

DEVELOPMENT OF PROVISIONAL QUANTITATIVE GOALS FOR THE COLUMBIA BASIN PARTNERSHIP (CBP) TASK FORCE

PART 1 – METHODOLOGY SUMMARY

Scope

- Provisional quantitative goals (goals) are being developed for all salmon and steelhead in the Columbia River Basin and its tributaries – including goals for both listed and non-listed salmon and steelhead as well as goals for historical anadromous production areas that are currently blocked.
- Goals are being identified for natural production, harvest, hatchery production, and run size and are being quantified in terms of adult abundance.
- Adult abundance goals in each of the above categories are being identified for 24 “stocks” that we defined for the purposes of this exercise. These stocks were defined by species (Chinook, Coho, Sockeye, Chum, and Steelhead), run type (spring, summer, fall, late fall), and region of origin (Lower Columbia, Middle Columbia, Upper Columbia, Snake, or Willamette) – for instance, Upper Columbia summer Chinook. These stocks are generally the same as listing units (ESUs or DPSs) except that different run types in the same ESU were separated for consistency with fishery management units.

Goal Overview

- Wherever possible, the provisional goals are based on existing goals set by state, federal and tribal entities.¹
- Goals for each stock and each category (natural production, harvest, and hatchery production, run sizes) are being identified in low, medium, and high categories that reflect a continuum of aspiration for progressive improvements to be achieved over an extended time period.
- The goals take into account a number of factors, including ESA de-listing requirements, habitat constraints and productive potential, density dependence, cultural needs of tribes, fishing interests and sustainability, and mitigation responsibilities including currently blocked historical anadromous production areas.

Regional Teams

- To develop the goals, the CBP task force convened regional teams composed of technical experts with expertise in the subject area.
- Technical experts were identified by CBP members and generally included local staff from state, tribal, and other task force participants.
- These regional teams operated under the guiding principles set by the CBP, including the principle that recommendations be firmly grounded in sound science.

¹ Existing natural production goals are documented in a database developed by the Northwest Power and Conservation Council, available at <https://app.nwcouncil.org/ext/maps/AFObjPrograms/>

- Regional teams are continuing to review and refine draft goals in some cases.

Natural Production Goals

- The low-range goals represent the best scientific knowledge for the abundance necessary to avoid extinction or avoid being listed under ESA. Typically, these were based on ESA de-listing goals for listed species. For non-listed species, low-range goals were based on application of the same technical guidance used in recovery plans to identify delisting levels. In the case of unlisted populations which currently occur at levels substantially greater than minimum viability levels, low-range values represent biological reference points rather than current management or recovery goals.
- Mid-range goals are approximately half-way between the low-range goals and the high-range goals. Optimum escapement levels under current conditions were identified as mid-range goals for some healthy stocks.
- High-range goals reflect aspirational “healthy and harvestable” levels that might potentially be achieved with aggressive improvements in habitat and other conditions currently limiting stocks.
- High-range goals are typically about three times greater than low-range goals and are also generally about 50 percent of less of historical average abundance estimates.

Harvest & Fishery Goals

- We have identified current harvest levels and exploitation rates by species and run type based on existing harvest management plans, agreements, and processes.
- We have also used the abundance-based management plans that currently exist as part these existing harvest management processes to project the harvest levels and exploitation rates that would result if natural production increased consistent with the CBP goals.
- Aspirational fishery goals were identified based on harvest rates consistent with the production potential of healthy salmon and steelhead stocks.

Hatchery Production Goals

- We have also identified existing hatchery production goals for conservation and mitigation programs throughout the basin. The goals are expressed in terms of current hatchery production and corresponding adult returns.
- We identified additional hatchery production goals where they are (1) defined in existing processes and plans (e.g., the John Day Mitigation program) or (2) proposed by CBP task force members to address specific purposes (e.g., currently blocked historical anadromous production areas).

Run Size Goals

- Aggregate numbers for natural production, fisheries, and hatchery production will be developed at basin and species scales and used for evaluating status and goals relative to a variety of needs across the basin. These goals are still in development.

PART 2 - QUANTITATIVE GOALS FOR NATURAL PRODUCTION

Qualitative goals contemplated by the Columbia Basin Partnership (CBP) call for restoration of salmon and steelhead in the Columbia Basin to healthy and harvestable levels. This goal likely reflects a substantial improvement in natural production of these species. Goals for species natural production (numbers of natural-origin adults spawning naturally) were identified in three categories – low, medium, and high – for each salmon and steelhead population. Current and historical abundance were also quantified in place goals into context. Historical is defined as pre-development and corresponding numbers were estimated by various means. Box 1 identifies the hierarchy of rules by which potential low, medium and high natural production numbers were identified by regional working groups of technical experts.

Rule Set

Box 1. Rule set for quantifying low, medium, and high range goals for natural production by the Columbia Basin Partnership Task Force. Rules are numbered in priority of application.

Low range

1. *Delisting abundance goal consistent with recovery scenario as specified in ESA recovery plan. (Not every population required to achieve high level of viability).*
2. *Minimum abundance threshold specified for population in ESA recovery plan (equivalent to a viable population with ≤5% risk of extinction in 100 years).*
3. *Minimum abundance threshold inferred from rule set developed and applied by Technical Recovery Teams to similar populations by species. (Applicable where population-specific viability goals were not otherwise identified.)*

Medium range

1. *From existing plans where identified and consistent with low and high range goals identified by the CBP Task Force.*
2. *Mid-way between low and high range goals for listed populations where not otherwise identified in existing plans.*
3. *Based on yield-based escapement goals where defined for unlisted populations based on stock-recruitment analyses.*
4. *Based on current abundance where yield-based goals have not been identified for unlisted populations.*

High range

1. *Based on broad sense goals identified in existing plans where consistent with qualitative goals identified by the CBP Task Force.*
2. *Equivalent to empirical estimates of abundance under historical conditions when populations were considered to be reasonably healthy.*
3. *Based on habitat-model inferences of abundance that would result from reasonably feasible habitat restoration actions and/or favorable habitat conditions.*
4. *Default value (generally three times the low range value) were used where historical or model-derived values were not available (not to exceed the estimated pre-development habitat potential).*

Results

Figure 1 shows low and high goal ranges in aggregate by stock in relation to current abundance. Corresponding numbers are identified in Table 1. Values are normalized so that ranges for more or less abundant stocks can be illustrated on the same graph. The gap between current (value of 1) and the low end of the goal range shows identifies the proportional increase in abundance need to reach the minimum goal. Current values overlap the goal range for stocks that are relatively healthy in terms of abundance.

