

# APPENDICES

# Appendix A: Scientific Framework

## Appendix A: Scientific Framework

The scientific framework and the hatchery review approach used in the APRE process is based on the work products of the Hatchery Scientific Review Group (HSRG). These work products and the background on the HSRG project are available on the internet at [www.hatcheryreform.org](http://www.hatcheryreform.org). Table A-1 shows the operational guidelines as they were adapted to the APRE review of individual hatchery programs in the Columbia River.

**TABLE A-1. Operational guidelines and their applicability as used in the APRE review (adapted from Hatchery Scientific Review Group)**

<b>Applicable Programs</b>	<b>Affected Outcomes</b>
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Operational Phase	Guidelines	Integrated	Segregated	Education (Yes on 2032)	Harvest	Conservation	Harvest	Biological Significance	Survival (Viability)	Ecological Interactions	Genetic Interactions	Environment (Passage, NIDES)	Discharge Nutrient Enhancement	M & E
Broodstock Choice	Wild fish should make up less than 5% of the broodstock for this program.		X		X			X	X					
Broodstock Choice	The broodstock chosen should represent natural populations native or adapted to the watersheds in which hatchery fish will be released.	X	X		X	X	X	X	X	X	X			
Broodstock Choice	The broodstock chosen should have a pathogen history that indicates no threat to other populations in the watershed.		X		X					X				
Broodstock Choice	The broodstock chosen should have the desired life history traits to meet harvest goals.		X		X	X	X							X
Broodstock Collection	Sufficient broodstock should be collected to maintain an effective population size of 1000 fish per generation.	X	X		X	X			X					X
Broodstock Collection	Integrated Hatchery Operations Team (IHOT) and Pacific Northwest Fish Health Protection Committee (PNFHPC) standards should be followed for broodstock fish health inspection.	X	X		X	X	X		X	X				X
Broodstock Collection	The broodstock should be collected and held in a manner that results in less than 10% pre-spawning mortality.	X	X		X	X	X		X					
Broodstock Collection	Integrated Hatchery Operations Team (IHOT) adult holding standards should be followed for loading.	X	X		X	X	X		X	X				X
Broodstock Collection	Sufficient numbers of donors should be collected from the natural stock to minimize founder effects when a program is initiated.	X			X	X		X	X					

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Broodstock Collection	Representative samples of natural and hatchery population components should be collected with respect to size, age, sex ratio, run and spawn timing, and other traits important to long-term fitness.	X			X	X	X	X	X	X	X	X	X
Broodstock Collection	10% or more of the broodstock should be derived from wild fish each year.	X			X	X		X	X				X
Broodstock Collection	The proportion of the spawners brought into the hatchery should follow a “spread-the-risk” strategy that attempts to improve the probability of survival for the entire population.	X				X			X				
Broodstock Collection	If the wild population has 150 fish or more, collection of wild broodstock should be limited to 30% of the population.	X				X			X				X
Broodstock Collection	The program should avoid the use of stocks from outside the watershed.		X		X	X		X	X		X		
Adult Holding	Hatchery intake screening for the adult holding supply should comply with Integrated Hatchery Operations Team (IHOT) and National Marine Fisheries Service facility standards.	X	X		X	X						X	X
Adult Holding	The water used for adult holding should meet or exceed the recommended Integrated Hatchery Operations Team (IHOT) water quality standards for temperature.	X	X		X	X	X		X				X

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		Integrated	Segregated	Education (Yes on 2032)	Harvest	Conservation	Harvest	Biological Significance	Survival (Viability)	Ecological Interactions	Genetic Interactions	Environment Passage, IPDES	Discharge-Nutrient-Enhancement
Adult Holding	The water supply for adult holding should be protected by flow and/or pond level alarms at the holding pond.	X				X			X				
Adult Holding	Water for adult holding should be available from multiple sources.	X				X							
Spawning	Males and females available for spawning on a given day should be randomly mated.	X	X		X	X	X		X				
Spawning	Gametes should not be pooled prior to fertilization.	X	X		X	X	X		X				
Spawning	Precocious males (mini-jacks and jacks) should be used for spawning as a set percentage or in proportion to their contribution to the adult run.	X	X		X	X	X		X				
Spawning	Dissinfection procedures during adult spawning should be implemented that prevent pathogen transmission between stocks of fish on site.	X	X		X	X	X		X				
Spawning	Back-up males should be used in the spawning protocol.	X				X	X		X				
Incubation	The water used for incubation should meet or exceed the recommended Integrated Hatchery Operations Team (IHOT) water quality standards for temperature.	X	X		X	X	X		X				X
Incubation	The water used for incubation should meet or exceed the recommended Integrated Hatchery Operations Team (IHOT) water quality standards for the following compounds: ammonia, carbon	X	X		X	X	X		X				X

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		Integrated	Segregated	Education (Yes on 2032)	Harvest	Conservation	Harvest	Biological Significance	Survival (Viability)	Ecological Interactions	Genetic Interactions	Environment Passage, IPFDES	Discharge-Nutrient-Enhancement	M & E
	dioxide, chlorine, pH, copper, dissolved oxygen, hydrogen sulfide, dissolved nitrogen, iron, and zinc.													
Incubation	IHOT species-specific incubation recommendations should be followed for water temperature.	X	X		X	X	X		X					X
Incubation	IHOT species-specific incubation recommendations should be followed for density parameters.	X	X		X	X	X		X					X
Incubation	Disinfection procedures should be implemented during incubation that prevent pathogen transmission between stocks of fish on site.	X	X		X	X	X		X					X
Incubation	Hatchery intake screening for the incubation water supply should comply with Integrated Hatchery Operations Team (IHOT) and National Marine Fisheries Service facility standards.	X	X		X	X							X	X
Incubation	If eggs are culled, culling should be done randomly over all segments of the egg-take.	X			X	X	X	X	X					
Incubation	Eggs should be incubated under conditions that result in equal survival of all segments of the population to ponding.	X			X	X	X		X					
Incubation	The water source for incubation should be pathogen-free.	X				X			X					
Incubation	The water supply for incubation should be protected by flow alarms at the incubation unit(s).	X				X			X					
Incubation	IHOT species-specific incubation recommendations should be	X				X	X		X					X

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		Integrated	Segregated	Education (Yes on 2032)	Harvest	Conservation	Harvest	Biological Significance	Survival (Viability)	Ecological Interactions	Genetic Interactions	Environment (Passage, NPDES Discharge, Nutrient Enhancement)	M & E
	followed for using substrate.												
Incubation	Water for incubation should be available from multiple sources.	X				X							
Incubation	Families should be incubated individually.	X				X	X	X					
Rearing	Rearing water should have a chemical profile significantly different from natural stream conditions to provide adequate imprinting of hatchery fish and minimize the attraction of naturally produced fish into the hatchery.	X	X		X	X	X	X	X				X
Rearing	The water used for rearing should meet or exceed the recommended Integrated Hatchery Operations Team (IHOT) water quality standards for temperature.	X	X		X	X	X	X					X
Rearing	The water used for rearing should meet or exceed the recommended Integrated Hatchery Operations Team (IHOT) water quality standards for the following compounds: ammonia, carbon dioxide, chlorine, pH, copper, dissolved oxygen, hydrogen sulfide, dissolved nitrogen, iron, and zinc.	X	X		X	X	X		X				X
Rearing	The correct amount and type of food should be provided to achieve the desired growth rate for the species and life stage being reared.	X	X		X	X	X		X	X			
Rearing	The correct amount and type of food should be provided to achieve the desired condition factor for the	X	X		X	X	X		X	X			



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		Integrated	Segregated	Education (Yes on 2032)	Harvest	Conservation	Harvest	Biological Significance	Survival (Viability)	Ecological Interactions	Genetic Interactions	Environment (Passage, INPDES Discharge, Nutrient Enhancement)	M & E
	species and life stage being reared.												
Rearing	Juvenile rearing density and loading guidelines used at the facility should be based on life-stage specific survival studies conducted on-site.	X	X		X	X	X		X				X
Rearing	The hatchery should operate to allow all migrating species of all ages to by-pass or pass through hatchery related structures.	X	X		X	X						X	
Rearing	Hatchery intake screening for the rearing water supply should comply with Integrated Hatchery Operations Team (IHOT) and National Marine Fisheries Service facility standards.	X	X		X	X						X	X
Rearing	IHOT fish health guidelines should be followed to prevent pathogen transmission between lots or stocks of fish on site or transmission or amplification to or within the watershed.	X	X		X	X			X				X
Rearing	The water used for rearing should provide natural water temperature profiles that result in fish similar in size to naturally produced fish of the same species.	X			X	X	X	X	X	X			X
Rearing	If juveniles are culled, culling should be done randomly over all segments of the population.	X			X	X	X	X	X				
Rearing	The program should attempt to better mimic the natural stream environment by rearing under	X			X	X	X	X	X	X			X

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		Integrated	Segregated	Education (Yes on 2032)	Harvest	Conservation	Harvest	Biological Significance	Survival (Viability)	Ecological Interactions	Genetic Interactions	Environment Passage, IPDES	Discharge_Nutrient-Enhancement
	natural water temperature profiles.												
Rearing	Fish should be reared under conditions that result in equal survival of all segments of the population to release.	X			X	X	X		X				
Rearing	The program should use a diet and growth regime that mimics natural seasonal growth patterns.	X			X	X	X		X	X			X
Rearing	The program should attempt to better mimic the natural stream environment by providing natural or artificial cover.	X			X	X	X		X	X			
Rearing	The water source for rearing should be specific-pathogen free.	X				X			X				
Rearing	The water supply for rearing should be protected by flow alarms at the rearing unit(s).	X				X			X				
Rearing	IHOT juvenile rearing standards should be followed for alarm systems.	X				X	X		X				X
Rearing	IHOT juvenile rearing standards should be followed for predator control measures to provide the necessary security for the cultured stock.	X				X	X		X				X
Rearing	Rearing water should be available from multiple sources.	X				X							
Rearing	Fish should be reared in multiple facilities or with redundant systems to reduce the risk of catastrophic loss.	X				X			X				
Release	Fish produced should be qualitatively similar to natural fish	X	X		X	X	X	X	X	X			X

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		Integrated	Segregated	Education (Yes on 2032)	Harvest	Conservation	Harvest	Biological Significance	Survival (Viability)	Ecological Interactions	Genetic Interactions	Environment (Passage, INPDES Discharge, Nutrient Enhancement)	M & E
	in growth rate.												
Release	Fish should be identified with nonlethal detectable identification marks or tags.	X	X		X	X		X	X	X			
Release	Marking/tagging techniques should be used to distinguish between the hatchery and natural populations.	X	X		X	X		X		X			X
Release	Fish produced should be qualitatively similar to natural fish in physiological status.	X	X		X	X	X	X	X				X
Release	Volitional releases during natural out-migration timing should be practiced.	X	X		X	X	X	X	X				X
Release	Fish should be released at an optimum time and size that has been determined by a site-specific survival study.	X	X		X	X	X	X					X
Release	Fish should be released in numbers that do not exceed the carrying capacity for the natural population.	X	X		X	X	X	X	X	X			
Release	Fish should be released in same drainage as rearing facility.	X	X		X	X			X			X	
Release	Marking/tagging techniques should be used to distinguish among segments of the hatchery population.	X	X		X	X							X
Release	Fish produced should be qualitatively similar to natural fish in size.	X			X	X	X	X	X	X			X
Release	Fish should be released at sizes and life history stages similar to those of natural fish of the same species.	X			X	X	X	X	X	X			X
Release	Fish produced should be	X			X	X	X	X	X	X			X

