Program Transition Plan Template

Program(s): Coho Salmon

Affected Recovery Population(s) and Recovery Designation(s):

Population Name	Population Recovery Designation
Lower Cowlitz River	Primary
Upper Cowlitz River	Primary
Cispus River	Primary
Tilton River	Stabilizing

Synopsis of how this Transition Plan is expected to change the current hatchery program and advance population(s) to the next Recovery Phase as characterized in FHMP:
In the short term, the overall hatchery program size will remain the same (contingent on bioprogramming), but will transition from the current segregated (1.2 million smolts) and integrated (978,000 smolts) programs to a single Upper Cowlitz Subbasin Integrated Hatchery Program of ~2.2 million smolts that will supplement both the Tilton and Upper Cowlitz/Cispus subbasins. This change is designed to increase adult abundance of hatchery fish available for reintroduction, and improve integration to better represent natural-origin populations for the Upper Cowlitz/Cispus and Tilton and will include transport of up to 12,000 integrated hatchery-origin fish to the Tilton and up to 40,000 integrated hatchery-orgin fish to the upper Cowlitz/Cispus subbasins. Additionally, marking programs will be altered to move CWT marking of coho smolts from Cowlitz Falls to Mayfield in 2022. These actions will promote recovery by reducing handling/tagging of natural-origin smolts and also provide integrated adults for supplementation to the Tilton River, while providing an overall increase in adult abundance upstream of Mayfield Dam. In the long term, two separate integrated hatchery programs may be developed (~2.2 million smolts total) to supplement both the Tilton and Upper Cowlitz subbasins, if determined to be beneficial through an adaptive management process.

Recovery Phase(s) as Described in FHMP: Lower Cowlitz Subbasin – Local Adaptation; Upper Cowlitz Subbasin - Recolonization; Tilton Subbasin – Recolonization

Goal of new program by recovery phase (i.e. conservation/harvest, etc.):

Recovery Phase	Goal of program	Thresholds/Triggers/Decision Rules required to transition from one phase to next
Preservation	Conservation (promote recovery) and harvest	Natural origin population at risk of extirpation ***Not applicable – as populations are already past this phase*** • 5 yr geomean total abundance (when counting NOR adults plus HOR adults up to the number which

		would cause pHOS to equal the pHOS goal for Local Adaptation) is **LESS** than the quasi-extinction threshold (QET to be determined during Population Phase Assessment). • Vast majority/all of historical habitat is unusable/heavily impacted/inaccessible currently (e.g., blocked by dams with no passage)
Recolonization	Conservation (promote recovery) and harvest	Natural origin population at low abundance; habitat underutilized **Upper Cowlitz and Tilton populations are assumed to be in this phase.** • 5 yr geomean total abundance (when counting NOR adults plus HOR adults up to the number which would cause pHOS to equal the pHOS goal for Local Adaptation) is **MORE** than quasi-extinction threshold but **LESS** than the number needed to meet the interim viability goal (NOAA VSP criteria or alternative). • Interim viability goal can be expressed as seeding a percentage (e.g., 50%) of the freshwater habitat, and can be estimated by stock recruit analysis (e.g., estimate spawner abundance required to produce 50% of Rmax). • Enough historical habitat is currently accessible (including by trap and

		haul) for maintenance of an equilibrium population size greater than QET (to be determined during Population Phase Assessment).

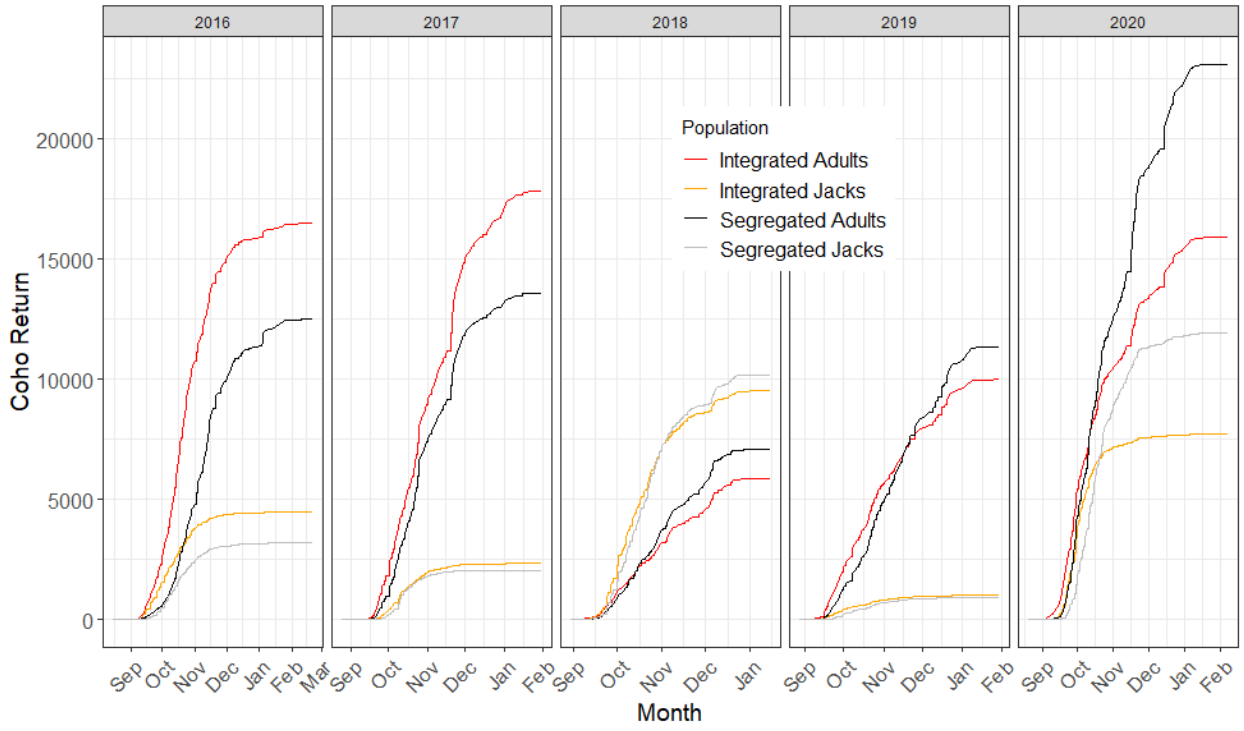
Local Adaptation	Conservation (promote recovery) and harvest	Natural origin population nearing full-seeding of available habitat
		