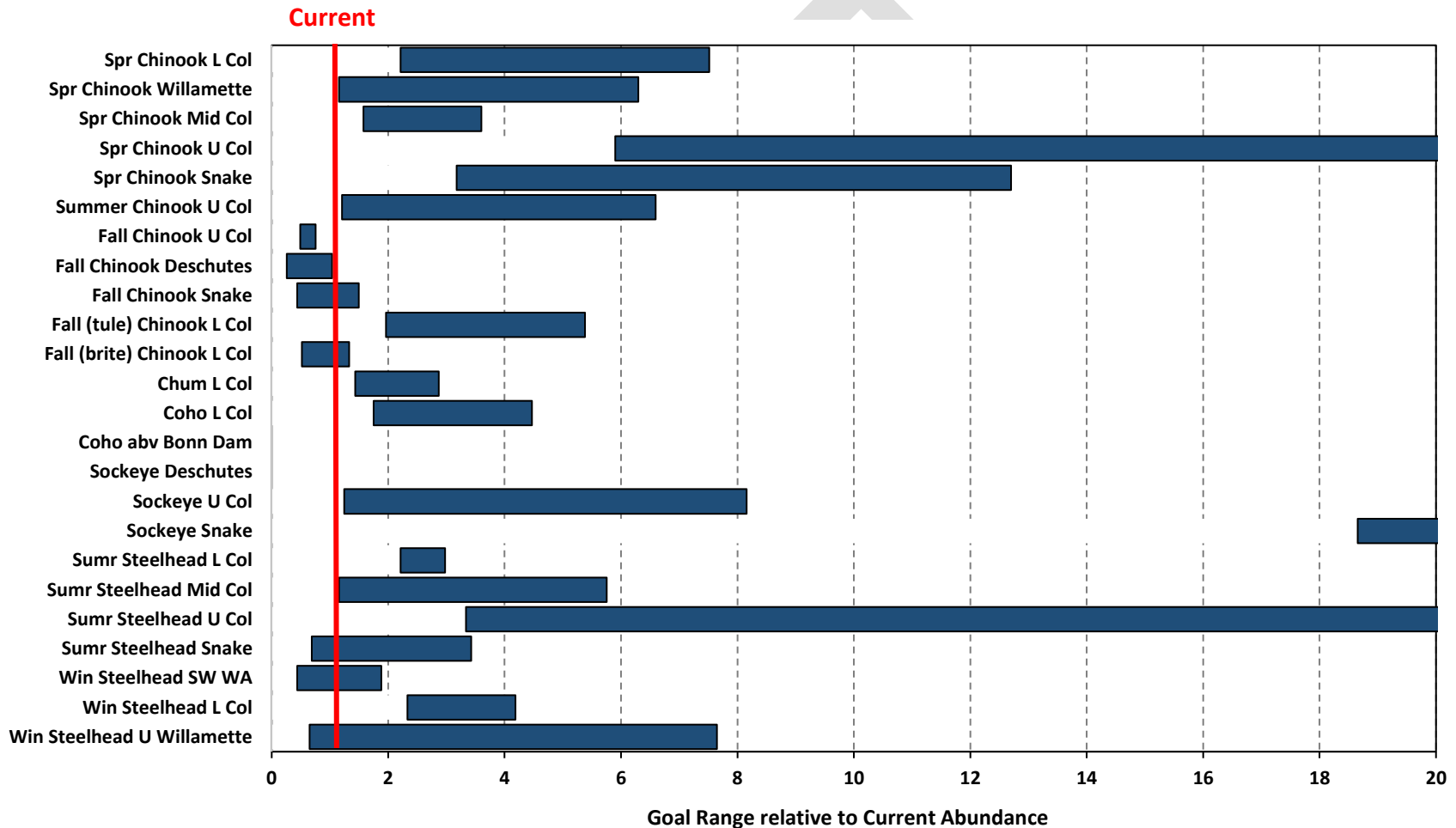


Figure 1. Aggregate abundance values for natural-origin escapements under current, historical (pre-development), and low, medium and high escapement goal ranges.

Table 1. Aggregate abundance values for natural-origin escapements under current, historical (pre-development), and low, medium and high escapement goal ranges. Numbers reflect current progress by work groups and may be revised based on new information.

