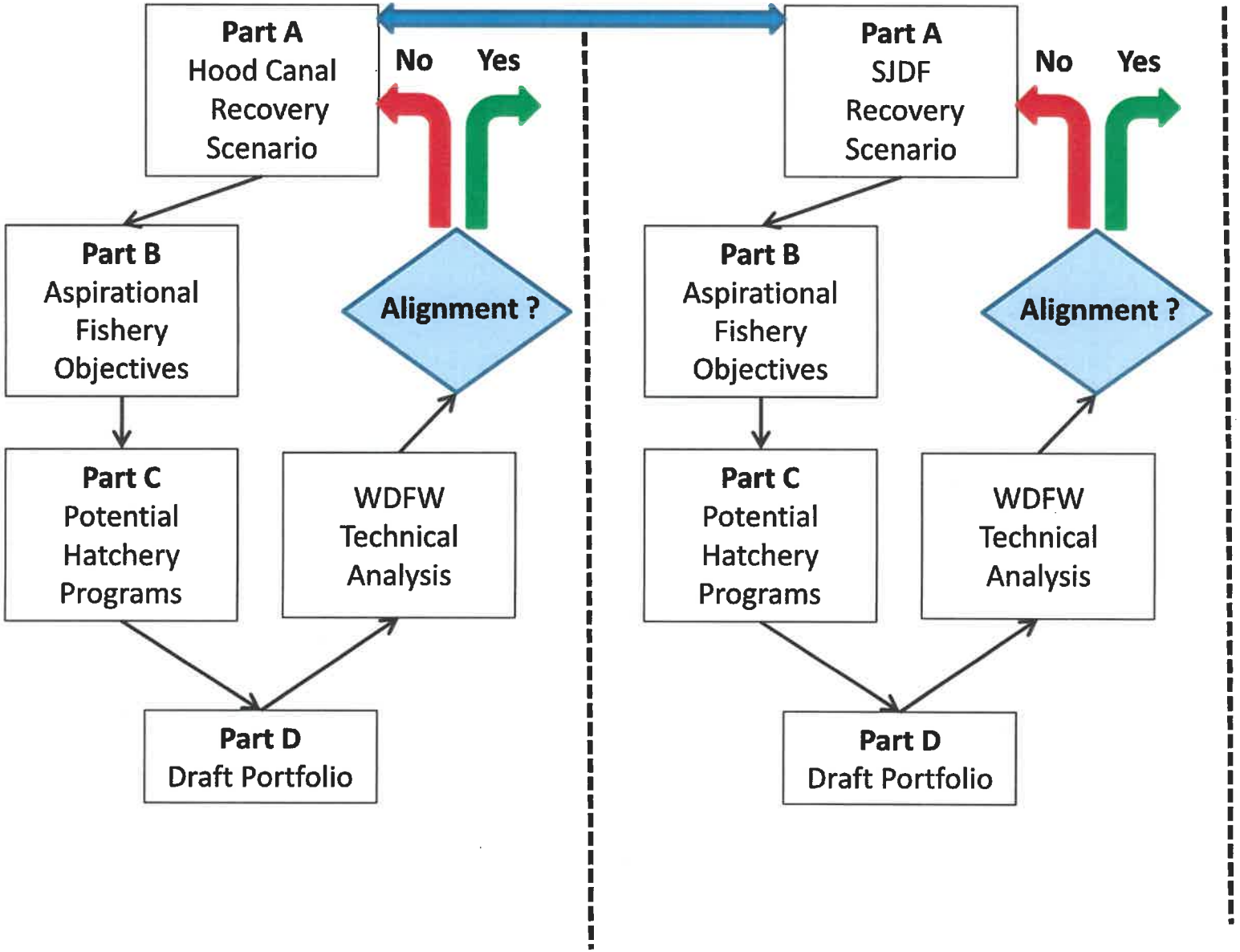