		Assuming Lower Cowlitz population is in this phase now.
		
		Upper Cowlitz/ Tilton
		• Develop assessment criteria for trigger(s) during next 1 year
		  ○ Such as integrating R_{max}, SAR and/or adult to adult productivity into phase triggers
		Lower
		• Develop/Confirm assessment criteria for trigger(s) during next 1 year of:
		  ○ Escapement
		  ○ R_{max}
		  ○ Adult to adult productivity
		• Maintain pHOS goal of 30% while Upper Cowlitz Integrated Program is established and reassess as program matures and data becomes available post 2025.

Full Recovery	Maintain Recovery and provide Harvest	Natural origin population is both above full-seeding of available habitat AND meeting is its healthy and harvestable recovery goals (to be determined through…) **Assuming current populations are not yet in this phase. Revisit criteria if population assessment**

		confirms populations are currently in Local Adaptation phase. • 5 yr geomean of spawner NOR abundance (not counting HORs) is **MORE** than minimum interim viability objective when only counting NOR spawners, and is also **MORE** than its recovery goal.

Current Program: This describes the coho salmon program prior to interim management implemented in 2021.	
Program Name:	**Lower Cowlitz Subbasin Coho Salmon**
Program Type:	Segregated
Recovery Phase:	Local Adaptation
Goal of Program(s):	Conservation/Harvest
Adult Broodstock Collection	
Broodstock Source	Cowlitz segregated HOR fish
Broodstock Collection location/methods	Cowlitz Salmon Hatchery/Separator
Integration Rate[1]	Segregated: 0.0
Collection timing curves: Estimated Broodstock Collection Curve (2020)	

[1] fixed, sliding scale



Secondary sources/plans for lack of adults	Integrated HOR returns to separator in excess upper Cowlitz Basin needs

Adult Transportation & Disposition

Target	*Rank*	*Quantity (range)*	*Location*	*Dates*
Tilton River	1	100% AHN	Gus Backstrom & Bremer Bridge ***See Tilton River Salmon and Steelhead Transport Plan***	Sept-March
Surplus -Food Quality	2	Above transport and hatchery needs	Food Bank	Sept-March
Nutrient Enhancement	3	Spawned carcasses, non-food grade fish above transport and hatchery needs	Upper Basin	Sept-March

Juvenile Release(s)

Release Strategy	1 group, Volitional followed by force out.
Quantity (range)	• 1,200,000
Release Age/size	1+/ Released at 15fpp
Release Location/Timing	Cowlitz Salmon Hatchery – April-May
Marking/Tagging strategy[2]	• 1,200,000 Ad Only
Fish Management needs	Adipose clip required to allow harvest in mark-selective fisheries CWT of integrated program allows for evaluation of stock composition to fisheries CWT validation of age composition
Evaluation Needs	Adipose clip allows for evaluation of pHOS/pNOB and PNI. CWT of integrated program allows for evaluation of stock composition on spawning grounds CWT validation/training of age composition (compared to scale)

Summary of Hatchery Configuration/Infrastructure:

- Adult collection for this program occurs at the Cowlitz Barrier Dam Separator. Broodstock is held at the Cowlitz Salmon Hatchery.
- Spawning and egg incubation occur at the Cowlitz Salmon Hatchery.
- Juvenile rearing occurs at the Cowlitz Salmon Hatchery in raceways.