Evolutionarily Significant Unit or Distinct Population Segment		Run Type	Current	Historical	Low	Med	High	High as % of historical
Chinook	L Columbia	Spring	4,431	101,700	9,800	21,550	33,300	33%
Chinook	U Willamette	Spring	4,095	312,173	4,725	15,262	25,798	8%
Chinook	M Columbia Spr	Spring	10,000	103,700	15,750	25,875	36,000	35%
Chinook	U Columbia Spr	Spring	1,090	259,432	6,433	16,968	25,452	10%
Chinook	Snake Spr/Sum	Spring/Summer	10,000	671,000	31,750	79,375	127,000	19%
Chinook	U Columbia Sum/Fall	Summer	18,771	693,952	22,704	81,398	123,841	18%
Chinook	U Columbia Sum/Fall	Fall	85,500	533,900	41,950	53,188	64,425	12%
Chinook	Deschutes Sum/Fall	Summer/Fall	15,400	17,000	4,000	13,000	16,000	94%
Chinook	Snake Fall	Fall (brights)	9,600	500,000	4,200	9,280	14,360	3%
Chinook	L Columbia	Fall (tules)	12,510	166,100	24,550	46,300	67,300	41%
Chinook	L Columbia	Fall (late brights)	11,593	33,000	6,000	9,200	15,400	47%
Chum	Columbia	Late Fall	11,178	900,000	16,050	24,075	32,100	4%
Coho	L Columbia	Fall (early & late)	31,401	288,200	54,900	98,150	140,400	49%
Coho	(Columbia upriver)	Fall		1,111,800				
Sockeye	(Mid Columbia)	Summer	5	50,000	1,000	3,000	5,000	10%
Sockeye	(U Columbia)	Summer	228,000	1,850,000	283,500	685,000	1,860,000	101%
Sockeye	Snake	Summer	134	150,000	2,500	5,750	9,000	6%
Steelhead	L Columbia	Summer	2,100	7,600	4,650	5,500	6,250	82%
Steelhead	Mid Columbia	Summer	18,155	132,800	21,000	62,750	104,500	79%
Steelhead	U Columbia	Summer	2,011	577,500	6,713	29,252	43,878	8%
Steelhead	Snake	Summer	30,500	172,200	21,000	62,750	104,500	61%
Steelhead	SW Washington	Winter	11,200	41,900	4,900	13,200	21,100	50%
Steelhead	L Columbia	Winter	8,570	58,000	20,000	27,900	35,900	62%
Steelhead	U Willamette	Winter	5,150	110,000	3,350	21,375	39,400	36%
			531,394	8,841,957	611,425	1,410,098	2,950,904	33%

Note: Numbers depicted in red are placeholders for work in progress by regional work groups.

PART 3 - QUANTITATIVE GOALS FOR HARVEST & FISHERIES

Qualitative goals contemplated by the Columbia Basin Partnership (CBP) call for providing diverse, productive and dependable fisheries for Columbia Basin salmon and steelhead. This goal will reflect a substantial improvement from the current state of these fisheries.

Current fisheries are generally regulated by harvest rate limits prescribed by a complex of existing management plans, agreements and processes. These rates do not represent fishery goals *per se* but rather constraints designed to protect weak and listed stocks. However, rates and corresponding harvests can be considered a baseline against which any desired future levels can be measured against. Therefore the CBP has documented current harvest rates for all Columbia Basin salmon and steelhead stocks.

Abundance-based management frameworks were developed primarily as guidance for annual fisheries in response to normal annual variability in run size. However, the practical effect in a recovering stock is to allow for higher harvest rates and numbers as average abundance improves over time – benefits of natural production improvements are thus shared between wild/natural escapements and fisheries as an outcome of the existing fishery management structure. For reference purposes, we also projected approximate increases in harvest rates that might be expected under current management frameworks with increases in abundance of wild/natural fish currently under consideration by the CBP (Figure 2). “Low” natural production goals identified by the CBP generally correspond to ESA delisting. “High” natural production goals generally describe aspirational higher numbers that might reasonably be achieved with “broad sense” recovery actions to provide species viability, harvestability and ecological benefits. Increases in harvest rates will be triggered for stocks where fisheries are currently regulated under abundance-based management frameworks.

Existing management frameworks designed to protect weak and listed stocks, generally do not optimize harvest of healthy stocks consistent with CBP goals for diverse, productive and dependable fisheries. Healthy stocks can typically support substantially higher harvest rates than are currently identified in existing management frameworks. Therefore, the CBP identified aspirational goals for fisheries which increase harvest rates consistent with levels sustainable by abundant and productive salmon stocks (Figure 3). Goals are generally conservative relative to historical harvest rates and those sustained by salmon stocks in more pristine areas of the North Pacific. Goals also reflect needs of the mixed stock fisheries and related opportunities for higher harvest rates on surplus hatchery fish.

Fishery goals are defined based on exploitation or harvest rates consistent with current management frameworks. These rates are for wild/natural fish which currently drive management. Higher harvest rates may be achieved for hatchery-origin fish through fishery time, area or gear measures. Corresponding harvest numbers are being calculated based on projections of future abundance consistent with natural production goals identified by the CBP task force. Aspirational harvest rate goals do not attempt to allocate fishery opportunities among specific fisheries. It is assumed that opportunities for additional harvest will be distributed among fisheries through existing management authorities and processes.

Rule Set**Box 1. Approach to identifying fishery implications of natural production goals identified by the Columbia Basin Partnership Task Force.****Current Harvest Rates**

1. Defined by a complex of existing plans, agreements and processes (US v Oregon, Pacific Fishery Management Council, Pacific Salmon Treaty).
2. Include a combination of abundance-based, escapement-based, and harvest rate-based goals defined for specific stocks.
3. Weak and ESA-listed stocks are protected by low fishing rates intended to minimize conservation risks.
4. Weak stock constraints limit access to harvestable surpluses of strong and hatchery stocks for which goals are generally based on maximum or optimum sustainable yields.

Harvest Rates under current management frameworks @ low, medium and high range wild/natural abundance goals

1. Average annual harvest rates increase by stock with increasing wild/natural numbers according to existing abundance-based management schedules which have been defined for some but not all stocks.
2. Harvests by stock are projected with increased wild/natural abundance and incremental increases in abundance-based harvest rates according to existing management frameworks.

