Program Transition Plan Template

Program(s): Lower Cowlitz, Tilton River, and Upper Cowltiz/Cispus Basin Winter Steelhead

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

Population Name	Population Recovery Designation
Lower Cowlitz Winter-run Steelhead	Contributing
Tilton Winter-run Steelhead	Contributing
Upper Cowlitz Subbasin Winter-run Steelhead (including Cispus)	Primary

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 2020 FHMP:
Transition from the current larger lower Cowlitz integrated program (478,000) and two smaller upper basin programs, the Tilton River (48,500) and the Upper Cowlitz Basin (118,000), to one segregated program and two integrated programs yielding the same total hatchery production size. New program production goals: Lower Cowlitz segregated: at least 308,500 (reduction from 478,000) Tilton River integrated: up to 100,000 (increase from 48,500) Upper Cowlitz integrated: up to 236,000 (increase from 118,000) The purpose of changes to the Cowlitz Steelhead hatchery programs is to promote abundance building in the upper Cowlitz and Tilton basins to advance recovery objectives. Converting the lower Cowlitz River hatchery program from integrated to segregated has the recovery objective of increasing abundance in tributaries by discontinuing the collection of broodstock from the natural population. This change also allows the run timing of the lower river hatchery program to be aggressively advanced and, when combined with upper basin program returns, to promote earlier and protracted steelhead angling opportunity in the lower Cowlitz River with meaningful opportunity each month from December to May. Within a specific year, if there are shortfalls for any program, all attempts to shift production to another program will be made. The most likely shift in annual production anticipated will be from the integrated programs to the lower segregated program due to shortfalls in broodstock collection for the integrated programs. In this case, the lower Cowlitz segregated program will scale up to compensate for integrated program shortfall(s). This strategy promotes continued abundance building of Tilton River and upper Cowlitz populations while maintaining flexibility in the lower Cowlitz River program to maintain overall production levels. This strategy will help Upper Cowlitz/Cispus and Tilton populations progress towards local adaptation while expanding overall hatchery steelhead return timing for fishery augmentation.

Current Assumed Recovery Phase(s): Lower Cowlitz/Local Adaptation, Tilton River/Recolonization, and Upper Cowlitz/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

		• 5 year 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 **Current Assumption is that the Tilton and Upper Cowlitz winter-run steelhead populations are 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 R_{max}). ○ 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 **Current assumption is that Lower Cowlitz winter-run population is in this phase.** • 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

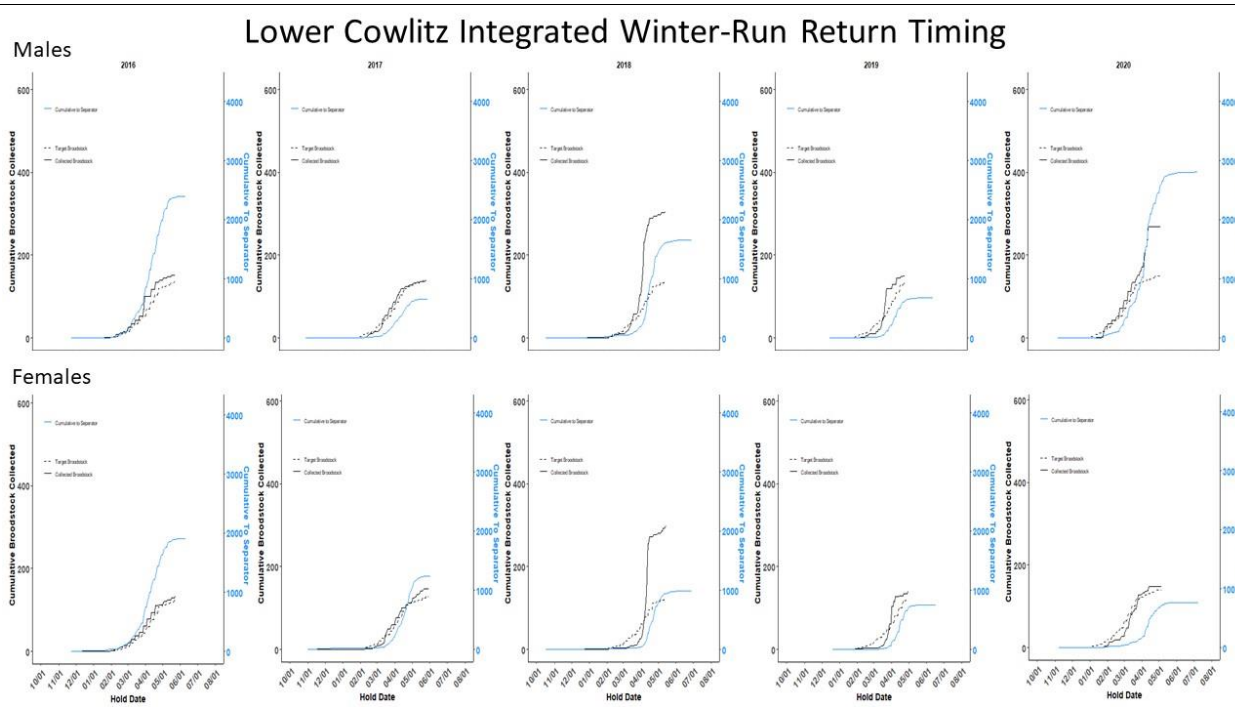
		• Determine how close to Local Adaptation Phase these populations are at this time
		• Develop/Confirm assessment criteria for trigger(s) during next 1 year:
		  ○ Escapement
		  ○ R_{max}
		  ○ Adult to adult productivity
		  ○ Assess pHOS in relation to HSRG standard that would apply to segregated program (i.e., 10%) – identify management options to achieve this target, if needed.

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…) • 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.

LOWER COWLITZ WINTER-RUN STEELHEAD PROGRAM

Current Program: This describes the Lower Cowlitz winter steelhead program prior to interim management implemented in 2020.

Program Name:	**Lower Cowlitz Winter Steelhead**
Program Type:	Integrated
Assumed Recovery Phase:	Local Adaptation
Goal of Program:	Conservation/Harvest
Adult Broodstock Collection	
Broodstock Source	Adult lower Cowlitz HOR returns/Lower Cowlitz NOR adults
Broodstock Collection location/methods	Lower Cowlitz HOR returns to separator/ NORs collected from lower river tributaries via weirs.
Integration Rate	Integrated: capped at 1 in 10 encountered at weirs. ~0.1 Recent performance: 0.016 (0.003, 0.029)
Collection timing curves:	



	HOR Females			HOR Males			Combined HOR Males and Females		
Year	Brood Collected	Brood Target	Separator Return	Brood Collected	Brood Target	Separator Return	Brood Collected	Brood Target	Separator Return
2016	132	128	1905	153	140	2399	285	268	4304
2017	147	128	1238	138	140	655	285	268	1893
2018	297	132	986	305	144	1652	602	276	2638
2019	140	139	752	150	149	679	290	288	1431
2020	148	139	766	268	149	2805	416	288	3571

Secondary sources/plans for lack of adults	**HOR adults from the lower Cowlitz River program used at a higher rate and decreased pNOB was accepted.**

Adult Transportation & Disposition

Target	*Rank*	*Quantity (range)*	*Location*	*Dates*
Broodstock	1	Up to 400	Hatchery	Feb.-May
Surplus	2	AHN	Local/Statewide/Tribal food banks	Dec. – Jun.
Nutrient Enhancement	3	N/A	N/A	N/A

Juvenile Release(s)

Release Strategy	Volitional Release/Truck Plant
Quantity; Release Goal	481,000
Release Age/Size	1+/7 fish per pound
Release Location/Timing	Cowlitz Trout Hatchery April 1 – May 30

Marking/Tagging strategy[1]	Integrated – Adipose fin clip
Fish Management needs	Adipose clip required to allow harvest in mark-selective fisheries
Evaluation Needs	Adipose clip allows for evaluation of pHOS/pHOB and PNI. CWT are not being used with this program due to mark being used for census purposes with another program (Upper Cowlitz Basin).
Summary of Hatchery Configuration/Infrastructure: • Adult collection for this program occurs at the Cowlitz Barrier Dam Separator and lower river weirs. Broodstock is held at the Cowlitz Salmon Hatchery. • Spawning and egg incubation occur at the Cowlitz Trout Hatchery. • Juvenile rearing occurs at the Cowlitz Trout Hatchery in both earthen ponds and raceways. Additional Notes: For the past three years lower Cowlitz HOR production has been volitionally released from the large earthen ponds at the Cowlitz Trout Hatchery, and a smaller component of that production was held back in the raceways to accelerate growth and were planted at the Blue Creek boat ramp via a truck. It is currently believed that the majority of NOR production from the lower Cowlitz River is coming from tributaries.	
Harvest Management Strategy[2]	
Upper river opportunity/harvest	NA – Fish from this program are not transported to the Upper Cowlitz Basin or Tilton
Lower river opportunity/harvest	Seasons/bag limits are set pre-season and managed in-season based on separator returns and broodstock collection goals. Harvest rate ranging from 46% to 80%
Ocean/ Columbia R. opportunity/harvest	Ocean: Typically not targeted in the ocean, Mark-selective fishery, but ocean harvest is considered to be negligible. Columbia R. – Mark-selective fishery with seasons addressed annually as part of Columbia River Management
Program Performance Metrics	
Proportionate Natural Influence (PNI)	
pHOS level	Target: 0.3 Recent performance: 0.36 (0.27, 0.57)
pNOB levels	Target 0.1

