



Review of Salmon Stock Status 2021

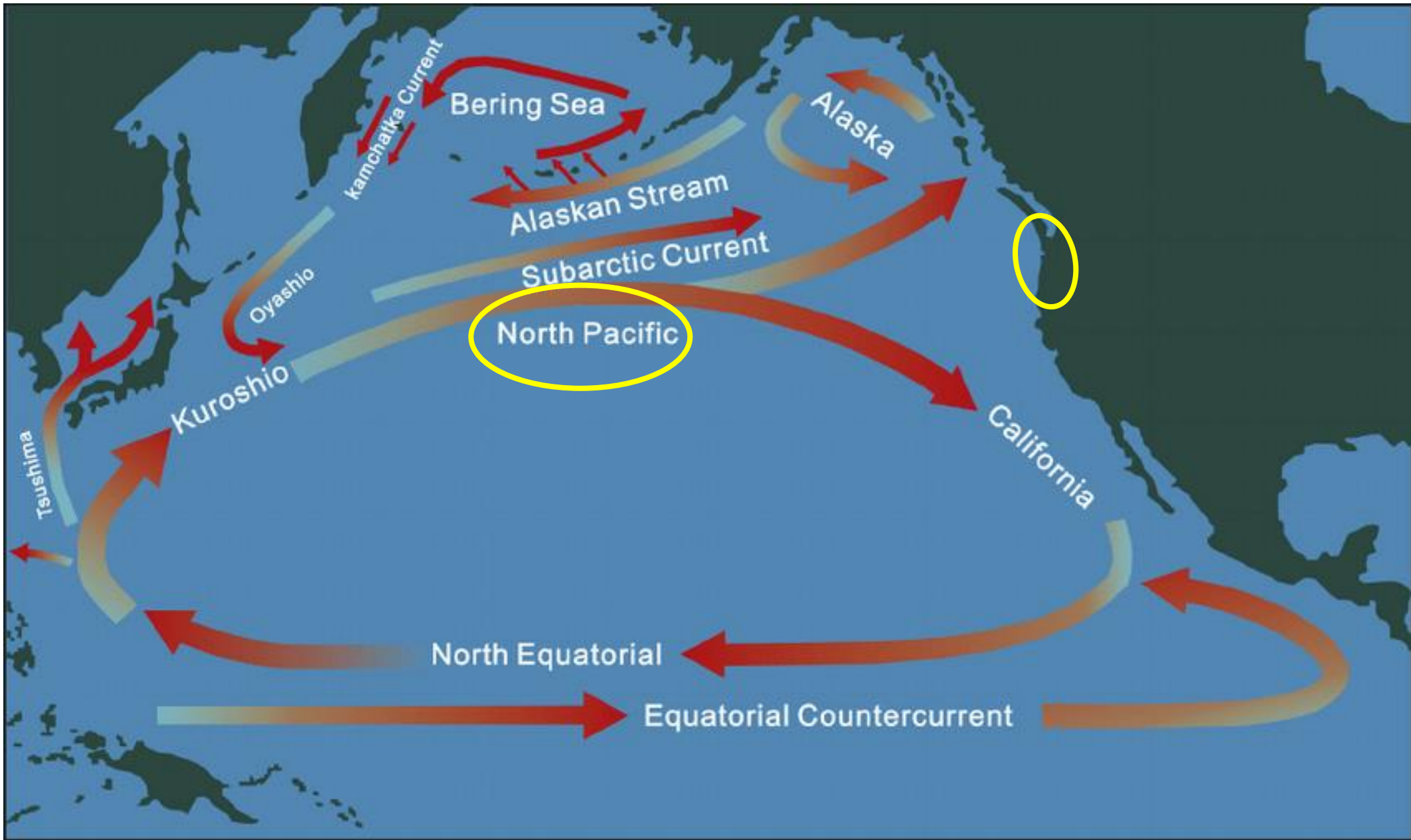
Chris Kern, Fish Division

March 19, 2021

Review of Salmon Stock Status 2021

- Background
- Past Returns; 2021 Forecasts





NWFSC Stoplight chart



		Year																						
<i>Ecosystem Indicators</i>		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Ocean basin	PDO (Sum Dec-March)	20	6	3	14	7	22	13	18	15	10	5	1	17	4	2	8	11	23	21	19	12	16	9
	PDO (Sum May-Sept)	11	4	6	5	12	18	17	19	13	15	2	10	7	3	1	8	21	23	22	16	14	20	9
	ONI (Average Jan-June)	22	1	1	7	14	16	15	18	8	12	3	11	19	4	6	8	10	20	23	13	5	21	17
Physical	SST NDBC buoys (°C; May-Sept)	18	6	8	4	5	12	23	13	2	15	1	11	3	7	9	17	21	20	19	14	16	22	10
	Upper 20 m T (°C; Nov-Mar)	22	12	9	11	7	16	17	14	13	6	1	10	19	5	4	8	3	23	21	20	15	18	2
	Upper 20 m T (°C; May-Sept)	15	10	12	4	1	3	23	19	8	9	2	5	16	7	6	17	21	18	13	11	14	22	20
	Deep temperature (°C; May-Sept)	22	6	8	4	1	10	12	16	11	5	2	7	14	9	3	15	21	20	13	18	19	17	23
	Deep salinity (May-Sept)	22	3	11	4	5	18	19	12	7	1	2	16	20	14	15	13	23	17	9	8	6	10	21
Biological	Copepod richness anom. (no. species; May-Sept)	21	2	1	8	7	16	15	20	17	11	9	10	19	4	6	3	12	22	23	18	14	13	5
	N. copepod biomass anom. (mg C m ⁻³ ; May-Sept)	21	16	12	13	5	18	15	22	17	14	8	11	10	2	4	6	7	19	23	20	9	3	1
	S. copepod biomass anom. (mg C m ⁻³ ; May-Sept)	23	2	5	4	3	15	17	22	14	11	1	7	18	10	8	6	12	20	21	19	13	16	9
	Biological transition (day of year)	20	11	10	4	9	16	15	21	14	5	1	2	18	6	12	7	7	22	22	19	17	13	3
	Nearshore Ichthyoplankton Log(mg C 1,000 m ⁻³ ; Jan-Mar)	18	3	12	6	1	22	23	16	9	18	3	14	2	8	5	11	20	15	16	13	10	21	7
	Nearshore & offshore Ichthyoplankton community index (PCO axis 1 scores; Jan-Mar)	11	6	5	8	10	13	17	21	1	14	3	12	15	4	2	7	9	19	22	23	18	20	16
	Chinook salmon juvenile catches (no. km ⁻¹ ; June)	20	4	5	17	8	12	18	21	13	11	1	6	7	16	2	3	10	14	19	22	15	9	NA
	Coho salmon juvenile catches (no. km ⁻¹ ; June)	20	8	14	6	7	3	17	21	18	4	5	10	11	16	19	1	13	9	15	22	2	12	NA
	Mean of ranks	19.1	6.3	7.6	7.4	6.4	14.4	17.3	18.3	11.3	10.1	3.1	8.9	13.4	7.4	6.5	8.6	13.8	19.0	18.9	17.2	12.4	15.8	10.9
	Rank of the mean rank	23	2	7	5	3	16	19	20	12	10	1	9	14	5	4	8	15	22	21	18	13	17	11

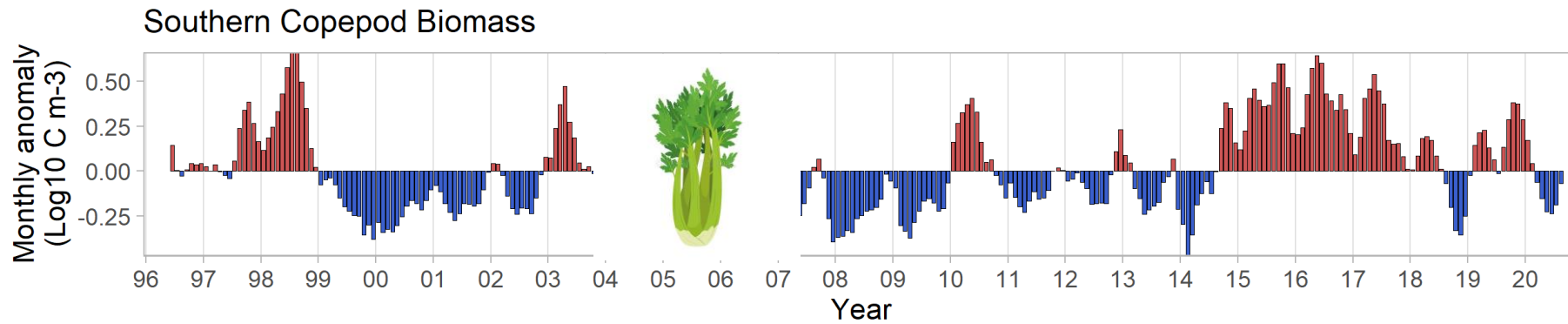
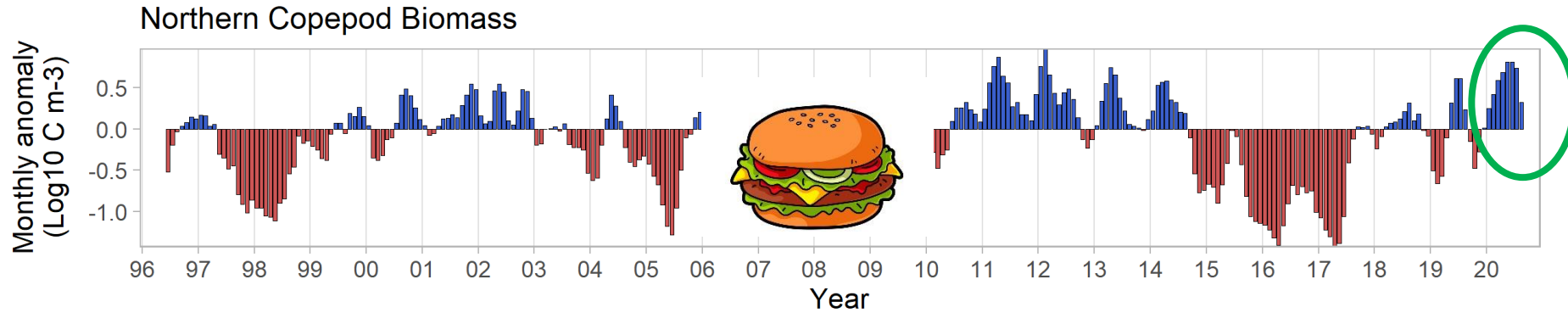
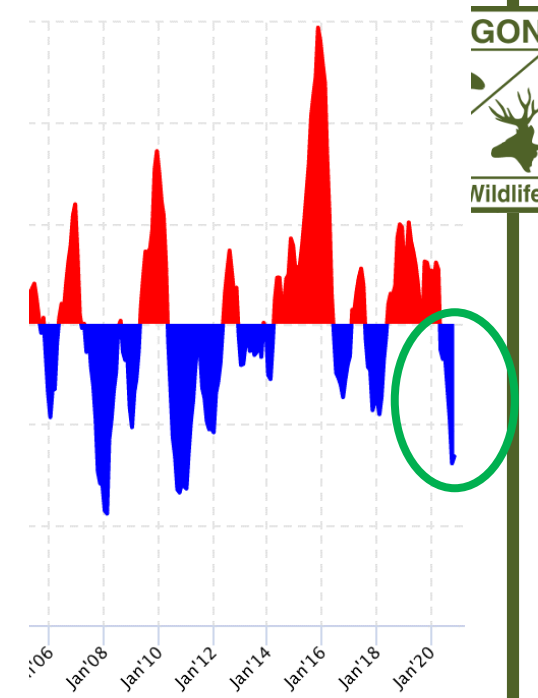
} Improved