Program Name:	**Upper Cowlitz Subbasin Coho Salmon**
Program Type:	Integrated
Recovery Phase:	Recolonization
Goal of Program(s):	Conservation/Harvest
Adult Broodstock Collection	
Broodstock Source	Upper Cowlitz HOR & NOR fish
Broodstock Collection location/methods	Cowlitz Salmon Hatchery/Separator

[2] Identify how do these strategies address fish Management/evaluation, monitoring data, and adaptive management trigger points.

Integration Rate Target[3]	1.0
Collection timing curves: Estimated Broodstock Collection Curve (2020)	Target: NA – Recolonization phase Recent Performance: 0.8-1.0
Secondary sources/plans for lack of adults	Segregated HOR fish in excess of Tilton River and segregated program needs.

Hatchery Adult Transportation & Disposition

Target	*Rank*	*Quantity (range)*	*Location*	*Dates*
Upper Cowlitz River	1	25% AHN	Franklin Bridge	Sept-March
Cispus River	1	25% AHN	Tom Music Bridge	Sept-March
Lake Scanewa	1	50% AHN	LCPUD Boat Launch	Sept-March
Surplus -Food Quality	2	Above transport and hatchery needs	Food Bank	Sept-March
Nutrient Enhancement	3	Spawned carcasses, non-food grade fish above transport and hatchery needs.	Upper Basin	Sept-March

Juvenile Release(s)	
Release Strategy	1 group Volitional followed by force out.
Quantity (range)	978,000
Release Age/size	• 1+/Released at 15fpp
Release Location/Timing	• Cowlitz Salmon Hatchery – April and May

[3] fixed, sliding scale

Marking/Tagging strategy[4]	• 978,000 Ad+CWT
Fish Management needs	Adipose clip required to allow harvest in mark-selective fisheries CWT allows for evaluation of stock composition to fisheries CWT evaluation of age composition
Evaluation Needs	Adipose clip allows for evaluation of pHOS/pHOB and PNI. CWT allows for evaluation of stock composition on spawning grounds CWT evaluation of age composition
Summary of Hatchery Configuration/Infrastructure: • Adult collection for this program occurs at the Cowlitz Barrier Dam Separator. Broodstock is held at the Cowlitz Salmon Hatchery. • Spawning and egg incubation occur at the Cowlitz Salmon Hatchery. • Juvenile rearing occurs at the Cowlitz Salmon Hatchery in raceways. • Current program requires nine raceways	

[4] Identify how do these strategies address fish Management/evaluation, monitoring data, and adaptive management trigger points.

Harvest Management Strategy[5]	
Upper river opportunity/harvest	Upper Cowlitz Subbasin: Mark Selective Harvest rate ranging from 3.2% to 21.6% Seasons/bag limits are set pre-season via NOF based on forecasted returns
Lower river opportunity/harvest	Lower Cowlitz Subbasin: Mark Selective Harvest rate ranging from 5.6% to 19.3% Seasons/bag limits are set pre-season via NOF based on forecasted returns and managed in-season based on separator returns.
Ocean/ Columbia R. opportunity/harvest	Ocean: non-mark-selective Columbia R. – mark-selective Seasons/bag limits are set pre-season via NOF based on forecasted returns
Program Performance Metrics	
Proportionate Natural Influence (PNI)	**Target:** **Recent Performance:**
pHOS level	Target: NA Recent Performance: Mean = 75%
pNOB levels	Target: 1.0 Recent Performance: 1.0
Brood stock mining rate	Target: <30% Recent Performance: <30%
Overall Performance Relative to Goals[6]	

Current Monitoring Program:

- Lower Cowlitz Tributary weir operation
- Spawning ground surveys throughout the basin
- A spot creel operates by interviewing angers in the lower Cowlitz River to collect in-season biological data. The ratio of the number of HOR fish kept to the number of NOR fish reported as released can then be compared to catch record card harvest reported to estimate the total number of NOR Coho released. Further, an assumed mortality rate can be applied to estimate fishery mortality in the future. Counts and sampling of fish that return to the separator
- Sampling of broodstock at the hatchery facility.

[5] %harvest or # harvest x transported; fishery type (e.g., adult/jacks; HOR/NOR, selective/non-selective, etc.)

[6] outline the main reasons why a transition is needed

Proposed Program:

Proposed Pathway #1	
Program Name:	**Upper Cowlitz Basin Coho Salmon**
Program Type:	**Integrated**
Recovery Phase:	**Recolonization**
Goal of Program:	**Increase returning adults for the Upper Cowlitz and Tilton basins while maintaining harvest opportunities.**
Timing for Transition[7]	2022
Adult Broodstock Collection	
Broodstock Source	Upper Cowlitz Basin NOR and HOR fish
Broodstock Collection location/methods	Cowlitz Salmon Hatchery/Separator
Integration Rate Target[8]	0.5