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

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

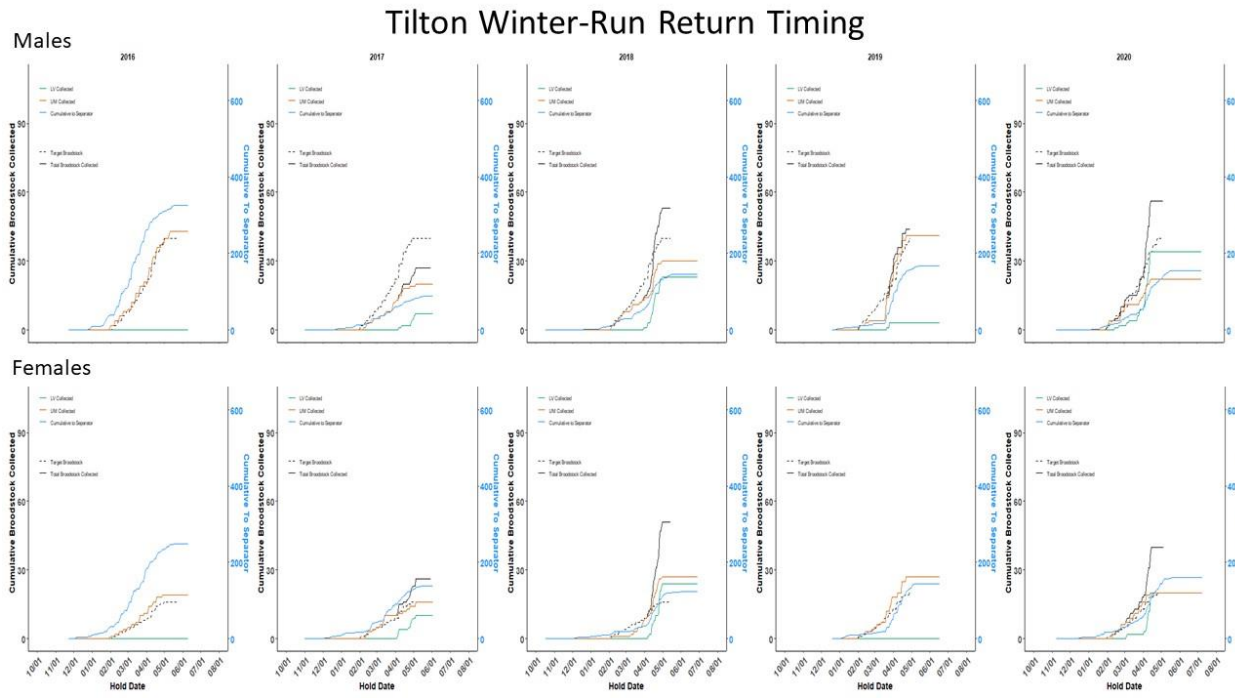
	Recent Performance: 0.016 (0.003, 0.029)
Brood stock mining rate	Target: 1:10 Recent Performance 1:10
Overall Performance Relative to Goals[3]	pHOS has not been within allowable standards as described by HSRG. Blue Creek is the area with the greatest number of HOR fish, but NOR numbers have remained extremely low. If Blue Creek is not included in pHOS analysis, the program is well below HSRG standards. Low abundance and a low collection rate (10%) of NORs at the weirs has resulted in integration rates below target.

Current Monitoring Program:

- Tributary weir operation
- Spawning ground surveys throughout the basin
- Creel
- Estimating juvenile production released from Blue Creek
- Counts and sampling of fish that return to the separator
- Sampling of broodstock at the hatchery facility.
- 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 steelhead released. Further, an assumed mortality rate can be applied to estimate fishery mortality in the future.

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

TILTON RIVER WINTER-RUN STEELHEAD PROGRAM	
Current Program: This describes the Tilton River winter steelhead program prior to interim management implemented in 2020.	
Program Name:	**Tilton River Winter Steelhead**
Program Type:	Integrated
Recovery Phase:	Recolonization
Goal of Program[4]:	Conservation/Harvest
Adult Broodstock Collection	
Broodstock Source	NOR Tilton River adults and subsequent HOR adults, if necessary
Broodstock Collection location/methods	NOR and HOR returns to separator
Integration Rate[5] Target	1.0
Collection timing curves:	



[4] Conservation / Harvest

[5] fixed, sliding scale

Year	Females Collected For Brood			Brood Target	Total Female Return to Separator			Combined HOR/NOR Males and Females		
	NOR	HOR	Total	Females	NOR	HOR	Total	Total Collected	Total Target	Total to Separator
2016	19	0	19	16	186	63	249	62	56	575
2017	16	10	26	16	118	21	139	53	56	228
2018	27	24	51	16	89	35	124	104	56	270
2019	27	0	27	20	122	22	144	71	60	312
2020	20	20	40	20	117	43	160	96	60	315

Year	Males Collected For Brood			Brood Target	Total Male Return to Separator			Combined HOR/NOR Males and Females		
	NOR	HOR	Total	Males	NOR	HOR	Total	Total Collected	Total Target	Total to Separator
2016	43	0	43	40	240	86	326	62	56	575
2017	20	7	27	40	70	19	89	53	56	228
2018	30	23	53	40	118	28	146	104	56	270
2019	41	3	44	40	138	30	168	71	60	312
2020	22	34	56	40	90	65	155	96	60	315

Secondary sources/plans for lack of adults	HOR progeny of the integrated to backfill when NOR returns to separator were low. In some particularly bad year HORs from other programs (lower Cowlitz & upper Cowlitz) are used.

Adult Transportation & Disposition

Target	*Rank*	*Quantity (range)*	*Location*	*Dates*
Broodstock	1	Up to 60	Hatchery	Feb – May
Tilton River	2	AHN	Gust Backstrom & Bremer Bridge ***See Tilton River Salmon and Steelhead Transport Plan***	Dec – June
Surplus	3	N/A	N/A	N/A
Nutrient Enhancement	4	N/A	N/A	N/A

Juvenile Release(s)

Release Strategy	Single release – truck plant
Quantity Goal	48,500
Release Age/Size	1+/7fpp
Release Location/Timing	Blue Creek Boat Ramp – April/May
Marking/Tagging strategy[6]	Adipose fin clip (Ad) + Left Ventral fin clip (LV)
Fish Management needs	Adipose fin clip required to allow harvest in mark-selective fisheries
Evaluation Needs	Adipose fin clip allows for evaluation of pHOS/pHOB and PNI. Ad+LV clip allows for evaluation of impact of contribution to lower Cowlitz River pHOS and for identification for broodstock collection and transport.

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

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 Trout Hatchery.
- Juvenile rearing occurs at the Cowlitz Trout Hatchery in raceways.

Additional Notes:

For the past three years the Tilton River program has been reared in raceways for the entire hatchery component of their life. This change occurred to assist with assessing survival of winter steelhead in the netted ponds. Fish are removed from the raceways and trucked a short distance to the Blue Creek boat ramp in late April/May where they are released.

NOR juvenile steelhead coming out of the Mayfield Counting House are currently implanted with CWT in the dorsal sinus, while those from the Upper Cowlitz are implanted with a CWT in the snout Approximately 2/3 of all juvenile steelhead trout enter the Mayfield Counting House and receive a dorsal sinus CWT, while 100% of transported juvenile steelhead from the Upper Cowlitz receive a snout CWT. NOR adults arriving at the separator with CWT in the dorsal sinus are transported to the Tilton, while those with a CWT located in their snout are transported to the Upper Cowlitz Subbasin. NOR steelhead that show up with no CWT are transported upstream to the Tilton and assumed to be fish that went through the turbines or lower Cowlitz River fish that overshoot their destination.

Harvest Management Strategy[7]	
Upper river opportunity/harvest	Tilton River: Mark-Selective Harvest rate ranging from 0% to 22% Seasons/bag limits are set pre-season and managed in-season based on separator returns and broodstock collection goals.
Lower river opportunity/harvest	Lower Cowlitz: Mark-Selective Harvest rate ranging from 46% to 80% Seasons/bag limits are set pre-season and managed in-season based on separator returns and broodstock collection goals.
Ocean/ Columbia R. opportunity/harvest	Ocean: Typically not targeted in the ocean, Mark-selective fishery, but ocean harvest is considered to be negligible. Columbia R. – Mark-selective fishery with seasons addressed annually as part of Columbia River Management.