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		Integrated	Segregated	Education (Yes on 2032)	Harvest	Conservation	Harvest	Biological Significance	Survival (Viability)	Ecological Interactions	Genetic Interactions	Environment (Passage, INPDES Discharge, Nutrient Enhancement)	M & E
	qualitatively similar to natural fish in behavior.												
Facilities	The facility should operate within the limitations established in National Pollution Discharge Elimination System permit.	X	X		X	X						X	X
M&E	Accurate fish inventory data that reflects pond populations within 10% should be maintained with a minimum of handling stress.	X	X		X	X	X		X				X
M&E	Goals for the program should be documented so that results can be adequately evaluated.	X	X		X	X							X
M&E	Results of program evaluation should be reported/documentated so that they can be taken into consideration when determining whether hatchery operations should be changed.	X	X		X	X							X
Effectiveness	Adults from this program should not make up more than 30% of the natural spawning escapement (for the species/race) in the subbasin.	X			X	X		X	X				X
Accountability	All new relevant information from research or other sources should be made available to hatchery staff and others and used for attaining goals.	X	X		X	X							
Accountability	The most recent information obtained from monitoring and evaluation programs for the production cycle, including performance indicators and progress toward goals, should be	X	X		X	X							

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	taken into consideration when determining whether hatchery operations should be changed or not.												
Accountability	Standards should be specified for in-culture performance of hatchery fish and their offspring.	X	X		X	X							
Accountability	Standards should be specified for post release performance of hatchery fish and their offspring.	X	X		X	X							
Education	The hatchery facility should be open to the public during hours of operation.			X									
Education	Hatchery operations should be visible to facility visitors.			X									
Education	Hatchery operations (egg take, incubation, rearing) should be demonstrated to the public.			X									
Education	The facility should have a fish ladder and/or adult holding facilities that are open to the public.			X									
Education	The hatchery should have signage describing the facility, fish production goals, ties to management goals, ecosystem function.			X									
Education	There should be a visible link to riparian zone such as viewing boardwalk or bridge.			X									
Education	The hatchery should regularly schedule tours for groups.			X									
Education	The program should provide opportunities for student interns.			X									

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Education	The program should provide opportunities for citizen volunteer involvement.			X									
Education	The agency should maintain a web page describing the hatchery program.			X									
Education	A pamphlet or brochure describing the agency or hatchery programs should be available.			X									
Education	Hatchery staff should be involved in community/volunteer meetings or outreach programs.			X									
Education	Hatchery staff should regularly give classroom presentations.			X									
Education	Hatchery staff should participate in formal professional presentations/seminars.			X									
Education	Where appropriate and beneficial, the facility should be used and staff should participate in agency, university, or other research projects?			X									
Education	Data and information pertaining to the program should be accessible to interested parties.			X									

## Appendix B: APRE Questionnaire, Form 1

## Appendix B: APRE Questionnaire, Form I

### APRE FORM 1<sup>1</sup>: CURRENT STATUS and GOALS for Stocks and Habitat

(The following is a list of the questions in form 1, the actual form as used in the survey can be viewed on APRE on-line questionnaire.)

Name of STOCK: \_\_\_\_\_

1. [#2028] Is a hatchery program associated with this stock?
  - a. yes
  - b. no
2. [#2029] If the answer to Question 1 was yes, is this an *integrated*<sup>2</sup> program?
  - a. yes
  - b. no
3. [#2030] Is the **purpose** of the program to *provide harvest*?
  - a. yes
  - b. no
4. [#2031] Is the **purpose** of the program to *contribute to conservation/ recovery*?
  - a. yes
  - b. no
5. [#2032] Is the **purpose** of the program to *contribute to research and/or education*?
  - a. yes
  - b. no
6. [#2033] Is the program **mitigation** for *hydro impacts*?
  - a. yes
  - b. no
7. [#2034] Is the program **mitigation** for *habitat loss*?
  - a. yes
  - b. no

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<sup>1</sup> Dr. Don A. Dillman, Washington State University, provided invaluable help in structuring this form to assure accurate and complete responses to the questions.

<sup>2</sup> A principal goal of an *integrated* hatchery programs is to minimize genetic divergence of the hatchery broodstock/population from a naturally spawning population. In an idealized integrated program, natural-origin and hatchery-origin fish within a particular watershed simply represent two genetically equal components of a common gene pool, where habitat conditions experienced by the natural component drive the local adaptation of the stock.

In contrast, a *segregated* hatchery program is one in which the goal is to allow the hatchery population to evolve along its own trajectory while minimizing genetic interactions with natural populations. As a consequence, segregated broodstocks can change genetically over time via domestication effects and hatchery management practices (e.g. selective breeding for run timing).



8. [#2035] Is the program **mitigation** for *impacts other than hydro and habitat loss*?
- yes
  - no

**The following questions pertain to the Biological Significance<sup>3</sup> of the stock:**

9. [#3] What is the ESA status for this stock?
- Endangered
  - Threatened
  - Candidate
  - Not listed and not a candidate for listing

**Comment:**

**Data Source:**

10. [#4] Which of the following best describes the origin for this stock?
- Native**
  - Admixture: **≥ 50% native genes**
  - Admixture: **< 50% native genes**
  - Reintroduced:** species occurred historically in watershed, was extirpated, but stock transfers re-established species in watershed
  - Introduced:** species was historically absent from watershed/habitat
  - Harvest:** species was historically absent from watershed/habitat but introduced for harvest purposes

**Comment:**

**Data Source:**

11. [#5] Which of the following best describes the population characteristics of this stock?
- Population has **unique, irreplaceable phenotypic attributes** (e.g. fish size, run timing, age structure, etc.) that are not shared with other stocks within or outside the province.
  - Population is **common within the province**: it shares phenotypic attributes with other stocks within the province, but **not** outside the province.
  - Population is **common**: key phenotypic attributes are shared with other stocks **within and outside** the province.

**Comment:**

**Data Source:**

12. [#6] How many distinct spatially-separated spawning aggregations are within this stock?
- ≤ 5
  - > 5

**Comment:**

**Data Source:**

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<sup>3</sup> The *Biological Significance* of a stock is a measure of its evolutionary importance in the context of its ESU. It is a function of stock origin, uniqueness (of phenotypic characteristics), and population structure (within the stock and within the ESU).

13. [#7] How many total stocks (of the same species/race) are there within the province or adjacent provinces?

- a.  $\leq 3$
- b.  $> 3$

**Comment:**

**Data Source:**

**The following questions pertain to the Viability<sup>4</sup> of the stock:**

14. [#8] What is the effective population size of this stock? (May be approximated by census data.)

- a.  $N_e \leq 100$
- b.  $100 < N_e \leq 500$
- c.  $500 < N_e \leq 2,500$
- d.  $2,500 < N_e \leq 5,000$
- e.  $N_e > 5,000$

**Comment:**

**Source of data/information:**

15. [#9] What is the intrinsic rate of population growth (R/S at low densities)?

(\*\*NOTE: *Question is worded differently on the web form\*\**)

- a. Population is **highly productive** and **sustains high harvest levels** ( $R/S > 5$ )
- b. Population is **stable** while **supporting a moderate harvest** ( $3 < R/S \leq 5$ )
- c. Population is **clearly stable** ( $2 < R/S \leq 3$ )
- d. Population **appears to be replacing itself** ( $1 < R/S \leq 2$ )
- e. Population is **declining** ( $R/S < 1$ )

**Comment:**

**Source of data/information:**

16. [#10] For a natural stock or integrated hatchery stock, what proportion of the natural spawners for this stock are hatchery-origin returns (HoR)?

- a.  $HoR \leq 1\%$
- b.  $1\% < HoR \leq 5\%$
- c.  $5\% < HoR \leq 30\%$
- d.  $HoR > 30\%$

**Comment:**

**Source of data/information:**

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<sup>4</sup> The *viability* of a stock is a measure of its genetic fitness, i.e. its ability to persist within the natural environment (for natural or integrated hatchery populations) or in the combined hatchery and receiving natural habitat (for segregated hatchery populations).

17. [#2027] For segregated hatchery populations, what proportion of eggs, fry or adults are from wild fish or another hatchery?

- a.  $\leq 1\%$
- b. 1% - 5 %
- c. 5% - 30%
- d.  $>30\%$

**Comment:**

**Source of data/information:**

**The next set of questions deals with Goals for stock status, habitat, and harvest.**

18. [#11] Assign a rating of ‘**High**,’ ‘**Medium**,’ or ‘**Low**’ to short-term and long-term goals for biological significance, viability, and habitat for this stock with respect to the following definitions:

**Biological significance** is determined by considering a number of specific factors relating to stock origin, biological attributes and population subdivisions, with the stock defined as being of either *low*, *medium* or *high* significance.

**Population viability** is also determined by considering a number of specific factors such as age class structure, spawner escapement and proportion of hatchery-origin fish in natural spawning, with the stock’s viability defined as being either *critical*, *at risk* or *healthy*. This rating refers to the stock’s ability to sustain itself in the natural environment (except in the case of a segregated harvest program, in which case the ratings are *low*, *medium* and *high* and refer to the stock’s ability to sustain itself in the culture environment).

**Habitat:** The stock’s spawning, freshwater, migration and estuarine **habitat** is rated as either *inadequate* (**Low**) (target stock is unproductive and the population will go extinct, even without terminal harvest), *limiting* (**Medium**) (target stock is productive enough for the population to sustain itself at a low level terminal harvest) or *healthy* (**High**) (productivity of the stock is high and the population is capable of growth and supporting significant terminal harvest).

	<b>Biological significance</b>	<b>Viability</b>	<b>Habitat</b>
<b>Present Status</b>			
<b>Short-term goal (10-15 yrs)</b>			
<b>Long-term goal (30-50 yrs)</b>			

**Comment:**

**Source of data/information:**

19-23. [#12, 121, 122, 123, and 124]

Assign a rating of **H**, **M**, **L**, or **N** for each type of fishery (**targeted and consumptive fisheries**) for this stock for:

- **Present** (current status)
- **Short-term** (10-15 years) goal
- **Long-term** (30-50 years) goal

Using the definitions:

- **H** = High (harvest opportunity each year, spread over seasons)
- **M** = Medium (opportunity most years, for some seasons)
- **L** = Low (occasional opportunity, single run)
- **N** = No harvest opportunity

		Location of Fishery					
		Marine	L Columbia	Zone 6	U. Columbia	Subbasin	
<b>Type of Fishery</b>	Commercial	Present					
		Short-term					
		Long-term					
	Ceremonial	Present					
		Short-term					
		Long-term					
	Subsistence	Present					
		Short-term					
		Long-term					
	Recreational Harvest	Present					
		Short-term					
		Long-term					
	Recreational Catch and Release <sup>5</sup>	Present					
		Short-term					
		Long-term					

**Comment:**

**Source of data/information:**

**The questions that follow deal address potential impacts of hatchery programs on the target stock**

24. [#2036] Do you have a numerical goal for total catch in all fisheries?

- a. yes
- b. no

<sup>5</sup> A recreational *catch and release* fishery is one where the purpose of the fishery is to catch and release the target stock. It does not refer to the incidental catch of the stock in fisheries that are targeting marked fish or fish of a different species.