<https://www.fisheries.noaa.gov/west-coast/science-data/ocean-ecosystem-indicators-pacific-salmon-marine-survival-northern>

Red = bad
Blue = good

El Nino

La Nina



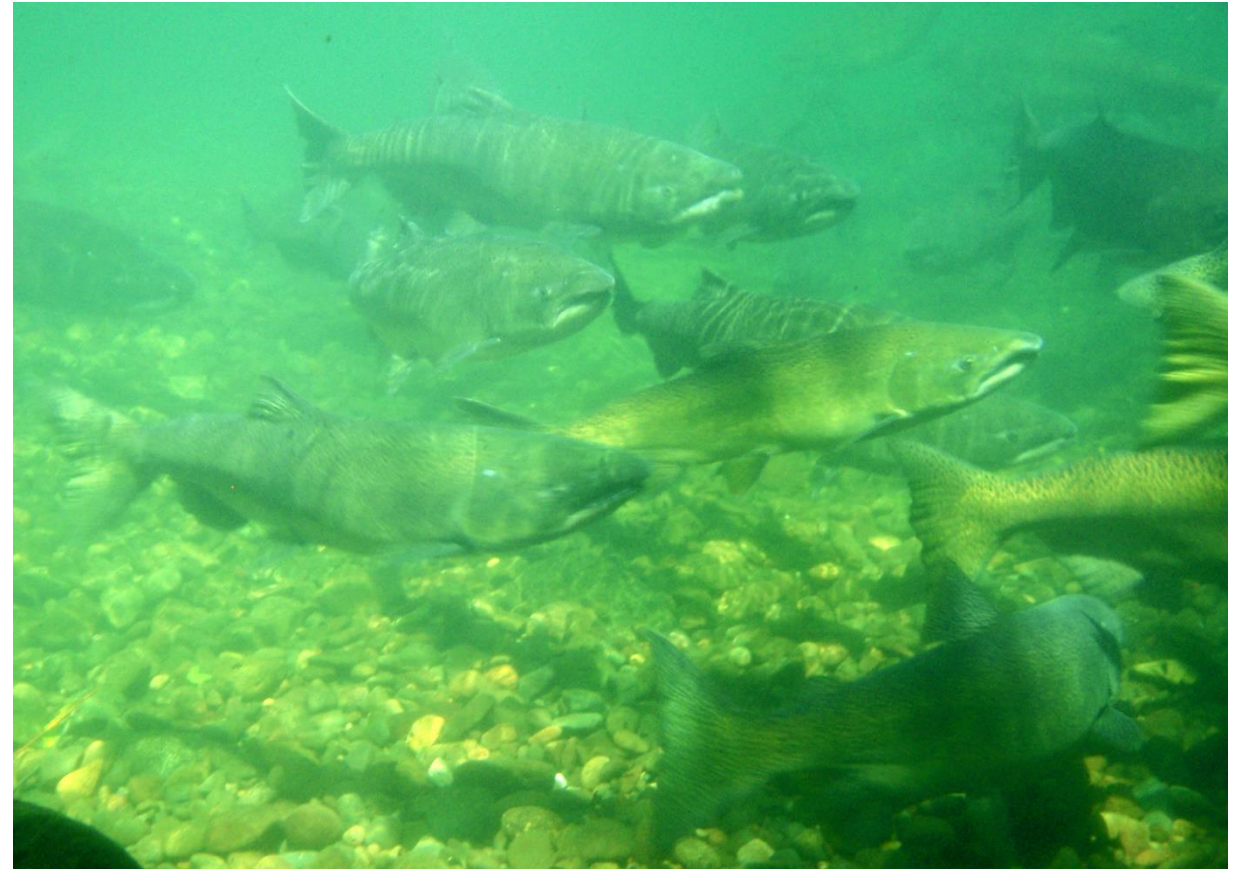
Jennifer Fisher, Oregon State University

Background Recap



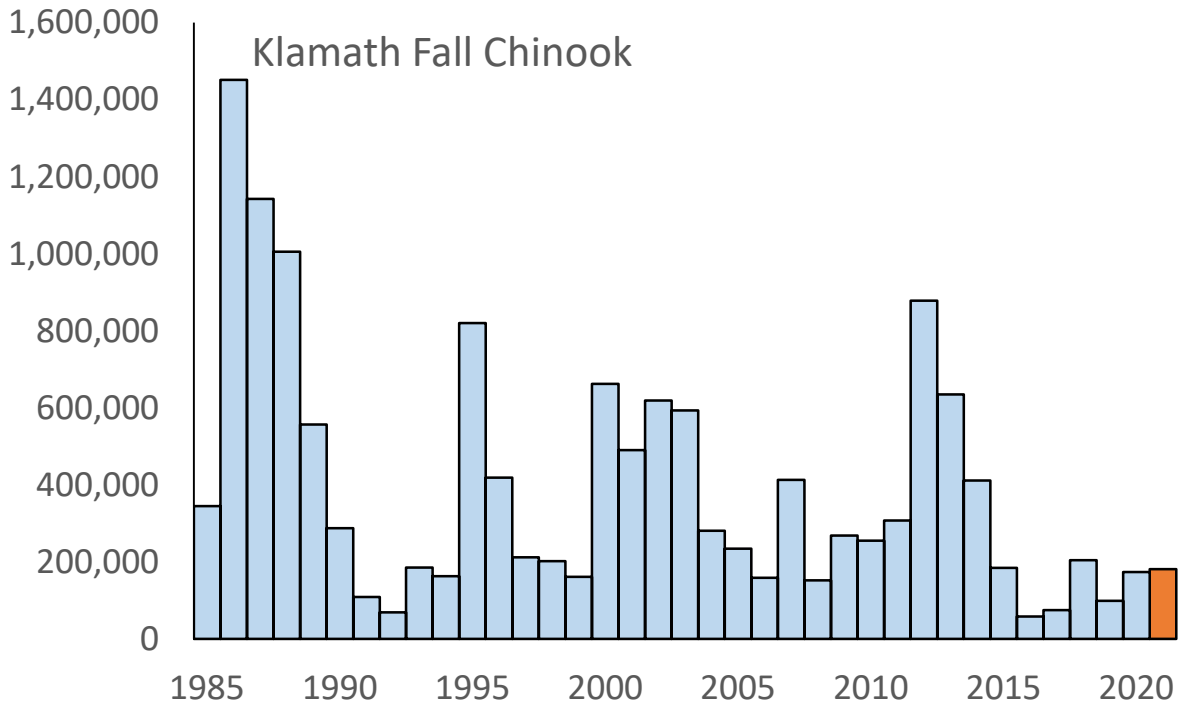
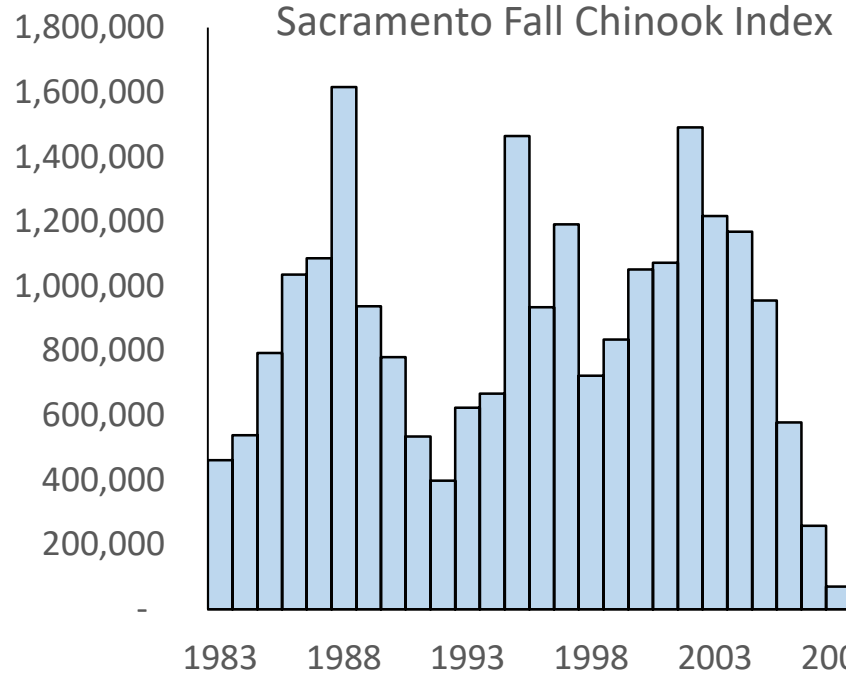
California, S. Oregon Stocks

