGMP. 4 recovery “phases” proposed.
- 2014- Report to Congress: “On the Science of Hatcheries”. More advanced versions of AHA.
- 2015-2017- Report to Congress updating HSRG Principles; Training on HSRG principles and use of AHA/ISIT tools provided to WDFW; More advanced versions of AHA/ISIT.

Some Examples of Implementation or Discussion of HSRG Principles/Metrics

- 2009- WDFW adopts Hatchery and Fishery Reform Policy; RIST- Review of hatchery reform issues.
- 2010-Mitchell Act Draft EIS.
- 2011- ISRP Review of Lower Snake Comp. Plan (Sp. Chinook).
- 2013- ISRP Review Lower Snake River Comp. Plan (steelhead); USFWS Review of Service Hatcheries in PNW.
- 2015- ESA Recovery Plan for Snake River Sockeye.
- 2016- Mitchell Act Final EIS.
- Since 2014, 35 citing's in published literature.

Basic Framework (Steps)

- **Goals for Population**
  - Conservation (VSP) and harvest
- **Biological Significance** (designation)
- **Population Status** (recovery phase)
- **Purpose of Hatchery Program**
  - Conservation, Harvest, Both
- **Type of Hatchery Program**
    - Integrated, Segregated, Both

Goals for Population

- **Conservation Goals (VSP)** **(McElhany, 2000)**
  - Abundance, productivity, spatial structure and genetic diversity
- **Harvest Goals**
  - Need to be specific: where, when, how many

Biological Significance (designation) (LCFRB 2004)

- Primary- Also, identified as ‘biologically significant’, ‘core’, ‘key’, or ‘highly viable’ populations. Important to recovery of the ESU.
- Contributing- Are viable but less abundant than Primary. These populations contribute to diversity of the ESU.
- Stabilizing-populations must maintain at least current level of viability.

Population Status (recovery phase)

- Preservation (unsustainable)
- Re-colonization (habitat underutilized)
- Local Adaptation (sustainable with reduced fitness)
- Fully Restored (abundant and productive)

Notes on Moving between Phases

1) Biologically based triggers, rather than time-lines. (abundance, productivity).
2) Triggers should allow movement both up and down the Phases.
3) The larger the trigger threshold, the longer local adaptation benefits (e.g., increased productivity) are deferred.

How HSRG Recommendations apply during Phases of Restoration

1) Preservation- No pHOS, PNI standards provided.*
2) Re-colonization- No pHOS, PNI standards provided.*
3) Local Adaptation- all standards apply
4) Full Restoration- all standards apply

- *The HSRG encourages use of NORs for BS during these phases.

The Purpose of Hatcheries

- **Hatcheries increase abundance**, that abundance can be used for either:

1) Conservation
2) Harvest
3) Both

Hatcheries can play a role in each Phase of Conservation while still supplying harvest benefits.

1) Program can be larger than needed during Preservation or Re-colonization phase.
2) Operate 2 programs (one for conservation (“safely net”), 1 for harvest) during Local-adaptation or Full Recovery Phase.

Type of Hatchery Program

- Integrated: programs are intended to artificially increase the demographic abundance of a natural population gene pool. Requires a self-sustaining natural population to provide fish for the broodstock. (Habitat, Harvest).

- Segregated: programs create a new, hatchery-adapted population distinct genetically from natural populations. Hatchery fish may pose significant genetic and ecological risks to naturally spawning populations

- Stepping-Stone: One of each for same population.

Definition of Terms

(used to estimate the direction and amount of gene flow)

pNOB=% of hatchery broodstock that are of natural origin.

pHOS=% of naturally spawning fish that are of hatchery origin.

PNI = Proportionate Natural Influence
pNOB/(pNOB+pHOS)

Definition of Terms-cont.

pHOS census =% Hatchery Origin fish on the spawning grounds (count). Rough estimate of gene flow.

pHOS effective = estimated % Hatchery Origin fish on the spawning grounds that actually reproduce (less than pHOSc). Better estimate of gene flow.

PEHC= Proportion Effective Hatchery Contribution. Actual measurement of gene flow through use of genetic techniques. Best estimate of gene flow. HSRG recommendations are based on actual gene flow.

Designation Standards

Primary—

- **Integrated hatchery programs--PNI ≥ 0.67; pHOS ≤30%**
- **Segregated hatchery programs—pHOS < 5%**

Contributing—

- **Integrated hatchery programs--PNI > 0.50; pHOS ≤30%**
- **Segregated hatchery programs—pHOS < 10%**

Stabilizing—

- **Integrated hatchery programs—current condition**
- **Segregated hatchery programs—current condition**

Points of clarification:

- Recommendations based on actual gene flow.
- NO recommended levels of pHOS and PNI during Preservation or recolonization phases doesn't mean "it doesn't matter".
- Use of NOB encouraged in Preservation or Recolonization phases. HSRG is working on refining recommendations.
- Refining recommendations for triggers to move between Phases. Both for abundance and time.
- pHOS limits for segregated programs should be use with caution.

Notes Affecting PNI, pHOS

- Raising PNI– 1) decrease pHOS; or 2) increase pNOB.

- Decreasing pHOS– 1) Remove extra hatchery fish through selective fishing; 2) Remove extra hatchery fish with physical barrier; 3) Reduce hatchery production.

Not the last word:

- The HSRG believes the work we have put forward should not be considered the last word, but only a step forward.
- New and better science in the future will improve our understanding of how hatcheries impact natural populations and should be discussed, tested, applied and evaluated against existing ideas.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Questions?