Program Performance Metrics	
Proportionate Natural Influence (PNI)	
pHOS level	Target: NA due to current phase of recovery being reintroduction. Recent performance:
pNOB levels	Target 1.0

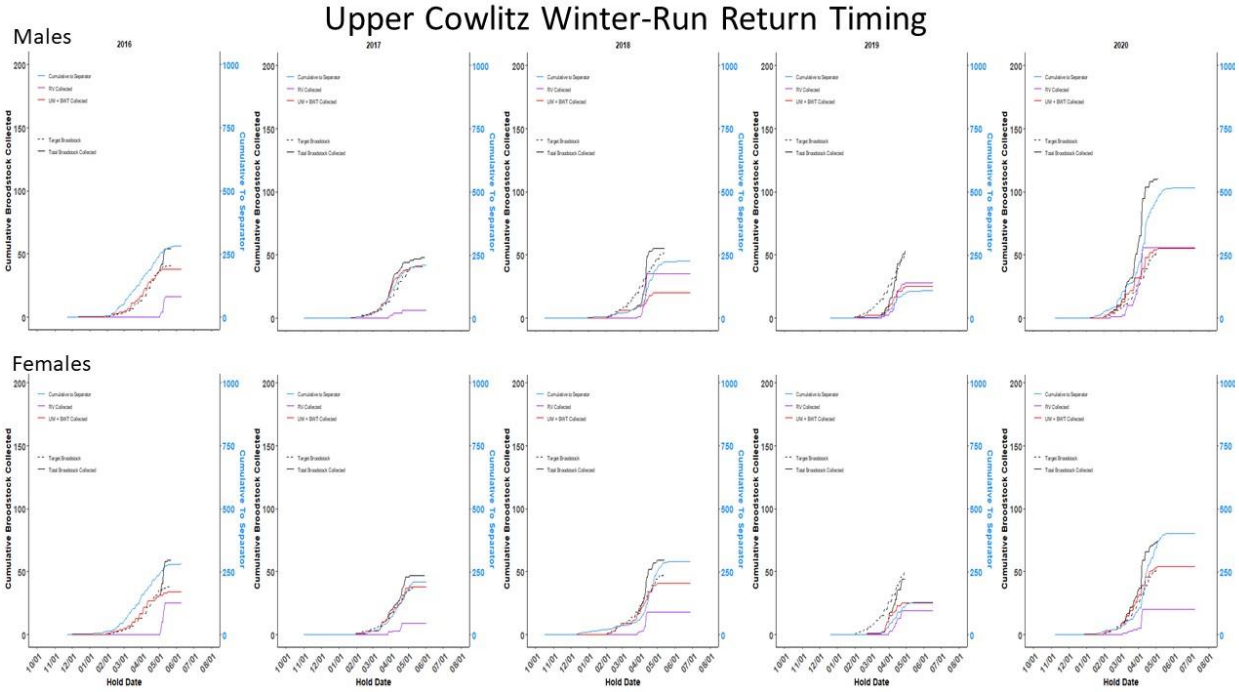
[7] %harvest or # harvest x transported; fishery type (e.g., adult/; HOR/NOR, selective/non-selective, etc.)

	Recent Performance: 0.70 (0.31, 1.00)
Brood stock mining rate	Target: <0.3 Recent Performance: 0.22
Overall Performance Relative to Goals[8]	Population in the reintroduction phase of recovery so pHOS targets currently do not apply. Low returns of NORs has resulted in integration rates below program target.
Current Monitoring Program: • Distribution spawning ground survey • Estimating juvenile production at Mayfield • Counts and sampling of fish that return to the separator • Sampling of broodstock at the hatchery facility	

UPPER COWLITZ SUBBASIN WINTER-RUN STEELHEAD PROGRAM	
Current Program: This describes the Upper Cowlitz Subbasin winter steelhead program prior to interim management implemented in 2020.	
Program Name:	**Upper Cowlitz Subbasin Winter Steelhead**
Program Type:	Integrated
Recovery Phase:	Recolonization
Goal of Program:	Conservation/Harvest
Adult Broodstock Collection	
Broodstock Source	NOR Upper Cowlitz Basin adults and subsequent HOR adults, if necessary
Broodstock Collection location/methods	NOR/HOR returns to Barrier Dam Separator
Integration Rate Target	1.0
Collection timing curves:	

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

Upper Cowlitz Winter-Run Return Timing



	Males Collected For Brood			Brood Target	Total Male Return to Separator			Combined HOR/NOR Males and Females		
Year	NOR	HOR	Total	Males	NOR	HOR	Total	Total Collected	Total Target	Total to Separator
2016	38	16	54	41	93	188	281	113	79	562
2017	42	6	48	41	168	41	209	95	79	418
2018	20	35	55	52	100	125	225	114	100	516
2019	25	28	53	53	73	35	108	97	106	237
2020	55	56	111	53	340	177	517	185	106	920

	Females Collected For Brood			Brood Target	Total Female Return to Separator			Combined HOR/NOR Males and Females		
Year	NOR	HOR	Total	Females	NOR	HOR	Total	Total Collected	Total Target	Total to Separator
2016	34	25	59	38	98	183	281	113	79	562
2017	38	9	47	38	127	82	209	95	79	418
2018	41	18	59	48	177	114	291	114	100	516
2019	25	19	44	53	95	34	129	97	106	237
2020	54	20	74	53	279	124	403	185	106	920

Secondary sources/plans for lack of adults	HOR progeny of the integrated program were used to backfill when NOR returns to separator were low. In some particularly low abundance years, HORs from other in basin programs (lower Cowlitz & upper Cowlitz) have been used.

Adult Transportation & Disposition

Target	*Rank*	*Quantity (range)*	*Location*	*Dates*
Broodstock	1	Up to 106	Cowlitz Salmon Hatchery	Feb – May
Upper Cowlitz Subbasin	2	AHN	Lake Scanewa/Cispus River/Upper Cowlitz River	Dec – June
Surplus	3	N/A	Local/Statewide/Tribal food banks	Dec – June

Nutrient Enhancement	4	N/A	N/A	N/A

Juvenile Release(s)	
Release Strategy	Volitional or Truck Plant
Quantity (range)	118,000 Integrated
Release Age/Size	1+/7 fish per pound
Release Location/Timing	Cowlitz Trout Hatchery - April/May
Marking/Tagging strategy[9]	AD clip + CWT & AD clip + RV
Fish Management needs	Adipose clip required to allow harvest in mark-selective fisheries CWT in Upper Cowlitz Subbasin integrated program allows for identification from lower Cowlitz River HOR program CWT allows for evaluation of stock composition to fisheries
Evaluation Needs	Adipose clip allows for evaluation of pHOS/pHOB and PNI. CWT allows for evaluation of stock composition on spawning grounds in lower Cowlitz River

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 Trout Hatchery.
- Juvenile rearing occurs at the Cowlitz Trout Hatchery in raceways.

Additional Comments:

For the past three years the Upper Cowlitz Subbasin program has been reared in raceways for the entire hatchery component of their life. This change occurred to assist with assessing survival of winter steelhead in the netted ponds. Fish are removed from the raceways and trucked a short distance to the Blue Creek boat ramp in late April/May where they are released.

NOR fish collected at Cowlitz Falls Fish Facility are currently implanted with CWT. NOR adults that show up at the separator with a CWT located in their snout are from the Upper Cowlitz Subbasin.

Harvest Management Strategy[10]	
Upper river opportunity/harvest	Upper Cowlitz Basin Mark-Selective Harvest rate ranging from 0% to 14% Seasons/bag limits are set pre-season and managed in-season based on separator returns and broodstock collection goals.
Lower river opportunity/harvest	Lower Cowlitz Mark-Selective Harvest rate ranging from 46% to 80% Seasons/bag limits are set pre-season and managed in-season based on separator returns and broodstock collection goals.

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

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

Ocean/ Columbia R. opportunity/harvest	Ocean: Typically not targeted in the ocean, Mark-selective fishery, but ocean harvest is considered to be negligible. Columbia R. – Mark-selective fishery with seasons addressed annually as part of Columbia River Management.
Program Performance Metrics	
Proportionate Natural Influence (PNI)	
pHOS level	Target: NA - due to current phase of recovery being reintroduction. Recent performance: 0.51
pNOB levels	Target 1.0 Recent Performance: 0.70 (0.37, 1.00)
Brood stock mining rate	Target:<0.3 Recent Performance 0.29
Overall Performance Relative to Goals[11]	Population in the reintroduction phase of recovery so pHOS targets currently do not apply. Low returns of NORs has resulted in integration rates below target
Current Monitoring Program: • Distribution spawning ground survey • Estimating juvenile production at Mayfield • Counts and sampling of fish that return to the separator • Sampling of broodstock at the hatchery facility	

