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## **2023 NASS RIVER SALMON STOCK ASSESSMENT UPDATE – FRIDAY, 1 SEPTEMBER**

The following is the ninth weekly public update for 2023 of Nass River salmon and summer-run steelhead stock assessments from the Nisga'a Lisims Government Fisheries and Wildlife Department.

**All data presented in this update are preliminary and subject to change with further assessment information that becomes available and should be interpreted cautiously. For in-season assessment purposes only.**

### **1. NASS RIVER ENVIRONMENTAL UPDATE – FISHWHEELS, MEZIADIN AND KWINGEESE**

Fishwheel Environmental data: **1 June to 31 August.**

- The current water level is 0.2 m lower than the average water level (1.4 m vs. 1.6 m) based on 1994–2022 operations. The water levels in June, July, and August 2023 currently rank the 8<sup>th</sup>, 8<sup>th</sup>, and 14<sup>th</sup> lowest years, respectively, compared to 30 years of operations since 1994 (Table 1).
- Current water temperature at GW fishwheels is 1.0°C cooler than the average water temperature (8.0°C vs. 9.0°C) based on 1994–2022 operations. The water temperatures in June, July, and August 2023 currently rank the 5<sup>th</sup>, 3<sup>rd</sup>, and 5<sup>th</sup> highest years, respectively, compared to 30 years of operations since 1994 (Table 2).

Meziadin Fishway data: operations started on 1 July. Count data from **1 July to 1 September.**

- Current water level is 0.09 m lower than average (1.13 vs. 1.22 m) and water temperature is 3.6°C warmer than the average water temperature (18.0°C vs. 14.4°C) based on operations from 1994 to 2022.
- Counts to date: 374,783 med/large Sockeye (4,944 tags), 23,789 small Sockeye, 50 Chinook (2 tagged), 181 small Chinook, 1,628 Coho (10 tagged), 24 small Coho, 4 Pinks, and 0 Bull Trout. Counts to date are above average for Sockeye (139,000), near average for Coho (1,652), and below average for Chinook (260) based on counts from 1994 to 2022.
- Projections to fishway based on Sockeye counts to date and linear regression of in-season to final counts from 1994 to 2022 ( $r^2=0.95$ ): 404,000 med/large Sockeye (95% CI: 356,000, 453,000). Current Meziadin Sockeye projections to pass fishway after 1 September, range from 29,000–78,000.

Kwingeeese video-counting weir data: operations started on 9 July. Counts data from **9 July to 1 September.**

- Current water level is 0.14 m lower than average (0.18 vs. 0.32 m) and water temperature is 5.4°C cooler than average (8.0°C vs. 13.4°C) based on operations from 2002 to 2022.
- Counts to date: 8,046 med/large Sockeye (39 tag), 341 med/large Chinook (74 tags), 308 med/large Coho (2 tags), 2 steelhead (0 fin marked), and 28 Bull Trout. Counts to date are above average for Sockeye (3,830) and Coho (110), and below average for Chinook (672) and steelhead (3) and based on counts from 2002 to 2022.