- Sacramento Fall Chinook
- Klamath Fall Chinook
- Rogue Fall Chinook
- S. Oregon Fall Chinook



Sacramento Fall Chinook

2019	507,000
2020	352,000
2021	270,000

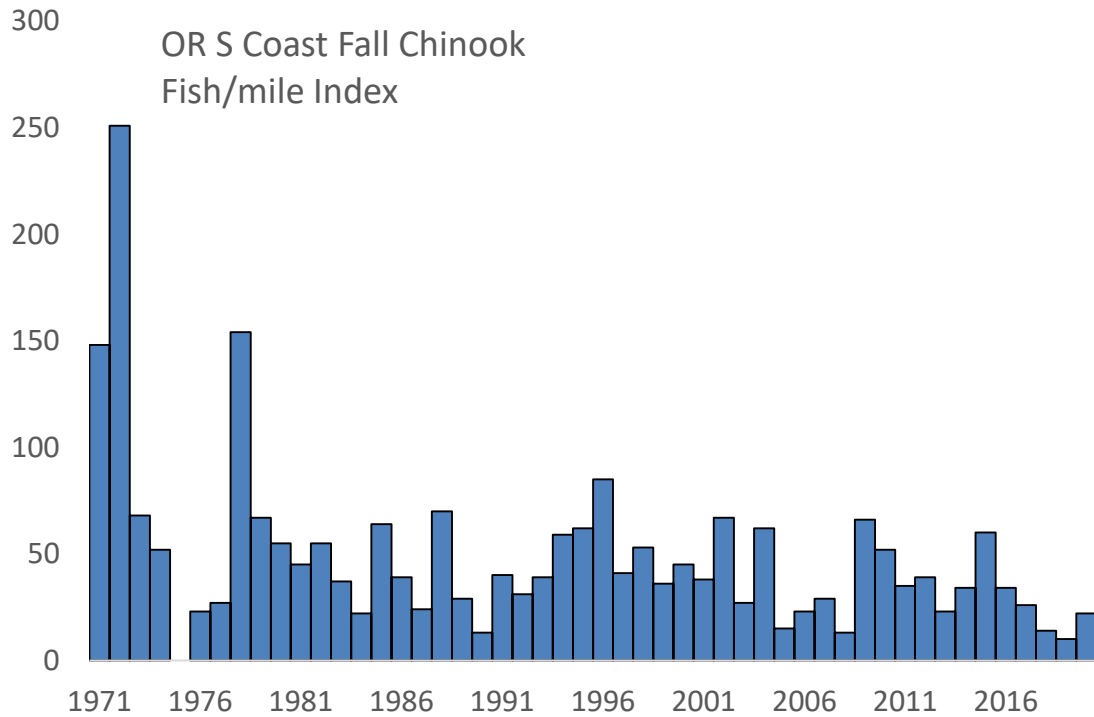
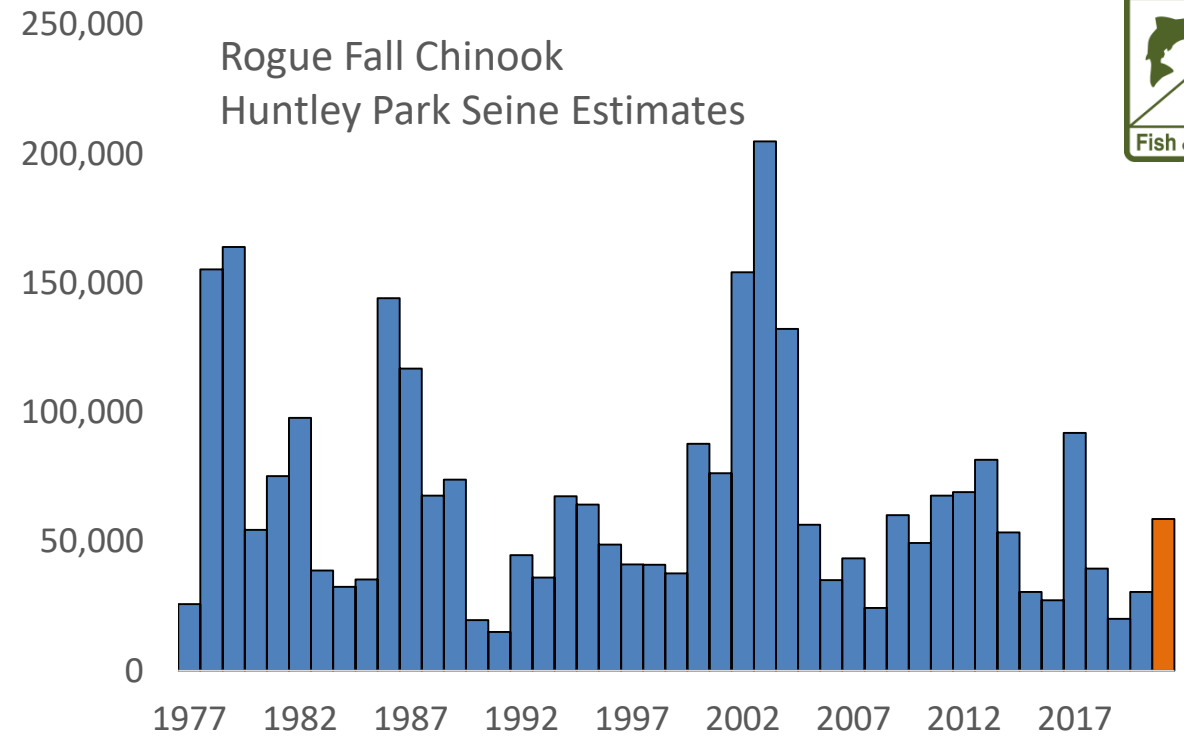


Klamath Fall Chinook

2019	99,000
2020	174,000
2021	181,000

Rogue Fall Chinook

2019	20,100
2020	30,500
2021	58,700



S Oregon Index

2019	10 per mile
2020	22 per mile

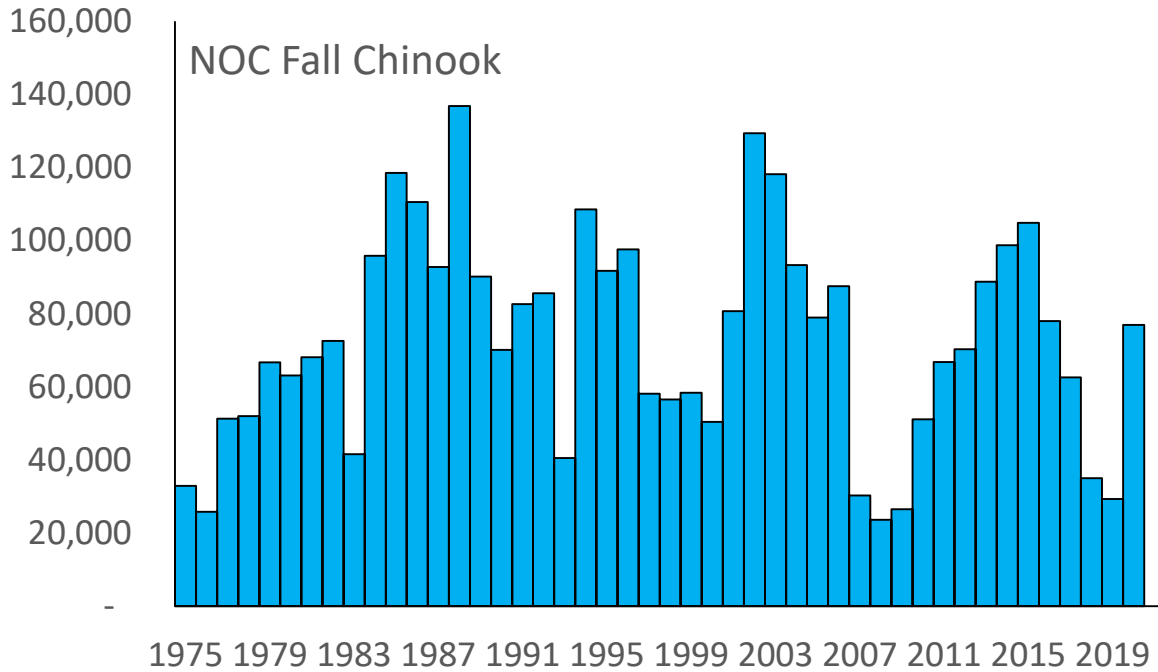
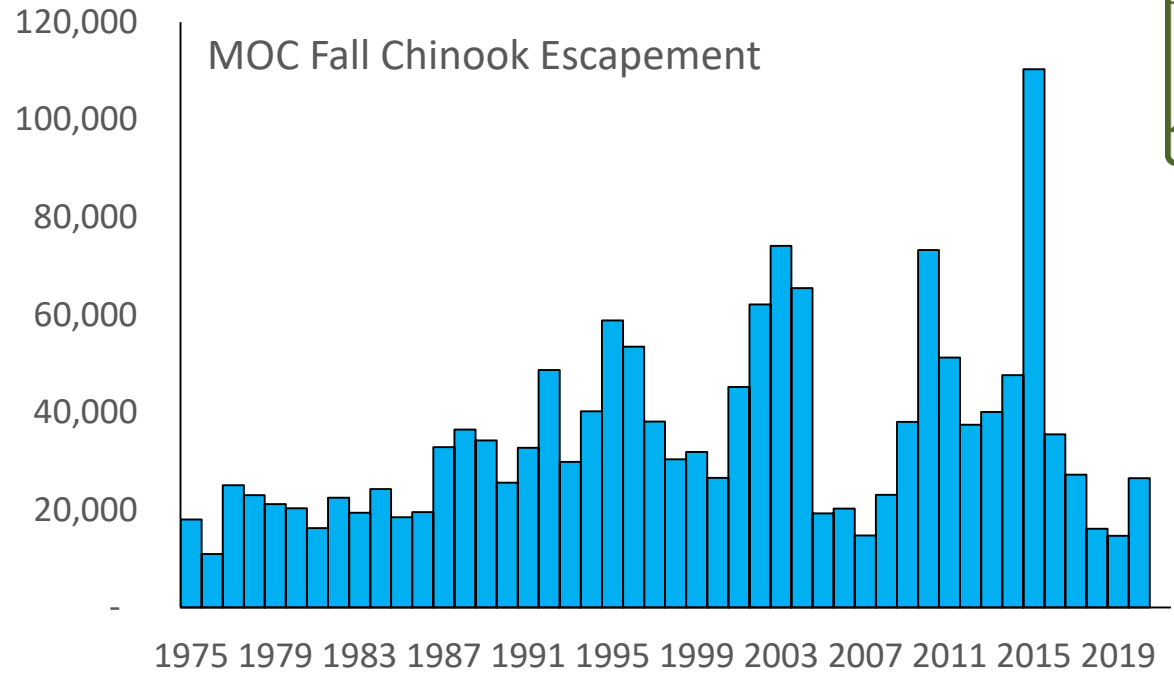
Oregon Coastal Stocks