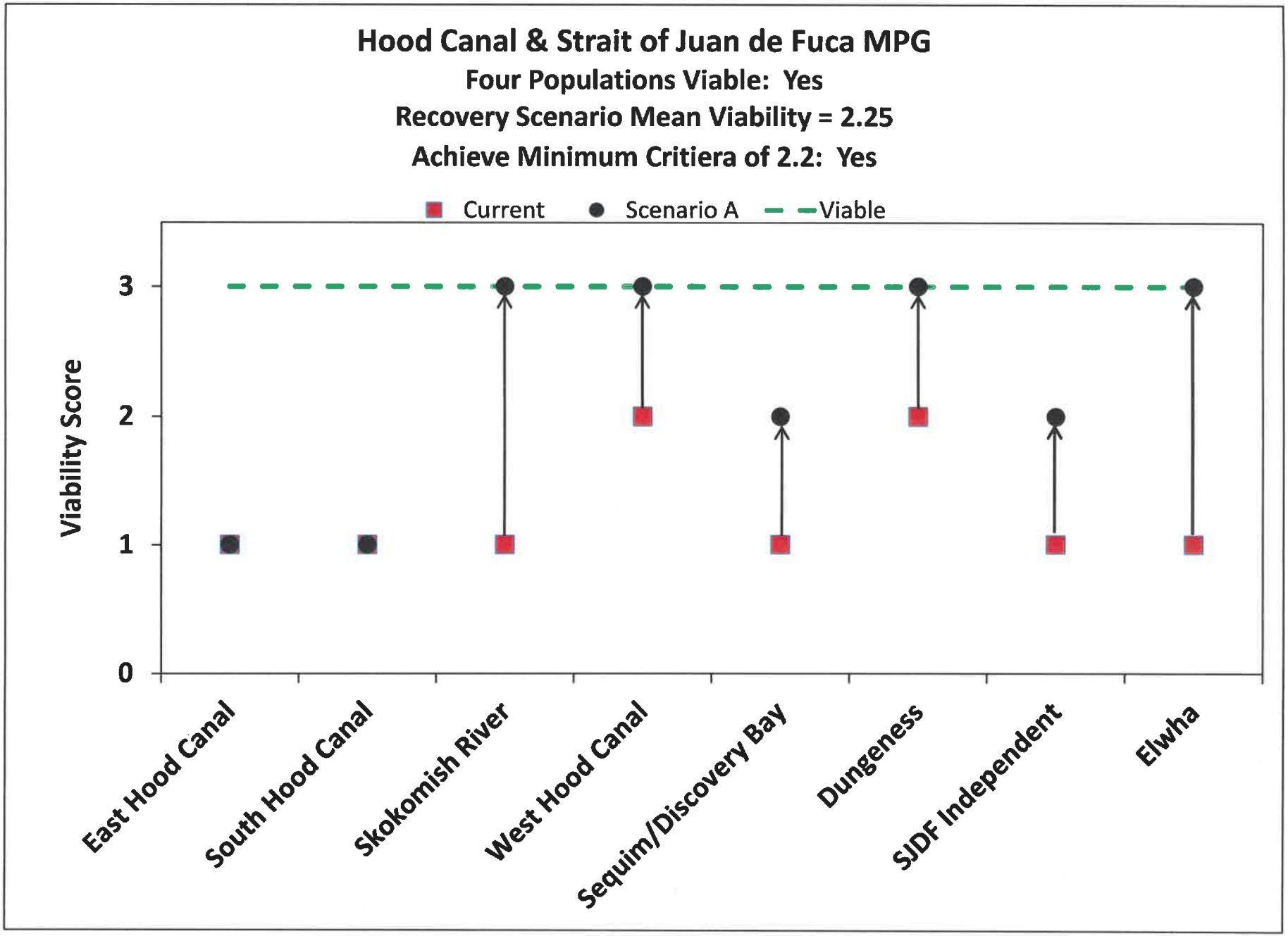
HC/SDJF Major Population Group