25. [#2037] Do you have a goal for spawning escapement composition (hatchery vs. natural) in the *hatchery*? APPLIES TO HATCHERY PROGRAMS ONLY
- yes
  - no
26. [#2038] Do you have a goal for spawning escapement composition (hatchery vs. natural) in the *wild*?
- yes
  - no
27. [#2039] Do you have a goal for smolt-to-adult return survival? APPLIES TO HATCHERY PROGRAMS ONLY
- yes
  - no
28. [#2040] Do you have goals for recruits per spawner (R/S)?
- yes
  - no
29. [#2041] How often do you compute the recruits per spawner for this stock?
- every year
  - periodically (at least once every five years)
  - seldom
  - never
30. [#2042] Are the goals to this program documented? (Indicate source of documentation below.) APPLIES TO HATCHERY PROGRAMS ONLY
- yes
  - no
31. [#2043] Are results of program evaluation reported/documented? (Indicate source below.) APPLIES TO HATCHERY PROGRAMS ONLY
- yes
  - no

32. [#14] For **natural stocks**, how is the stock potentially (directly or indirectly) affected by hatchery programs in the subbasin? Through:

- a. directed supplementation
- b. unintended straying
- c. competition
- d. predation
- e. hatchery structures or water quality/quantity
- f. broodstock collection
- g. monitoring and research activities
- h. not affected
- i. harvest

**Comments:**

**Data Source:**

33. [#13] **Catch and Escapement**. Enter catch and escapement information in the left-hand table and survival information in the right-hand table for this stock for the most recent 12 years for which data is available. Enter goals in the shaded, first row of each table. Enter **NA** if *Not Applicable* and **M** if information is *Missing*.

Return Year	Total Catch (all ages)	Escapement		
		NoR's Spawning	NoR's to Hatchery	HoR's
<b>Goal</b>				

Brood Year	Smolt to Adult Return Survival (%)	Recruits per Spawner

**Comment:**

**Source of data/information:**

**Appendix C: APRE Questionnaire, Form 2**

## APRE FORM 2<sup>1</sup>: Hatchery Program Description

(The following is a list of the questions in form 1, the actual form as used in the survey can be viewed on APRE on-line questionnaire.)

Form 2 has four parts: Parts A covers hatchery program description, Part B consists of the questions derived from the APRE framework (conditions for success), Part C covers the Hatchery Genetics Management Plan items related to threatened and endangered species (response to most of the HGMP items will be provided though the answers to Part B questions), and Part D covers the supporting data.

The questions that follow all pertain to the following hatchery program

\_\_\_\_\_ (NAME OF PROGRAM)  
 \_\_\_\_\_ (SUBBASIN –of release)  
 \_\_\_\_\_ (PROVINCE –of release)  
 \_\_\_\_\_ (SPECIES/RACE)  
 \_\_\_\_\_ (DATE)

### Part A: Program Description

The first set of questions deal with a general description of the hatchery program.

**Question 1:** [1121] Using the table provide the planned release numbers, size data, release date and release location for the program.

Age Class	Maximum Number	Size (fpp)	Release Date	Location			
				Stream	Release Point (RKm)	Major Watershed	Eco-province
Eggs							
Unfed Fry							
Fry							
Fingerling							
Yearling							

### Data Source

<sup>1</sup> Dr. Don A. Dillman, Washington State University, provided invaluable help in structuring this form to assure accurate and complete responses to the questions.



**Question 2:** [#2053]

Briefly describe the hatchery program including the following items:

Broodstock source: \_\_\_\_\_

Broodstock collection location (Stream, RKM, subbasin): \_\_\_\_\_

Adult holding location (Stream, RKM, subbasin): \_\_\_\_\_

Spawning location (Stream, RKM, subbasin): \_\_\_\_\_

Incubation location (Facility name, stream, RKM, subbasin): \_\_\_\_\_

Rearing location (Facility name, stream, RKM, subbasin): \_\_\_\_\_

Comments:

Source:

**Question 3:** [#1003]

First, identify the agency or organization that operates this hatchery program:

\_\_\_\_\_ (name of agency)

Next, the name and address of the contact person for the program is:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

Email: \_\_\_\_\_.

**Question 4:** [#1004]

Name any co-operators (other agencies, tribes, or organizations involved—including contractors) involved with this program:

1. \_\_\_\_\_ 4. \_\_\_\_\_

2. \_\_\_\_\_ 5. \_\_\_\_\_

3. \_\_\_\_\_ 6. \_\_\_\_\_

For each cooperator briefly describe their involvement in the program:

1.

2.

etc.

**The next three questions deal with program funding and costs. Note that these costs/funds pertain to the specific program costs- NOT to those of the entire facility or complex.**

**(If cost estimates for the individual program is not available, indicate the total cost for the facility and the proportion of the total poundage attributable to this program.)**

**Question 5: [#1005]**

First, what are the funding sources for the program?

List sources:

\_\_\_\_\_  
\_\_\_\_\_

**Question 6: [#2005]**

- a. Next, what is the number of full time equivalent staff? \_\_\_\_\_[enter number]
- b. What are the annual operating costs? \_\_\_\_\_[enter approximate dollar amount]

**Question 7: [#1020]**

What was the first year of operation for this hatchery program? (This is the first year fish were released for this program.)

\_\_\_\_\_ [enter year here]?

**Question 8: [#1007] (Note: this question is worded as a multiple choice question on the web form\*\*\*)**

Hatchery programs are typically classified as either *integrated* or *segregated*.

Is your program *integrated*. \_\_\_\_\_(Yes or No)

(If *No* we can assume that it is segregated)

**Next we will talk about the purpose of your program.**

**Question 9:** [#1008]

- a. Is it the purpose of the program to provide *harvest*? \_\_\_\_\_(Yes or No)
- b. Is it the purpose of the program to contribute to *conservation/recovery*? \_\_\_\_\_(Yes or No)
- c. Is the purpose of the program *research and/or education*. \_\_\_\_\_(Yes or No)

**Question 10:** [#1009]

- a) Is this program mitigation for hydro impacts? \_\_\_\_\_ (Yes or No)
- b) Is this program mitigation for habitat loss? \_\_\_\_\_ (Yes or No)
- c) Is this program mitigation for impacts other than hydro or habitat? \_\_\_\_\_ (Yes or No)

The following question pertains to the guidelines followed by your program.

**Question 11:** [#2054]

List the fish culture guidelines followed for this program (*check all that apply*)

- a) \_\_\_\_\_ IHOT
- b) \_\_\_\_\_ PNFHPC
- c) \_\_\_\_\_ State guidelines
- d) \_\_\_\_\_ Tribal guidelines
- e) \_\_\_\_\_ Federal guidelines
- f) \_\_\_\_\_ Other guidelines (please specify)

**Part B: Facilities and Operations**

**Next we would like to talk about the facilities and operations involved with your hatchery program. First we have several questions that deal with the water sources used for adult holding, incubation and rearing. We start with adult holding. (If standards other than IHOT are followed, specify in comments section.)**

**Question 12:** [#1033]

**For adult holding:**

- a) Is the water source [for adult holding] gravity flow? \_\_\_\_\_(Yes or No)
- b) Is the water source [for adult holding] pumped? \_\_\_\_\_(Yes or No)
- c) Is the water source [for adult holding] pathogen-free? \_\_\_\_\_(Yes or No)
- d) Is the water source [for adult holding] specific-pathogen free? \_\_\_\_\_(Yes or No)
- e) Is the water source [for adult holding] fish free? \_\_\_\_\_(Yes or No)
- f) Is the water source [for adult holding] accessible to anadromous fish? \_\_\_\_\_(Yes or No)
- g) Is water [for adult holding] available from multiple sources? \_\_\_\_\_(Yes or No)
- h) Is water [for adult holding] from the natal stream for the cultured stock? \_\_\_\_\_(Yes or No)
- i) Does the water used [for adult holding] result in natural water temperature profiles that provide optimum maturation and gamete development? \_\_\_\_\_(Yes or No)

- j) Does the water used [for adult holding] meet or exceed the recommended Integrated Hatchery Operations Team (IHOT) water quality standards for temperature? \_\_\_\_\_(Yes or No)
- k) Does the water used [for adult holding] meet or exceed the recommended Integrated Hatchery Operations Team (IHOT) water quality standards for the following compounds: ammonia, carbon dioxide, chlorine, pH, copper, dissolved oxygen, hydrogen sulfide, dissolved nitrogen, iron, and zinc? \_\_\_\_\_(Yes or No)
- l) Is the water supply [for adult holding] protected by flow alarms at the intake(s) ? \_\_\_\_\_(Yes or No)
- m) Is the water supply [for adult holding] protected by flow alarms at the head box? \_\_\_\_\_(Yes or No)
- n) Is the water supply [for adult holding] protected by flow and/or pond level alarms at the holding pond(s) ? \_\_\_\_\_(Yes or No)
- o) Is the water supply [for adult holding] protected by back-up power generation? \_\_\_\_\_(Yes or No)
- p) Do naturally produced fish have access to intake screens? \_\_\_\_\_(Yes or No)
- q) Do hatchery intake screening comply with Integrated Hatchery Operations Team (IHOT) and National Marine Fisheries Service facility standards? \_\_\_\_\_(Yes or No)

**Next we go to water source questions for incubation.**

**Question 13. [#1035]**

**For incubation:**

- a. Is the water source [for incubation] gravity flow? \_\_\_\_\_(Yes or No)
- b. Is the water source [for incubation] pumped? \_\_\_\_\_(Yes or No)
- c. Is the water source [for incubation] pathogen-free? \_\_\_\_\_(Yes or No)
- d. Is the water source [for incubation] specific-pathogen free? \_\_\_\_\_(Yes or No)
- e. Is the water source [for incubation] fish free? \_\_\_\_\_(Yes or No)
- f. Is the water source [for incubation] accessible to anadromous fish? \_\_\_\_\_(Yes or No)
- g. Is water [for incubation] available from multiple sources? \_\_\_\_\_(Yes or No)
- h. Is water [for incubation] from the natal stream for the cultured stock? \_\_\_\_\_(Yes or No)
- i. Does the water used [for incubation] provide natural water temperature profiles that result in hatching/emergence timing similar to that of the naturally produced stock? \_\_\_\_\_(Yes or No)
- j. Can incubation water [for incubation] be heated or chilled to approximate natural water temperature profiles? \_\_\_\_\_(Yes or No)
- k. Does the water used [for incubation] meet or exceed the recommended Integrated Hatchery Operations Team (IHOT) water quality standards for temperature? \_\_\_\_\_(Yes or No)

- l. Does the water used [for incubation] meet or exceed the recommended Integrated Hatchery Operations Team (IHOT) water quality standards for the following compounds: ammonia, carbon dioxide, chlorine, pH, copper, dissolved oxygen, hydrogen sulfide, dissolved nitrogen, iron, and zinc?  
\_\_\_\_\_ (Yes or No)
- m. Is the water supply [for incubation] protected by flow alarms at the intake(s) ? \_\_\_\_\_ (Yes or No)
- n. Is the water supply [for incubation] protected by flow alarms at the head box ? \_\_\_\_\_ (Yes or No)
- o. Is the water supply [for incubation] protected by flow alarms at the incubation unit(s) ? \_\_\_\_\_ (Yes or No)
- p. Is the water supply [for incubation] protected by back-up power generation? \_\_\_\_\_ (Yes or No)
- q. Do naturally produced fish have access to intake screens? \_\_\_\_\_ (Yes or No)
- r. Does hatchery intake screening comply with Integrated Hatchery Operations Team (IHOT) and National Marine Fisheries Service facility standards? \_\_\_\_\_ (Yes or No)