- Mid/North Oregon Coast Fall Chinook
- Oregon Coast Wild Coho



Mid-Oregon Fall Chinook

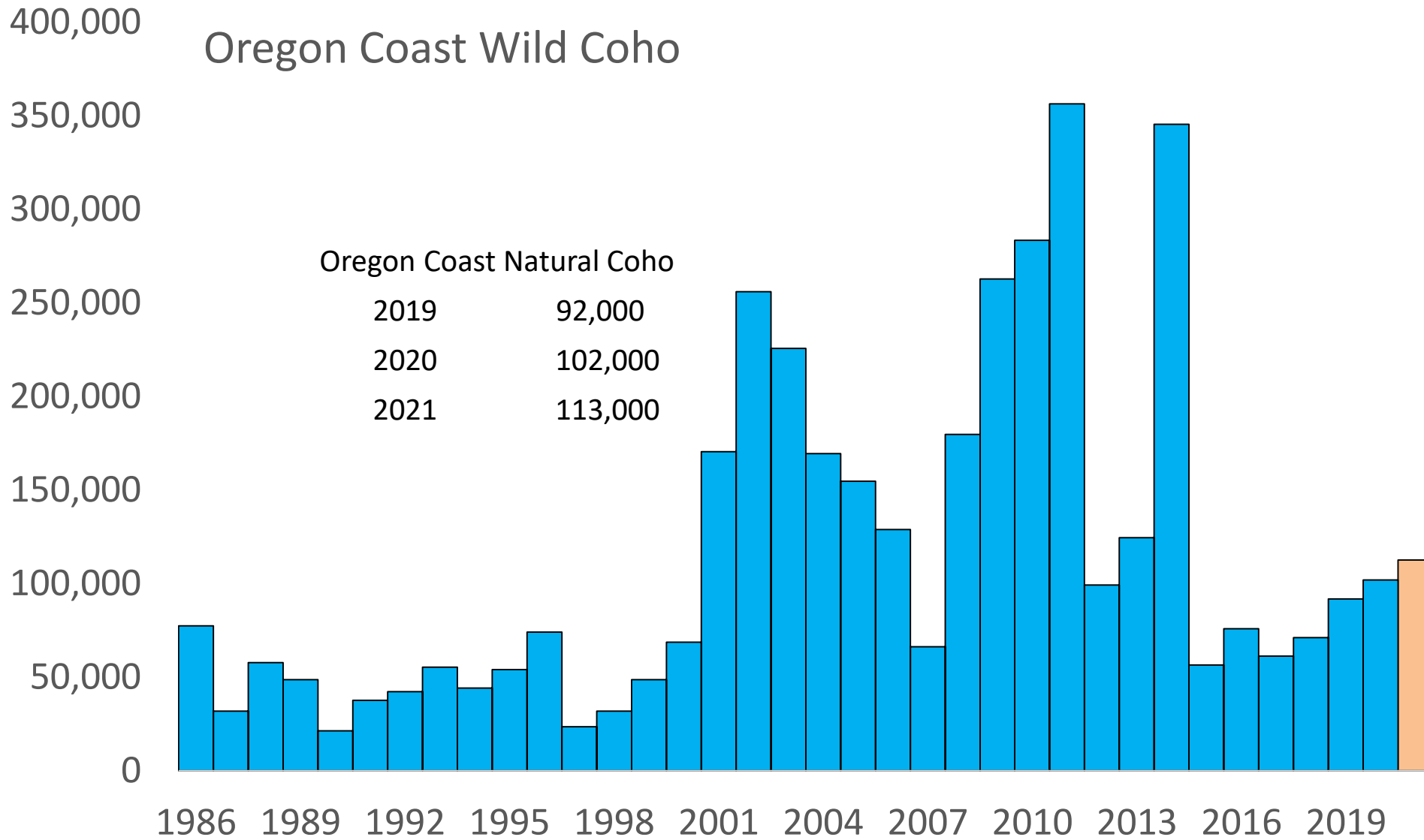
2019	14,600
2020	26,500



N Oregon Fall Chinook

2019	29,400
2020	76,900

Oregon Coast Wild Coho



Columbia River Stocks

- Willamette and Upriver Spring Chinook
- Upper Columbia Summer Chinook
- Fall Chinook
- Coho
- Steelhead