Low Range Goals

1. Assume that existing management frameworks for weak stock management remain in place until such time as low range natural production goals consistent with delisting are achieved.
2. Based on existing management frameworks for currently-healthy stocks.
3. Ranges reflect annual variation in harvest rates based on abundance in order to meet wild/natural spawning escapement goals and access higher numbers during large run years.
4. Average harvest rates are identified consistent with implementation of existing fisheries under abundance-based management frameworks.
5. Small increases in average harvest rates might be expected to occur for stocks managed based on abundance due to increases in wild/natural numbers consistent with CBP low range goals for natural production improvements.

Mid-Range Goals

1. Based on existing management frameworks for currently-healthy stocks.
2. Intermediate between low and high range goals for currently-weak or depleted stocks.

High Range Goals

1. Based on existing management frameworks for currently-healthy stocks
2. For currently weak or depleted stocks, based on reasonably-realistic harvest rates expected to be sustainable by healthy wild/natural stocks.
3. Prescribed rates were also consistent with needs to provide significant access to wild and hatchery fish in mixed stock fisheries across the range of harvest including ocean, Columbia River mainstem and tributary fisheries.

Results

Figure 2 shows the incremental increases in average harvest rates likely to occur with increasing natural production in relation to current levels. Corresponding numbers are identified in Table 1. Increases occur only for stocks where the harvest is regulated according to an abundance-based framework. For stocks currently managed under a fixed harvest rate can, it is assumed for the purposes of this exercise that future harvest rates would be the same as current (although harvest numbers would be expected to increase due to a higher abundance of fish available to the fishery). These projections make no assumptions at this point regarding the ability to access allowable rates due to other stock limits in mixed stock fisheries.

Figure 3 shows abundance-based harvest/impact rates that reflect aspirational fishery objectives beyond incremental increases projected under existing management frameworks consistent with natural

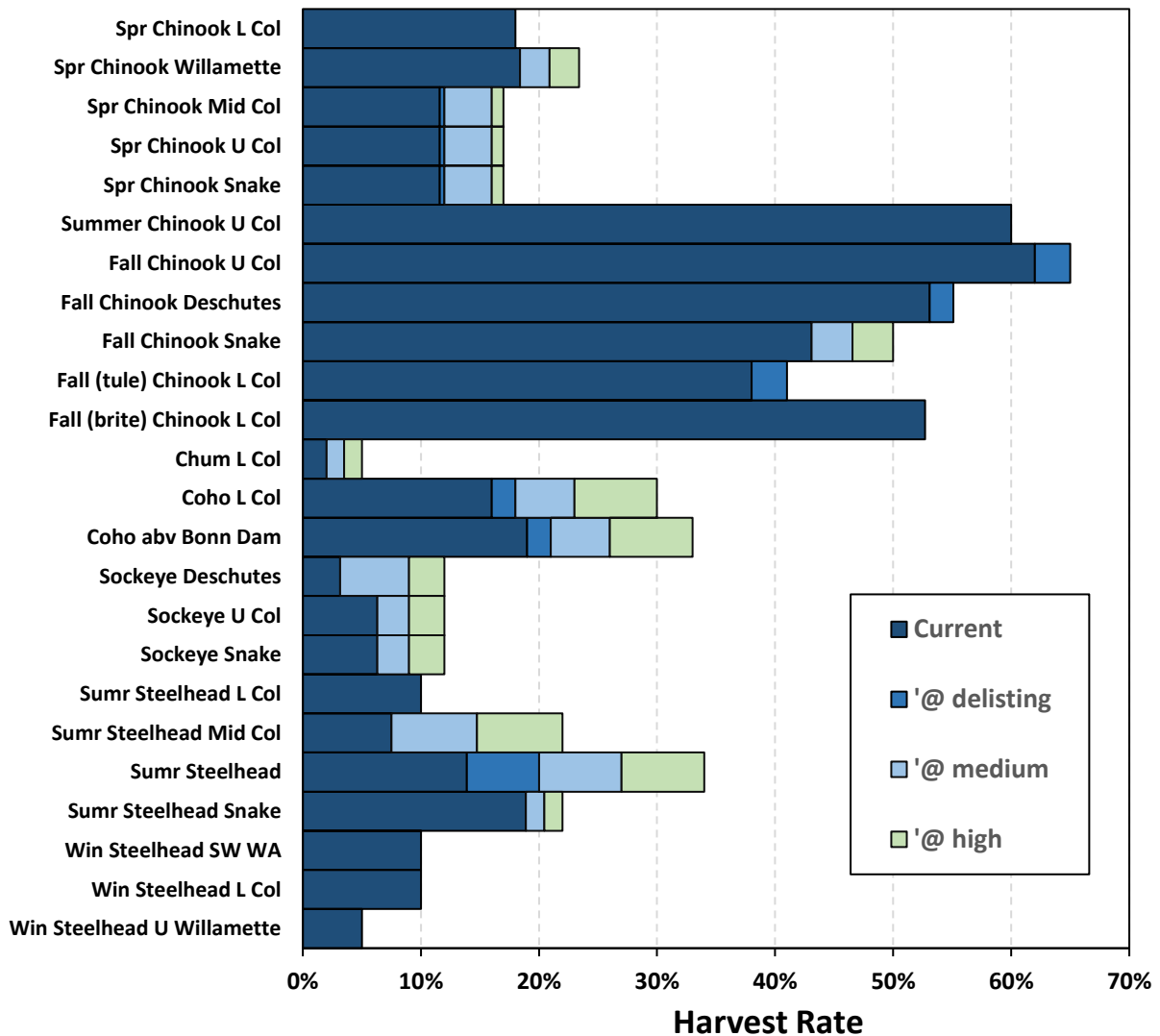


Figure 2. Current average fishery harvest/impact rates of natural-origin fish and range of increases consistent with CBP natural production goals under current management frameworks in combined marine and freshwater fisheries for Columbia Basin salmon and steelhead stocks.