**Next a similar set of questions for the rearing water supply.**

**Question 14. [#1037]**

**For rearing:**

- a. Is the water source [for rearing] gravity flow? \_\_\_\_\_ (Yes or No)
- b. Is the water source [for rearing] pumped? \_\_\_\_\_ (Yes or No)
- c. Is the water source [for rearing] pathogen-free? \_\_\_\_\_ (Yes or No)
- d. Is the water source [for rearing] specific-pathogen free? \_\_\_\_\_ (Yes or No)
- e. Is the water source [for rearing] fish free? \_\_\_\_\_ (Yes or No)
- f. Is the water source [for rearing] accessible to anadromous fish? \_\_\_\_\_ (Yes or No)
- g. Is water [for rearing] available from multiple sources? \_\_\_\_\_ (Yes or No)
- h. Is water [for rearing] from the natal stream for the cultured stock? \_\_\_\_\_ (Yes or No)
- i. Does the water used [for rearing] provide natural water temperature profiles that result in fish similar in size to naturally produced fish of the same species?  
\_\_\_\_\_ (Yes or No)
- j. Does rearing water [for rearing] have a chemical profile significantly different from natural stream conditions to provide adequate imprinting of hatchery fish and minimize the attraction of naturally produced fish into the hatchery? \_\_\_\_\_ (Yes or No)
- k. Does the hatchery operate to allow all migrating species of all ages to by-pass or pass through hatchery related structures? \_\_\_\_\_ (Yes or No)
- l. Are adequate flows maintained to provide unimpeded passage of adults and juveniles in the by-pass reach created by hatchery water withdrawals? \_\_\_\_\_ (Yes or No)

- m. Does the water used [for rearing] meet or exceed the recommended Integrated Hatchery Operations Team (IHOT) water quality standards for temperature? \_\_\_\_\_(Yes or No)
- n. Does the water used [for rearing] meet or exceed the recommended Integrated Hatchery Operations Team (IHOT) water quality standards for the following compounds: ammonia, carbon dioxide, chlorine, pH, copper, dissolved oxygen, hydrogen sulfide, dissolved nitrogen, iron, and zinc? \_\_\_\_\_(Yes or No)
- o. Is the water supply [for rearing] protected by flow alarms at the intake(s) ? \_\_\_\_\_(Yes or No)
- p. Is the water supply protected [for rearing] by flow alarms at the head box ? \_\_\_\_\_(Yes or No)
- q. Is the water supply [for rearing] protected by flow alarms at the rearing unit(s) ? \_\_\_\_\_(Yes or No)
- r. Is the water supply [for rearing] protected by back-up power generation? \_\_\_\_\_(Yes or No)
- s. Do naturally produced fish have access to intake screens? \_\_\_\_\_(Yes or No)
- t. Do hatchery intake screening comply with Integrated Hatchery Operations Team (IHOT) and National Marine Fisheries Service facility standards? \_\_\_\_\_(Yes or No)

**Next we take a look at the hatchery discharge.**

**Question 15.** [#1039]

- a. Does the facility operate within the limitations established in its National Pollution Discharge Elimination System (NPDES) permit? \_\_\_\_\_(Yes or No)
- b. If the production from this facility falls below the minimum production requirement for an NPDES permit, does the facility operate in compliance with state or federal regulations for discharge? \_\_\_\_\_(Yes or No)
- c. Does the facility have a discharge permit? \_\_\_\_\_(Yes or No)

**The next set of questions deal with broodstock collection.**

**Question 16:** [#1246]

In this hatchery program:

- a. is broodstock collected by volitional return to adult capture pond? \_\_\_\_\_(Yes or No)
- b. is broodstock collected at another facility? \_\_\_\_\_(Yes or No)
- c. is broodstock collected from wild by weir? \_\_\_\_\_(Yes or No)
- d. is broodstock collected from wild by net? \_\_\_\_\_(Yes or No)
- e. is broodstock collected from wild by hook and line? \_\_\_\_\_(Yes or No)
- f. is broodstock collected from wild by gaffing? \_\_\_\_\_(Yes or No)
- g. is broodstock collected by methods other than those mentioned above? \_\_\_\_\_(Yes or No)

- h. does spawning take place in covered facility? \_\_\_\_\_(Yes or No)
- i. does spawning takes place at remote location? \_\_\_\_\_(Yes or No)

**The following questions pertain to CHOICE of broodstock**

**Question 17:** [#1260]

Does the broodstock chosen represent natural populations native to the watersheds in which hatchery fish will be released? \_\_\_\_\_(Yes or No)

**Question 18:** [#1261]

If stock has been extirpated, is the broodstock chosen likely to adapt to the system based on life history and evolutionary history? \_\_\_\_\_(Yes or No)

**Question 19:** [#1262]

Does the broodstock chosen display morphological and life history traits similar to the natural population? \_\_\_\_\_(Yes or No)

**Question 20:** [#1263]

Does the broodstock chosen have a history of pathogens NOT endemic to the watershed? \_\_\_\_\_(Yes or No)

**Question 21.** [#1264]

Does the broodstock chosen have the desired life history traits to meet harvest goals? (e.g. timing and migration patterns that result in full recruitment to target fisheries)\_\_\_\_\_ (Yes or No)

**The following information request and questions pertain to COLLECTION of broodstock**

**Question 22:** [#1051]

Are sufficient numbers of donors collected from the natural stock to minimize founder effects? \_\_\_\_\_(Yes or No)

**Question 23:** [#1052]

Is intentional artificial selection of broodstock practiced with respect to size, age, sex ratio, run or spawn timing or other trait? \_\_\_\_\_(Yes or No)

**Question 24:** [#1053]

Are representative samples of natural and hatchery population components collected with respect to size, age, sex ratio, run and spawn timing, and other traits important to long-term fitness? (For integrated populations, consider both natural and hatchery components; for segregated populations, you should only consider the hatchery component.) \_\_\_\_\_(Yes or No)

**Question 25:** [#1054]

Does the proportion of the spawners brought into the hatchery follow a “spread-the-risk” strategy that attempts to improve the probability of survival for the entire population (hatchery and natural components)? \_\_\_\_\_(Yes or No)

**Question 26.** [#1055]

If the wild population has 150 fish or more, is collection of wild broodstock limited to 30% of the population? \_\_\_\_\_(Yes or No)

**Question 27:** [#1056]

Are sufficient broodstock collected to maintain an effective population size of 1000 fish per generation? (More than 500 successful spawners of each sex.) \_\_\_\_\_(Yes or No)

**Question 28:** [#1057]

Is more than 10% of the broodstock derived from wild fish each year? \_\_\_\_\_(Yes or No)

**The following questions pertain to hatchery fish spawning in the wild**

**Question 29:** [#1271]

Do you have guidelines for acceptable contribution of hatchery origin fish to natural spawning? \_\_\_\_\_(Yes or No)

**Question 30:** [#1272]

Are guidelines for hatchery contribution to natural spawning met for all affected naturally spawning populations? \_\_\_\_\_(Yes or No)

Please provide relevant documentation to support this answer.

**The next set of questions deal with fish health standards for broodstock handling.**

**Question 31:** [#1062]

Does the program avoid stock transfers and subsequent releases of eggs or fish from outside the watershed? \_\_\_\_\_(Yes or No)

If no, provide a brief description of the transfers in the comments box.

**Question 32:** [#1063]

- a. Are Integrated Hatchery Operations Team (IHOT), Pacific Northwest Fish Health Protection Committee (PNFHPC), state or tribal guidelines followed for *broodstock fish health inspection*? \_\_\_\_\_(Yes or No)
- b. Are IHOT, PNFHPC, state or tribal guidelines followed for *transfer of eggs or adults*? \_\_\_\_\_(Yes or No)
- c. Are IHOT, PNFHPC, state or tribal guidelines followed for *broodstock holding and disposal of carcasses*? \_\_\_\_\_(Yes or No)



**Question 33:** [#1064]

Is the broodstock collected and held in a manner that results in less than 10% prespawning mortality? \_\_\_\_\_(*Yes or No*)

The calculation should include capture and holding up to spawning.

**Next we address health standards for adult holding...**

**Question 34:** [#1066]

- a. Are Integrated Hatchery Operations Team (IHOT) adult holding guidelines followed for loading? \_\_\_\_\_(*Yes or No*)
- b. Are IHOT adult holding guidelines followed for density? \_\_\_\_\_(*Yes or No*)
- c. Are IHOT adult holding guidelines followed for water quality? \_\_\_\_\_(*Yes or No*)
- d. Are IHOT adult holding guidelines followed for alarm systems? \_\_\_\_\_(*Yes or No*)
- e. Are IHOT adult holding guidelines followed for predator control measures to provide the necessary security for the broodstock? \_\_\_\_\_(*Yes or No*)

**The following questions pertain to spawning...**

**Question 35:** [#1070]

Are males and females available for spawning on a given day randomly mated? \_\_\_\_\_(*Yes or No*)

**Question 36:** [#1071]

Are gametes pooled prior to fertilization? \_\_\_\_\_(*Yes or No*)

**Question 37:** [#1072]

Are back-up males used in the spawning protocol? \_\_\_\_\_(*Yes or No*)

**Question 38:** [#1073]

Are precocious males (e.g. mini-jacks and jacks) used for spawning as a set percentage or in proportion to their contribution to the adult run? (note whether mini-jacks are used in the comment box.) \_\_\_\_\_(*Yes or No*)

**Question 39:** [#1076]

Are fish allowed to select their own mates and go through all normal spawning behavior in a natural environment? \_\_\_\_\_(*Yes or No*)

**Question 40:** [#1077]

Are disinfection procedures during adult spawning implemented that prevent pathogen transmission between stocks of fish on site? (i.e. no leakage into other holding ponds, equipment is disinfected, no water reuse, etc.) \_\_\_\_\_(*Yes or No*)

(If you have written protocols then list the document in the data source box.)

**Question 41:** [#1078]

Is spawning waste collected and disinfected prior to discharge to receiving water? (e.g. Is ovarian fluid and blood from spawning activities disinfected or simply discharged into receiving waters? If discharged, the answer is no) \_\_\_\_\_(Yes or No)

**Next we will talk about incubation and rearing operations of the program...**

**Question 42:** [#1081] Are eggs incubated under conditions that result in equal survival of all segments of the population to ponding? (Does any portion of the eggs derive a survival advantage or disadvantage from incubation procedures? If yes, then mark NO in above box.)\_\_\_\_\_ (Yes or No)

**Question 43:** [#1082] Are incubation conditions manipulated as to synchronize ponding of fry? \_\_\_\_\_(Yes or No)

**Question 44:** [New Question #2055] For each brood, how many times are eggs culled for this program? (Select best answer)

- a) 0
- b) 1
- c) 2
- d) >2

**Question 45:** [#2044] If eggs are culled, is culling done randomly over all segments of the egg-take? \_\_\_\_\_(Yes or No)

**Question 46:** [#1083]

Are eggs incubated in a manner that allows volitional ponding of fry? \_\_\_\_\_(Yes or No)

**Question 47:** [#1097]

Are families within spawning groups mixed randomly at ponding so that unintentional rearing differences affect families equally? \_\_\_\_\_(Yes or No)

**Question 48:** [#1084]

Are families incubated individually? (Includes both eying and hatching.)\_\_\_\_\_ (Yes/No)

**Question 49:** [#1085]

Does incubation take place in home stream water? \_\_\_\_\_(Yes or No)

**Question 50:** [#1086]

Does the program use water sources that result in hatching/emergence timing similar to that of the naturally produced population? \_\_\_\_\_(Yes or No)

**The next several questions deal with IHOT recommendations for incubation...**

**Question 51:** [#1088]

- a. Are IHOT species-specific incubation recommendations followed for water quality? \_\_\_\_\_(Yes or No)
- b. Are IHOT species-specific incubation recommendations followed for flows? \_\_\_\_\_(Yes or No)
- c. Are IHOT species-specific incubation recommendations followed for temperature? \_\_\_\_\_(Yes or No)
- d. Are IHOT species-specific incubation recommendations followed for substrate? \_\_\_\_\_(Yes or No)
- e. Are IHOT species-specific incubation recommendations followed for incubator capacities? \_\_\_\_\_(Yes or No)