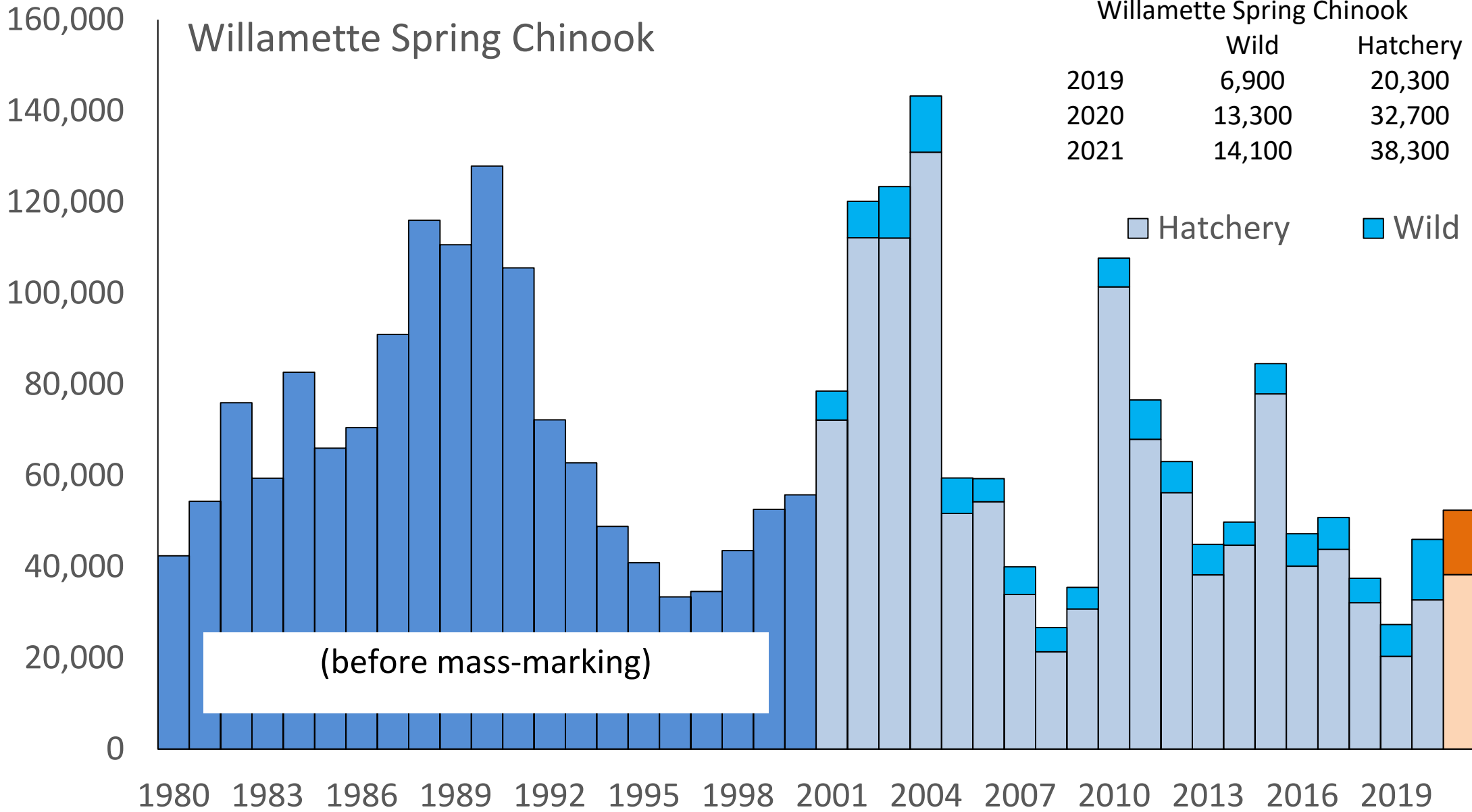




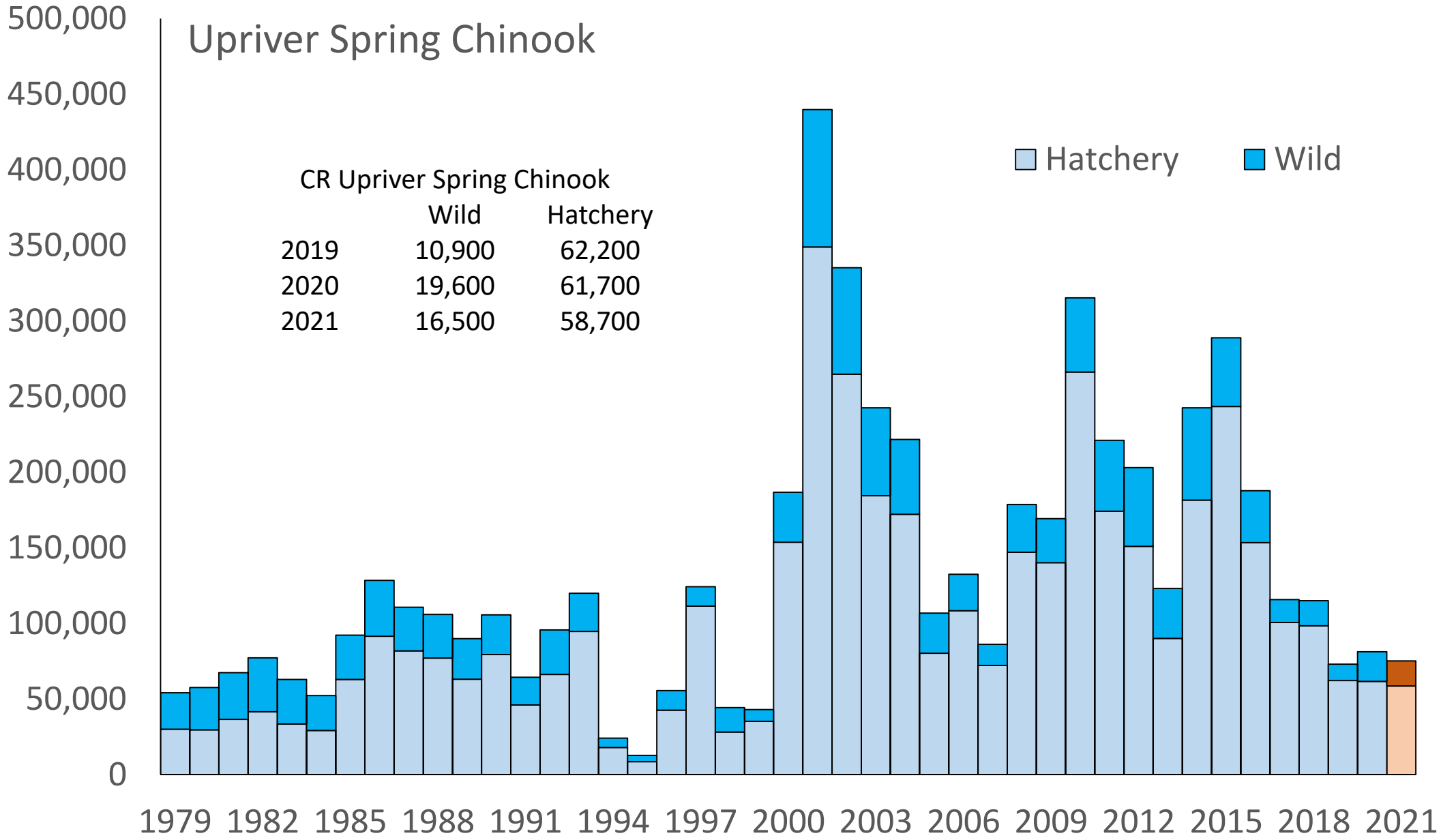
Willamette Spring Chinook

Willamette Spring Chinook

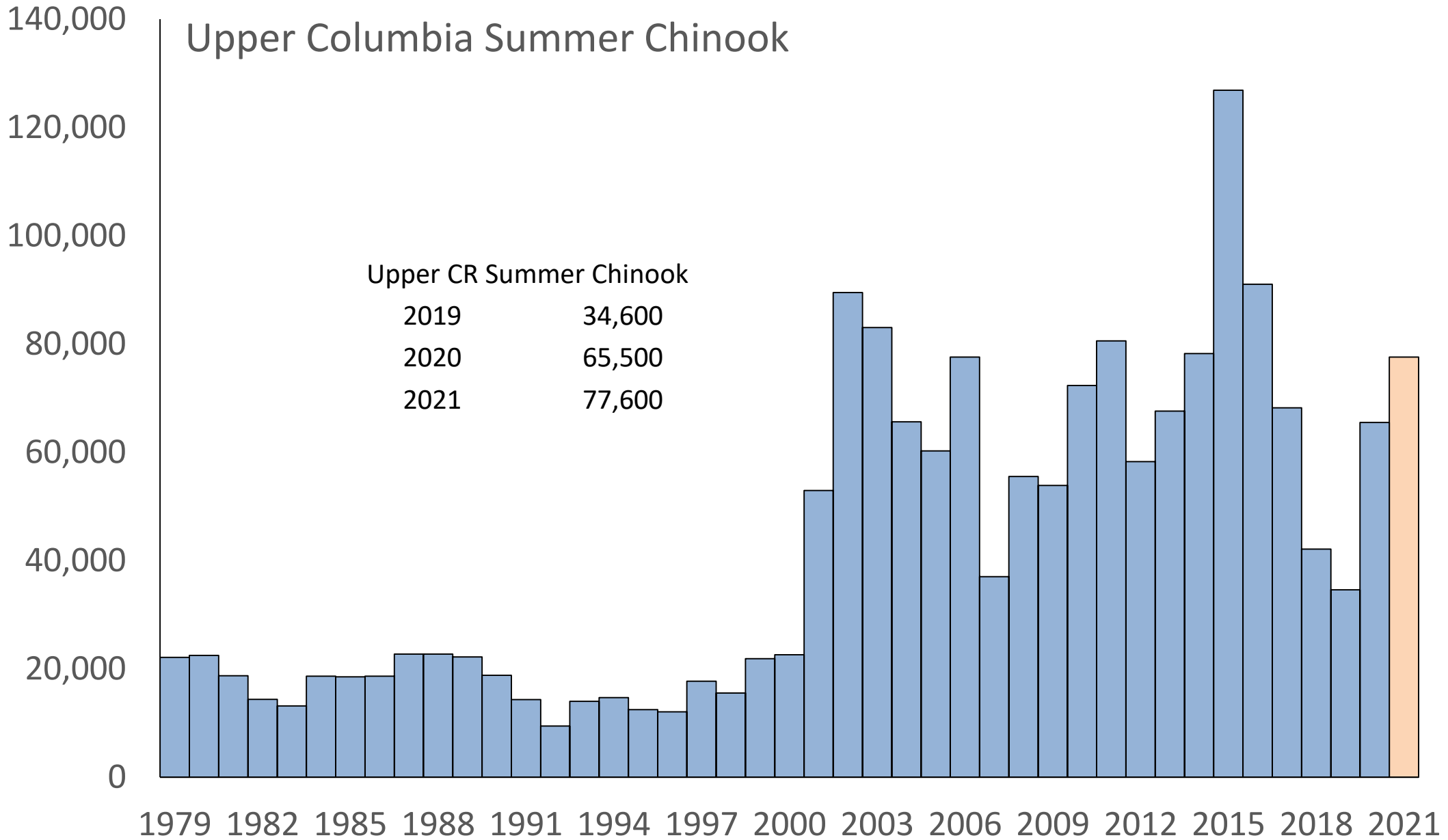
	Wild	Hatchery
2019	6,900	20,300
2020	13,300	32,700
2021	14,100	38,300