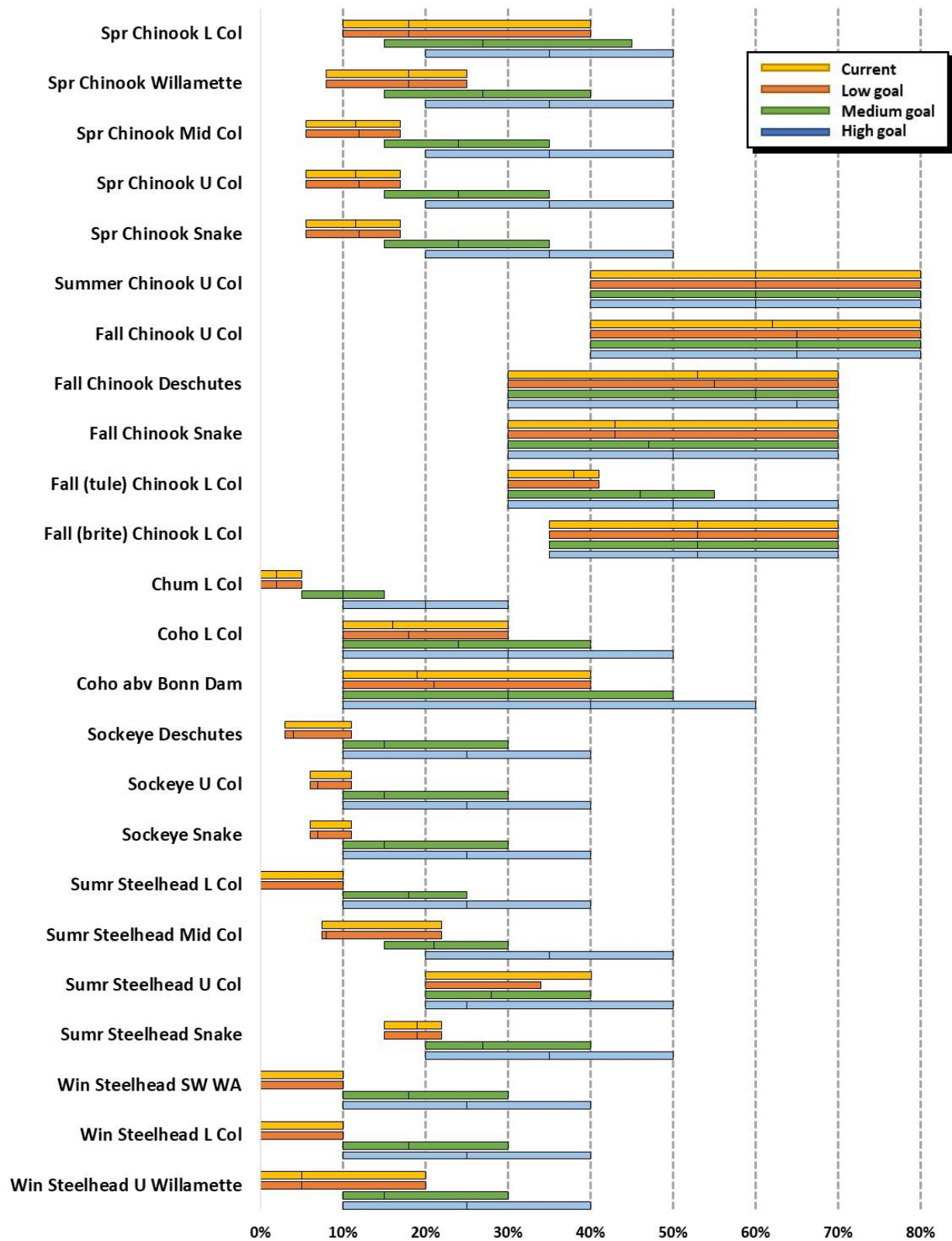


Figure 3. Abundance-based harvest/impact rates identified as aspirational fishery goals relative to current rates for natural-origin fish. Average values are depicted by vertical lines within colored bars.

Table 2. Current fishery harvest/impact rates, range of increases under current management frameworks, and low, medium, and high goals for wild/natural fish in combined marine and freshwater fisheries for Columbia Basin salmon and steelhead stocks.