**Question 52:** [#1089]

Are disinfection procedures implemented during incubation that prevent pathogen transmission between stocks of fish on site? (Do you have written protocols? If so, describe in the data source box.) \_\_\_\_\_(Yes or No)

**Question 53:** [#1090]

Are eggs monitored when needed to determine fertilization efficiency and embryonic development? (Defines proper time to shock.) \_\_\_\_\_(Yes or No)

**Question 54:** [#1091]

Following eye-up stage, are eggs inventoried, and dead or undeveloped eggs removed and disposed of as described in the disease control guidelines? \_\_\_\_\_(Yes or No)

**Next we will talk about how you determine when fry will be ponded...**

**Question 55:** [#1093]

- a. Are fry removed from incubation units when 80-90% of observed fry have yolk-sac material that is 80-90% utilized and contained within body cavity (“button-up”)? \_\_\_\_\_(Yes or No)
- b. Are fry ponded based on visual inspection of the amount of yolk remaining? \_\_\_\_\_(Yes or No)
- c. Are fry ponded based on a reaching a specified number of accumulated temperature units? \_\_\_\_\_(Yes or No)
- d. Are fry ponded based on a measured maximum wet weight? \_\_\_\_\_(Yes or No)
- e. Are fry ponded based on the recommendations of the facility’s fish health specialist? \_\_\_\_\_(Yes or No)

**Question 56:** [#1094]

Are eggs (dead or culled) discarded in a manner that prevents pathogen transmission to the receiving watershed? \_\_\_\_\_(Yes or No)  
(Provide protocols in comment or cite data source)

**Question 57:** [#1095]

Are fish reared under conditions that result in equal survival of all segments of the population to release? \_\_\_\_\_(Yes or No)

*(In other words, does any portion of the population derive a survival advantage or disadvantage from rearing procedures? If yes, then mark NO in box.)*

**Question 58:** [#1096]

For Segregated Harvest programs, are all fish reared under environmental conditions to improve survival of all segments of the population? \_\_\_\_\_(Yes or No)

*(For example, the answer to this question would be No, if growth of later returning steelhead is accelerated to meet juvenile release size guidelines.)*

**Question 59:** [#2056]

For each brood, how often are juveniles culled in this program? *(Select the best answer)*

- a) 0
- b) 1
- c) 2
- d) >2

**Question 60:** [#1098]

If juveniles are culled, is culling done randomly over all segments of the population?

*(Check the Does not apply box if juveniles are not culled. Otherwise, make sure to capture (in the comments box) the number culled, and the rationale for culling. Include also, the disposition of juveniles)*

**Question 61:** [#1099]

When required to maintain effective population size, are larger families culled to minimize family size variation? \_\_\_\_\_(Yes or No)

**Next we have two questions about fish health...**

**Question 62:** [#1100]

Are IHOT fish health guidelines followed to prevent pathogen transmission between lots or stocks of fish on site or transmission or amplification to or within the watershed?

\_\_\_\_\_ (Yes or No)

*(If other standards/guidelines are used note in comments...get copy of guidelines.)*

**Question 63.** [#1103]

Whenever possible, are vaccines used to minimize the use of antimicrobial compounds?

\_\_\_\_\_ (Yes or No)

**The next set of questions deal with Feeding**

**Question 64:** [#1105]

Does the operator follow:

- a. Are proper feeding rates followed so that fish size is within 10% of program goal each year? \_\_\_\_\_(Yes or No)
- b. Does the operator conduct periodic feed quality analysis? \_\_\_\_\_(Yes or No)
- c. Is feed stored under proper conditions as described in IHOT guidelines? \_\_\_\_\_(Yes or No)

**Question 65.** [#1106]

Is the correct amount and type of food provided to achieve the desired: (Check all that apply)

- a. Is the correct amount and type of food provided to achieve the desired growth rate? \_\_\_\_\_(Yes or No)
- b. Is the correct amount and type of food provided to achieve the desired body composition? \_\_\_\_\_(Yes or No)
- c. Is the correct amount and type of food provided to achieve the desired condition factors for the species and life stage being reared? \_\_\_\_\_(Yes or No)

*Note: Body composition (b) determined by internal measurements (lipids etc.) while Condition factor (c) is based on physical measurements (Length and weight).*

**Question 66:** [#1109]

Does the program use a diet and growth regime that mimics natural seasonal growth patterns? If not, describe the differences in the comment field. \_\_\_\_\_(Yes or No)

*Note: For most programs this is rapid growth in spring, maintenance condition during winter. If yes, note in the comment box how this is determined.*

**Question 67:** [#1110]

Are settleable solids, unused feed and feces periodically removed to ensure proper cleanliness of rearing container? \_\_\_\_\_(Yes or No)

*In the comments field note what the procedure is and cite if there is a document that supports a yes answer to the question.*

**Next we will talk about whether the program is attempting to mimic natural rearing conditions**

**Question 68:** [#1111] Is the program attempting to better mimic the natural stream environment?

- a. Is the program attempting to better mimic the natural stream environment by reducing rearing density below agency or other guidelines? \_\_\_\_\_(Yes or No)
- b. Is the program attempting to better mimic the natural stream environment by rearing under natural water temperature? \_\_\_\_\_(Yes or No)
- c. Is the program attempting to better mimic the natural stream environment by actively simulating photoperiod? \_\_\_\_\_(Yes or No)
- d. Is the program attempting to better mimic the natural stream environment by providing a range of hydraulic characteristics? \_\_\_\_\_(Yes or No)
- e. Is the program attempting to better mimic the natural stream environment by subsurface feeding conditions? \_\_\_\_\_(Yes or No)
- f. Is the program attempting to better mimic the natural stream environment by predator avoidance training? \_\_\_\_\_(Yes or No)
- g. Is the program attempting to better mimic the natural stream environment by providing natural or artificial cover?

**The next set of questions deal with the quality of fish produced from the program...**

**Question 69:** [#1112]

Are the fish produced similar to natural fish:

- a. Are the fish produced qualitatively similar to natural fish in size (fpp and length)? \_\_\_\_\_(Yes or No)
- b. Are the fish produced qualitatively similar to natural fish in morphology? \_\_\_\_\_(Yes or No)
- c. Are the fish produced qualitatively similar to natural fish in behavior? \_\_\_\_\_(Yes or No)
- d. Are the fish produced qualitatively similar to natural fish in growth rate? \_\_\_\_\_(Yes or No)
- e. Are the fish produced qualitatively similar to natural fish in physiological status? \_\_\_\_\_(Yes or No)
- f. Are the fish produced qualitatively similar to natural fish in health? \_\_\_\_\_(Yes or No)
- g. Are the fish produced qualitatively similar to natural fish in other characteristics? \_\_\_\_\_(explain)

**Next we talk about guidelines for juvenile rearing...**

**Question 70:** [#1113]

Are fish reared in multiple facilities or with redundant systems to reduce the risk of catastrophic loss? \_\_\_\_\_(Yes or No)

**Question 71:** [#2045] What is the basis for the juvenile rearing density and loading guidelines used at the facility?

- a. Are juvenile rearing density and loading guidelines used at the facility based on *standardized agency guidelines*? \_\_\_\_\_(Yes or No)
- b. Are juvenile rearing density and loading guidelines used at the facility based on *life-stage specific survival studies conducted on-site*? \_\_\_\_\_(Yes or No)
- c. Are juvenile rearing density and loading guidelines used at the facility based on *life-stage specific survival studies conducted at other facilities*? \_\_\_\_\_(Yes or No)
- d. Are juvenile rearing density and loading guidelines used at the facility based on *staff experience (e.g. trial and error)*? \_\_\_\_\_(Yes or No)
- e. Are juvenile rearing density and loading guidelines used at the facility based on *other criteria*? \_\_\_\_\_(Yes or No)

**Question 72:** [1114]

Are IHOT rearing guidelines followed?

- a. \_\_\_\_\_Are IHOT juvenile rearing standards followed for water quality? (Yes or No)
- b. \_\_\_\_\_Are IHOT juvenile rearing standards followed for alarm systems? (Yes or No)
- c. \_\_\_\_\_Are IHOT juvenile rearing standards followed for predator control measures to provide the necessary security for the cultured stock? (Yes or No)
- d. \_\_\_\_\_Are IHOT juvenile rearing standards followed for loading?
- e. \_\_\_\_\_Are IHOT juvenile rearing standards followed for density?

**The next few questions apply to captive broodstock programs only. These questions should be skipped if they do not apply.**

**Question 73:** [#1115]

- a. For captive broodstocks, are fish maintained on a *natural photoperiod* to ensure normal maturation? \_\_\_\_\_(Yes or No)
- b. For captive broodstocks, are fish maintained at 12<sup>0</sup>C to minimize disease? \_\_\_\_\_(Yes or No)

**Question 74:** [#1116]

For captive broodstocks, are diets and growth regimes selected that produce potent, fertile gametes and reduce excessive early maturation of fish? \_\_\_\_\_(Yes or No)

*If yes, describe in the comments how this objective is achieved.*

**Question 75:** [#1117]

For captive broodstocks, are families reared individually to maintain pedigrees?

\_\_\_\_\_ (Yes or No)

**The next two questions deal with record keeping...**

**Question 76:** [#1118]

Does the fish inventory data accurately reflect pond or rearing vessel populations within 10%?. \_\_\_\_\_ (Yes or No)

*In the comment box please provide the data to support the answer.*

**Question 77:** [#1119]

Identify the inventory program (e.g. HATPRO) used at this facility

\_\_\_\_\_ [text]

**Next we turn to questions about hatchery security...**

**Question 78:** [#1255]

Is the facility sited so as to minimize the risk of catastrophic fish loss from flooding?

\_\_\_\_\_ (Yes or No)

*In the comments box capture relevant data regarding flooding incidences and their severity at the hatchery.*

**Question 79:** [#1256]

Is staff notified of emergency situations at the facility through the use of alarms, autodialer, and pagers? \_\_\_\_\_ (Yes or No)

**Question 80:** [#1257]

Is the facility continuously staffed to ensure the security of fish stocks on-site?

\_\_\_\_\_ (Yes or No)

*A yes answer means that someone either lives on-site or the facility is staffed 24-hours.*

**Now we will address the potential environmental impacts of the program...**

**Question 81:** [#1258]

Has a facility riparian management plan been implemented that incorporates vegetation management, herbicide and pesticide use, and surface water management provisions?

\_\_\_\_\_ (Yes or No)

**Question 82:** [#1259]

Has an on or off-site facility habitat mitigation plan been implemented? \_\_\_\_\_ (Yes or No)

*The plan would have been designed to mitigate for hatchery facilities or operations.*



**Question 83:** [#1120]

Does the hatchery operate to allow all migrating species of all ages to pass through hatchery related structures to maximize use of natural habitat? \_\_\_\_\_(Yes or No)

*Provide rationale for answer in comments box*

**The next set of questions deal release operations of the program.**

**Question 84:** [#1125]

Are fish released at sizes and life history stages similar to those of natural fish of the same species? \_\_\_\_\_(Yes or No)

*Document life-stages released in comment field.*

**Question 85:** [#1126]

Are fish released at a time, size, location, and in a manner that achieves the harvest goals established for the stock? \_\_\_\_\_(Yes or No)

**Question 86:** [#1127]

Are volitional releases during natural out-migration timing practiced? \_\_\_\_\_(Yes or No)

*For a yes answer, releases should occur over multiple-days to weeks. At least 90% of the fish exit rearing facility voluntarily.*

**Question 87:** [#2046]

How is the migratory status of the release population determined?