Upriver Spring Chinook

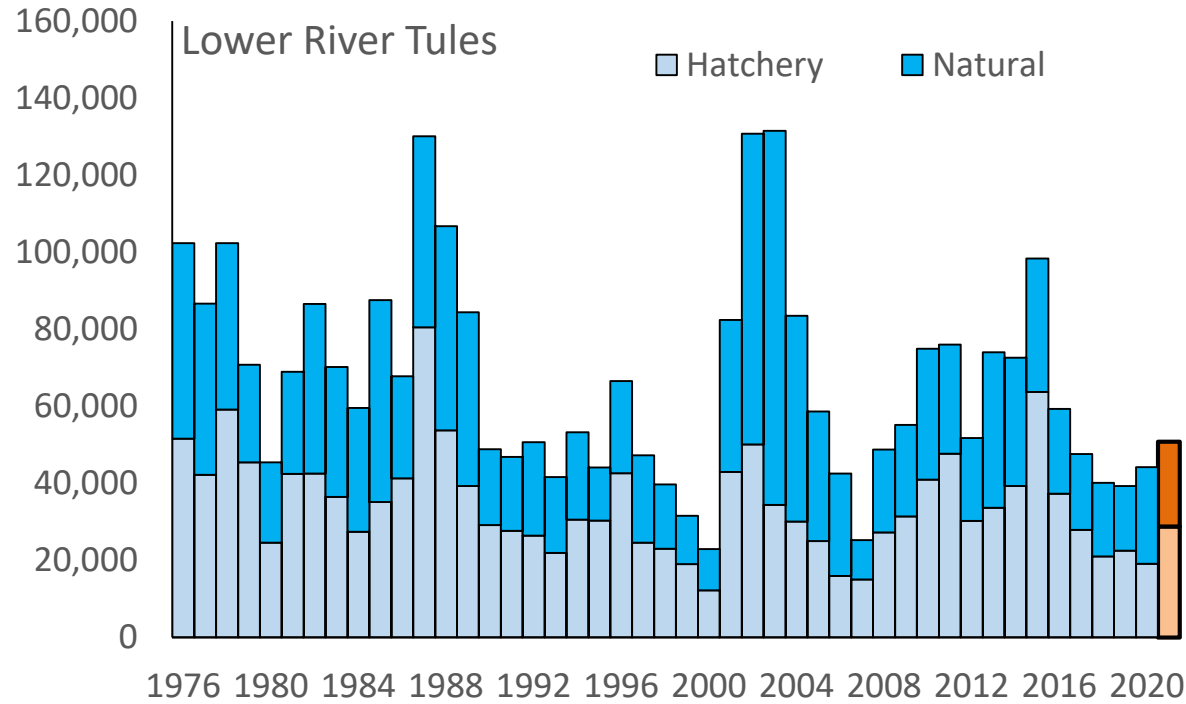
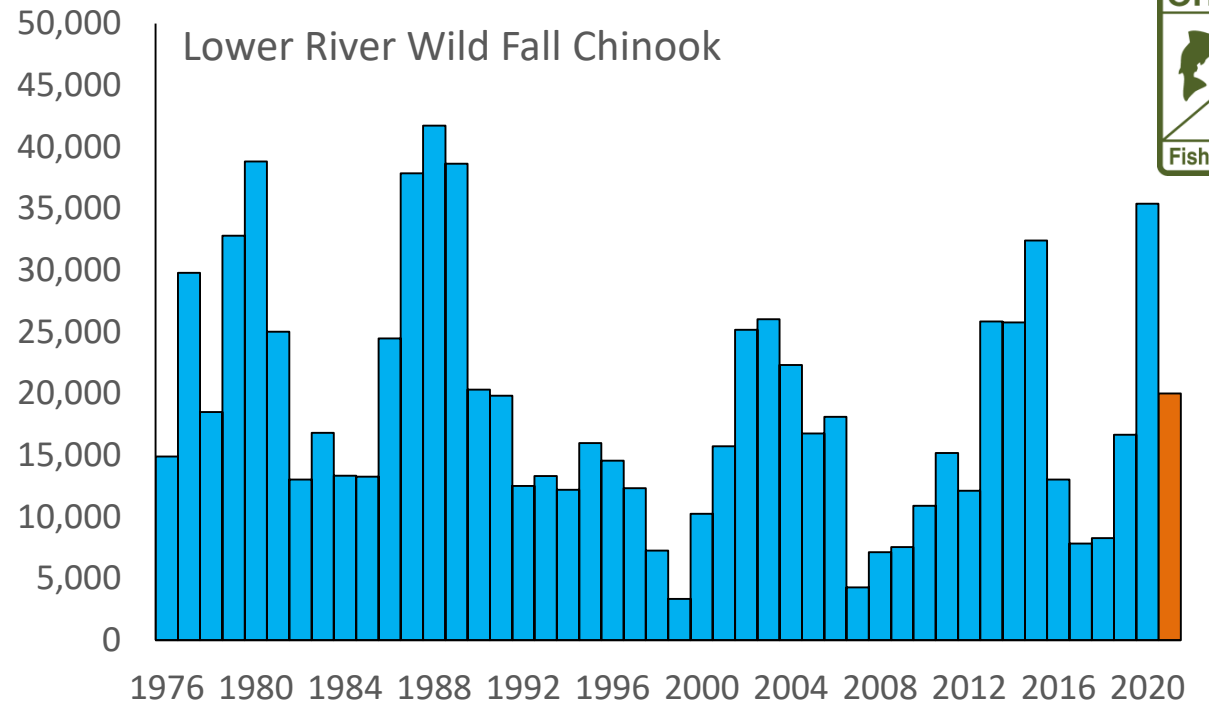