**Table 1. Monthly mean water levels (m) at the Gitwinksihlkw fishwheels, 1994–2023.**

Mean WL	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Mean (94-22)
June	3.1	2.7	3.8	3.5	3.2	3.8	3.4	3.5	4.0	3.0	3.2	2.9	3.6	4.8	2.8	4.1	2.6	3.5	3.8	3.1	2.6	2.6	2.1	2.9	1.8	2.0	3.1	4.5	5.0	2.7	3.3
July	2.9	2.6	3.2	2.6	1.9	3.0	3.2	3.0	2.6	2.4	2.3	2.2	2.6	4.0	2.6	2.8	1.8	2.1	3.5	1.7	2.0	1.7	1.6	1.7	1.4	1.5	2.7	2.9	3.9	1.9	2.5
Aug	2.5	2.0	2.1	2.1	1.6	2.3	2.4	1.9	2.0	1.2	1.7	1.7	1.4	1.8	2.3	1.6	1.4	1.8	1.7	1.2	1.1	1.5	1.1	1.6	1.0	1.8	3.1	1.9	2.4	1.7	1.8
Sep	1.5	1.8	1.2	1.3	1.2	1.4	2.3	1.1	1.7	1.3	0.9	1.3	1.3	1.3	1.0	1.2	0.9	3.9	0.9	0.7	0.7	0.8	1.1	1.1	0.3	1.0	1.4	1.8	2.5		1.4
Season	2.7	2.3	2.6	2.5	1.9	2.6	2.8	2.5	2.7	2.2	2.2	2.1	2.3	3.1	2.5	2.6	1.7	2.7	2.7	1.9	1.8	1.8	1.6	2.0	1.3	1.7	2.7	2.9	3.7	2.1	2.3
Rank (Low)	22	14	19	18	8	20	27	16	25	12	13	10	15	29	17	21	3	23	26	7	5	6	2	9	1	4	24	28	30	11	

**Table 2. Monthly mean water temperatures (°C) at the Gitwinksihlkw fishwheels, 1994–2023.**

Mean Temp	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Mean (94-22)
June	9.0	12.4	8.1	8.5	8.4	8.4	9.4	3.9	6.4	8.6	11.3	9.1	8.8	8.1	7.0	7.4	8.4	7.5	6.7	8.4	8.1	8.9	9.5	8.6	10.1	9.3	7.0	8.4	7.7	9.5	7.9
July	10.4	11.3	9.5	10.4	6.8	9.7	10.5	5.8	9.1	10.2	12.1	9.5	10.1	8.6	8.0	9.0	10.2	8.7	8.1	10.1	9.6	10.5	10.8	10.3	11.0	10.3	8.7	11.1	9.8	11.2	9.8
Aug	10.5	10.1	9.7	10.3	6.8	11.2	10.9	7.6	9.5	10.8	10.5	10.0	10.1	9.6	9.3	10.2	9.7	9.0	8.9	10.1	10.2	9.9	9.4	10.1	9.7	9.4	8.7	10.5	11.1	10.6	9.8
Sep	9.5	8.8	8.6	9.5	6.8	10.2	9.4	5.6	8.7	8.8	8.9	8.8	9.0	8.9	8.2	9.5	8.0	8.1	8.3	10.1	8.6	8.3	8.6	9.6	8.2	9.2	8.5	8.7	9.8		8.7
Season	10.0	10.1	9.0	9.7	7.1	10.2	10.3	5.8	8.9	10.0	11.0	9.4	9.8	8.9	8.2	8.9	9.2	8.4	8.0	9.6	9.3	9.7	9.8	9.7	10.1	9.7	8.2	9.9	9.6	10.4	9.3
Rank (Highest)	7	5	21	13	29	4	3	30	24	8	1	18	10	22	27	23	20	25	28	16	19	14	11	12	6	15	26	9	17	2	

## 2. NASS RIVER FISHWHEEL CATCH UPDATE

### GITWINKSIHLKW (GW) FISHWHEELS - NASS RIVER TEST FISHERY – STARTED IN 1994 [30<sup>th</sup> year]:

The 2023 Nass River test fishery fishwheels (FW1 and FW2) began operation on June 1 for tagging and historical catch index assessments for salmon and summer-run steelhead. All fish caught in the GW fishwheels to date were released alive after tagging and/or counting.

### GREASE HARBOUR (GH) FISHWHEELS:

Three fishwheels began operation on June 10 (FW5 and FW6) and June 13 (FW3) at Grease Harbour (upstream of Ts'im Anwiihlist), located approximately 16 km upstream of GW fishwheels. Fishwheel 6 was shut down for season on 13 August. The GH fishwheels are used for in-season mark-recapture tag recoveries of salmon, abundance estimates passing upstream, additional tagging (adult Chinook and Chum salmon, and Pacific Lamprey), and for selective harvesting when permitted by Nisga'a Lisims Government. No harvests have occurred to date or are planned in future.