Priority		Collection Strategy	pNOB goal	Brood Source	Spawning Strategy
1	Normal HOR/NOR return, no shortage	Collect at separator	50%; actual will be variable	a. Upper Cowlitz Basin NORs and HORs	a. HOR x NOR when possible b. HOR x HOR when necessary to backfill c. Re-use NOR males once
2	Low NOR, Normal HOR	Collect at separator	50% or lower if necessary	a. Upper Cowlitz Basin NORs and HORs b. Reduce NOR retention rate to 30% or less	a. HOR x NOR when possible, HOR x HOR when necessary to backfill; b. Re-use NOR males c. Accept a lower pNOB/integration rate

[7] immediate, stepping stone, specific timeframe/ milestone targets

[8] fixed, sliding scale

3	Low HOR return, normal NOR	Collect at separator	50%; or High as achievable while meeting seeding targets for NORs	a. Upper Cowlitz Basin NORs and HORs -Retain all HORs above demographic replacement needs b. Retain up to 30% Upper Cowlitz Basin NOR c. Restrict harvest	a. HOR x NOR; b. Exceed pNOB limit but not mining rate (potentially unless seeding target is established)
4	Shortages across board	Collect at separator	10-50%	a. Retain all HORs as needed to meet program goals b. Retain up to 30% NOR c. Restrict harvest	a. HOR x NOR when possible b. Accept we may be below program goal c. Accept a lower pNOB/integration rate

Definitions: - The following are interim thresholds for implementing broodstock collection as described in the table above (based on most recent 9 years of data since mass marking collected at separator).

Normal HOR – 2,000–8,000

Low HOR – <2,000

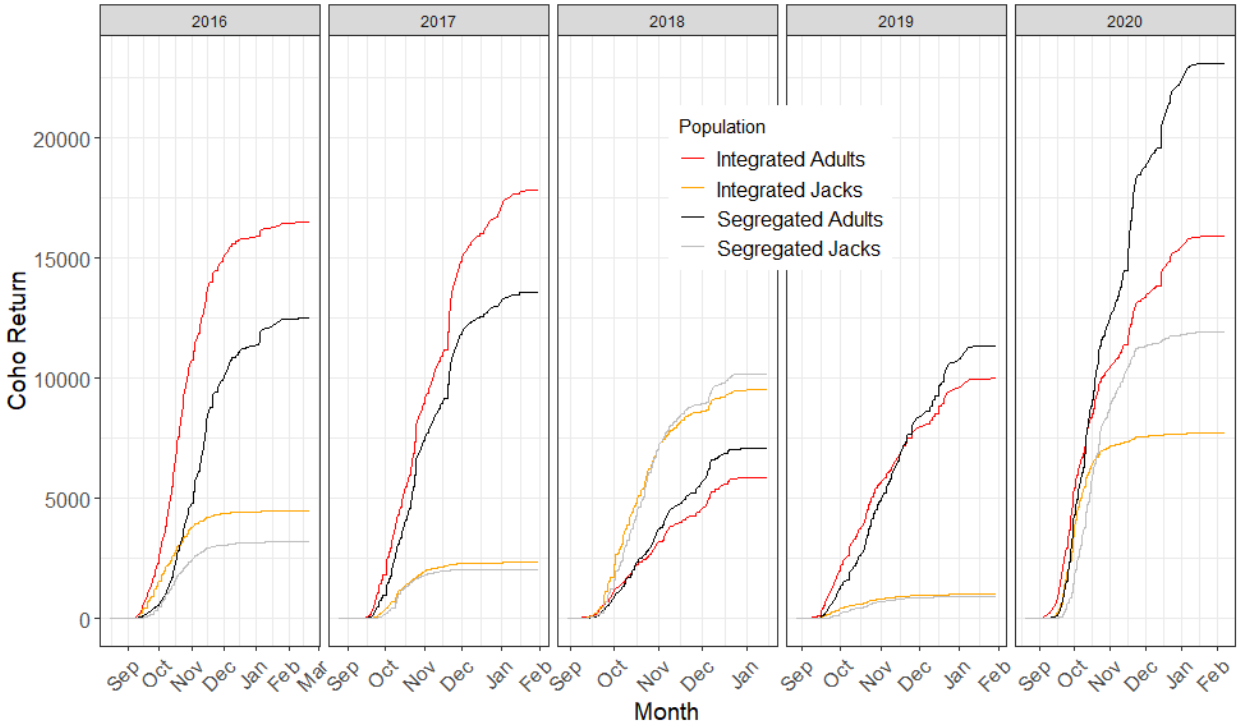
Normal NOR – 1,000–5,000

Low NOR – <1,000

Integration Target – 50% or less if necessary

NOR brood stock mining rate – 10% target (30% max)

Collection timing curves: Example only, actual collection goals will be set via Annual Operating Plan



Upper Cowlitz Coho

Recent, 5 year average return per program by week and respective broodstock collection goals.

