

PRELIMINARY - Short Term Additional Production Options for Cowlitz River – for CRAG Discussion.

Option 1: - Mayfield Net Pen Coho Production

Utilize existing Mayfield net pens for coho production (from Dec. – April). Currently, there is not space in the Cowlitz Salmon Hatchery (CSH) to grow the 500,000 spring Chinook fall release group to a size much larger than 16 FPP. This option would allow us to grow a portion of the 16 FPP group to a larger size at CSH and release them in the spring to increase the smolt-to-adult return ratio (SAR):

- Net Pen Capacity (Coho): 40,000 lbs @ 15 FPP = 500,000 coho
 - This opens 2 ponds for additional spring chinook for a spring release.
- 2 ponds can hold 20,000 lbs of spring Chinook in March (time of release).
- Total estimated cost: ~\$160,000 (rough estimate only, pricing dependent on procurement process, staffing rates etc.)
- Risks for net pen operations: transport mortality, predation, theft, vandalism, disease
- The table below provides different strategies for rearing 500,000 fish at three sizes, with a 20,000 lb limit for the portion released at sizes above 16 FPP
- NOTE: analysis by WDFW staff of SAR data from RMIS included all years where both 5 and 8 FPP releases occurred, and the only two years of complete SAR data for 16 FPP fall releases:

A. Current Program (16 FPP, fall release)			Low Survival		Average Survival		High Survival	
FPP at Release	Smolts Released (Numbers)	Extra Pounds Smolts Released	SAR	Return	SAR	Return	SAR	Return
16	500,000	NA	0.09%	458	0.18%	892	0.27%	1,326

B. Portion of Fish Released at 5 FPP			Low Survival		Average Survival		High Survival	
FPP at Release	Smolts Released (Numbers)	Extra Pounds Smolts Released	SAR	Return	SAR	Return	SAR	Return
5	100,000	20,000	0.33%	326	1.40%	1,402	3.21%	3,213
8	0	0	0.11%	0	0.90%	0	2.14%	0
16	400,000	NA	0.09%	366	0.18%	714	0.27%	1,061
Total	500,000	20,000		693		2,116		4,274

C. Portion of Fish Released at 8 FPP			Low Survival		Average Survival		High Survival	
FPP at Release	Smolts Released (Numbers)	Extra Pounds Smolts Released	SAR	Return	SAR	Return	SAR	Return
5	0	0	0.33%	0	1.40%	0	3.21%	0
8	160,000	20,000	0.11%	172	0.90%	1,444	2.14%	3,422
16	340,000	NA	0.09%	311	0.18%	607	0.27%	902
Total	500,000	20,000		483		2,051		4,324

D. Mixed Release Strategy			Low Survival		Average Survival		High Survival	
FPP at Release	Smolts Released (Numbers)	Extra Pounds Smolts Released	SAR	Return	SAR	Return	SAR	Return
5	50,000	10,000	0.33%	163	1.40%	701	3.21%	1,606
8	80,000	10,000	0.11%	86	0.90%	722	2.14%	1,711
16	376,924	NA	0.09%	345	0.18%	673	0.27%	1,000
Total	506,924	20,000		594		2,096		4,317

Option 2: - Additional Spring Chinook production at FOC Net Pens

Increase number of FOC Net Pens for additional spring Chinook production

- Current program: FOC (Toledo Sand and Gravel) receives 57,000 at 12 fpp in November and release 55,000 at 5 fpp in March.
- Could rear any number of the Spring Chinook 16fpp group to a larger size to increase SAR.
- Risks for FOC Net Pen operations: transport mortality, predation, theft, vandalism, disease, potential low recruitment to Barrier Dam

Size of program is dependent upon rearing capacity of the gravel pits/lakes and ESA constraints up to 500k of the 16fpp group.

Total estimated cost: ~\$TBD (cost based on scale of operation)

Option 3: - Cowlitz Falls Fish Collection Facility Raceways

- Utilize the Cowlitz Falls raceways to grow a portion of the Spring Chinook 16fpp fall release group to a larger size and release them in the spring to increase SAR:
- 6 ponds x 1,083 lbs / pond = 6,500 lbs total
- Total estimated cost: ~\$TBD (based on TPU salaries, trucking, marking and operating costs)
- Risks: transport mortality, disease
- The table below provides different strategies for rearing 500,000 fish at three sizes, with a 6,500 lb limit for the portion released at sizes above 16 FPP
- NOTE: analysis by WDFW staff of SAR data from RMIS included all years where both 5 and 8 FPP releases occurred, and the only *two years* of complete SAR data for 16 FPP fall releases:

A. Current Program (16 FPP, fall release)			<u>Low Survival</u>		<u>Average Survival</u>		<u>High Survival</u>	
FPP at Release	Smolts Released (Numbers)	Extra Pounds Smolts Released	SAR	Return	SAR	Return	SAR	Return
16	500,000	NA	0.09%	458	0.18%	892	0.27%	1,326

B. Portion of Fish Released at 5 FPP			<u>Low Survival</u>		<u>Average Survival</u>		<u>High Survival</u>	
FPP at Release	Smolts Released (Numbers)	Extra Pounds Smolts Released	SAR	Return	SAR	Return	SAR	Return
5	32,500	6,500	0.33%	106	1.40%	456	3.21%	1,044
8	0	0	0.11%	0	0.90%	0	2.14%	0
16	467,500	NA	0.09%	428	0.18%	834	0.27%	1,240
Total	500,000	6,500		534		1,290		2,284

C. Portion of Fish Released at 8 FPP			<u>Low Survival</u>		<u>Average Survival</u>		<u>High Survival</u>	
FPP at Release	Smolts Released (Numbers)	Extra Pounds Smolts Released	SAR	Return	SAR	Return	SAR	Return
5	0	0	0.33%	0	1.40%	0	3.21%	0
8	52,000	6,500	0.11%	56	0.90%	469	2.14%	1,112
16	448,000	NA	0.09%	410	0.18%	799	0.27%	1,188
Total	500,000	6,500		466		1,269		2,301

D. Mixed Release Strategy			<u>Low Survival</u>		<u>Average Survival</u>		<u>High Survival</u>	
FPP at Release	Smolts Released (Numbers)	Extra Pounds Smolts Released	SAR	Return	SAR	Return	SAR	Return
5	21,500	4,300	0.33%	70	1.40%	301	3.21%	691
8	17,600	2,200	0.11%	19	0.90%	159	2.14%	376
16	460,000	NA	0.09%	421	0.18%	821	0.27%	1,220
Total	499,100	6,500		510		1,281		2,287

Option 4. - Additional 1 million zero age Spring Chinook production

Zero age release utilizing North Toutle Hatchery incubation and hatching.

- Spawn approximately 580 spring Chinook adults at Cowlitz Salmon Hatchery to produce 1,000,000 fry.
- Hold in CSH incubation until eyed. Transfer eyed eggs to North Toutle Hatchery.
- In April, coho would be released from CSH and North Toutle would begin transferring spring Chinook fry back to the empty ponds at CSH.
- Spring Chinook would be released in June at approximately 60-80 fpp.
- Risks: transport mortality, infrastructure failure, disease, potential straying
- We have very limited data from the mid-1990s on survival of spring Chinook released in the Cowlitz River at this size, and survival was very low (~0.002%); however, the ocean conditions at that time were poor so survival would likely be higher in some years

Total estimated cost: ~\$ 135,000 (Rough estimate only)