Must have:

- ≥ 4 Primary Populations
- ≥ 2.2 Geometric Mean




Hood Canal & Strait of Juan de Fuca MPG
Four Populations Viable: Yes
Recovery Scenario Mean Viability = 2.25
Achieve Minimum Critiera of 2.2: Yes
Current
Scenario A
Viable
Viability Score
3
2
1
0
East Hood Canal
South Hood Canal
Skokomish River
West Hood Canal
Sequim/Discovery Bay
Dungeness
SJDF Independent
Elwha

Summary of Options for Hood Canal & Strait of Juan de Fuca Portfolio

Draft July 31, 2017

Population or Watershed	Run Timing	Option	Designation	Fishery		Integrated Hatchery			Segregated Hatchery		Rationale for Preliminary Group Recommendation
				Dec. – Feb. (angler days) [1/]	March – May (angler days) [2/]	Purpose	PNI Limit	Proposed Program Size	DGF Limit (Proposed)	Proposed Program Size	
East Hood Canal	Winter	A	Contributing								
		B	Stabilizing								
South Hood Canal	Winter	All	Contributing								
Skokomish	Winter	A	Primary		C&R Unclipped C&K Clipped (1,500 angler days)	Conservation Harvest	0.67	15,000 [3/]			
		B			C&R (1,500 angler days)	Conservation	0.67				
		C	Contributing	C&K (450 angler days)	C&R (4,200 angler days)	Conservation	0.50		0.04 (0.022)	20,000	
West Hood Canal	Winter	A	Primary								
		B		Quilcene C&K (270 angler days))					0.02 (0.02)	12,000	
Sequim/ Discovery Bay	Winter	A	Primary								
		B	Contributing								
		C	Stabilizing								
Dungeness	Winter/ Summer	A	Primary								
		B		C&K (1,300 angler days)					0.02 (0.02)	58,200 [4/]	
SJDF Independents	Winter	All	Contributing								
Elwha	Winter	All	Primary		C&R (630 angler days)			175,000 [5/]			

[1/] Assumes an average SAR of 1.08% (Dungeness average for BY 2000-2011), a 25% recreational harvest rate, and an average catch of 0.12 steelhead per angler trip.

[2/] Assumes runsize equal to the average number of spawners from 2010-2015, 10% release mortality rate, and an average encounter of 0.12 steelhead per angler trip.

[3/] Program included in Settlement Agreement.

[4/] NOAA Fisheries provided 4(d) approval for 10,000 smolt program.

[5/] NOAA Fisheries provided 4(d) approval for Lower Elwha Klallam program that will be phased-out as the number of natural-origin spawners increases.

Acronyms:

DGF. Demographic gene flow.

C&K. Recreational catch and keep fishery.

C&R. Recreational catch and release fishery.

CUSHMAN PROJECT
FERC Project No. 460

Settlement Agreement for the Cushman Project

January 12, 2009

(5) years during Phase Two for the duration of the Amended License and any subsequent annual licenses.

2.2. The Licensee shall monitor upstream passage survival of coho, Chinook, sockeye and steelhead at least three (3) times during the start-up years of the upstream passage fishway, and then for two (2) years every ten (10) years thereafter.

Article 417: Fish Supplementation Program

Within nine (9) months after issuance of the Amended License, the Licensee shall file with the Commission, for approval, a plan to implement the fish supplementation program. The purposes of the fish supplementation program are to protect, mitigate damages to, and enhance anadromous and resident fisheries. The objectives of the program are: 1) to support the reintroduction, restoration, and long-term maintenance of anadromous fish populations in the North Fork Skokomish watershed; 2) to provide harvest opportunities to treaty Indian and non-treaty fishers; and 3) to provide recreational fishing opportunities.