Table reflects HOR and NOR collection/return *example. Will be updated annually and documented in the AOP.*

5 yr average (2017-2021)

		Integrated HOR		**NOR**	
		Upper Cowlitz **HOR** (AD)		UCOW **NOR** (UM+BWT)	
Week	Week	Return	Brood	Return	Brood

Number	Ending	Average	Goal	Average	Goal
Week 34	August 27	0		0	
Week 35	September 3	1		3	
Week 36	September 10	11	3	3	3
Week 37	September 17	61	14	3	14
Week 38	September 24	284	28	14	28
Week 39	October 1	601	60	91	60
Week 40	October 8	606	58	120	58
Week 41	October 15	859	70	195	70
Week 42	October 22	898	77	194	77
Week 43	October 29	805	91	227	91
Week 44	November 5	606	68	146	68
Week 45	November 12	655	89	229	89
Week 46	November 19	837	89	318	89
Week 47	November 26	673	90	107	90
Week 48	December 3	399	47	102	47
Week 49	December 10	434	50	153	50
Week 50	December 17	409	32	132	32
Week 51	December 24	299	28	241	28
Week 52	December 31	101	17	164	17
Week 01	January 7	274	17	117	17
Week 02	January 14	61	15	116	15
Week 03	January 21	46	5	98	5
Week 04	January 28	28	2	59	2
Week 05	February 4	5	1	36	1
Week 06	February 11	2		38	
Week 07	February 18	2		61	
Week 08	February 25	0		55	
Totals		8958	949	3021	949
Total Return Size		8958		3021	

Total Brood Collected	949	949
Brood %	50.0%	50.0%
Assumed Fecundity	3207	3200
pNOB	50.0%	
Mining Rate	n/a	<30.0%
Demographic Replacement (RRS=0.75)	n/a	1265
Demographic Replacement (RRSHarv=0.5)	n/a	1898
Total Egg Take	1,391,996	1,391,996
Total Release Goal	2,200,000	

Adult Transportation & Disposition

Tilton River – Transport of Upper Cowlitz HORs into Tilton

Adult Transportation & Disposition				
Target Population	*Rank*	*Quantity (range)*	Location	*Dates (Range)*
Demographic Replacement	*1*	Dependent on proportion of unmarked NOR Tilton Fish unintentionally taken for Upper Cowlitz broodstock (due to Mayfield marking) and/or transported to Upper Cowlitz/Cispus	***See Tilton River Salmon and Steelhead Transport Plan***	*Sept - Mar*
Tilton River	2		Gust Backstrom & Bremer Bridge	Sept - Mar

		Up to 12,000 Adults	***See Tilton River Salmon and Steelhead Transport Plan***	
Surplus	*N/A*	*N/A*	*N/A*	*Sept - Mar*
Nutrient Enhancement	*N/A*	*N/A*	*Tilton River*	*Sept - Mar*

Tilton River NORs

Adult Transportation & Disposition				
Target Population	*Rank*	*Quantity (range)*	Location	*Dates (Range)*
Tilton River	1	AHN	Gust Backstrom & Bremer Bridge ***See Tilton River Salmon and Steelhead Transport Plan***	Sept - Mar
Surplus	*N/A*	*N/A*	N/A	*N/A*
Nutrient Enhancement	*N/A*	*N/A*	*N/A*	*N/A*

Upper Cowlitz HORs

Adult Transportation & Disposition				
Target Population	*Rank*	*Quantity (range)*	Location	*Dates (Range)*
Demographic Replacement	*1*	This is dependent on NOR fish taken for broodstock, establish a HOR RRS value and assumed basin specific HOR harvest rate	Upper Cowlitz Basin	*Sept - Mar*

Broodstock	2	Up to program need	Cowlitz Salmon Separator	*Sept - Mar*	
Upper Cowlitz and Cispus River	3	Up to 40,000 Adults	Lake Scanewa (50%) Cispus River (25%) Upper Cowlitz River (25%)	Sept - Mar	
Surplus	*4*	*All fish above hatchery and transport needs*	*N/A*	*Sept - Mar*	
Nutrient Enhancement	*5*	Spawned carcasses, non-food grade fish above transport and hatchery needs.	Upper Cowlitz Basin	*Sept - Mar*	

Upper Cowlitz NOR's

Adult Transportation & Disposition				
Target Population	*Rank*	*Quantity (range)*	Location	*Dates (Range)*
Follow Mining Rate	*1*	30% or les s of all returning NOR adults	Upper Cowlitz Basin	*Sept - Mar*

Broodstock	2	Up to 950, program need not to exceed 30% mining rate	Cowlitz Salmon Separator	*Sept - Mar*	
Upper Cowlitz and Cispus River	3	AHN	Release preferentially at Lake Scanewa with the following thresholds: Angling - none for now, unless this becomes an apparent problem, then it will be managed via harvest strategies via emergency regulations. Flow - Do not release into drawdown or forecast spill event at Cowlitz Falls Dam (>11KCFS)	Sept - Mar	
Surplus	*N/A*	*N/A*	*N/A*	*N/A*	
Nutrient Enhancement	*N/A*	*Spawned Carcasses*	*N/A*	*N/A*	

