



# The Necessary Ingredients for Hatchery Reform

---

The HSRG has developed a set of criteria for determining whether key elements of hatchery reform are being implemented in the region. The principal requirements for operating hatcheries consistent with resource goals are a **Scientific Framework** and an **Information Sharing System**. These requirements are described in more detail below. During the coming year, the HSRG will ask the co-managers to report on progress in these areas. Their responses will be a part of the HSRG's 2006 Report to Congress.

- 1) A transparent and actively maintained **Scientific Framework**<sup>1</sup> should include:
  - a) Explicitly stated, comprehensive, scientifically-defensible biological premises<sup>2</sup> to support decision making.
  - b) A research plan to address key uncertainties in the Framework.
  - c) A formal procedure to periodically update the Framework.
- 2) **An Information Sharing System**<sup>3</sup> that provides real time access<sup>4</sup> to reliable information about goals, actions and outcomes at the Evolutionarily Significant Unit (ESU), regional and stock-specific levels. Specifically, for each stock, by region and by ESU, the following should be provided:
  - a) A **Comprehensive Strategic Plan** that answers the questions: *Where are we currently? Where do we want to be in the future?*
    - i) *What is current status of harvest and conservation?*
      - (1) What has been the recent *management intent*<sup>5</sup> for the stock?
      - (2) What is the current average number and composition of the natural spawning escapement?
      - (3) What is the current average number and composition of the hatchery escapement?
      - (4) What is the current average contribution to each fishery from the stock (by hatchery and natural components)?
    - ii) *What is the current condition of habitat, harvest, and hatcheries?*
      - (1) What has been the recent *management strategy*<sup>6</sup> for the stock?
      - (2) What is the estimated capacity and productivity of the habitat available to the stock?

---

<sup>1</sup> The Scientific Framework developed by the HSRG should serve as the starting point

<sup>2</sup> The biological premises should include detailed assumptions (models) about genetics, ecology, physiology, behavior and fish health, as they relate to the effects of hatchery production.

<sup>3</sup> The Managing for Success system, including the All-H Analyzer (AHA) calculator, is being designed to meet this need.

<sup>4</sup> Different levels of access should be available for different user groups, e.g., regional managers will have access to more detailed and provisional information, whereas public users should have access to summary information that meets defined quality criteria.

<sup>5</sup> The *management intent* describes goals for harvest, conservation and/or education.

<sup>6</sup> The *management strategy* describes how habitat, harvest and hatchery management will contribute toward goals.



- (3) What is the average exploitation rate for the stock (by hatchery and natural components)?
  - (4) If there is a hatchery associated with the stock, what is: its purpose (harvest and/or conservation), type (segregated or integrated), size (number of broodstock and number of juveniles released), broodstock composition (percent natural-origin recruits or NORs), reproductive success (recruits per spawner), and *stray rate*<sup>7</sup>?
- iii) *What is the long-term goal for harvest and conservation?*
- (1) What is the long-term *management intent* for the stock?
  - (2) What is the target number and composition of the natural spawning escapement?
  - (3) What is the long-term goal for composition of the hatchery escapement?
  - (4) What is the target contribution to each fishery from the stock (by hatchery and natural components)?
- iv) *What is the target future condition for habitat, harvest, and hatcheries?*
- (1) What is the long-term *management strategy* for the stock?
  - (2) What is the estimated capacity and productivity of the habitat available to the stock?
  - (3) What is the targeted average exploitation rate for the stock (by hatchery and natural components)?
  - (4) If there will be a hatchery associated with the stock, what will be: its purpose (harvest and/or conservation), type (segregated or integrated), size (number of broodstock, and target number of juveniles to be released), broodstock composition (percent NORs), reproductive success (recruits per spawner), and expected stray rate?
- b) **An Overview of Actions** targeting or affecting the stock. What habitat, harvest, and hatchery actions are completed, under way or planned to move toward the long-term goals? For example, for each hatchery action provide:
- i) A description of how and to what extent the action will affect goals for harvest and/or conservation (including action objectives in terms of response variables and measurable indicators).
  - ii) An action plan (milestones and schedule).
  - iii) The cost of each phase of the action.
  - iv) The status of each phase of the action and the identity of the individual responsible (for management of time, quality and human resources).
  - v) The action categories (e.g., cost, “action type,” others).
  - vi) An action priority rating relative to goals for harvest and/or conservation (at the stock, regional and ESU levels).
- c) **A Summary of Outcomes.** Collect and display empirical information that shows if actions are correctly implemented and effective, and if progress is made toward long-term goals for harvest and conservation. This information would be shown in tables and/or simple graphs that also show targets and goals.
- i) Is the action plan fully implemented as intended? For example, if the action was to integrate natural fish into the hatchery broodstock, was the target number of broodstock and broodstock composition (NORs vs. hatchery-origin recruits or HORs) achieved? Was the targeted number of juveniles released?
  - ii) Is the action effective—are actions resulting in expected changes in effectiveness indicators? Specifically, show:
    - (1) composition of natural spawners (NORs vs. HORs).
    - (2) stray rates.

---

<sup>7</sup> The term *stray rate* as used here means the fraction of returning HORs that does *not* return to the hatchery.



- (3) distribution of natural spawners (NORs vs. HORs).
  - (4) number and size of fish contributing to each fishery.
  - (5) biological traits of adult returns (NORs vs. HORs).
  - (6) reproductive success in the natural environment (recruits per spawner).
  - (7) reproductive success in the hatchery environment (recruits per spawner).
  - (8) biological traits of hatchery fish released.
  - (9) biological traits of naturally produced juveniles.
- iii) How is the stock responding over time? Specifically, show:
- (1) time trends in estimated natural escapement abundance.
  - (2) time trends in composition (NORs vs. HORs) in natural escapement.
  - (3) time trends in diversity of the natural stock.
  - (4) time trends in productivity (recruits per spawner) in the natural environment.
  - (5) time trends in estimates of the productivity and capacity of the natural environment.
  - (6) time trends in harvest by fishery of NORs and HORs.
  - (7) identify other species and stocks potentially affected by this stock (link to those stocks in the database).