The Licensee shall develop the Fish Supplementation Plan in consultation with the Fisheries and Habitat Committee, and shall seek approval of the National Marine Fisheries Service, U.S. Fish and Wildlife Service, and the Bureau of Indian Affairs. The Licensee shall also seek the comments and recommendations of the National Park Service. The Licensee shall allow a minimum of thirty (30) days for members of the Fisheries and Habitat Committee and the National Park Service to comment and make recommendations before submitting the plan for approval to the USFWS, BIA and NMFS. When filing the plan with the Commission, the Licensee shall include documentation of consultation; copies of comments and recommendations; and specific descriptions of how comments and recommendations from Fisheries and Habitat Committee members and the National Park Service are accommodated by the Licensee's plan. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons based on Project-specific information. If the Licensee files the Fish Supplementation Plan with the Commission without first obtaining the approval of NMFS, USFWS and BIA, the Licensee shall include specific reasons for doing so.

The Commission reserves the right to require changes to the fish supplementation program plan. Implementation of the plan shall commence when the Licensee is notified by the Commission that the filing is approved. Upon Commission approval, the Licensee shall implement the plan.

The plan shall incorporate the guiding principles and program elements of the Cushman Project Fish Supplementation Framework included as Appendix 4 in the Settlement Agreement and consist of the following elements:

1. Species

The fish supplementation program shall include five species: sockeye, spring Chinook, steelhead, coho and rainbow trout.

2. Facilities

2.1 Upstream Fish Passage Facility: The Licensee shall construct, operate and maintain an upstream fish passage facility as described in Article 415. In addition to upstream fish passage, the facility will be used to collect brood stock for the sockeye, spring Chinook, and coho supplementation programs.

2.2 Supplementation Facilities

2.2.1 The Licensee shall construct, operate and maintain an adult holding, spawning, egg incubation, and early rearing facility for the sockeye supplementation program that is capable of producing the number of healthy fry shown in Table 1. The facility shall be located at Tacoma's Saltwater Park property.

Table 1. Sockeye Supplementation Program Production Targets

Species	Type	Number	Fish/Pound	Pounds
Sockeye	Fed fry (May)	200,000	2500	80
	Fed fry (June)	1,000,000	800	1,250
	Fed fry (Sept)	800,000	150	5,333
TOTALS		2,000,000		6,663

2.2.2 The Licensee shall construct, operate and maintain adult holding, spawning, egg incubation, early rearing and net pen rearing facilities for the spring Chinook, steelhead, and coho supplementation programs which are capable of producing the quantity of healthy fish shown in Tables 2, 3 and 4, respectively. These facilities shall be located either at Saltwater Park, in the vicinity of Tacoma's Cushman No. 2 Powerhouse, on the east shore of Lake Kokanee, or some combination of these locations. Prior to and during construction, if these sites are determined to be infeasible, the Licensee will locate facilities at an alternate site. The Licensee shall determine the specific location of the facilities in consultation with the Fisheries and Habitat Committee.

Table 2. Spring Chinook Supplementation Program Production Targets

Species	Type	Number	Fish/Pound	Pounds
Spring	Fingerling	300,000	50	6,000
Chinook	Yearling	75,000	10	7,500
TOTALS		375,000		13,500

Table 3. Winter Steelhead Supplementation Program Production Targets

Species	Type	Number	Fish/Pound	Pounds
Winter	Smolts	15,000	8	1,875
Steelhead	Adults	225	0.125	1,800
TOTALS		15,225		3,675

Table 4. Coho Supplementation Program Production Targets

Species	Type	Number	Fish/Pound	Pounds
Coho	Smolts	10,000 – 35,000	15	666 – 2,333

2

2.3 The Licensee shall construct, operate and maintain net pen rearing facilities in Lake Kokanee adjacent to Cushman Dam No. 2 for spring Chinook, coho, steelhead and rainbow trout. The spring Chinook net pens shall be sized to rear 13,500 pounds of spring Chinook juveniles as described in Table 2. The winter steelhead net pens shall be sized to rear 1,875 pounds of winter steelhead smolts and 1,800 pounds of winter steelhead adults as described in Table 3. The coho net pens shall be sized to rear 2,333 pounds of coho smolts as described in Table 4. The rainbow trout net pens shall be sized to rear 11,667 pounds of catchable rainbow trout.