Notes:	
Juvenile Releases	
Release Group	**1 group – additional groups to evaluate the effect of release timing and release size may occur during the period of the current FHMP to optimize program performance.**
Quantity (range)	2,200,000
Release Age/size	15 fpp
Release Location/Timing	April-May
Marking/Tagging strategy[9]	○ For HORS: All fish will be adipose fin clipped and a portion of fish from each raceway will be Ad+CWT as determined by M&E needs. ○ For NORs: ▪ Transition CWT marking of NORs to Mayfield from the CFFF. ▪ Target start date: spring 2022 ▪ Rationale: ▪ Strategy to mark at Mayfield is acceptable because while the contributing Tilton population is inadvertently mined by about 200 fish(due to Mayfield Collection Efficiency) it is demographically replaced by the integrated population of up to 12,000 fish. ▪ Avoids impacts to larger population from handling all outmigrants from upper Cowlitz at facility that is not equipped for this.

[9] Identify how do these strategies address fish Management/evaluation, monitoring data, and adaptive management trigger points.

	▪ Impact to the upper Cowlitz stray rate might initially be high but is anticipated to be negligible (nearer to natural stray rate if upper Cowlitz FPS and production is high) ▪ See Marking Transition Spreadsheet. ○

Summary of Hatchery Configuration/Infrastructure Modifications[10]:

Estimate rate of survival through the juvenile bypass route based on historic data, validate measures at Mayfield Juvenile Bypass – Secondary Separator automation frequency concurrent to the first year of CWT marking and prior to CWT adult returns to verify if rates are similar or above 2015 and 2016 test years and to predict rate of returning CWT adults. If survival rates through the juvenile bypass are lower than anticipated during the verification study season, survival estimates will be repeated for a minimum of an additional 1 to 2 years concurrent to CWT releases.

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Harvest Management Strategy

INTERIM (until we have management targets for NOR populations)			
	Abundance		
Area	**Low**	**Normal**	**Above Normal**

[10] Identify changes necessary to accommodate Transition (and steps necessary to achieve)

Tilton	Managed based on forecasted hatchery returns; Fishery on excess HORs transported to Tilton **ABOVE** those needed for broodstock; Seasons set via North of Falcon; Restricted Mark-Selective fishery (reduced bag limit or full closure); In-season management based on actual separator returns of HOR/NOR.	Managed based on forecasted hatchery returns; Fishery on excess HORs transported to Tilton **ABOVE** those needed for broodstock; Seasons set via North of Falcon; Full Season Mark-Selective fishery (generally 6 hatchery fish with 2 adults); In-season management based on actual separator returns of HOR/NOR.	Managed based on forecasted hatchery returns; Fishery on excess HORs transported to Tilton **ABOVE** those needed for broodstock; Seasons set via North of Falcon; Full Season Mark-Selective fishery (generally 6 hatchery fish with 2 adults); In-season management based on actual separator returns of HOR/NOR.	
Upper Cowlitz/Cispus	Managed based on forecasted hatchery returns; Fishery on excess HORs transported to upper Cowlitz and Cispus **ABOVE** those needed for broodstock (hatchery equivalents); Seasons set via North of Falcon; Restricted Mark-Selective fishery (reduced bag limit or full closure); In-season management based on actual separator returns of HOR/NOR.	Managed based on forecasted hatchery returns; Fishery on excess HORs transported to upper Cowlitz and Cispus **ABOVE** those needed for broodstock (hatchery equivalents); Seasons set via North of Falcon; Restricted Mark-Selective fishery (generally 6 hatchery fish with 2 adults); In-season management based on actual separator returns of HOR/NOR.	Managed based on forecasted hatchery returns; Fishery on excess HORs transported to upper Cowlitz and Cispus **ABOVE** those needed for broodstock (hatchery equivalents); Seasons set via North of Falcon; Restricted Mark-Selective fishery (generally 6 hatchery fish with 2 adults); In-season management based on actual separator returns of HOR/NOR.	

Lower Cowlitz	Managed based on forecasted hatchery returns; Seasons set via North of Falcon; Restricted Mark-Selective fishery (generally 6 hatchery fish with 2 adults); In-season management based on actual separator returns of HOR/NOR.	Managed based on forecasted hatchery returns; Seasons set via North of Falcon; Full Season Mark-Selective fishery (generally 6 hatchery fish with 2 adults); In-season management based on actual separator returns of HOR/NOR.	Managed based on forecasted hatchery returns; Seasons set via North of Falcon; Full Season Mark-Selective fishery (generally 6 hatchery fish with 2 adults); In-season management based on actual separator returns of HOR/NOR.	
Ocean/Columbia River	Mark-Selective; Seasons set via North of Falcon; Cowlitz stock part of CR coho aggregate. Limited by Non Ad-Clip	Mark-Selective; Seasons set via North of Falcon; Cowlitz stock part of CR coho aggregate. Limited by Non Ad-Clip	Mark-Selective; Seasons set via North of Falcon; Cowlitz stock part of CR coho aggregate. Limited by Non Ad-Clip	