Stock	Current Exploitation Rates (wild/natural)						Increments (existing plans)			Low goal		Medium goal		High goal	
	Ocean	Fresh water	Total (avg)	Range	Related guidance	Guidance includes	@ low	@ med	@ high	Avg.	Range	Avg.	Range	Avg.	Range
Spr Chinook L Col	10%	8%	18%	10-40%			18%	18%	18%	18%	10-40%	27%	15-45%	35%	20-50%
Spr Chinook Willamette	8%	10%	18%	8-25%	<15%	Freshwater	18%	21%	23%	18%	8-25%	27%	15-40%	35%	20-50%
Spr Chinook Mid Col	--	11.6%	11.6%	5.5-17%	5.5-17%	Freshwater	12%	16%	17%	12%	5.5-17%	24%	25-35%	35%	20-50%
Spr Chinook U Col	--	11.6%	11.6%	5.5-17%	5.5-17%	Freshwater	12%	16%	17%	12%	5.5-17%	24%	25-35%	35%	20-50%
Spr Chinook Snake	--	11.6%	11.6%	5.5-17%	5.5-17%	Freshwater	12%	16%	17%	12%	5.5-17%	24%	25-35%	35%	20-50%
Summer Chinook U Col	36%	24%	60%	40-80%	5.2-50%	Freshwater	60%	60%	60%	60%	40-80%	60%	40-80%	60%	40-80%
Fall Chinook U Col	36%	26%	62%	40-80%	21.5-45%	Freshwater	65%	65.0%	65%	65%	40-80%	65%	40-80%	65%	40-80%
Fall Chinook Deschutes	36%	17%	53%	30-70%	21.5-45%	Freshwater	55%	55%	55%	55%	30-70%	60%	30-70%	65%	30-70%
Fall Chinook Snake	33%	10%	43%	30-70%	21.5-45%	Freshwater	43%	46.6%	50%	43%	30-70%	47%	30-70%	50%	30-70%
Fall (tule) Chinook L Col	29%	9%	38%	30-41%	30-41%	All	41%	41%	41%	41%	30-41%	46%	30-55%	50%	30-70%
Fall (brite) Chinook L Col	38%	15%	53%	35-70%			53%	53%	53%	53%	35-70%	53%	35-70%	53%	35-70%
Chum L Col	--	2%	2%	<5%	<5%	Freshwater	2%	3.5%	5%	2%	<5%	10%	5-15%	20%	10-30%
Coho L Col	10%	6%	16%	<10-30%	<10-30%	All	18%	23%	30%	18%	<10-30%	24%	10-40%	30%	10-50%
Coho abv Bonn Dam	10%	9%	19%	<10-35%	<10-30%	All < BON	21%	26%	33%	21%	<10-40%	30%	10-50%	40%	20-60%
Sockeye Deschutes	--	3.2%	3.2%	3-11%	6-8+%	Freshwater	3%	9%	12%	4%	3-11%	15%	10-30%	25%	10-40%
Sockeye U Col	--	6.3%	6.3%	6-11%	6-8+%	Freshwater	6%	9%	12%	7%	6-11%	15%	10-30%	25%	10-40%
Sockeye Snake	--	6.3%	6.3%	6-11%	6-8+%	Freshwater	6%	9%	12%	7%	6-11%	15%	10-30%	25%	10-40%
Sumr Steelhead L Col	--	<10%	10%	<10%	<10%	Freshwater	10%	10%	10%	10%	<10%	18%	10-25%	25%	10-40%
Sumr Steelhead Mid Col	--	7.5%	7.5%	15-22%	15-22%	Freshwater	8%	14.8%	22%	8%	15-22%	21%	15-30%	35%	20-50%
Sumr Steelhead U Col	--	13.9%	13.9%	20-34%	20-34%	Freshwater	20%	27%	34%	20%	20-34%	28%	20-40%	35%	20-50%
Sumr Steelhead Snake	--	18.9%	18.9%	15-22%	15-22%	Freshwater	19%	20.5%	22%	19%	15-22%	27%	20-40%	35%	20-50%
Win Steelhead SW WA	--	<10%	10%	<10%	<10%	Freshwater	10%	10%	10%	10%	<10%	18%	10-30%	25%	10-40%
Win Steelhead L Col	--	<10%	10%	<10%	<10%	Freshwater	10%	10%	10%	10%	<10%	18%	10-30%	25%	10-40%
Win Steelhead U Willamette	--	5%	5%	<20%	<20%	Freshwater	5%	5%	5%	5%	<20%	15%	10-30%	25%	10-40%

Notes:

- CBP Stocks defined based on the combination of conservation (ESU or DPS) and fishery management units.
- Goal ranges reflect abundance-based annual harvest strategies as well as normal annual variation in fisheries.
- Related guidance is for reference purposes – typically these are abundance-based ranges identified in US v OR or other NOAA consultations for Columbia Basin fisheries. In a few cases, may also include marine harvest in OR/WA Ocean (e.g., Lower River Hatchery Fall Chinook, Columbia River Coho).
- Harvest rate goals not specifically identified for hatchery fish at this time. Sustainable rates will typically be substantially higher than for wild/natural fish.

PART 4 - QUANTITATIVE GOALS FOR HATCHERIES

Qualitative goals contemplated by the Columbia Basin Partnership (CBP) call for producing hatchery salmon and steelhead to support conservation, mitigate for lost natural production, and support fisheries.

Hatchery goals are defined in different fashions for conservation and mitigation programs throughout the basin. Some programs define goals based on adult returns. However, goals for many programs are identified solely in terms of juvenile production.

For CBP purposes, current hatchery production levels were documented for each stock by hatchery program and corresponding numbers of adults were estimated by stock. Adult return goals were identified where available. In a few instances, plans and needs for additional production were also identified by Task Force members (e.g., John Day Mitigation, new programs for blocked areas).

Rule Set

Box 2. *Rule set for quantifying low, medium and high range abundance goals by the Columbia Basin Partnership Task Force.*

Current

1. *Juvenile production levels of existing programs. (Juveniles provide a common currency for all programs including those where adult return goals are not specifically identified.)*
2. *Adult returns from current programs to the Columbia River and regional production areas (Lower Columbia, Willamette, Middle Columbia, Upper Columbia, Snake) are identified by stock based on recent average numbers.*

Planned

1. *Identify additional juvenile production in development where defined in existing processes and plans (e.g., John Day Mitigation).*
2. *Corresponding adult returns as defined or inferred from current program return rates.*

Additional Needs

1. *Identify any additional or reduced juvenile production needs to address specific purposes identified by CBP Task Force Partners (e.g., currently blocked historical anadromous production areas).*
2. *Corresponding to adult returns as defined or inferred from current program return rates.*

RESULTS

Figure 1 shows current hatchery production by stock. Table 1 summaries releases and corresponding adult returns – adult returns are rough approximations at this time.