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

Proposed Pathway #1	
Program Name:	**Lower Cowlitz Winter steelhead**
Program Type:	Segregated
Recovery Phase as Identified in FHMP:	Local Adaptation
Goal of Program:	Promote continued abundance building of the lower Cowlitz River NOR winter steelhead population by minimizing impacts to lower Cowlitz NOR winter steelhead populations through pHOS control and by eliminating need for broodstock collection. The purpose of the program is shifting to a harvest augmentation/mitigation program with the goal of aggressively manipulating return timing to produce an earlier arriving segregated stock. In combination with other upper river integrated hatchery programs, this will create a broader return timing of HOR steelhead from December-May. The lower Cowlitz River Program will also serve as the program to backfill overall winter steelhead production in the event that upper river integrated programs fall short of annual collection goals.
Timing for Transition[12]	**BY 2022: Proceed for 3 generations (9 years) starting 2022 (assumed years 2022 – 2031) with annual evaluation (starting in 2025) and adaptive management per APR; once desired return timing shift has occurred, protract collection across entire return of segregated program to maintain return timing.**

Adult Broodstock Collection	
Broodstock Source	**HOR Lower Cowlitz**
Broodstock Collection location/methods	**Separator**
Integration Rate[13]	**0% - Segregated program**

Priority		Collection Strategy	pNOB goal	Brood Source	Spawning Strategy
1	Normal HOR segregated ; Normal HOR integrated	a) HOR at separator emphasizing early return by collecting brood until brood stock program goals are achieved	0%	a) Lower Cowlitz HORs at Separator; b) HOR Integrated Programs at Separator	a) HOR x HOR Lower River; b) HOR Lower River x HOR Integrated; c) HOR integrated x HOR Integrated
2	Low HOR segregated ; Low HOR Integrated	a) HOR at separator emphasizing early return by collecting brood until brood stock program	0%	a) Lower Cowlitz HORs at Separator; b) HOR Integrated if excess to broodstock and transport goals (Demographic	a) HOR x HOR Lower River; b) Any other Cowlitz HOR fish available excess to their respective program

		goals are achieved		Replacement/minimum transport target).		

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 (Lower) – 1,201 - 5,000

Low HOR (Lower) - <1,200

Normal NOR (Lower) – 401-800

Low NOR (Lower) – <400

LOWER COWLITZ

Adult Transportation & Disposition				
Target Population	*Rank*	*Quantity (range)*	Location	*D*
Broodstock	*1*	*TBD*	Cowlitz Salmon Separator	
Recycling	*Pending pHOS and other control/monitoring requirements discussio*			
Surplus	*2*	*AHN*	Food bank (food quality) or Landfill (non-food)	
Nutrient Enhancement	*N/A*	*N/A*	*Per disease management policies steelhead are not available for nutrient enhancement*	

Collection timing curves Example only, actual collection goals will be set via Annual Operating Plan - Begin collection with earliest arriving HORs from lower river program and continue collection of all HORs until broodstock goal is achieved. Additional fish will be collected to buffer against any shortfalls in the integrated programs.

5 yr ave (2017-2021)

		Lower Cowlitz	
		LCOW **HOR** (AD)	
Week Number	Week Ending	Return Average	Brood Goal
Week 42	23-Oct	0	0
Week 43	30-Oct	0	0
Week 44	6-Nov	0	0
Week 45	13-Nov	1	1
Week 46	20-Nov	0	0
Week 47	27-Nov	2	2
Week 48	4-Dec	2	2
Week 49	11-Dec	2	2
Week 50	18-Dec	2	2

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

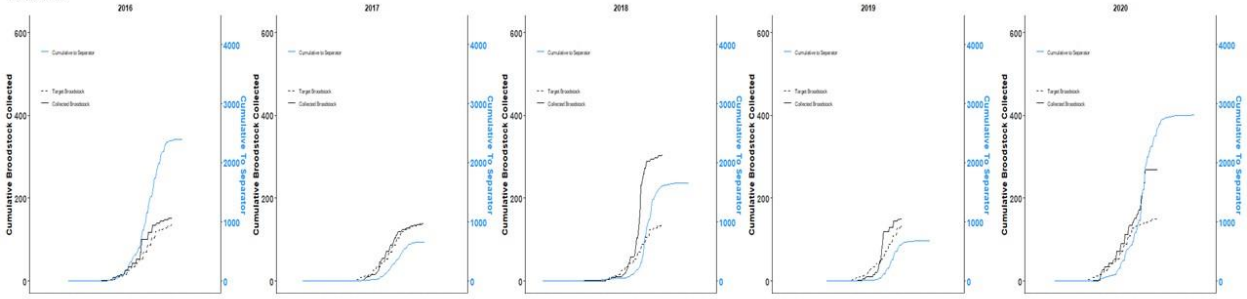
[13] fixed, sliding scale

Week 51	25-Dec	2	2
Week 52	1-Jan	4	4
Week 53	8-Jan	3	3
Week 1	15-Jan	4	4
Week 2	22-Jan	10	10
Week 3	29-Jan	10	10
Week 4	5-Feb	10	10
Week 5	12-Feb	16	16
Week 6	19-Feb	20	20
Week 7	26-Feb	12	12
Week 8	5-Mar	44	44
Week 9	12-Mar	65	20
Week 10	19-Mar	99	Backfill Tilton / Upper shortages as needed
Week 11	26-Mar	80	
Week 12	2-Apr	155	
Week 13	9-Apr	233	
Week 14	16-Apr	450	
Week 15	23-Apr	488	
Week 16	30-Apr	358	
Week 17	7-May	210	
Week 18	14-May	135	
Week 19	21-May	49	
Week 20	28-May	22	
Week 21	4-Jun	9	
Week 22	11-Jun	6	
Week 23	18-Jun	1	
Week 24	25-Jun	1	
Week 25	2-Jul	0	
Week 26	9-Jul	0	
Week 27	16-Jul	0	

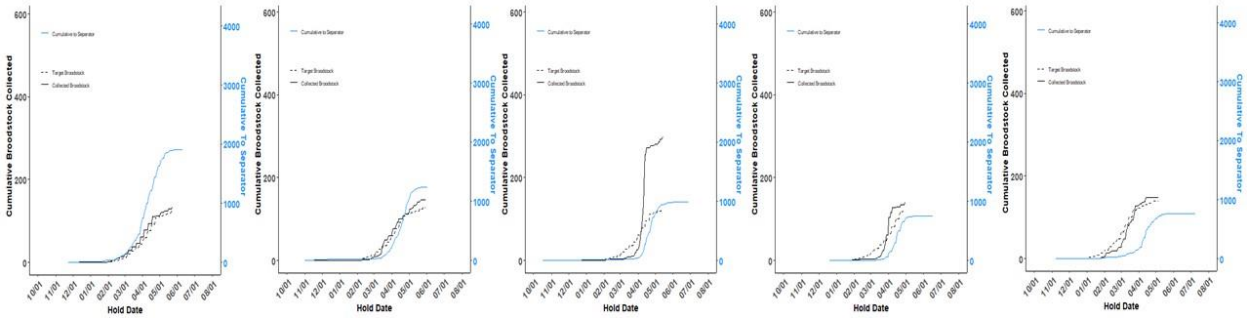
Totals	2508	166
Total Return Size	2508	
Total Brood Collected	166	
Brood %	100.0%	
Assumed Fecundity	5408	
pNOB	0	
Mining Rate	0	
Demographic Replacement (RRS=0.75)	0	
Demographic Replacement (RRSHarv=0.5)	0	
Total Egg Take	433,590	
Total Release Goal	308,500	

Lower Cowlitz Integrated Winter-Run Return Timing

Males



Females



	HOR Females			HOR Males			Combined HOR Males and Females		
Year	Brood Collected	Brood Target	Separator Return	Brood Collected	Brood Target	Separator Return	Brood Collected	Brood Target	Separator Return
2016	132	128	1905	153	140	2399	285	268	4304
2017	147	128	1238	138	140	655	285	268	1893
2018	297	132	986	305	144	1652	602	276	2638
2019	140	139	752	150	149	679	290	288	1431
2020	148	139	766	268	149	2805	416	288	3571

Secondary sources/plans for lack of adults	1. **HOR adults from lower Cowlitz segregated program** 2. **HOR adults from Tilton River integrated program** 3. **HOR adults from Upper Cowlitz Subbasin integrated program** 4. **Accept short fall of program production goal (low chance as program requires less than 100 females to reach egg take goal).** 5. **Prioritize disposition of HOR adults to highest performing SAR program (including naturally produced) from previous 5 years**

Program Name:	**Tilton River Winter steelhead**
Program Type:	Integrated
Recovery Phase as Identified in FHMP:	Recolonization

Goal of Program:	Promote continued abundance building of the Tilton River NOR winter steelhead population while making continued progress towards local adaption and continuing to provide harvest opportunity.. Through improved integration, this program also seeks to more broadly represent the natural run-timing of the population
Timing for Transition[14]	**BY 2023**
Adult Broodstock Collection	
Broodstock Source	**Tilton HORs and Tilton NORs**
Broodstock Collection location/methods	**Separator**
Integration Rate[15]	**50% or lower if necessary**