LONG TERM			
	Abundance		
Area	**Low**	**Normal**	**Above Normal**

	Tilton	Managed based on forecasted hatchery/NOR returns, broodstock needs and management goals; Fishery on excess HORs transported to Tilton **ABOVE** those needed to replace NORs used for broodstock (hatchery equivalents); Seasons set via North of Falcon; Restricted Mark-Selective fishery (reduced bag limit or full closure); In-season management based on actual separator returns of HOR/NOR.	Managed based on forecasted hatchery/NOR returns, broodstock needs and management goals; Fishery on both HOR/NOR transported to Tilton (non-mark selective fisheries) could occur consistent with management plans that assure natural origin populations will meet goals; Seasons set via North of Falcon; Full Season **Non-Mark-Selective fishery** (HOR/NOR bag limits TBD); In-season management based on actual separator returns of HOR/NOR.	Managed based on forecasted hatchery/NOR returns, broodstock needs and management goals; Fishery on both HOR/NOR transported to Tilton (non-mark selective fisheries) could occur consistent with management plans that assure natural origin populations will meet goals; Seasons set via North of Falcon; Full Season **Non-Mark-Selective fishery** (increased bag limits); In-season management based on actual separator returns of HOR/NOR.	

Upper Cowlitz/Cispus	Managed based on forecasted hatchery/NOR returns, broodstock needs and management goals; Fishery on excess HORs transported to Upper Cowlitz basin **ABOVE** those needed to replace NORs needed for broodstock (hatchery equivalents); Seasons set via North of Falcon; Restricted Mark-Selective fishery (reduced bag limit or full closure); In-season management based on actual separator returns of HOR/NOR.	Managed based on forecasted hatchery/NOR returns, broodstock needs and management goals; Fishery on both HOR/NOR transported to upper Cowlitz basin (non-mark selective fisheries) could occur consistent with management plans that assure natural origin populations will meet goals; Seasons set via North of Falcon; Full Season **Non-Mark-Selective fishery** (HOR/NOR bag limits TBD); In-season management based on actual separator returns of HOR/NOR.	Managed based on forecasted hatchery/NOR returns, broodstock needs and management goals; Fishery on both HOR/NOR transported to Upper Cowlitz basin (non-mark selective fisheries) could occur consistent with management plans that assure natural origin populations will meet goals; Seasons set via North of Falcon; Full Season **Non-Mark-Selective fishery** (increased bag limits); In-season management based on actual separator returns of HOR/NOR.	

Lower Cowlitz	Managed based on forecasted hatchery/NOR returns, broodstock needs and management goals; Seasons set via North of Falcon; Restricted Mark-Selective fishery (reduced bag limit or full closure); In-season management based on actual separator returns of HOR/NOR.	Managed based on forecasted hatchery/NOR returns, broodstock needs and management goals; Fishery on both HOR/NOR (non-mark selective fisheries) could occur consistent with management plans that assure natural origin populations will meet goals; Seasons set via North of Falcon; Full Season **Non-Mark-Selective fishery** (HOR/NOR bag limits TBD); In-season management based on actual separator returns of HOR/NOR.	Managed based on forecasted hatchery/NOR returns, broodstock needs and management goals; Fishery on both HOR/NOR (non-mark selective fisheries) could occur consistent with management plans that assure natural origin populations will meet goals; Seasons set via North of Falcon; Full Season **Non-Mark-Selective fishery** (increased bag limits); In-season management based on actual separator returns of HOR/NOR.	
Ocean/Columbia River	Mark-Selective; Seasons set via North of Falcon; Cowlitz stock part of CR coho aggregate. Limited by Non Ad-Clip	Mark-Selective; Seasons set via North of Falcon; Cowlitz stock part of CR coho aggregate. Limited by Non Ad-Clip	Mark-Selective; Seasons set via North of Falcon; Cowlitz stock part of CR coho aggregate. Limited by Non Ad-Clip	

Harvest Management Notes:

Steps needed to achieve long term management:

- Establish Rmax and return targets
- Determine hatchery equivalent value used for NOR replacement and establish general management guideline for NOR replacement

- WDFW - update FMEP to include above strategy and consult with NMFS. Verify ESA permitting needs with NMFS.
- Forecasts by HOR/NOR instead of aggregate
- Develop earlier in-season predictors of total return for management purposes.

Program Performance Metrics	
Proportionate Natural Influence (PNI)	**Target:** **Recent Performance:**
pHOS level	**Target: <0.3** **Recent Performance:**
pNOB levels	**Target: 0.3-0.5** **Recent Performance:**
Brood stock mining rate	**Target: <0.3** **Recent Performance:**

Anticipated Performance Relative to Goals

The Coho program has performed well within the hatchery as these fish are very resilient. It may make sense to shift this production outside of the hatchery to allow more space for species of concern: Spring Chinook.
Loadings recommended below are based on fish health observations over the last 4-5 years.