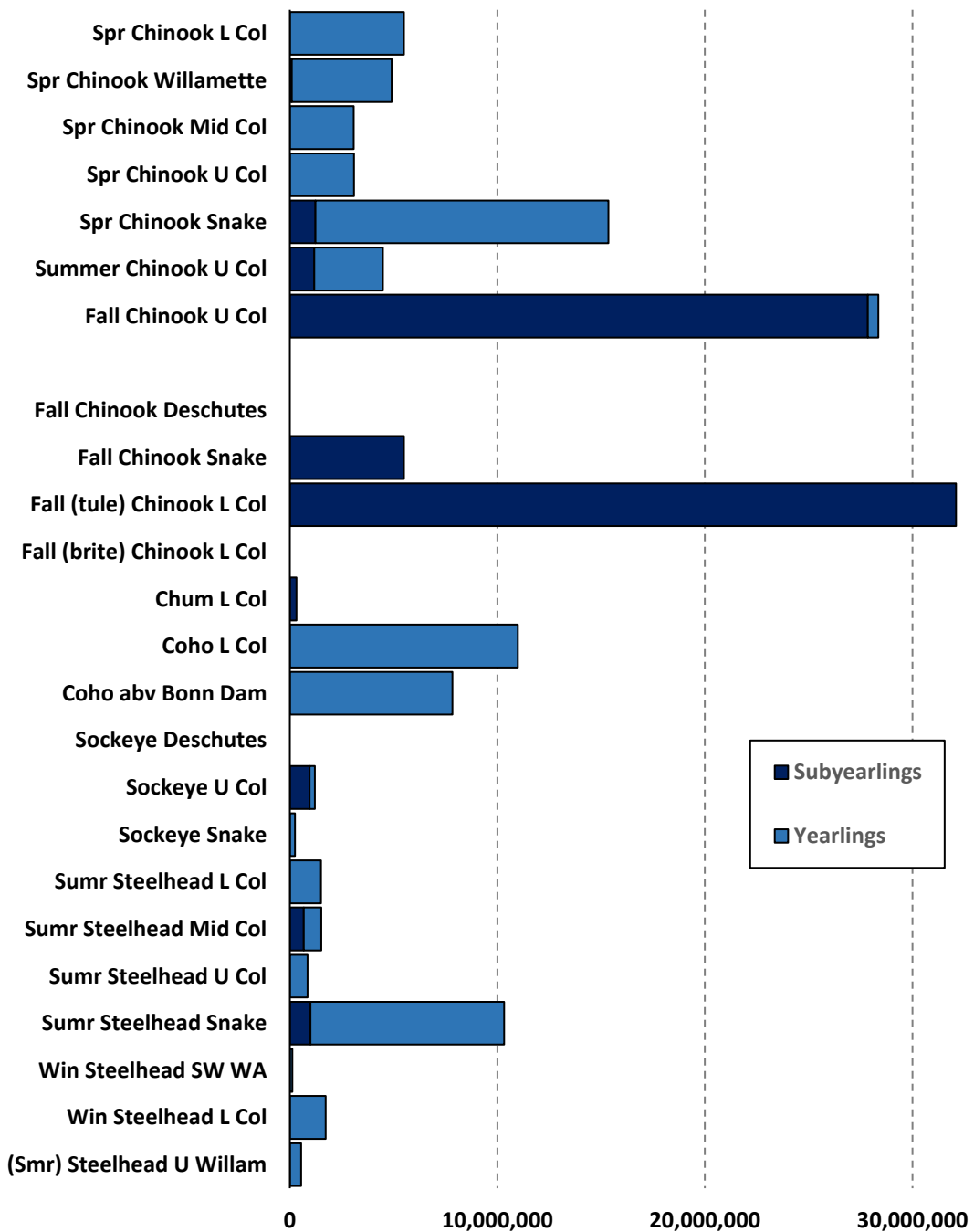


Figure 4. Current hatchery production for Columbia Basin salmon and steelhead stocks.

Table 3. Current hatchery production and approximate adult returns to the Columbia River mouth for Columbia Basin salmon and steelhead stocks.

Evolutionarily Significant Unit or Distinct Population Segment	Run Type	Fishery Management Unit	Current production (avg.)			Col R	New production		
			Yearlings	Subyearlings	Total	Adults	Total	Col R Adults	
Chinook	L Columbia	Spring	Lower River Spring	5,500,000	0	5,500,000	13,800	--	--
Chinook	U Willamette	Spring	Willamette Spring	4,800,000	100,000	4,900,000	48,506	--	--
Chinook	M Columbia Spr	Spring	Upriver Spring	3,080,000	0	3,080,000	54,674	--	--
Chinook	U Columbia Spr	Spring	Upriver Spring	3,090,000	0	3,090,000	19,422	0.7-13.5 mil	4,400-85,000
Chinook	Snake Spr/Sum	Spring/Summer	Upriver Spring	14,120,000	1,230,000	15,350,000	85,555	--	--
Chinook	U Columbia Sum/Fall	Summer	Upper Columbia Summer	3,310,000	1,180,000	4,490,000	45,151	0.9-18 mil	53,000-220,000
Chinook	U Columbia Sum/Fall	Fall	Upriver Bright (URB)	500,000	27,850,000	28,350,000	223,553	~11 mil	~45,000
								0.3-5.4 mil	2,000-40,000
Chinook	Deschutes Sum/Fall	Summer/Fall	Upriver Bright (URB)	0	0	0	0	--	--
Chinook	Snake Fall	Fall (brights)	Snake River Bright (SRB)	0	5,500,000	5,500,000	42,893	--	--
Chinook	L Columbia	Fall (tules)	Lower River Hatchery (LRH)	0	32,100,000	32,100,000	82,568	--	--
Chinook	L Columbia	Fall (late brights)	Lower River Wild (LRW)	0	0	0	0	--	--
Chum	Columbia	Late Fall	Chum	0	320,000	320,000	289	--	--
Coho	L Columbia	Fall (early & late)	Lower Columbia Coho	10,990,000	0	10,990,000	246,829	--	--
Coho	(Columbia upriver)	Fall	Upriver Coho	7,830,000	0	7,830,000	137,731	--	--
Sockeye	(Mid Columbia)	Summer	Mid Columbia Sockeye				95	--	--
Sockeye	(U Columbia)	Summer	U Columbia Sockeye	250,000	950,000	1,200,000	32,701	--	--
Sockeye	Snake	Summer	Snake Sockeye	250,000	0	250,000	1,096	--	--
Steelhead	L Columbia	Summer	L Col summer run	1,505,000	0	1,505,000	50,400	--	--
Steelhead	Mid Columbia	Summer	Summer A run	840,000	670,000	1,510,000	58,000	--	--
Steelhead	U Columbia	Summer	Summer A run	860,000	0	860,000	24,000	0.9-3.9 mil	25,000-110,000
Steelhead	Snake	Summer	Summer A & B runs	9,330,000	1,000,000	10,330,000	160,000	--	--
Steelhead	SW Washington	Winter	Winter run	120,000	0	120,000	1,500	--	--
Steelhead	L Columbia	Winter	Winter run	1,720,000	0	1,720,000	4,000	--	--
Steelhead	U Willamette	Winter	(Summer run only)	550,000	0	550,000	16,000	--	--
				68,645,000	70,900,000	139,545,000	1,348,764	13.8-51.8	86,000-274,000