- a. Is the migratory status of the release population determined by *ATPase testing* (or other physiological tests)? \_\_\_\_\_(Yes or No)
- b. Is the migratory status of the release population determined by *salt-water challenge*? \_\_\_\_\_(Yes or No)
- c. Is the migratory status of the release population determined by *volitional release*? \_\_\_\_\_(Yes or No)
- d. Is the migratory status of the release population determined by *behavior*? \_\_\_\_\_(Yes or No)
- e. Is the migratory status of the release population determined by *condition factor*? \_\_\_\_\_(Yes or No)
- f. Is the migratory status of the release population determined by *physical appearance*? \_\_\_\_\_(Yes or No)
- g. Is the migratory status of the release population determined by *other criteria*? \_\_\_\_\_(Yes or No)

**Question 88:** [#1128]

Are fish released in a manner that simulates natural seasonal migratory patterns?

\_\_\_\_\_ (Yes or No)

*Releases should occur over multiple-days to weeks during each season. (But does not have to be volitional)*

**Question 89:** [#1129]

Are fish released at an optimum time and size that has been determined by a site-specific survival study? \_\_\_\_\_ (Yes or No)

*Cite study in Data Source Field*

**Question 90:** [#1130]

Are fish released at an optimum time and size that has been determined by survival studies from another facility? \_\_\_\_\_ (Yes or No)

**Question 91:** [#1131]

Are fish released at a specific time and size specified in an established juvenile production goal? \_\_\_\_\_ (Yes or No)

*Provide data in comments if not already entered previously.*

**Question 92:** [#1132]

Are fish released at a specific time and size based on favorable environmental conditions in the receiving habitat? \_\_\_\_\_ (Yes or No)

*Describe in comments*

**Question 93:** [#1265]

Has the carrying capacity of the **subbasin** been taken into consideration in sizing this program in regards to determining the number of fish released? \_\_\_\_\_ (Yes or No)

**Question 94:** [#1135]

Are fish released in stream reaches within the historic range of that stock? \_\_\_\_\_ (Yes or No)

**Question 95:** [#1136]

Are fish released at times of the year and sizes to allow adoption of multiple life history strategies? \_\_\_\_\_ (Yes or No)

*The answer to this question is Yes, if hatchery is releasing multiple life-stages, on different release dates (over many weeks or months).*

**Question 96:** [#1138]

Are fish released in the same subbasin as rearing facility? \_\_\_\_\_ (Yes or No)

*This question is trying to determine if fish (juveniles) are transported into the subbasin.*

**The next couple of questions deal with health and inspection issues**

**Question 97:** [#1139]

Are all fish examined for presence of “reportable pathogens” as defined in the PNFHPC disease control guidelines, no less than 3 weeks prior to release? \_\_\_\_\_(*Yes or No*)

**Question 98:** [#1140]

Are fish transfers into the subbasin inspected and accompanied by appropriate notifications as described in IHOT or PNFHPC guidelines? \_\_\_\_\_(*Yes or No*)

**Question 99:** [#1141] Are Integrated Hatchery Operations Team (IHOT) guidelines followed for fish transport? \_\_\_\_\_(*Yes or No*)

*If no, list other guidelines followed in comment box.*

**Next we have three questions about fish marking...**

**Question 100:** [#1142]

Are marking/tagging techniques used to distinguish among segments of the hatchery population (e.g. yearlings or subyearlings)? \_\_\_\_\_(*Yes or No*)

**Question 101:** [#1266]

Are 100% of the hatchery fish marked so that they can be distinguished from the natural populations? \_\_\_\_\_(*Yes or No*)

*Note that marking can be internal or external.*

**Question 102:** [#1143]

Can marked fish be identified using non-lethal means? \_\_\_\_\_(*Yes or No*)

**Question 103:** [#1145]

Are hatchery adults (carcasses or live fish) distributed by staff within the subbasin?

- a. Are hatchery adults distributed (by staff) within the subbasin to provide ecological benefits (marine nutrients, wildlife food etc.)? \_\_\_\_\_(*Yes or No*)
- b. Are hatchery adults distributed (by staff) within the subbasin to provide fishing opportunity? \_\_\_\_\_(*Yes or No*)
- c. Are hatchery adults distributed (by staff) within the subbasin to provide natural production? \_\_\_\_\_(*Yes or No*)

*Note: Could be carcasses or live fish*

**Question 104:** [#2047]

What percent of the naturally spawning population in the subbasin consists of adults from this program? Check best answer!

- a. Adults from this program make up *less than 5% of the natural* spawning escapement (for the species/race) in the subbasin.
- b. Adults from this program make up *between 5 and 30% of the natural* spawning escapement (for the species/race) in the subbasin.
- c. Adults from this program make up *more than 30% of the natural* spawning escapement (for the species/race) in the subbasin.

**Question105:** [#2057]

The percent of hatchery fish spawning in the wild each year is estimated by: (*Check all that apply*)

- a) Annual stream surveys (e.g. carcasses)
- b) Escapement data from a weir or dam
- c) Staff experience
- d) Harvest records, creel surveys
- e) Is not estimated

**Question 106:** [#2048]

Wild fish make up what percent of the broodstock for this program?

- a. Wild fish make up *less than 5% of the broodstock* for this program.
- b. Wild fish make up *between 5 and 30% of the broodstock* for this program
- c. Wild fish make up *more than 30% of the broodstock* for this program.

**Question 107:** [#2058]

The percent of wild fish used as broodstock for this program is estimated based on: (*Check all that apply*)

- a) External marks (e.g. fin clips)
- b) Internal marks (CWT, Pit tags)
- c) Staff experience
- d) Is not estimated

**Next we move to a different topic ...the following questions pertain to accountability...**

**Question 108:** [#1149]

Are key hatchery personnel aware of the goals for the hatchery with respect to conservation, harvest and other purposes? \_\_\_\_\_ (*Yes or No*)

In the comment box describe how they are made aware of goals (written report?)

**Question 109:** [#1150]

Are expenditures tracked to assure that funds are expended as intended for the hatchery program? \_\_\_\_\_(Yes or No)

**Question 110:** [#1151]

Are key staff aware of the funding available for carrying out the various activities in the production cycle so that it can be done in the most cost effective manner? \_\_\_\_\_(Yes or No)

**Question 111:** [#2049]

Are hatchery programming and operational decisions based on an **Adaptive Management Plan**? \_\_\_\_\_(Yes or No)

*(For example, is an annual report produced describing hatchery operations, results of studies, program changes etc? If a written plan does not exist then the answer is No.)*

**Question 112:** [#1152]

Is all new relevant information from research or other sources made available to hatchery staff and others and used for attaining goals? \_\_\_\_\_(Yes or No)

**Question 113:** [#1153]

Is the most recent information obtained from monitoring and evaluation programs for the production cycle, including performance indicators and progress toward goals, taken into consideration when determining whether hatchery operations should be changed or not? \_\_\_\_\_(Yes or No)

*Provide examples in the comments box if available.*

**Question 114:** [#1154]

Is there a management program in place that assures that information pertaining to items #1150-1153 is available on a “real-time” basis and that changes warranted by that information are implemented? \_\_\_\_\_(Yes or No) (“Real-time” is within a year.)

**Question 115:** [#1155]

Are standards specified for in-culture performance of hatchery fish? \_\_\_\_\_(Yes or No)  
*Provide documentation in source box*

**Question 116:** [#2050]

Are in-culture performance standards met? \_\_\_\_\_(Yes or No)  
*Provide documentation in source box.*

**Question 117:** [#2051]

Are standards specified for post release performance of hatchery fish and their offspring? \_\_\_\_\_(Yes or No)

**Question 118:** [#2052]

Are post-release performance standards met? \_\_\_\_\_(*Yes or No*)

**Question 119:** [#1156]

Are there state or federal laws or policies that constrain the program by specifying objectives, such as numbers and size of fish produced? \_\_\_\_\_(*Yes or No*) (*Does not mean the NMFS estuary release numbers.*)

**Next we will talk about education related questions...**

**Question 120:** [#1157]

Is the hatchery facility open to the public during hours of operation? \_\_\_\_\_(*Yes or No*)

**Question 121:** [#1158]

Are the hatchery operations visible to facility visitors? \_\_\_\_\_(*Yes or No*)

**Question 122:** [#1159]

Are hatchery operations (egg take, incubation, rearing) demonstrated to the public? \_\_\_\_\_(*Yes or No*)

**Question 123:** [#1160]

Does the facility have a fish ladder and/or adult holding facilities that are open to the public? \_\_\_\_\_(*Yes or No*)

**Question 124:** [#1161]

Does the hatchery have signage describing the facility, fish production goals, ties to management goals, and ecosystem function? \_\_\_\_\_(*Yes or No*)

**Question 125:** [#1162]

Is there a visible link to the riparian zone such as viewing boardwalk or bridge? \_\_\_\_\_(*Yes or No*)

**Question 126:** [#1163]

Is the facility used by other fish and wildlife programs? \_\_\_\_\_(*Yes or No*)

**Question 127:** [#1164]

Does the hatchery schedule tours for groups? \_\_\_\_\_(*Yes or No*)

**Question 128:** [#1165]

Does the program provide opportunities for student interns? \_\_\_\_\_(*Yes or No*)

**Question 129:** [#1166]

Does the program provide opportunities for citizen volunteer involvement? \_\_\_\_\_(*Yes or No*)

**Question 130:** [#1167]

Does the agency maintain a web page describing the hatchery program? \_\_\_\_\_(Yes or No)

**Question 131:** [#1168]

Is a pamphlet or brochure describing agency or hatchery programs available?  
\_\_\_\_\_(Yes or No)

**Question 132:** [#1169]

Are eggs or fish provided to volunteer groups and educational groups? \_\_\_\_\_(Yes or No)

**Question 133:** [#1170]

Is hatchery staff involved in community/volunteer meetings or outreach programs?  
\_\_\_\_\_(Yes or No)

**Question 134:** [#1171]

Does hatchery staff regularly give classroom presentations? \_\_\_\_\_(Yes or No)

*At least yearly in order to answer yes.*

**Question 135:** [#1172]

Does hatchery staff participate in formal professional presentations/seminars?  
\_\_\_\_\_(Yes or No)

**Question 136:** [#1173]

Is the facility used or does staff participate in agency, university, or other research projects? \_\_\_\_\_(Yes or No)

**Question 137:** [#1174]

Are data and information pertaining to the program accessible to interested parties?  
\_\_\_\_\_(Yes or No)

**Part C: HGMP Questions**

**Question 138 :** [#1011]

Which of the following statements apply? (*Check all that apply*)

- a. Hatchery fish are not accessible to fisheries
- b. Hatchery fish accessible to fisheries because the fish produced are temporarily and/or spatially separated from weaker stocks
- c. Hatchery fish accessible to fisheries because the fish produced are differentially marked to enable selective harvest
- d. Hatchery fish accessible to fisheries because the fish produced are available in sufficient number to the fisheries (location, time, gear) that are intended to benefit from the program (i.e. to meet the harvest goals)
- e. It is unknown if hatchery fish are accessible to fisheries

**Question 139:** [#1012]

Identify the performance indicators for harvest benefits.

<b>Indicator</b>	<b>Performance Standard</b>	<b>Indicator is monitored</b>
Spawner to spawner survival of hatchery fish.		
Contribution of hatchery fish to target fisheries.		
Angler success (hatchery fish per angler day) in target recreational fisheries		
Contribution of hatchery fish to cultural needs		
Selective harvest success (expected benefits of mass marking)		
Value of harvest (lbs)		
Quality of hatchery fish harvested		

In the Performance Standard box enter the performance standard for all that apply. You can use a number, provide a brief text description, and use NA for No Applicable, or U for unknown, and No if no standard is defined.