3. Program Details

3.1 Stock Selection: The Licensee shall, in consultation with the Fisheries and Habitat Committee and the National Park Service, evaluate potential donor stocks for selection and use in developing hatchery production.

3.2 Fish Health and Genetic Fitness: The Licensee shall specify best management practices in the plan and implement these practices to help ensure fish health and maintenance of genetic fitness in all aspects of the supplementation program.

3.3 Sequencing and Phase-In: The Licensee shall develop a schedule in consultation with the Fisheries and Habitat Committee which includes sequencing of steps necessary to implement the supplementation program. The schedule will address when potential donor stocks might be available and when start-up phases for each species can begin. The schedule shall allow for incremental phasing in of the program. Production quantity and schedule changes may be made by the Fisheries and Habitat Committee to accommodate unforeseen circumstances such as donor stock availability.

3.4 Production and Release Strategies: The Licensee's supplementation program shall include production and release strategies in an attempt to achieve the production targets for each species in Tables 1-4.

3.4.1 Sockeye: The Licensee's program shall be targeted to produce and release the sockeye fry quantities as shown in Table 1. The production quantities and release strategies for the facility may be adjusted by the Fisheries and Habitat Committee within the design production capacity of that facility. The initial production will be dependent on the availability of donor stock. The Licensee shall transport and release juvenile sockeye into Lake Cushman or in the North Fork Skokomish River as determined by the Fisheries and Habitat Committee.

3.4.2 Spring Chinook: The Licensee's program shall be targeted to produce and release the spring Chinook fingerling and yearling quantities shown in Table 2. The production quantities and release strategies for those facilities may be adjusted by the Fisheries and Habitat Committee within the design production capacity of those facilities. The Licensee shall rear these fingerling and yearling spring Chinook in Lake Kokanee net pens or, if determined infeasible, in another appropriate location, preferably in the North Fork Skokomish River sub-basin. The Licensee shall release these fish into the pool at the base of Cushman No. 2 Dam as fingerlings/ yearlings.

3.4.3 Steelhead: The Licensee's program shall be targeted to produce and release the Winter Steelhead smolt quantities and adult numbers shown in Table 3. The production quantities and release strategies for those facilities may be adjusted by the Fisheries and Habitat Committee within the design production capacity of those facilities. The Licensee shall rear these winter steelhead smolts and adults in Lake Kokanee net pens or, if determined infeasible, in another appropriate location, preferably in the North Fork Skokomish River sub-basin. The Licensee shall release the winter steelhead smolts into the pool at the base of Cushman No. 2 Dam where they can hold until they are ready to distribute themselves downstream. The Licensee shall release winter steelhead adults into the North Fork Skokomish at locations to be

determined by the Fisheries and Habitat Committee that are reasonably accessible by truck.

3.4.4 Coho: The Licensee's program shall be targeted to produce and release the quantity of coho smolts shown in Table 4. The production quantities and release strategies for those facilities may be adjusted by the Fisheries and Habitat Committee within the design production capacity of those facilities. Because the effects of the new flow regime on North Fork coho production are unknown, the Licensee shall rear between 10,000 and 35,000 coho smolts annually as determined by the Fisheries and Habitat Committee. The Licensee shall collect broodstock at the adult collection facility or at an alternate location in the North Fork Skokomish River if necessary and agreed to by the Fisheries and Habitat Committee, and held in a net pen in Lake Kokanee. Egg incubation and early rearing shall occur at the facility described above. After early rearing, the Licensee shall rear these coho in Lake Kokanee net pens or, if determined infeasible, in another appropriate location, preferably in the North Fork Skokomish River sub-basin. The Licensee shall use a portion of these coho smolts as test fish for evaluating the Lake Cushman downstream migrant collection facility. The Licensee shall release the remaining coho smolts into the pool at the base of Cushman No. 2 Dam.