Note: Values in red are working approximations.

PART 5 - COLUMBIA RIVER SALMON & STEELHEAD ABUNDANCE

Table 4. Approximate Columbia River mouth return of salmon and steelhead.

Species		Current Abundance (2008-2017 averages) ^a				Historical Abundance	
		Wild/Natl	Hatchery	Total	% Hat	ISAB 2015	NPPC 1986
Chinook	Spring	58,400	233,600	292,000	80%	0.5 mil	1.4-2.3 mil
	Summer	30,100	45,200	75,300	60%	2.0 mil	2.7-4.6 mil
	Fall	376,500	376,500	753,000	50%	1.25 mil	1.3-2.3 mil
	<i>Subtotal</i>	<i>465,000</i>	<i>655,300</i>	<i>1,120,300</i>	<i>58%</i>	<i>3.75 mil</i>	<i>5.4-9.2 mil</i>
Sockeye		295,700	32,900	328,500	10%	2.25 mil	1.5-2.6 mil
Coho		40,900	368,100	409,000	90%	0.56 mil	1.0-1.8 mil
Chum		13,600	700	14,300	5%	0.45 mil	0.8-1.0 mil
Steelhead	Winter	8,200	8,200	16,500	50%	--	--
	Summer	79,200	317,000	396,200	80%	--	--
	<i>Subtotal</i>	<i>87,500</i>	<i>325,200</i>	<i>412,700</i>	<i>79%</i>	<i>0.45 mil</i>	<i>0.8-1.4 mil</i>
Total		902,600	1,382,100	2,284,700	60%	7.46 mil	9.6-16.3 mil

Note: Values in red are working approximations.

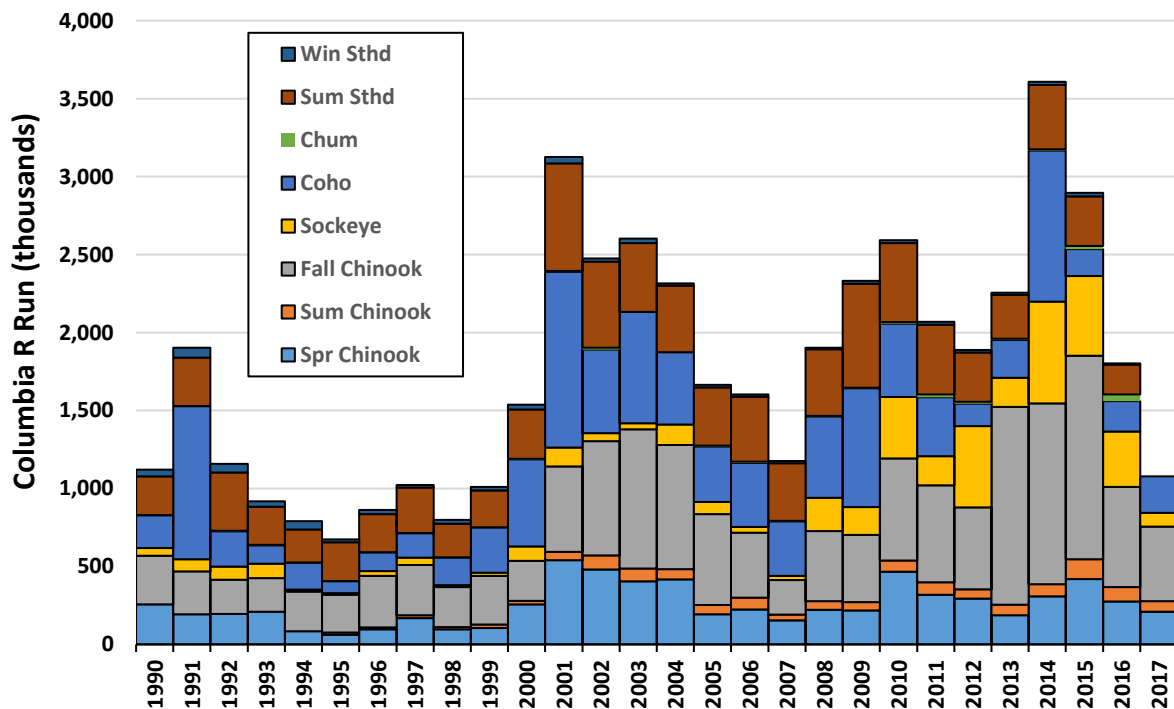


Figure 5. Annual salmon and steelhead run size to the Columbia River by stock. 1990-2017.

^a Source: Generally, Us v OR Technical Advisory Committee