In the Indicator is monitored box; enter Y if the standard is monitored, N if it is not, NA if not Applicable, or U for unknown.

**Question 140:** [#1013]

Identify the performance indicators for harvest risks.

<b>Indicator</b>	<b>Performance Standard</b>	<b>Indicator is monitored</b>
Harvest impacts on co-mingled stocks		
Bias in run size estimation of natural stocks due to masking effect		
Lack of harvest access (under harvest due e.g. to co-mingling with weaker stocks)		

In the Performance Standard box enter the performance standard for all that apply. You can use a number, provide a brief text description, and use NA for No Applicable, or U for unknown, and No if no standard is defined.

In the Indicator is monitored box; enter Y if the standard is monitored, N if it is not, NA if not Applicable, or U for unknown.



**Question 141:** [#1014]

Identify the performance indicators for conservation benefits.

<b>Indicator</b>	<b>Performance Standard</b>	<b>Indicator is monitored</b>
Genetic and life history diversity (over time)		
Spawner to spawner reproductive success of hatchery fish		
Reproductive success of the receiving (supplemented) naturally spawning population		
Contribution to the abundance of the naturally spawning population		
Time and location of spawning		
Contribution to ecosystem function (e.g. through nutrient enhancement, food web effects, etc.)		

In the Performance Standard box enter the performance standard for all that apply. You can use a number, provide a brief text description, and use NA for No Applicable, or U for unknown, and No if no standard is defined.

In the Indicator is monitored box; enter Y if the standard is monitored, N if it is not, NA if not Applicable, or U for unknown.

**Question 142:** [#1015]

Identify the performance indicators for conservation risks.

<b>Indicator</b>	<b>Performance Standard</b>	<b>Indicator is monitored</b>
Unintended contribution of hatchery fish to natural spawning (through straying)		
Loss of genetic and life history diversity		
Loss of reproductive success		
Ecological interactions through competition with natural stocks (by life stage)		
Ecological interactions through predation on natural stocks (by life stage)		
Adverse effects of hatchery operations and facilities on fish migration		
Disease transfers		

In the Performance Standard box enter the performance standard for all that apply. You can use a number, provide a brief text description, and use NA for Not Applicable, or U for unknown, and No if no standard is defined.

In the Indicator is monitored box; enter Y if the standard is monitored, N if it is not, NA if not Applicable, or U for unknown.

**Question 143:** [#1016] Identify the performance indicators for information gain. Which of the following statements are true?

- a. Hatchery program contributes to research to improve performance and cost effectiveness
- b. New information affects change to the hatchery program through a structured adaptive decision making process
- c. Hatchery program participates in basin wide-coordinated research efforts
- d. Hatchery program actively contributes to public education
- e. Funding for monitoring of performance indicators is adequate

**Question 144:** [#1017]

Describe plans and methods proposed to collect data necessary to respond to each “Performance Indicator” identified for the program.

[text field to be completed by manager/operator]

**Question 145:** [# 15]

Identify ESA-listed populations that may incidentally be affected by the program (*includes ESA-listed fish in target hatchery fish releases, adult returns, and broodstock collection areas*)

**Question 146:** [#1018]

Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

[text field to be completed by manager/operator]

**Question 147:** [#1019]

Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.

*(e.g. “The Wenatchee River smolt trap will be continuously monitored, and checked every eight hours, to minimize the duration of holding and risk of harm to listed spring chinook and steelhead that may be incidentally captured during the sockeye smolt emigration period.”)*

[text field to be completed by manager/operator]

**Question 148:** [#1021]

What will be the final year of hatchery program? Enter “U” if that is “Undetermined.

**Question 149:** [#1022]

If the answer to the previous question (hatchery termination date) is undetermined, which of the following statements are true?

- a. The program is on-going with no planned termination
- b. The program meets goals that cannot be accomplished in any other manner and is expected to continue indefinitely
- c. The program is expected to end when goals can be met by other means not requiring artificial production
- d. The program will be terminated when it is determined that the program will not meet its goals

**Question 150:** [#1025]

List all ESA permits or authorizations in hand for the hatchery program (select one or more):

- a. Section 7 or Section 10 permit
- b. 4D rule
- c. 401 certification
- d. Other (Specify)
- e. None

**Question 151-153.** [#1273, 1026, 2026] Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).

**Table 1. Estimated listed salmonid take levels of by hatchery activity.**

<b>Listed species affected:</b> _____				
<b>ESU/Population:</b> _____		<b>Activity:</b> _____		
<b>Location of hatchery activity:</b> _____		<b>Dates of activity:</b> _____		
<b>Hatchery program operator:</b> _____				
<b>Annual Take of Listed Fish By Life Stage</b> <i>(Number of Fish)</i>				
<b>Type of Take</b>	<b>Egg/Fry</b>	<b>Juvenile/Smolt</b>	<b>Adult</b>	<b>Carcass</b>
<b>Observe or harass a)</b>				
<b>Collect for transport b)</b>				
<b>Capture, handle, and release c)</b>				
<b>Capture, handle, tag/mark/tissue sample, and release d)</b>				
<b>Removal (e.g. broodstock) e)</b>				
<b>Intentional lethal take f)</b>				
<b>Unintentional lethal take g)</b>				
<b>Other Take (specify) h)</b>				

- a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migration delay at weirs.
- b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
- c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.
- d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.
- e. Listed fish removed from the wild and collected for use as broodstock.
- f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.
- g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
- h. Other takes not identified above as a category.

**Instructions:**

1. An entry for a fish to be taken should be in the take category that describes the greatest impact.
2. Each take to be entered in the table should be in one take category only (there should not be more than one entry for the same sampling event).
3. If an individual fish is to be taken more than once on separate occasions, each take must be entered in the take table.

**Question 154.** [#1027] Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.

*(e.g. “The number of days that steelhead are trapped at Priest Rapids Dam will be reduced if the total mortality of handled fish is projected inseason to exceed the 1988-99 maximum observed level of 100 fish.”)*

[text field to be completed by manager/operator]

**Question 155.** [#1028] Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the NPPC *Annual Production Review Report and Recommendations - NPPC document 99-15*). Explain any proposed deviations from the plan or policies.

*(e.g. “The hatchery program will be operated consistent with the ESU-wide plan, with the exception of age class at release. Fish will be released as yearlings rather than as sub-yearlings as specified in the ESU-wide plan, to maximize smolt-to-adult survival rates given extremely low run sizes the past four years.”)*

[text field to be completed by manager/operator]

**Question 156.** [#1029] List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.

**Question 157.** [#1030] Relationship to harvest objectives.

*Explain whether artificial production and harvest management have been integrated to provide as many benefits and as few biological risks as possible to the listed species. Reference any harvest plan that describes measures applied to integrate the program with harvest management.*

[text field to be completed by manager/operator]

**Question 158.** [#1031] Relationship to habitat protection and recovery strategies.

*Describe the major factors affecting natural production (if known). Describe any habitat protection efforts, and expected natural production benefits over the short- and long-term. For Columbia Basin programs, use NPPC document 99-15, section II.C. as guidance in indicating program linkage with assumptions regarding habitat conditions.*

[text field to be completed by manager/operator]

**Question 159.** [#1032] Which of the following species co-occur to a significant degree with the program fish in either freshwater or early marine life stages.

Significant co-occurrence between program fish and this species (check all that apply)	
<input type="checkbox"/>	Steelhead
<input type="checkbox"/>	Pink
<input type="checkbox"/>	Chum
<input type="checkbox"/>	Sockeye
<input type="checkbox"/>	Coho
<input type="checkbox"/>	Chinook
<input type="checkbox"/>	Bull Trout

**Question 160.** [#1251] Describe operational difficulties or disasters that have led to significant fish mortality.

[text field to be completed by manager/operator]

**Question 161.** [#1067] Are procedures in place that maintain broodstock collection within programmed levels?

If the answer is yes, describe that procedure:

Check all that apply	
<input type="checkbox"/>	A collection plan for natural origin adults is in place that prevents collection of surplus fish
<input type="checkbox"/>	All fish returning to the hatchery are needed to maintain the programmed hatchery level
<input type="checkbox"/>	Excess adults are used for seeding available habitat in accordance with genetic guidelines
<input type="checkbox"/>	Excess adults are culled at random and sold, buried, or donated to food banks depending on their quality

**Questions 162.** [#1074] Are cryopreserved gametes used?

*If used describe the number of donors, year of collection, number of times donors were used in the past, and expected and observed viability.*

[text field to be completed by manager/operator]

**Question 163.** [#1080] Describe circumstances where extra eggs may be taken (*e.g as a safeguard against potential incubation losses*), and the disposition of surplus fish safely carried through to the eyed-egg or fry stage to prevent exceeding programmed levels.

[text field to be completed by manager/operator]

**Question 164.** [#1101] For the facility, provide a five year disease history of pathogens that significantly affect fish health.

[text field to be completed by manager/operator]

**Question 165.** [#1102] Have hatchery specific performance standards for carrying capacity that consider fish health and post-release survival been developed and are they followed? (*yes/no*)

**Question 166.** [#1133] For off-station releases, describe fish acclimation procedures including methods applied and length of time.  
[text field to be completed by manager/operator]

**Question 167.** [#1134] Describe disposition plans for fish identified at the time of release as surplus to programmed or approved levels.  
[text field to be completed by manager/operator]

**Question 168.** [#1148] Describe emergency release procedures in response to flooding or water system failure.  
[text field to be completed by manager/operator]

### **Research Information**

Provide the following information for any research programs conducted in direct association with the hatchery program described in this HGMP. Provide sufficient detail to allow for the independent assessment of the effects of the research program on listed fish. If applicable, correlate with research indicated as needed in any ESU hatchery plan approved by the co-managers and NMFS. Attach a copy of any formal research proposal addressing activities covered in this section. Include estimated take levels for the research program with take levels provided for the associated hatchery program.

**Question 169.** [#1175] What is the objective or purpose of the research program?

*Indicate why the research is needed, its benefit or effect on listed natural fish populations, and broad significance of the proposed project.*

[text field to be completed by manager/operator]

**Question 170.** [#1176] Identify cooperating and funding agencies.  
[text field to be completed by manager/operator]

**Question 171.** [#1177] Identify principal investigator or project supervisor and staff.  
[text field to be completed by manager/operator]

**Question 172.** [#1178] Identify stocks affected by the research project.  
[text field to be completed by manager/operator]

**Question 173.** [#1179] Identify techniques used: include capture methods, drugs, samples collected, tags applied.  
[text field to be completed by manager/operator]

**Question 174.** [#1180] Identify dates or time period in which research activity occurs.  
[text field to be completed by manager/operator]

**Question 175.** [#1181] Describe the care and maintenance of live fish or eggs, holding duration, transport methods.

**Question 176.** [#1182] Describe the expected type and effects of take and potential for injury or mortality.

**Question 177.** [#1184] Identify alternative methods to achieve project objectives.

**Question 178.** [#1185] List species similar or related to the threatened species; provide number and causes of mortality related to this research project.

**Question 179.** [#1186] Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities.

(e.g. “Listed coastal cutthroat trout sampled for the predation study will be collected in compliance with NMFS Electrofishing Guidelines to minimize the risk of injury or immediate mortality.”).

**Questions 180-182.** [#1274, 1269, 1270] For research projects describe the level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size (Table 1) if not already indicated above.