Priority		Collection Strategy	pNOB goal	Brood Source	Spawning Strategy
1	Normal HOR/NOR return	a. HORs & NORs at separator; NOR collection curves defined ahead of season. Will not exceed 30% mining rate.	50%; actual will be variable	Tilton NORs and HORs at the Separator. Replace NORs taken for brood to meet demographic replacement standard with HORs.	a. HOR x NOR; re-use NOR males once or matrix spawning strategy
2	Low NOR, Normal HOR	a. HORs & NORs at separator; NOR collection curves defined ahead of season. Will not exceed 30% mining rate.	50%; actual will be variable, lower if necessary	Tilton NORs and HORs at the Separator. Replace NORs taken for brood to meet demographic replacement standard with HORs.	a. HOR x NOR; re-use NOR males once or matrix spawning strategy; b. HOR x HOR crosses from Tilton River program. c. Accept lower juvenile production (increase other Cowlitz programs to compensate).
3	Low HOR return, normal NOR	a. HORs & NORs at separator; NOR collection curves defined ahead of season. Will not exceed 30% mining rate.	50%; actual will be variable	Tilton NORs and HORs at the Separator. Replace NORs taken for brood to meet demographic replacement	a. HOR x NOR; re-use NOR males once or matrix spawning strategy; b. c. Accept lower juvenile production (increase other Cowlitz programs to

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

[15] fixed, sliding scale

				standard with HORs.	compensate) and have higher pNOB/integration rate.
4	Shortages across board	a. HORs & NORs at separator; NOR collection curves defined ahead of season. Will not exceed 30% mining rate.	50%: actual will be variable	Replace NORs taken for brood to meet demographic replacement standard with HORs.	a. HOR x NOR; re-use NOR males once or matrix spawning strategy; b. Accept lower juvenile production (increase lower river segregated programs to compensate).

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 – 101 - 500

Low HOR - <100

Normal NOR – 101 - 500

Low NOR – <100

Integration Target – 50% or less if necessary

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

Tilton River HOR's

Adult Transportation & Disposition				
Target Population	*Rank*	*Quantity (range)*	Location	*D*
Demographic Replacement	*1*	Dependent on # of NOR fish taken for broodstock and assumed HOR harvest rate in basin of interest	***See Tilton River Salmon and Steelhead Transport Plan***	
Broodstock	2	Up to TBD	Cowlitz Salmon Separator	
Tilton River	3	AHN	Gus Backstrom & Bremer Bridge ***See Tilton River Salmon and Steelhead Transport Plan***	
Surplus	*N/A*	*N/A*	N/A during recolonization - may need as outlet during local adaptation	
Nutrient Enhancement	*N/A*	*N/A*	*Per disease management policies steelhead are not available for nutrient enhancement*	

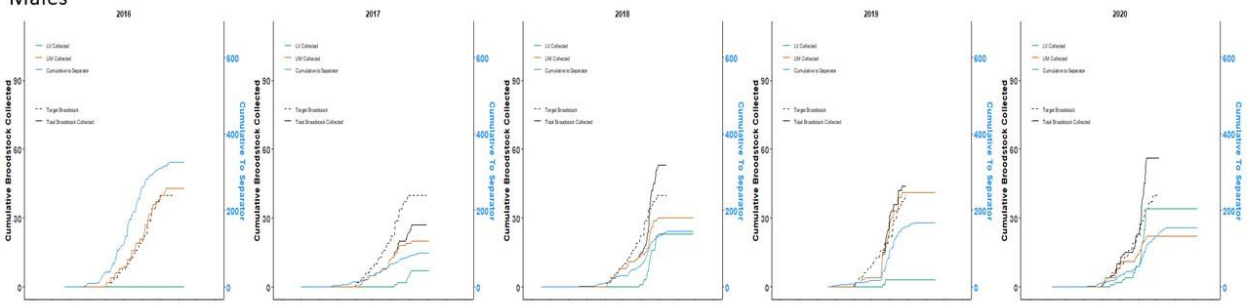
Tilton River NOR's

Adult Transportation & Disposition				
Target Population	*Rank*	*Quantity (range)*	Location	*D*
Follow Mining Rate	*1*	<30% of all returning NOR adults	Tilton River	
Broodstock	2	Up to TBD	Cowlitz Salmon Separator	
Tilton River	3	AHN	Gus Backstrom & Bremer Bridge ***See Tilton River Salmon and Steelhead Transport Plan***	
Surplus	*N/A*	*N/A*	N/A	
Nutrient Enhancement	*N/A*	*N/A*	*Per disease management policies steelhead are not available for nutrient enhancement*	

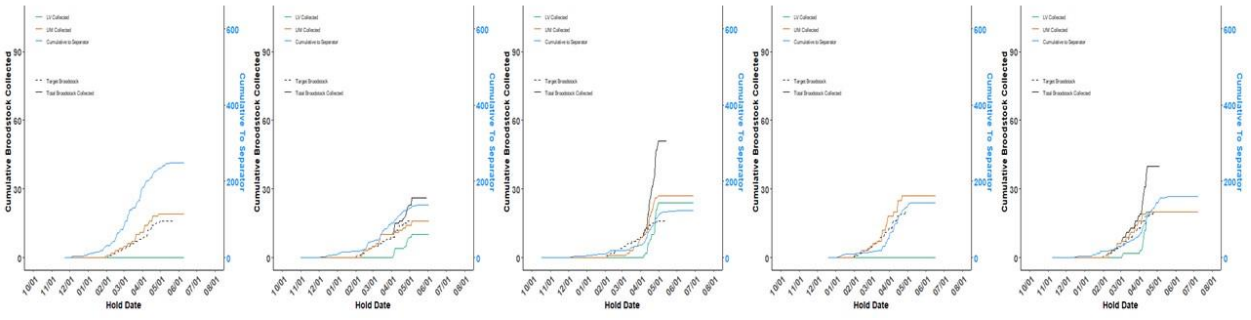
Collection timing curves example only, will be set via AOP annually.

Tilton Winter-Run Return Timing

Males



Females

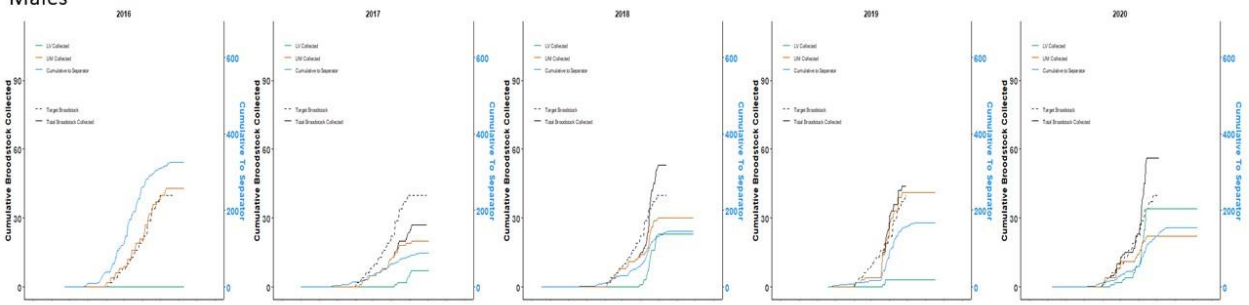


5 yr ave (2017-2021)

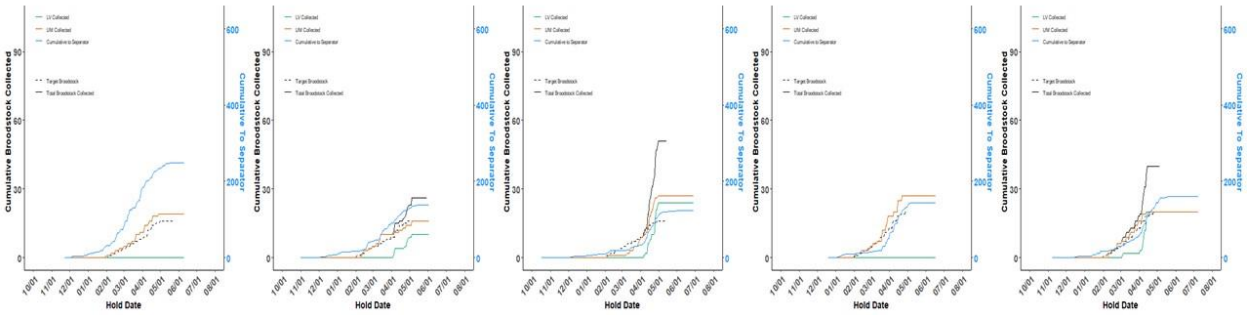
		Tilton			
		Tilton **NOR** (UM)		Tilton **HOR** (AD+LV)	
Week Number	Week Ending	Return Average	Brood Goal	Return Average	Brood Goal
Week 42	23-Oct	0		0	
Week 43	30-Oct	0		0	
Week 44	6-Nov	0		0	
Week 45	13-Nov	0		0	
Week 46	20-Nov	0		0	
Week 47	27-Nov	0		0	
Week 48	4-Dec	0		0	
Week 49	11-Dec	1		0	
Week 50	18-Dec	1		0	
Week 51	25-Dec	2		0	
Week 52	1-Jan	1		0	
Week 53	8-Jan	2		0	
Week 1	15-Jan	3		0	
Week 2	22-Jan	3		0	
Week 3	29-Jan	5	1	0	0
Week 4	5-Feb	3	1	0	0
Week 5	12-Feb	5	1	0	0
Week 6	19-Feb	5	1	0	0
Week 7	26-Feb	7	1	0	0
Week 8	5-Mar	5	1	1	1
Week 9	12-Mar	4	1	2	1
Week 10	19-Mar	12	2	2	1
Week 11	26-Mar	12	2	1	1
Week 12	2-Apr	19	3	4	3
Week 13	9-Apr	18	3	5	3
Week 14	16-Apr	30	5	10	8
Week 15	23-Apr	21	4	11	8
Week 16	30-Apr	11		10	
Week 17	7-May	8		7	
Week 18	14-May	5		6	
Week 19	21-May	2		3	
Week 20	28-May	1		0	
Week 21	4-Jun	0		0	
Week 22	11-Jun	0		0	
Week 23	18-Jun	0		0	
Week 24	25-Jun	0		0	
Week 25	2-Jul	0		0	
Week 26	9-Jul	0		0	
Week 27	16-Jul	0		0	
Totals		188	27	64	27
Total Return Size		252			
Total Brood Collected		53			
Brood %		50.0%		50.0%	
Assumed Fecundity		5000			
pNOB		0.50			
Mining Rate		0.141			
Demographic Replacement (RRS=0.75)		35			
Demographic Replacement (RRSHarv=0.5)		53			
Total Egg Take		131,019			
Total Release Goal		100,000			