3.4.5 Rainbow Trout: The Licensee shall annually release between 24,000 and 35,000 rainbow trout (8,000 to 11,667 pounds of rainbow trout) into Lake Kokanee. The Licensee shall rear these rainbow trout in Lake Kokanee net pens and release them directly into Lake Kokanee. The Licensee shall consult with WDFW when determining the size and number of rainbow trout and the timing of the releases.

3.5 Hatchery Monitoring Plan

The Licensee shall implement the following Fish Hatchery Monitoring Plan after issuance of the Amended License and through the term of the Amended License and any subsequent annual licenses, in consultation with Fisheries and Habitat Committee.

Within 18 months after issuance of the Amended License, the Licensee shall file with the Commission, for approval, a Hatchery Monitoring Plan. The Licensee shall develop the Hatchery Monitoring Plan in consultation with the Fisheries and Habitat Committee, and shall seek approval of NMFS, USFWS, and BIA. The Licensee shall allow a minimum of thirty (30) days for members of the Fisheries and Habitat Committee to comment and make recommendations before submitting the plan for approval to USFWS, BIA and NMFS. When filing the plan with the Commission, the Licensee shall include documentation of consultation; copies of comments and recommendations; and specific descriptions of how comments and recommendations from Fisheries and Habitat Committee members are accommodated by the Licensee's plan. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons based on Project-

City of Tacoma
Department of Public Utilities, Light Division
Cushman Hydroelectric Project, FERC No. 460

License Article 417
Fish Supplementation Program
August 2011

shore of Lake Kokanee on an existing well water source. Embryos will be reared in captivity and released at two life-history stages: smolt and mature adult. Growth rates in the hatchery will be carefully managed to follow natural-like patterns. Once the juveniles are large enough to be transferred to the Lake Kokanee net pens, they will be reared in the pens following the same program objectives, and released as smolts into the North Fork Skokomish River at the base of Cushman Dam No. 2. Although the program goal will be to produce age-2 smolts, some fish may achieve threshold smolt size (approximately 150 mm) during the first year. Those fish will be released as yearlings, while the remaining fish will be reared to age 2.

It is anticipated that an adaptive management approach will need to be taken to recast Hood Canal winter steelhead rearing protocols to the net pen environment. If monitoring reveals the net pen approach precludes achievement of the goal to produce predominantly age-2 smolts, provisions will be made to modify rearing conditions, or utilize a more traditional hatchery environment (e.g., troughs, tanks, and/or raceways).

Tacoma will retain a sufficient number of juveniles to rear and release up to 225 age-4 adults (Table 4). These fish will be reared to age-4 in the Lake Kokanee net pens and released for natural spawning in the North Fork at locations reasonably accessible by truck.

These efforts will continue for three winter steelhead generations (twelve years based on a typical four-year life history) or other time frame as determined by the FHC.

As adult winter steelhead begin returning to the North Fork adult collection facility, they will be trucked to the North Fork watershed upstream of Cushman Dam No.1 to spawn naturally, as determined by the FHC.

Once the winter steelhead restoration component has been applied and completed, if recommended by the FHC, the steelhead restoration effort would then be redirected to restoring summer steelhead to the system. The summer steelhead aspect of the program would be conducted using the same protocols as the winter steelhead program. The summer steelhead program will continue for three steelhead generations (twelve years based on a typical four-year life history) or other time frame as determined by the FHC.

Tacoma has no control over the saltwater life history phase of this species, and because no one can guarantee a defined number of adults will return to the North Fork Skokomish River in any given year, Tacoma will take reasonable steps, as determined by the FHC, to achieve the adult return objective. The steelhead program can be modified by the FHC within the physical constraints of the facilities provided at the sites. The facilities will be designed based on the rearing and release strategy identified in Table 4.