The following recommendations target opening up more space:
We need to keep the final population per pond to 236k to meet rearing criteria. Prior to marking ideal Ponding/Early space required is: 236k / pond. Post marking space is: 9 ponds @ 390k/pond @ 80fpp

Monitoring and Analysis needs associated with Adaptive Management trigger points

- Complete analysis of SARs for current programs (Seg vs Int) to determine what impacts transitioning to one integrated program will have on adult returns.
- Following capital improvements and evaluation of Mayfield juvenile fish bypass system will be necessary to determine if assumptions for improved survival are correct
- Summarize existing Mayfield Dam FGE data

Bio-programming considerations for all programs (capacity, water, how it fits with other programs):

- Problem Statement – Rearing the entire integrated coho program through release at the Cowlitz Salmon Hatchery may create capacity issues with and limit options for spring and fall Chinook hatchery programs. Bio-programming should evaluate this constraint and explore options to address this including use of net-pens for off-site rearing.

Note: Bioprogramming will be revisited for all programs combined following drafting of all Transition Plans and incorporation of Public Input.

List of Reference Materials from Transition Plan Workshops
Coho marking switch to Mayfield from CFFF spreadsheet
Tilton River Salmon and Steelhead Transport plan

COHO Bioprogramming

The coho program has performed well within the hatchery as these fish are very resilient. It may make sense to shift this production outside of the hatchery to allow more space for species of concern: spring Chinook.
Loadings recommended below are based on fish health observations over the last 4-5 years.

The following recommendations target opening up more space: We need to keep the final population per pond to 236k to meet rearing criteria. Prior to marking ideal Ponding/Early space required is: 236k / pond. Post marking space is: 9 ponds @ 390k/pond @ 80fpp			Potential Implementation
Potential Solutions	**Pros**	**Cons**	**Timing**
Reduce Program Size: This program is performing very well and because it is nearing recovery targets and HOR's are not harvested at appreciable rates, it could make sense to take a moderate reduction to this program in order to provide more rearing space for spring Chinook.	No negative impact to other programs/maintains flexibility No infrastructure modifications/additions Requires less brood = more adults for upstream as HOR's are plenty Retains HOR's onstation while providing space for springers.	May reduce adult returns (commensurate with release # & expected SAR) Program reductions have a bad connotation and will likely be met with opposition.	2022

Send Yearling Coho to net pens: By sending the coho to the net pens, pond space would become available to accommodate the Fall program at proper densities or additional spring Chinook and provide additional compartments for different growth rates/size fish.	Coho typically do well in net pens Lighter densities may increase survivals for falls Improves water quality during rearing for falls Creates space for entire FA:CK program or addt'l Springs Reduces pressure to release spring Chinook early	Haven't tested coho in these pens, net pens have risk (vandalism, predation, environment, disease) Note: the current program is highly effective and we'd be "messing with a good thing" or "fixing something that isn't broken". 24 pens (708k fish= 47klbs) is a large operation and will be time and cost addition (Currently only have 20 pens) Still need to truck fish out of pens = labor and stress increase - May require addt'l infrastructure at Mayfield dam for release Utilizes capacity that could be used for displacing coho for springs	2021
Release Coho early: Freeing up pond space will have similar impact as reducing program size or sending coho to net pens.	Frees up space for extended rearing of Fall or Spring Chinook	Will reduce adult returns Program reductions have a bad connotation and will likely be met with opposition. Increase residualism / predation of NOR's	2021

Infrastructure: Adding or identifying additional rearing space is another option to address rearing challenges. 1) Additional ponds on reuse would free up space for fall or spring chinook 3) Utilizing the adult ponds for coho may be an option to open up space for priority species. (not ideal rearing conditions as they were not designed for juvenile rearing) 4) Utilize Trout Hatchery Remodel to accommodate other options 5) Additional net pens and potential new location	Additional ponds address some early rearing and all later rearing challenges Coho in adult ponds frees some space for falls or springs Trout Hatchery could be made to address all issues theoretically Additional net pens address rearing challenges Potential for funding partnerships (i.e. SRKW) Hatchery infrastructure/facilities have less risk than alternatives (net pens)	Add ponds: Space is challenging, and cost is very high Adult ponds: Poor design for juvenile rearing and would require upgrades, cost is moderate Trout Hatchery: may conflict with other uses/plans; cost is high; may reduce adult recruitment to CSH and increase pHOS in Blue Cr/Lwr Cow. Addtl net pens: labor intensive; risk, cost is moderate (addt'l pens) to high (new pens/location)	2023++

Note: This Transition Plan is intended to serve as a step toward Recovery goals. It will be Evaluated for its progress toward achieving those objectives through the Annual Program Review (APR) as described in Chapter 12 of the Fisheries and Hatchery Management Plan (FHMP 2020), and will be altered through adaptive management as described in that process as necessary. The Hatchery Scientific Review Group (HSRG) evaluation guidelines will be evaluated for applicability during each step of recovery.