Tilton Winter-Run Return Timing

Males



Females



	Females Collected For Brood			Brood Target	Total Female Return to Separator			Combined HOR/NOR Males and Females		
Year	NOR	HOR	Total	Females	NOR	HOR	Total	Total Collected	Total Target	Total to Separator
2016	19	0	19	16	186	63	249	62	56	575
2017	16	10	26	16	118	21	139	53	56	228
2018	27	24	51	16	89	35	124	104	56	270
2019	27	0	27	20	122	22	144	71	60	312
2020	20	20	40	20	117	43	160	96	60	315

	Males Collected For Brood			Brood Target	Total Male Return to Separator			Combined HOR/NOR Males and Females		
Year	NOR	HOR	Total	Males	NOR	HOR	Total	Total Collected	Total Target	Total to Separator
2016	43	0	43	40	240	86	326	62	56	575
2017	20	7	27	40	70	19	89	53	56	228
2018	30	23	53	40	118	28	146	104	56	270
2019	41	3	44	40	138	30	168	71	60	312
2020	22	34	56	40	90	65	155	96	60	315

Secondary sources/plans for lack of adults	• **HOR adults from Tilton River program** • **Shift production to lower Cowlitz River or Upper Cowlitz Subbasin programs if fish and space available**

Program Name:	**Upper Cowlitz Subbasin Winter steelhead**
Program Type:	Integrated
Recovery Phase as Identified in FHMP:	Recolonization
Goal of Program:	Promote continued abundance building of the upper Cowlitz Subbasin NOR winter steelhead population while making continued progress towards local adaption and continuing to provide harvest opportunity. Through improved integration, this

	program also seeks to more broadly represent the natural run-timing of the population.
Timing for Transition[16]	**BY 2023**
Adult Broodstock Collection	
Broodstock Source	**Upper Cowlitz HORs and Upper Cowlitz NORs**
Broodstock Collection location/methods	**Separator**
Integration Rate[17]	**50% or lower if necessary**

Priority		Collection Strategy	pNOB goal	Brood Source	Spawning Strategy
1	Normal HOR/NOR	a. HORs & NORs at separator;	50%	NOR & HOR adults (UM+CWT/Ad+CWT) at the separator. Replace NORs taken for brood to meet demographic replacement standard with HORs.	a. HOR x NOR; re-use NOR males once or matrix spawning strategy;
2	Low NOR, Normal HOR	a. HORs & NORs at separator;	50% or lower if necessary	NOR & HOR adults (UM+CWT/Ad+CWT) at the separator. Replace NORs taken for brood to meet demographic replacement standard with HORs.	a. HOR x NOR; re-use NOR males once or matrix spawning strategy; HOR x HOR crosses from Upper Cowlitz integrated program. b. Accept lower pNOB/integration rate as part of a stepping stone strategy; plan (a) plus lower NORs
3	Low HOR return, normal NOR	a. HORs & NORs at separator;	50% but could go higher if necessary	NOR & HOR (Upper Cowlitz/Tilton/Lower Cowlitz) adults (UM+CWT/Ad+CWT) at the separator.	a. HOR x NOR; re-use NOR males or matrix spawning strategy; b. Accept lower juvenile production and have higher pNOB/integration rate.

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

[17] fixed, sliding scale

4	Shortages across board	a. HORs & NORs at separator;	50% or as high as possible within population limits	NOR & HOR adults (UM+CWT/Ad+CWT) at the separator. Replace NORs taken for brood to meet demographic replacement standard with HORs.	a. HOR x NOR; re-use NOR males or matrix spawning strategy; HOR x HOR crosses from Upper Cowlitz Subbasin integrated program. b. Shift production to one of the other two programs if there is a sufficient number of fish and space in the facility. c. Accept lower juvenile production.	

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 (Tilton) – 201 – 1,000

Low HOR (Tilton) - <200

Normal NOR – 301 - 800

Low NOR – <300

Minimum Integration Target – 50%

Maximum Integration – 100%

Maximum NOR brood stock mining rate – 30%

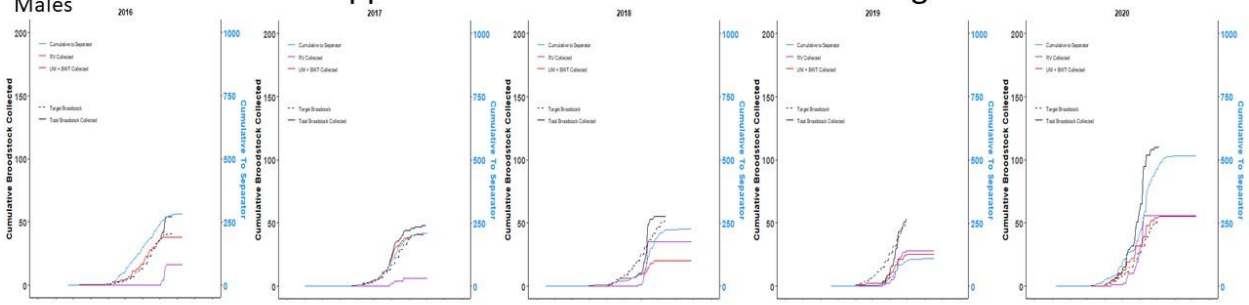
Collection timing curves: Example only, actual collection goals will be set via Annual Operating Plan.

5 yr ave (2017-2021)

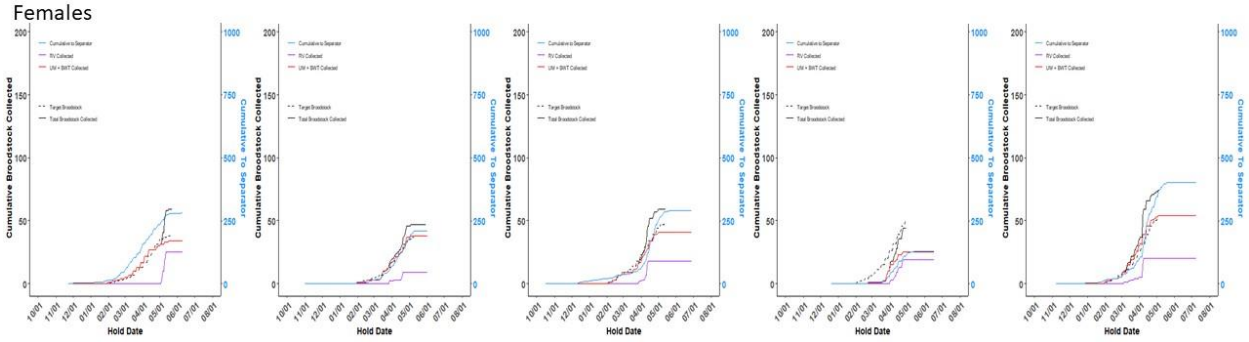
		Upper Cowlitz			
		UCOW **NOR** (UM+BV		UCOW **HOR** (AD+RV)	
Week Number	Week Ending	Return Average	Brood Goal	Return Average	Brood Goal
Week 42	23-Oct	0		0	
Week 43	30-Oct	0		0	
Week 44	6-Nov	0		0	
Week 45	13-Nov	0		0	
Week 46	20-Nov	0		0	
Week 47	27-Nov	0		0	
Week 48	4-Dec	0		0	
Week 49	11-Dec	0		0	
Week 50	18-Dec	1		0	
Week 51	25-Dec	1		0	
Week 52	1-Jan	2		0	
Week 53	8-Jan	2		0	
Week 1	15-Jan	3		0	
Week 2	22-Jan	4		0	
Week 3	29-Jan	3		0	
Week 4	5-Feb	6	1	1	0
Week 5	12-Feb	5	1	2	0
Week 6	19-Feb	7	1	1	0
Week 7	26-Feb	5	1	3	1
Week 8	5-Mar	11	2	2	0
Week 9	12-Mar	14	3	5	1
Week 10	19-Mar	20	4	5	1
Week 11	26-Mar	10	2	2	1
Week 12	2-Apr	34	7	7	2
Week 13	9-Apr	32	7	17	4
Week 14	16-Apr	51	11	51	13
Week 15	23-Apr	47	10	70	17
Week 16	30-Apr	31	7	46	11
Week 17	7-May	18	4	31	8
Week 18	14-May	13	3	22	6
Week 19	21-May	6		11	
Week 20	28-May	4		6	
Week 21	4-Jun	1		1	
Week 22	11-Jun	1		0	
Week 23	18-Jun	0		0	
Week 24	25-Jun	0		0	
Week 25	2-Jul	0		0	
Week 26	9-Jul	0		0	
Week 27	16-Jul	0		0	
Totals		333	66	284	66
Total Return Size		617			
Total Brood Collected		132			
Brood %		50.0%		50.0%	
Assumed Fecundity		5000			
pNOB		0.50			
Mining Rate		0.198			
Demographic Replacement (RRS=0.75)		88			
Demographic Replacement (RRSHarv=0.5)		132			
Total Egg Take		314,329			
Total Release Goal		236,000			