Table 4. Winter Steelhead supplementation program production levels

Species	Type	Number	Fish/Pound	Pounds	SAR[1]	Adults
Winter	Smolts	15,000	8	1,875	0.03	450
Steelhead	Adults	225	0.125	1,800		225

[1]SAR = estimated Smolt to adult return rates

4. Coho

There are currently two distinct coho populations utilizing the North Fork Skokomish River. An early run component consists of hatchery strays from the George Adams Hatchery that return in September and October, and a late spawning component consists of wild (adipose intact) coho that spawn as late as February. The WDFW conducts spawning surveys of index reaches in the North Fork on an annual basis to estimate escapement and population size.

Current habitat conditions under the existing flow regime in the North Fork Skokomish are highly suited for coho spawning and rearing. This is evidenced by the substantial numbers of returning adults and the resultant numbers of juveniles present in the system. In March 2008, Tacoma altered the flow regime downstream of Cushman Dam No. 2 in terms of both flow volume and distribution. A change in population structure is anticipated with the increase in outflow from Cushman Dam No. 2 likely shifting habitat components to the benefit of other species (e.g. Chinook and steelhead). It is also anticipated that this increase will provide off-channel rearing opportunities for coho not previously available under pre-March 2008 flow conditions. By inundating more of the valley floor, particularly in the lower four miles of river, side channel habitats that would be utilized by over-wintering coho will increase, thereby compensating for the loss of mainstem slow water rearing habitat that currently exists.

Because the effects of the new flow regime on North Fork coho production are unknown, Tacoma will rear between 10,000 and 35,000 yearling coho annually as determined by the FHC (Table 5). Brood stock will be collected at the adult collection facility and held in a net pen in Lake Kokanee. A facility tentatively identified to be located on the east shore of Lake Kokanee will accommodate egg incubation and early rearing for this program. When fry are large enough to be transferred to the Lake Kokanee net pens, they will be raised in the pens to yearling size and released into the pool at the base of Cushman No. 2 Dam. A portion of these coho smolts will be used as test fish for evaluating the Lake Cushman downstream migrant collection facility.

In addition to allocating coho adults to the supplementation program, adult coho returning to the North Fork Skokomish adult collection facility will be transported and released upstream of Cushman Dam No. 1 to spawn naturally. Tacoma has no control over the saltwater life history phase of this species, and because no one can guarantee a defined number of adults will return to the North Fork Skokomish River in any given year, Tacoma will take reasonable steps, as determined by the FHC, to achieve the adult return objective. The coho program can be modified by the FHC within the physical constraints of the facilities provided at the sites. The facilities will be designed based on the rearing and release strategy identified in Table 5.

Table 5. Coho supplementation program production levels

Species	Type	Number	Fish/Pound	Pounds	SAR[1]	Adults
Coho	Yearling	10,000 – 35,000	15	666 – 2,333	0.05	500 -1,750

[1]SAR = estimated Smolt to adult return rates

5. Resident Trout

The objective of Tacoma's resident trout program is to implement a program that minimizes potential impacts on naturally produced fish stocks, is compatible with the anadromous programs proposed for the North Fork Skokomish, and provides viable recreational fishing opportunity.

Tacoma will initiate its resident trout program in Lake Kokanee and water bodies other than Lake Cushman for a number of biological reasons. Successful implementation of the Lake Cushman anadromous fish program is the Skokomish Tribe and Tacoma's highest priority fish supplementation objective. As such, it is important to focus on maximizing opportunities for successful anadromous program initiation. By attempting to implement a resident fish program in Lake Cushman at the same time the anadromous program is being started, the possibility exists that conflicts between the two could negatively impact the success of the anadromous program and the ESA-listed resident Bull trout.

Tacoma's anadromous fish program includes the introduction of sockeye, spring Chinook, coho and steelhead into the upper North Fork basin. The WDFW has agreed to revise their original