

The HSRG and Hatchery Reform in the Pacific Northwest:



Hatchery Scientific Review Group



Outline of topics

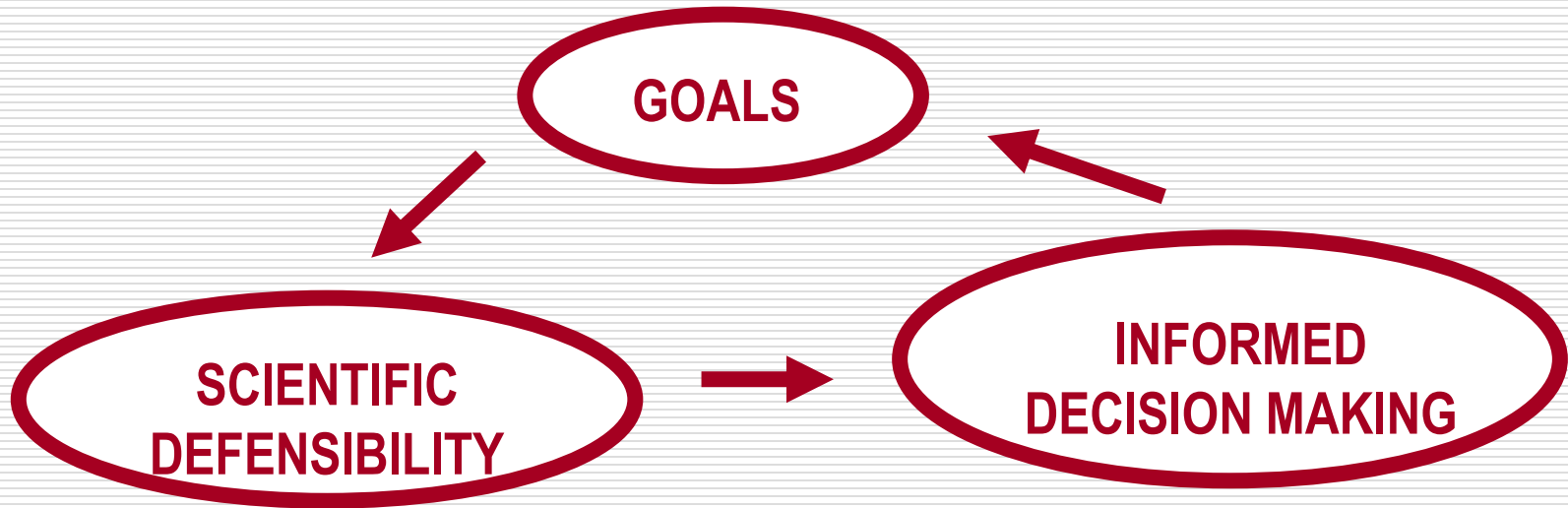
- 1) What is Hatchery Reform?
- 2) History of HSRG
- 3) Review of basic framework
- 4) Clarification on selected points

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
$$\text{pNOB}/(\text{pNOB}+\text{pHOS})$$

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 $\leq 30\%$
- Segregated hatchery programs—pHOS $< 5\%$

Contributing—

- Integrated hatchery programs--PNI > 0.50 ; pHOS $\leq 30\%$
- 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?