Upper Cowlitz Winter-Run Return Timing

Males



Females



	Males Collected For Brood			Brood Target	Total Male Return to Separator			Combined HOR/NOR Males and Females		
Year	NOR	HOR	Total	Males	NOR	HOR	Total	Total Collected	Total Target	Total to Separator
2016	38	16	54	41	93	188	281	113	79	562
2017	42	6	48	41	168	41	209	95	79	418
2018	20	35	55	52	100	125	225	114	100	516
2019	25	28	53	53	73	35	108	97	106	237
2020	55	56	111	53	340	177	517	185	106	920

	Females Collected For Brood			Brood Target	Total Female Return to Separator			Combined HOR/NOR Males and Females		
Year	NOR	HOR	Total	Females	NOR	HOR	Total	Total Collected	Total Target	Total to Separator
2016	34	25	59	38	98	183	281	113	79	562
2017	38	9	47	38	127	82	209	95	79	418
2018	41	18	59	48	177	114	291	114	100	516
2019	25	19	44	53	95	34	129	97	106	237
2020	54	20	74	53	279	124	403	185	106	920

Secondary sources/plans for lack of adults	• **HOR adults from Upper Cowlitz Subbasin program** • **HOR adults from Tilton River integrated program** • **HOR adults from lower Cowlitz integrated program** • **Shift production to lower Cowlitz River or Tilton River programs if fish and space available**

Adult Transportation & Disposition

Upper Cowlitz HOR's

Adult Transportation & Disposition				
Target Population	*Rank*	*Quantity (range)*	Location	*Da*

Demographic Replacement	*1*	Dependent on # of NOR fish taken for broodstock and assumed HOR harvest rate in basin of interest	Upper Cowlitz Basin	*N*
Broodstock	2	Up to TBD	Cowlitz Salmon Separator	*N*
Upper Cowlitz and Cispus River	3	AHN	Lake Scanewa (0 %) Cispus River (50 %) Upper Cowlitz River (50 %)	N
Surplus	*N/A*	*N/A*	N/A during recolonization - may need as outlet during local adaptation	
Nutrient Enhancement	*N/A*	*N/A*	*Per disease management policies steelhead are not available for nutrient enhancement*	

Upper Cowlitz NOR's

Adult Transportation & Disposition				
Target Population	*Rank*	*Quantity (range)*	Location	*Da*
Follow Mining Rate	*1*	<30% of all returning NOR adults	Upper Cowlitz Basin	*N*
Broodstock	2	Up to TBD	Cowlitz Salmon Separator	*N*
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. Temperature - Day use until mid - June, until temps at the facility are greater than 18 deg C. Consider use of alternate Lake Scanewa (Fish Haul Rd or Kayak takeout) or other secondary location as future release locations. Flow - Do not release into drawdown or forecast spill event at Cowlitz Falls Dam (>11KCFS)	N
Surplus	*N/A*	*N/A*	N/A	
Nutrient Enhancement	*N/A*	*N/A*	*Per disease management policies steelhead are not available for nutrient enhancement*	

Juvenile Releases

Release Group 1 of 3	**1) Tilton Integrated winter steelhead– up to 100,000** **2) Upper Cowlitz Integrated winter steelhead– up to 236,000** **3) Lower Cowlitz Segregated winter steelhead– at least 308,500** **Cowlitz Segregated Summer Steelhead – 650,000** **Regardless of the year all attempts will be made to make sure that a total of 1,291,500 steelhead smolts are released from the Cowlitz Trout Hatchery by adaptively managing in season and scaling upper Cowlitz and Tilton program sizes with Lower Cowlitz winter steelhead program**
Quantity	**of 1,291,500**
Release Age/Size	1+/5-7fpp
Release Location/Timing	Cowlitz Trout Hatchery April-May

Marking/Tagging strategy[18]	• HORs:
	  ○ Lower – adipose fin (ad) clipped only
	  ○ Tilton – ad + left ventral (lv) fin clip or other lower impact approach
	  ○ Upper – adipose fin clip + CWT
	  ○ Summers – adipose fin clip only
	• NORs:
	  ○ Lower – unmarked
	  ○ Tilton – previously unmarked; dorsal sinus CWT/unclipped
	  ○ Upper – CWT snout/unclipped
	• Note: Maxillary clip may be considered as an improvement to replace ventral fin clip or dorsal sinus CWT in future if favorably determined by the M&E group.

Summary of Hatchery Configuration/Infrastructure Modifications[19]:

- Adult collection for the Lower Cowlitz, Upper Cowlitz and Tilton programs will occur at the Cowlitz Barrier Dam Separator. Broodstock s held at the Cowlitz Salmon Hatchery.
- Egg incubation will occur at the Cowlitz Trout Hatchery.
- Juvenile rearing will occur at the Cowlitz Trout Hatchery in earthen ponds and raceways.

Additional Comments:

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

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

Harvest Management Strategy

	Abundance		
Area	**Low**	**Normal**	**Above Normal**
INTERIM (until we have management targets for NOR populations)			
Upper/Cispus (Integ. Prog)	Currently, no Cowlitz specific forecasts available. Pre-season management based on overall steelhead forecast strength; Fishery on excess HORs transported to upper Cowlitz and Cispus **ABOVE** those needed to replace NORs used for broodstock (hatchery equivalents); Restricted Mark-Selective fishery (reduced bag limit or full closure); In-season management based on actual separator returns of HOR/NOR.	Currently, no Cowlitz specific forecasts available. Pre-season managment based on overall steelhead forcast strength; Fishery on excess HORs transported to upper Cowlitz and Cispus **ABOVE** those needed to replace NORs used for broodstock (hatchery equivalents); Full Season Mark-Selective fishery (hatchery fish with 2 adults) In-season management based on actual separator returns of HOR/NOR.	Currently, no Cowlitz specific forcasts available. Pre-season management based on overall steelhead forcast strength; Fishery on excess HORs transported to upper Cowlitz and Cispus **ABOVE** those needed to replace NORs used for broodstock (hatchery equivalents); Full Season Mark-Selective fishery (hatchery fish with 2 adults); Potential for increased bag limits In-season management based on actual separator returns of HOR/NOR.
Tilton (Integ. Prog)	Currently, no Cowlitz specific forecasts available. Pre-season management based on overall steelhead forecast strength; Fishery on excess HORs transported to Tilton **ABOVE** those needed to replace NORs used for broodstock (hatchery equivalents); Restricted Mark-Selective fishery (reduced bag limit or full closure); In-season management based on actual separator returns of HOR/NOR.	Currently, no Cowlitz specific forecasts available. Pre-season management based on overall steelhead forecast strength; Fishery on excess HORs transported to Tilton **ABOVE** those needed to replace NORs used for broodstock (hatchery equivalents); Full Season Mark-Selective fishery (hatchery fish with 2 adults); In-season management based on actual separator returns of HOR/NOR.	Currently, no Cowlitz specific forecasts available. Pre-season management based on overall steelhead forecast strength; Fishery on excess HORs transported to Tilton **ABOVE** those needed to replace NORs used for broodstock (hatchery equivalents); Full Season Mark-Selective fishery (hatchery fish with 2 adults); Potential for increased bag limits In-season management based on actual separator returns of HOR/NOR.
Lower Cowlitz (Seg. Prog)	Currently, no Cowlitz specific forecasts available. Pre-season management based on overall steelhead forecast strength. Restricted Mark-Selective fishery (reduced bag limit or full closure); In-season management based on actual separator returns of HOR.	Currently, no Cowlitz specific forecasts available. Pre-season management based on overall steelhead forecast strength; Full Season Mark-Selective fishery (hatchery with 3 adults); In-season management based on actual separator returns of HOR.	Currently, no Cowlitz specific forecasts available. Pre-season management based on overall steelhead forecast strength; Full Season Mark-Selective fishery (hatchery with 3 adults); Potential for increased bag limits In-season management based on actual separator returns of HOR.
Ocean/Columbia River	Mark-Selective; Ocean Fishery is neglible. Cowlitz stock part of LCR steelhead aggregate for Columbia River Fishery Management. Seasons considered via North of Falcon;	Mark-Selective; Ocean Fishery is neglible. Cowlitz stock part of LCR steelhead aggregate for Columbia River Fishery Management. Seasons considered via North of Falcon;	Mark-Selective; Ocean Fishery is neglible. Cowlitz stock part of LCR steelhead aggregate for Columbia River Fishery Management. Seasons considered via North of Falcon;