**Table 1. Estimated listed salmonid take levels of by hatchery activity.**

<b>Listed species affected:</b> _____				
<b>ESU/Population:</b> _____		<b>Activity:</b> _____		
<b>Location of hatchery activity:</b> _____			<b>Dates of activity:</b> _____	
<b>Hatchery program operator:</b> _____				
<b>Annual Take of Listed Fish By Life Stage (<u>Number of Fish</u>)</b>				
<b>Type of Take</b>	Egg/Fry	Juvenile/Sm olt	Adult	Carcass
<b>Observe or harass a)</b>				
<b>Collect for transport b)</b>				
<b>Capture, handle, and release c)</b>				
<b>Capture, handle, tag/mark/tissue sample, and release d)</b>				
<b>Removal (e.g. broodstock) e)</b>				
<b>Intentional lethal take f)</b>				
<b>Unintentional lethal take g)</b>				
<b>Other Take (specify) h)</b>				

a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.



- b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
- c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.
- d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.
- e. Listed fish removed from the wild and collected for use as broodstock.
- f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.
- g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
- h. Other takes not identified above as a category.

**Instructions:**

- 1. An entry for a fish to be taken should be in the take category that describes the greatest impact.*
- 2. Each take to be entered in the table should be in one take category only (there should not be more than one entry for the same sampling event).*
- 3. If an individual fish is to be taken more than once on separate occasions, each take must be entered in the take table.*



**Question 184.** [#1034] Fill out the tables below choosing the source(s) of water available. Provide available information on flow and temperature means and ranges.

For **adult holding**:

Water Source	Mean Flow (gpm)	Min. Flow (gpm)	Max. Flow (gpm)	Mean Temp. °F	Min. Temp. °F	Max. Temp. °F	Mean D.O. (ppm)	Min. D.O. (ppm)	Max. D.O. (ppm)
Spring									
Well									
Surface Water									
Brackish Water									
Saltwater									

**Question 185.** [#1036] Same for **incubation**.

Water Source	Mean Flow (gpm)	Min. Flow (gpm)	Max. Flow (gpm)	Mean Temp. °F	Min. Temp. °F	Max. Temp. °F	Mean D.O. (ppm)	Min. D.O. (ppm)	Max. D.O. (ppm)
Spring									
Well									
Surface Water									

**Question 186.** [#1038] Same for **rearing**.

Water Source	Mean Flow (gpm)	Min. Flow (gpm)	Max. Flow (gpm)	Mean Temp. °F	Min. Temp. °F	Max. Temp. °F	Mean D.O. (ppm)	Min. D.O. (ppm)	Max. D.O. (ppm)
Spring									
Well									
Surface Water									
Brackish Water									
Saltwater									

**Question 187.** [#1047] Using the table below, indicate the type of fish transportation equipment used, the length of time in transit, and any chemical treatment and dosage applied during transport.

<b>Equipment Type</b>	<b>Capacity (gallons)</b>	<b>Supplemental Oxygen (Y/N)</b>	<b>Normal Transit Time</b>	<b>Chemical(s) Used</b>	<b>Dosage (ppm)</b>
Tank					
Other Equipment					

**Data Source**

**Question 188.** [#1048] Using the following table, describe the type (*concrete, asphalt, gravel, etc*), pond volume, dimensions (if applicable) and flow for each broodstock holding pond.

<b># of Ponds</b>	<b>Pond Type</b>	<b>Volume (cu. ft.)</b>	<b>Length (ft.)</b>	<b>Width (ft.)</b>	<b>Depth (ft.)</b>	<b>Available Flow (gpm)</b>

**Data Source**

**Question 189.** [#1049] Using the following table fill in the number of each type of incubator, the water flow used, and volume (if applicable) and loading of incubation units.

Incubator Type	Number of Units	Flow (gpm)	Volume (if applicable)	Loading – Eyeing (eggs/unit)	Loading – Hatching (eggs/unit)
Pull down list and other					

**Data Source**

**Question 190.** [#1050] Using the following table, describe the type (*concrete, asphalt, gravel, etc*), pond volume, dimensions (if applicable) and flow for each rearing, acclimation, and release pond.

# of Units	Pond Type	Volume (cu. ft.)	Length (ft.)	Width (ft.)	Depth (ft.)	Flow (gpm)	Maximum Flow Index	Maximum Density Index

**Data Source**

**Question 191.** [#1065] Using the following table, enter the planned and past broodstock collection levels for the last 12 years, or for most recent years available.

<b>Year</b>	<b>Adults Females</b>	<b>Males</b>	<b>Jacks</b>	<b>Eggs</b>	<b>Juveniles</b>
<b>Planned</b>					
<b>1990</b>					
<b>1991</b>					
<b>1992</b>					
<b>1993</b>					
<b>1994</b>					
<b>1995</b>					
<b>1996</b>					
<b>1997</b>					
<b>1998</b>					
<b>1999</b>					
<b>2000</b>					
<b>2001</b>					

**Data Source**

**Question 192.** [#1079] Using the following table, enter the program egg take, egg survival to eye-up and/or ponding, fry to fingerling survival, and fingerling to smolt survival for the last 12 years, or for most recent years available. Also provide any performance standards for incubation and rearing survival that the hatchery is operating under.

<b>Year</b>	<b>Egg Take</b>	<b>Green-Eyed Survival (%)</b>	<b>Eyed-Ponding Survival (%)</b>	<b>Egg Survival Performance Standard</b>	<b>Fry – Fingerling Survival (%)</b>	<b>Rearing Survival Performance Standard</b>	<b>Fingerling – Smolt Survival (%)</b>
1990							
1991							
1992							
1993							
1994							
1995							
1996							
1997							
1998							
1999							
2000							
2001							

**Data Source**





**Question 195.** [#1108] Using the table below, indicate the food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow, and estimates of total food conversion efficiency during rearing (*average program performance*).

Rearing Period	Food Type	Application Schedule (# feedings/day)	Feeding Rate Range (% B.W./day)	Lbs. fed per gpm of inflow	Food Conversion During Period

**Data Source**

**Question 196.** [#1122] For existing programs, provide fish release number and size data for the past three fish generations, or approximately the past 12 years, if available.

Release year	Eggs/Unfed Fry	Release Date	Avg size (fpp)	Fry	Release Date	Avg size (fpp)	Fingerling	Release Date	Avg size (fpp)	Yearling	Release Date	Avg size (fpp)
1991												
1992												
1993												
1994												
1995												
1996												
1997												
1998												
1999												
2000												
2001												
2002												
Average												

**Data Source**

## **Appendix D. Excerpts from APRE Database**

## Appendix D: Excerpts from APRE Database

Table D-1 shows a summary of the statistics used in this report. This only a small subset of the over 200 questions covered in this survey, the complete set of answers are contained in the APRE data base ([www.apre.info](http://www.apre.info) )

<b>Table D-1. Summary responses to a subset of the questions in the APRE data base</b>	<b>All Programs</b>	<b>Integrated Programs</b>	<b>Segregated Programs</b>
	<b># Yes Answers</b>	<b># Yes Answers</b>	<b># Yes Answers</b>
<b>Operational Questions</b>			
Identify the program type (integrated or segregated)	106		
Has a final year of operation for this program been specified?	8	77	106
Are representative samples of natural and hatchery population components collected with respect to size, age, sex ratio, run and spawn timing, and other traits important to long-term fitness? Explain.	144	91	53
Are sufficient broodstock collected to maintain an effective population size of 1000 fish per generation? (More than 500 successful spawners of each sex.)	104	60	44
Is more than 10% of the broodstock derived from wild fish each year?	49	47	2
Does the program avoid stock transfers and subsequent releases of eggs or fish from outside the watershed? Explain.	108	82	26
Are fish released at sizes and life history stages similar to those of natural fish of the same species?	67	46	21
Are volitional releases during natural out-migration timing practiced? Explain	88	59	29
Are fish released in the same subbasin as rearing facility?	102	69	33
Can marked fish be detected using non-lethal means?	163	96	67
Are standards specified for in-culture performance of hatchery fish?	167	99	68
Has the carrying capacity of the subbasin been taken into consideration in sizing this program in regards to determining the number of fish released?	136	90	46
Are 100% of the hatchery fish marked so that they can be distinguished from the natural populations?	148	87	61
Do you have guidelines for acceptable contribution of hatchery origin fish to natural spawning?	137	87	50
Are guidelines for hatchery contribution to natural spawning met for all affected naturally spawning populations?	111	76	35
Is the purpose of the program to provide harvest?	151	83	68
Is the purpose of the program to contribute to conservation/ recovery?	85	75	10

<b>Table D-1. Summary responses to a subset of the questions in the APRE data base</b>	<b>All Programs</b>	<b>Integrated Programs</b>	<b>Segregated Programs</b>
	<b># Yes Answers</b>	<b># Yes Answers</b>	<b># Yes Answers</b>
<b>Operational Questions</b>			
Is the purpose of the program to contribute to research and/or education?	64	52	12
Is the program mitigation for hydro impacts?	159	93	66
Is the program mitigation for habitat loss?	123	75	48
Do you have a goal for spawning escapement composition (hatchery vs. natural) in the hatchery?	98	62	36
Do you have a goal for spawning escapement composition (hatchery vs. natural) in the wild?	63	31	32
Do you have a goal for smolt-to-adult return survival?	76	54	22
Do you have goals for recruits per spawner (R/S)?	73	53	20
Wild fish make up less than percent of the broodstock for this program?	92	33	59
Are hatchery programming and operational decisions based on an adaptive management plan?	152	95	57
Are in-culture performance standards met?	160	96	64
Are standards specified for post-release performance of hatchery fish and their offspring?	133	82	51
Are post-release performance standards met?	76	38	38
<b>Are natural rearing conditions simulated for:</b>			
reducing rearing density below agency or other guidelines?	45	36	9
rearing under natural water temperature?	62	43	19
actively simulating photoperiod?	45	28	17
providing a range of hydraulic characteristics?	8	4	4
subsurface feeding conditions?	5	2	3
predator avoidance training?	8	6	2
cover?	19	10	9
does not apply/answer unknown/not yet answered	75	40	35

<b>Table D-1. Summary responses to a subset of the questions in the APRE data base</b>	<b>All Programs</b>	<b>Integrated Programs</b>	<b>Segregated Programs</b>
	<b># Yes Answers</b>	<b># Yes Answers</b>	<b># Yes Answers</b>
<b>Operational Questions</b>			
Are the fish produced qualitatively similar to natural fish in:			
size	37	26	11
morphology	134	86	48
behavior	67	46	21
growth rate	13	10	3
physiological status	122	81	41
health	135	87	48
other	16	9	7
does not apply/answer unknown/not yet answered	18	4	14
<b>If the answer to the previous question is undetermined, which of the following statements are true?</b>			
Is the program on-going with no planned termination?	140	72	68
Does the program meet goals that cannot be accomplished in any other manner and is expected to continue indefinitely?	32	11	21
Is the program expected to end when goals can be met by other means not requiring artificial production	29	25	4
Will the program be terminated when it is determined that the program will not meet its goals?	12	5	7

<b>Table D-2. How many anadromous hatchery programs contribute the indicated percentage to the naturally spawning population in their subbasin?</b>				
	<b>0-5%</b>	<b>5-30%</b>	<b>&gt;30%</b>	<b>unk</b>
<b>All Programs</b>	<b>28</b>	<b>33</b>	<b>76</b>	<b>38</b>
<b>Integrated Programs</b>	<b>16</b>	<b>18</b>	<b>57</b>	<b>15</b>
<b>Segregated Programs</b>	<b>12</b>	<b>15</b>	<b>19</b>	<b>23</b>

## Appendix E. Province Reports

A summary of findings by province is provided in electronic form on the enclosed CD. Attached to each province summary are the reports for all individual programs reviewed within the province. The Province reports focus on the anadromous hatchery programs. Information about resident programs included in the APRE review are available on the APRE database: [www.apre.info](http://www.apre.info) .

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