Upper Columbia Summer Chinook



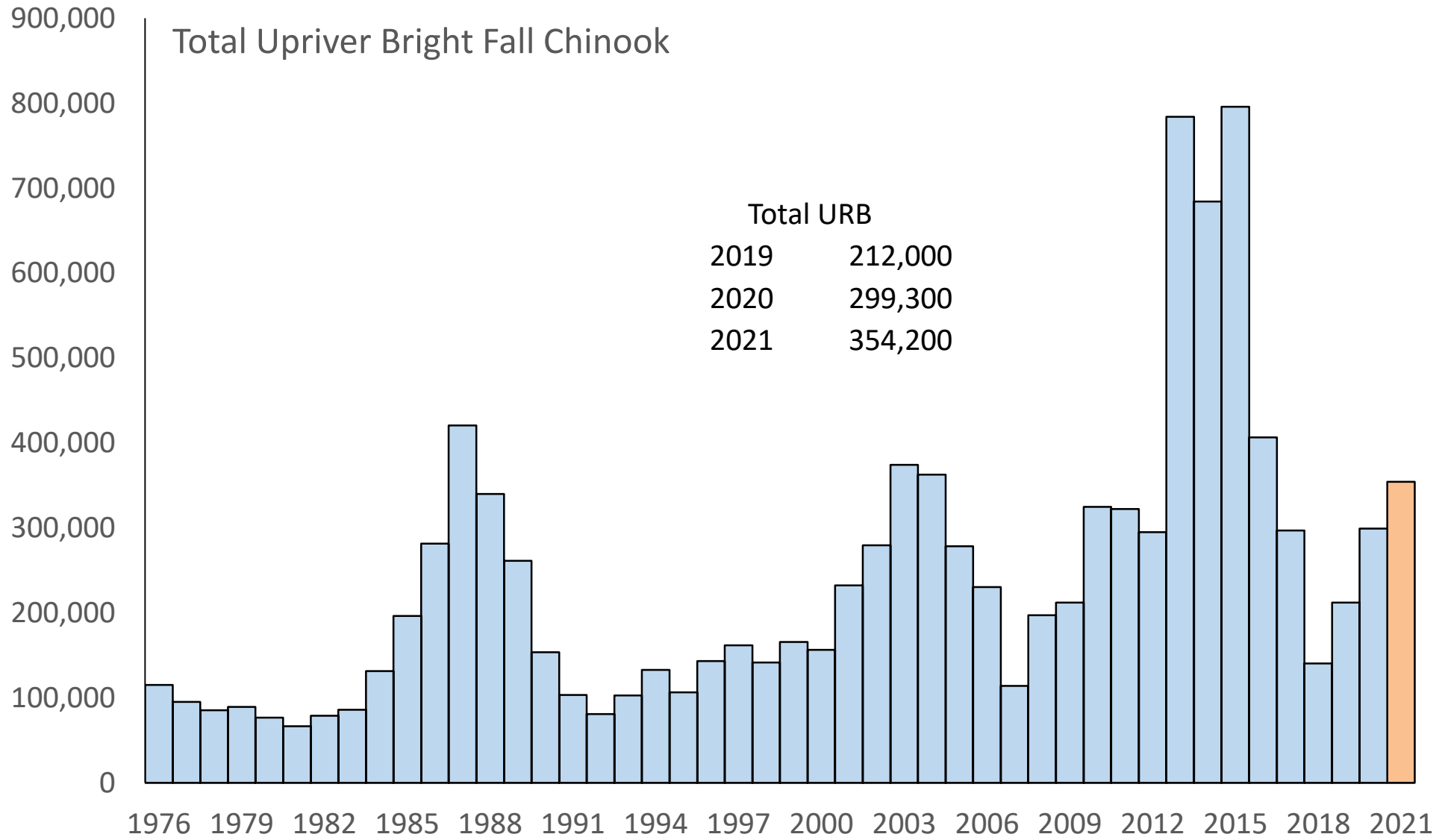
L Columbia Wild Fall Chinook

2019	16,700
2020	35,400
2021	20,000



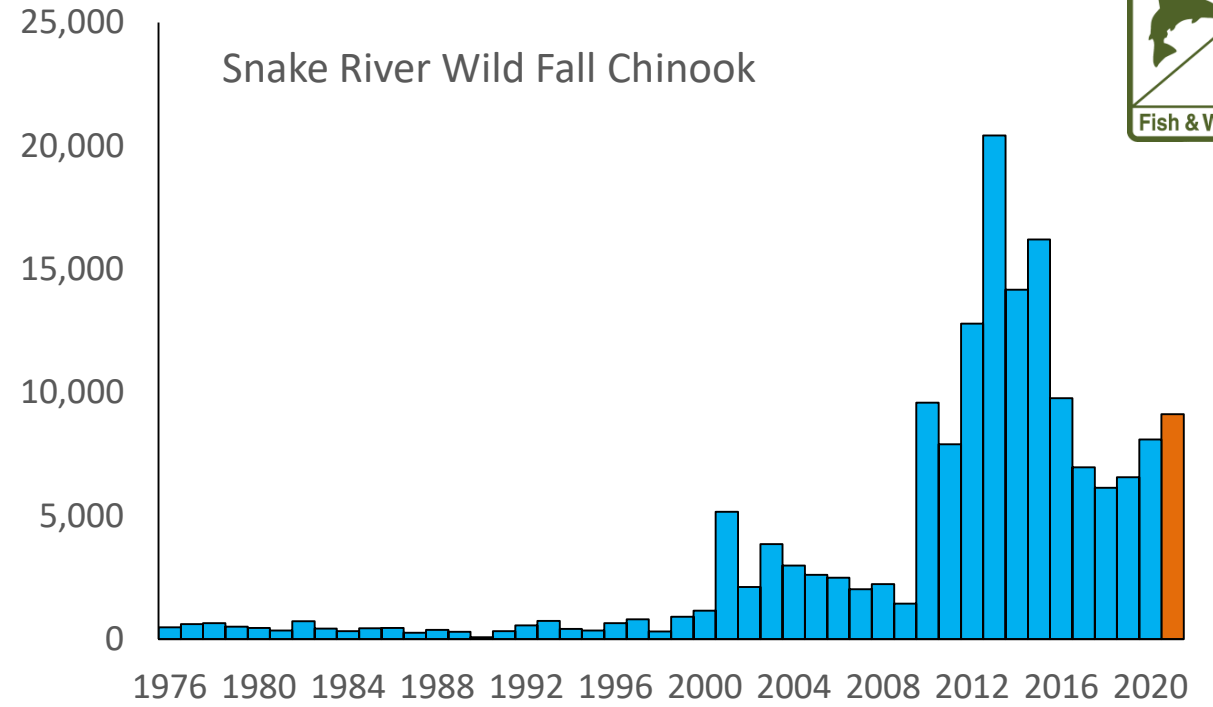
L Columbia Tule

	Wild	Hatchery
2019	16,800	22,500
2020	25,000	19,200
2021	22,000	28,900



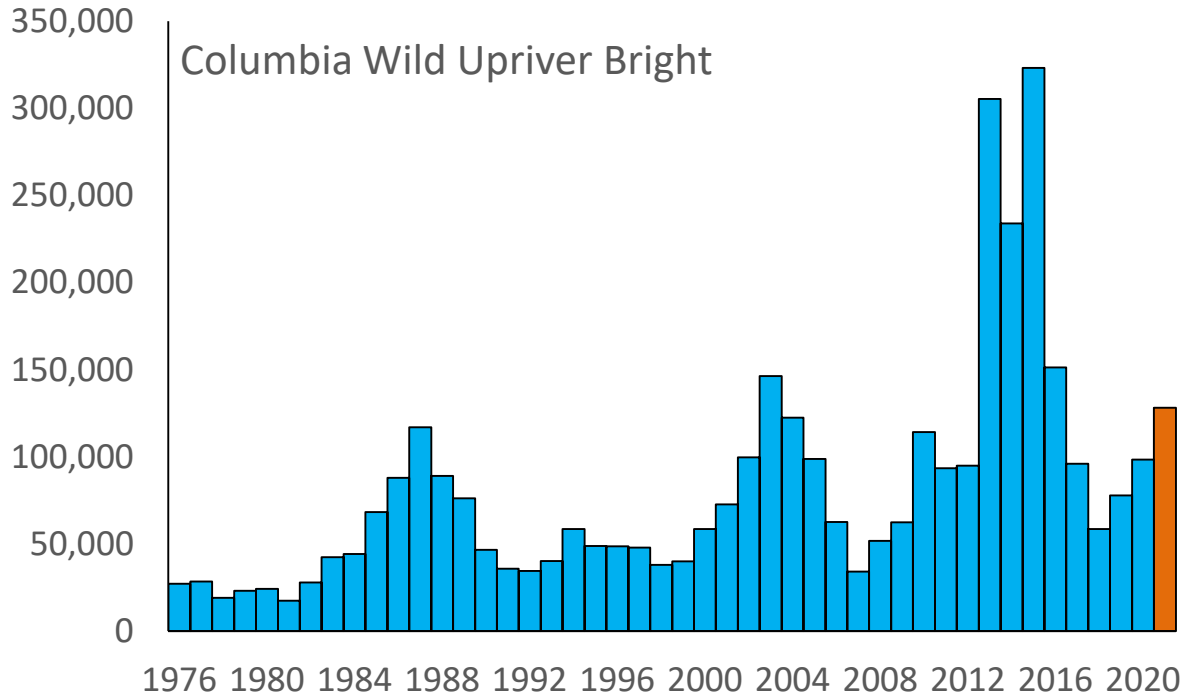
Snake River

2019	6,600
2020	8,100
2021	9,100



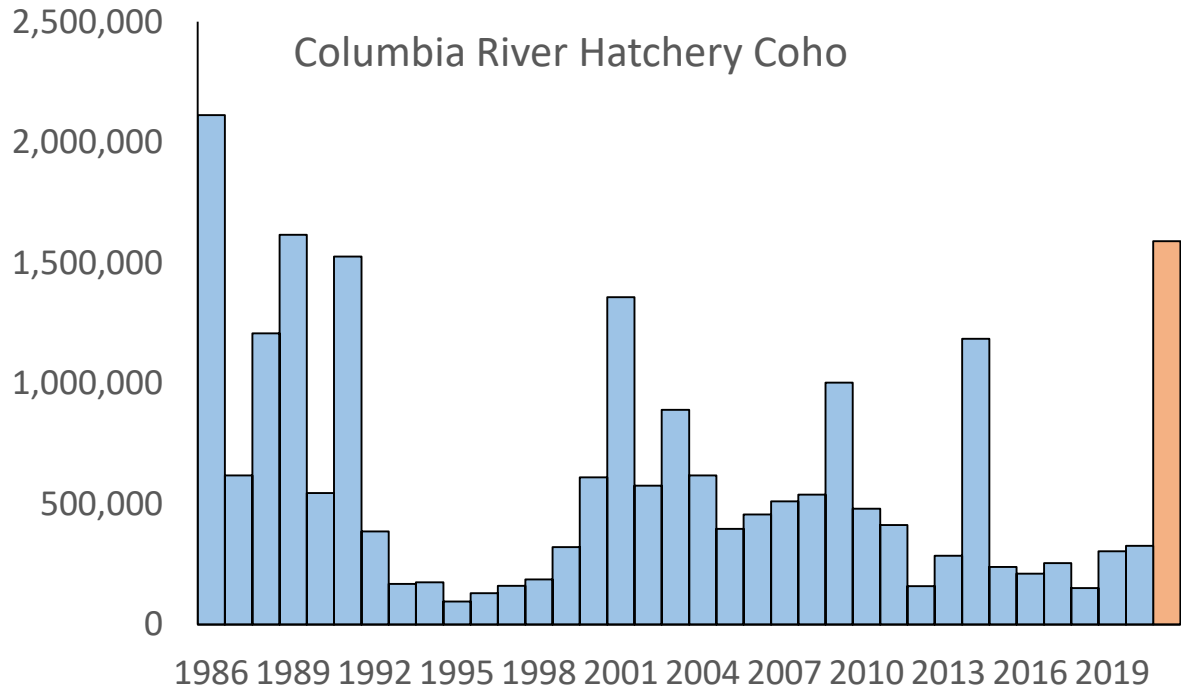
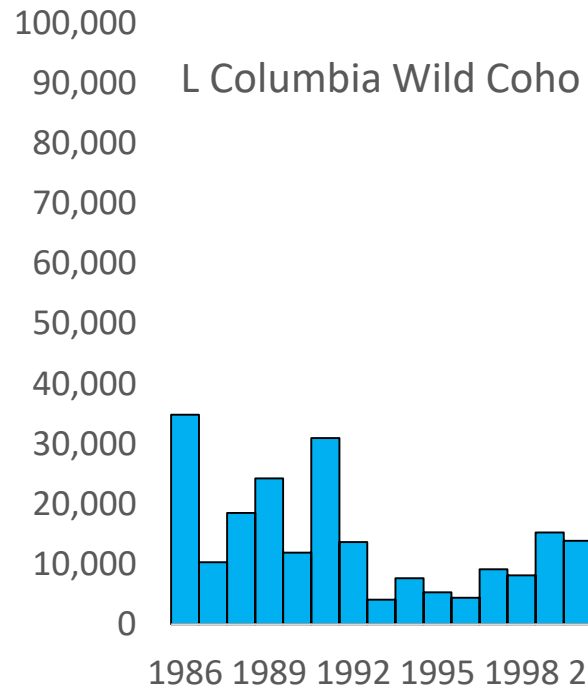
Upper C Wild URB