	Abundance		
Area	**Low**	**Normal**	**Above Normal**
LONG TERM mangage for HOR harvest and NOR harvest when abundance targets (escapement goals) are on track to be met.			
Upper/Cispus (Integ. Prog)	Utilize Cowlitz specific forecasts (once developed) for pre-season management; Fishery on excess HORs transported to upper Cowlitz and Cispus **ABOVE** those needed to replace NORs used for broodstock (hatchery equivalents); Once seeding/escapement goals are established: Restricted Mark-Selective fishery (reduced bag limit or full closure); In-season management based on actual separator returns of HOR/NOR.	Utilize Cowlitz specific forecasts (once developed) for pre-season management; Fishery on excess HORs transported to upper Cowlitz and Cispus **ABOVE** those needed to replace NORs used for broodstock (hatchery equivalents); Potential for NOR harvest if above escapement goals Once seeding/escapement goals are established and met: Full Season Non Mark-Selective fishery (HOR/NOR bag limits TBD); In-season management based on actual separator returns of HOR/NOR.	Utilize Cowlitz specific forecasts (once developed) for pre-season management; Fishery on excess HORs transported to upper Cowlitz and Cispus **ABOVE** those needed to replace NORs used for broodstock (hatchery equivalents); Potential for NOR harvest if above escapement goals Once seeding/escapement goals are established and met: Full Season Non Mark-Selective fishery (HOR/NOR bag limits TBD); Potential for increased bag limits In-season management based on actual separator returns of HOR/NOR.
Tilton (Integ. Prog)	Utilize Cowlitz specific forecasts (once developed) for pre-season management; Fishery on excess HORs transported to upper Cowlitz and Cispus **ABOVE** those needed to replace NORs used for broodstock (hatchery equivalents); Once seeding/escapement goals are established: Restricted Mark-Selective fishery (reduced bag limit or full closure); In-season management based on actual separator returns of HOR/NOR.	Utilize Cowlitz specific forecasts (once developed) for pre-season management; Fishery on excess HORs transported to upper Cowlitz and Cispus **ABOVE** those needed to replace NORs used for broodstock (hatchery equivalents); Potential for NOR harvest if above escapement goals Once seeding/escapement goals are established and met: Full Season Non Mark-Selective fishery (HOR/NOR bag limits TBD); In-season management based on actual separator returns of HOR/NOR.	Utilize Cowlitz specific forecasts (once developed) for pre-season management; Fishery on excess HORs transported to upper Cowlitz and Cispus **ABOVE** those needed to replace NORs used for broodstock (hatchery equivalents); Potential for NOR harvest if above escapement goals Once seeding/escapement goals are established and met: Full Season Non Mark-Selective fishery (HOR/NOR bag limits TBD); Potential for increased bag limits In-season management based on actual separator returns of HOR/NOR.
Lower Cowlitz (Seg. Prog)	Utilize Cowlitz specific forecasts (once developed) for pre-season management; Restricted Mark-Selective fishery (reduced bag limit or full closure); In-season management based on actual separator returns of HOR.	Utilize Cowlitz specific forecasts (once developed) for pre-season management; Once seeding/escapement goals are established and met: Full Season Non Mark-Selective fishery (HOR/NOR bag limits TBD); In-season management based on actual separator returns of HOR/NOR. In-season managment for NORs - needs development.	Utilize Cowlitz specific forecasts (once developed) for pre-season management; Full Season Non Mark-Selective fishery (HOR/NOR bag limits TBD); Potential for increased bag limits In-season management based on actual separator returns of HOR. In-season managment for NORs - needs development.
Ocean/Columbia River	Mark-Selective; Ocean Fishery is neglible. Cowlitz stock part of LCR steelhead aggregate for Columbia River Fishery Management. Seasons considered via North of Falcon;	Mark-Selective; Ocean Fishery is neglible. Cowlitz stock part of LCR steelhead aggregate for Columbia River Fishery Management. Seasons considered via North of Falcon;	Mark-Selective; Ocean Fishery is neglible. Cowlitz stock part of LCR steelhead aggregate for Columbia River Fishery Management. Seasons considered via North of Falcon;

Interim Need:

Cowlitz specific steelhead forecasts by HOR/NOR

Steps needed to achieve long term management:

Cowlitz specific steelhead forecast by HOR and NOR

Establish Rmax and develop escapement goal

Determine hatchery equivalent value used for NOR replacement

Improve Juvenile collection at CFFF

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.

WDFW- Update FMEP to include above strategy and consult with NMFS

Develop earlier in-season predictors of total return for management purposes

Remodel Trout Hatchery

Program Performance Metrics	
Proportionate Natural Influence (PNI)	**See Table: Goal of new program by recovery phase** **PNI –** • **Lower Cowlitz Segregated Program – PNI goal = 0** • **Upper Cowlitz and Tilton Integrated Programs - PNI goal = 0.67** **pHOS –** • **Lower Cowlitz Segregated Program– evaluate and adaptively manage for 10% pHOS target; population is assumed to be in local adaptation phase and is a "contributing" population** • **Upper Cowlitz and Tilton Integrated Programs – currently assumed to be in recolonization phase. Not managed for pHOS during this phase.** **pNOB levels –** • **Lower Cowlitz Segregated Program – pNOB goal = 0** • **Upper Cowlitz and Tilton Integrated Programs – pNOB goal of 50% with in-season adaptive management (see Adult Broodstock Collection matrix above)**
pHOS level	
pNOB levels	
Brood stock mining rate	
Anticipated Performance Relative to Goals	

	Brood Stock Mining Rate: • **Lower Cowlitz Segregated Program = 0%** • **Upper Cowlitz and Tilton Integrated Programs = 30% maximum** **Broodstock Collection prioritization by phase.** • Recolonization: 1. Demographic replacement (after harvest) of NORs used for brood for upper basin integrated programs 2. 30% NOAA mining rate cap on NORs 3. Meeting hatchery brood take goals for upper basin integrated programs (backfill segregated program size allowed) 4. 70% of full seeding achieved in upper basin populations • Develop minimum transport targets based on evaluation of seeding capacity 5. Collect extra brood for integrated programs to enable grading and surplus of juvenile fish to improve SAR 6. pNOB/pHOS/PNI goals achieved • Local Adaptation 1. Demographic replacement (after harvest) of NORs used for brood for upper basin integrated programs 2. 30% NOAA mining rate cap on NORS 3. 70% of full seeding achieved in upper basin populations 4. pNOB/pHOS/PNI goals achieved 5. Meeting hatchery brood take goals for upper basin integrated programs (backfill segregated program is allowed) 6. Collect extra brood for integrated programs to enable grading and surplus of juvenile fish to improve SAR **Anticipated Performance Relative to Goals** • **Lower Cowlitz Segregated Program = Expand harvest opportunity early in the**

	season while minimizing impacts to Lower Cowlitz NOR winter steelhead population through pHOS management. • **Upper Cowlitz/Tilton Integrated Programs - Improve ability to build abundance in these populations during reintroduction phase and promote natural return timing curve, while contributing to harvest opportunity.**

Monitoring data needs associated with Adaptive Management trigger points:

- Continued monitoring of adult and juvenile (outmigrant) abundance for Upper Cowlitz/Cispus and Tilton populations and adult spawner escapement monitoring for Lower Cowlitz Population for use in viability assessment and development of full seeding estimate (R_{max}) and escapement goals
- Creel evaluation
- Collection efficiency and Fish Passage Survival monitoring at Cowlitz Falls Dam
- Fish guidance efficiency and Fish Passage Survival monitoring at Mayfield Dam
- Determination of hatchery equivalent value for demographic replacement
- Evaluation of Lower Cowlitz winter steelhead timing manipulation
- SAR Evaluation

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

Overall production targets for the compliment of new winter steelhead programs (winters: Lower; Tilton; Upper Cowlitz) combined will be the same as the previous compliment of programs. There may be annual differences in release numbers at the individual program level due to broodstock availability, but the combined total of all programs will result in the same release number goal by scaling upper basin and lower Cowlitz programs appropriately in-season. This means that the proposed new suite of programs will fit into the existing facility without any modifications, but there will likely be approaches that can improve survival of each program (e.g., remodel of trout hatchery; earlier return timing, reduced pNOB, implementation of grading and surplus of juvenile fish).

Proposed Program:

List of Reference Materials from Transition Plan Workshops.

Ranking Proposed Transition Pathways and Final Decision

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.