2019	77,900
2020	98,400
2021	128,200



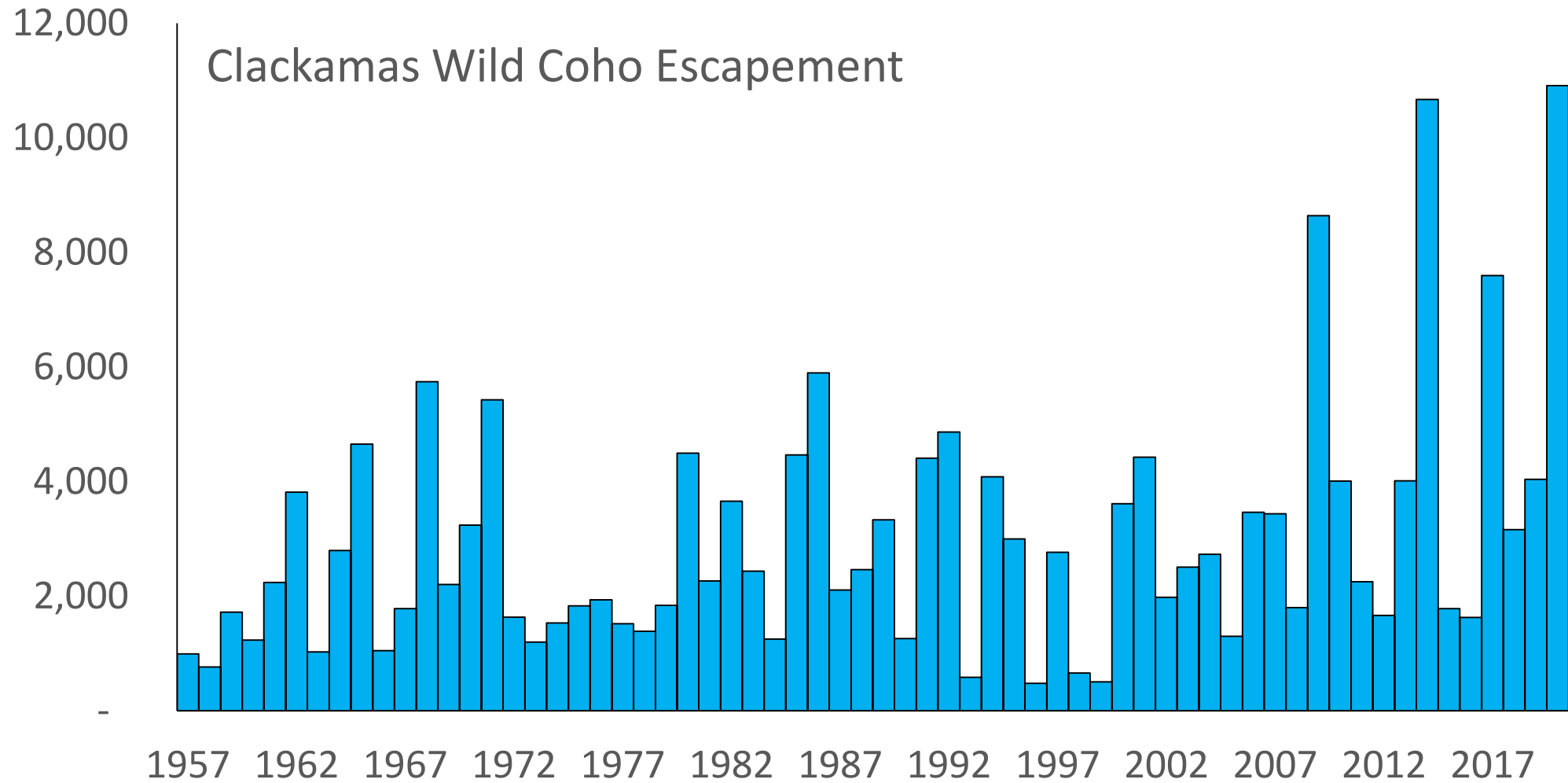
LCR Wild Coho

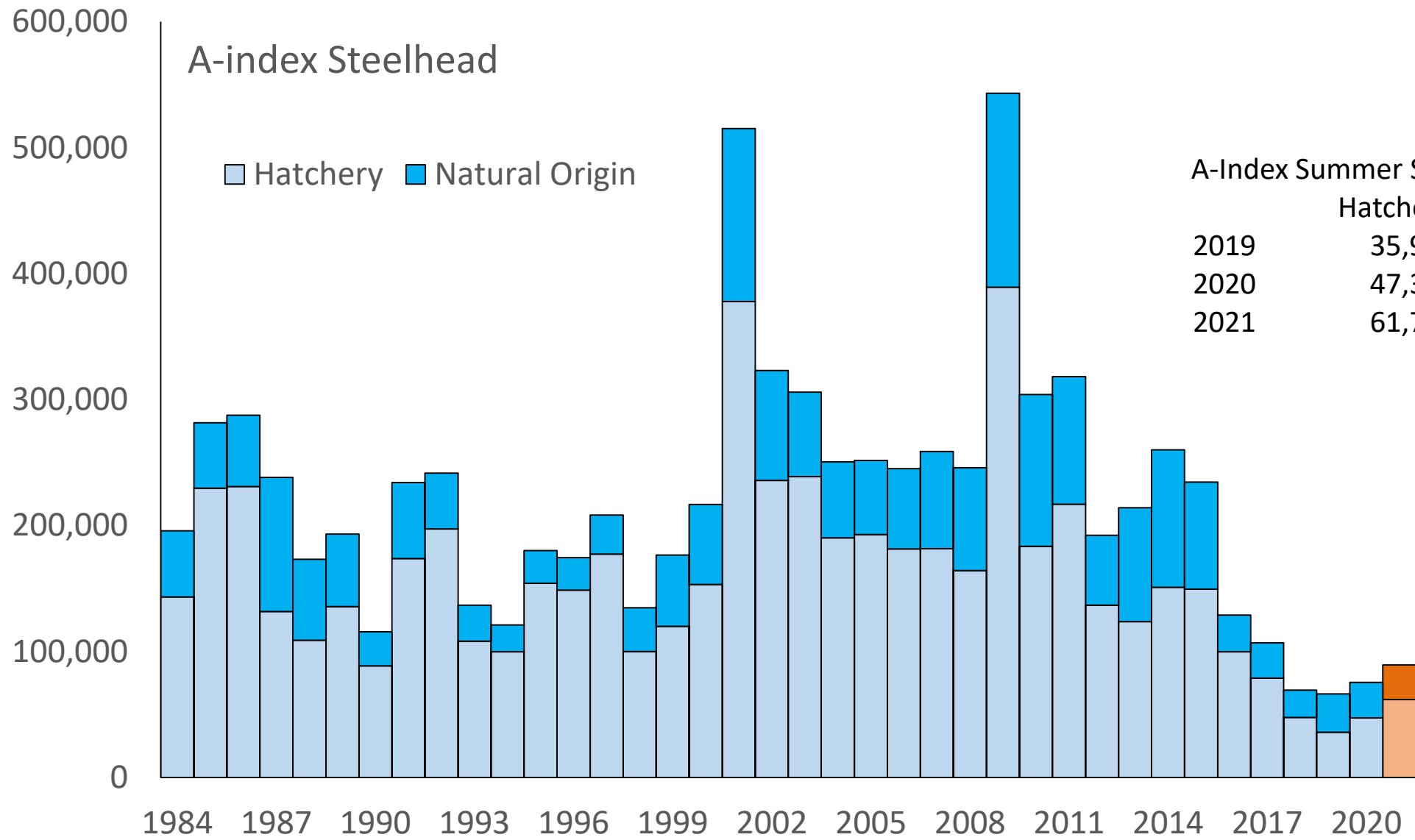
2019	27,100
2020	34,000
2021	35,100



CR Hatchery Coho
Ocean Abundance

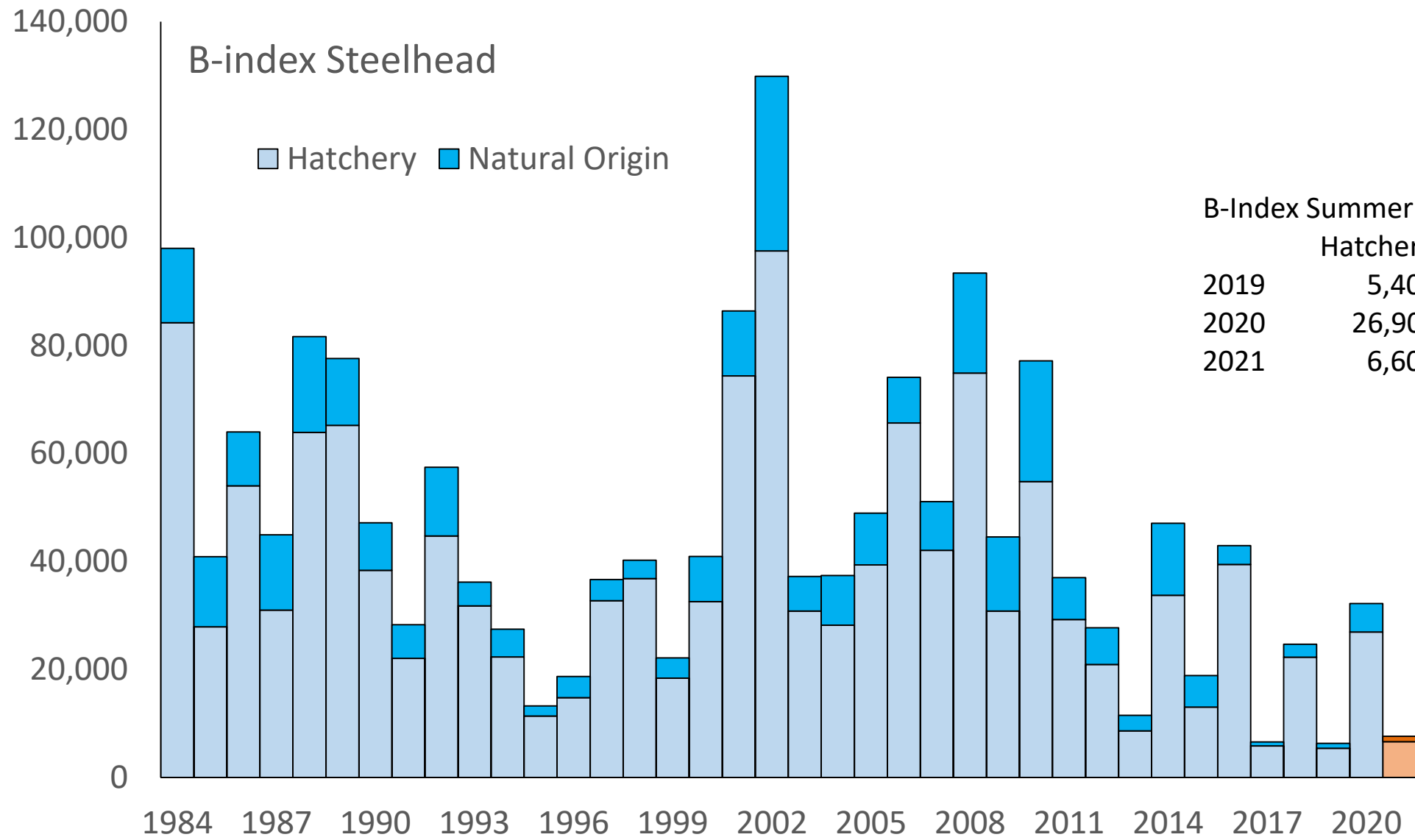
2019	303,600
2020	326,500
2021	1,590,000





A-Index Summer Steelhead

	Hatchery	Natural
2019	35,900	30,300
2020	47,300	28,100
2021	61,700	27,500



B-Index Summer Steelhead

	Hatchery	Natural
2019	5,400	900
2020	26,900	5,300
2021	6,600	1,000

Review of Salmon Stock Status 2021

- Improvements in several key ocean indicators, but some remain mediocre
- This “mixed bag” is fairly normal during transitions ↑ ↓
- Coho often first to respond
- Pattern of cycles of ups and downs across all stocks
- Cycles generally similar for stocks dependent upon the same ocean ecosystem