Total fishwheel catches of salmon, steelhead, and Pacific Lamprey to date are shown in Table 3 including tagging results and jacks caught. The total Nass fishwheel catches are currently above average for all adult salmon except for Chinook and steelhead. Record high fishwheel catches of pinks in 2023 (9.2 [213,000] times average [23,000]). All Sockeye caught at all fishwheels to date have been released, as have the other salmon, steelhead and other fish caught.

**Table 3. Nass fishwheel salmon, steelhead, and Pacific Lamprey catches, 2023.**

FISHWHEEL CATCH SUMMARIES	SOCK	CHIN	COHO	STEEL	PINK-ODD	CHUM	LAMP
FISHWHEEL TOTAL CATCH OF ADULTS	66,576	2,370	14,022	601	213,546	187	2,142
HISTORICAL AVG CUM CATCH (00-22) TO DATE	43,800	4,200	11,700	710	23,110	90	700
HISTORICAL AVG CUM TOTAL CATCH (00-22)	45,000	4,200	13,000	900	25,000	130	740
AVERAGE DAILY CATCH (5 D) OF ADULTS - GW	66	1	78	9	296	5	1
AVERAGE DAILY CATCH (5 D) OF ADULTS - GH	330	0	291	13	399	2	12
FISHWHEEL TOTAL TAGGED (OR ADIPOSE FIN MARKED)	9,913	2,056	1,902	457	1,425	165	1,180
FISHWHEEL TOTAL JACKS	6,244	3,327	238	NA	NA	NA	NA
HISTORICAL MEAN JACKS (00-22) TO DATE	3,762	777	556	NA	NA	NA	NA

Other adult species and juvenile salmon catches at the fishwheels to date include: 151 Dolly Varden (69 tagged), 83 Peamouth Chub, 77 Rainbow Trout, 66 Mountain Whitefish, 61 Cutthroat Trout, 33 Suckers, 15 Sculpin, 20 Pikeminnow, 119 salmon juvenile smolts (32 Coho, 78 Chinook, 9 Sockeye), 3 seals, and 2 frogs.

## 3. RUN SIZE AND ESCAPEMENT ESTIMATES FOR NASS SALMON & SUMMER-RUN STEELHEAD

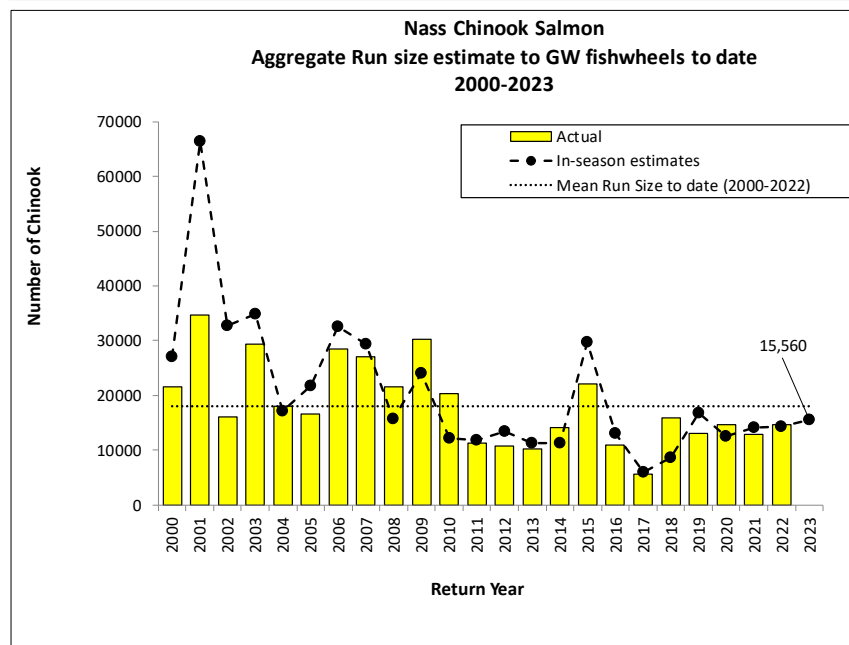
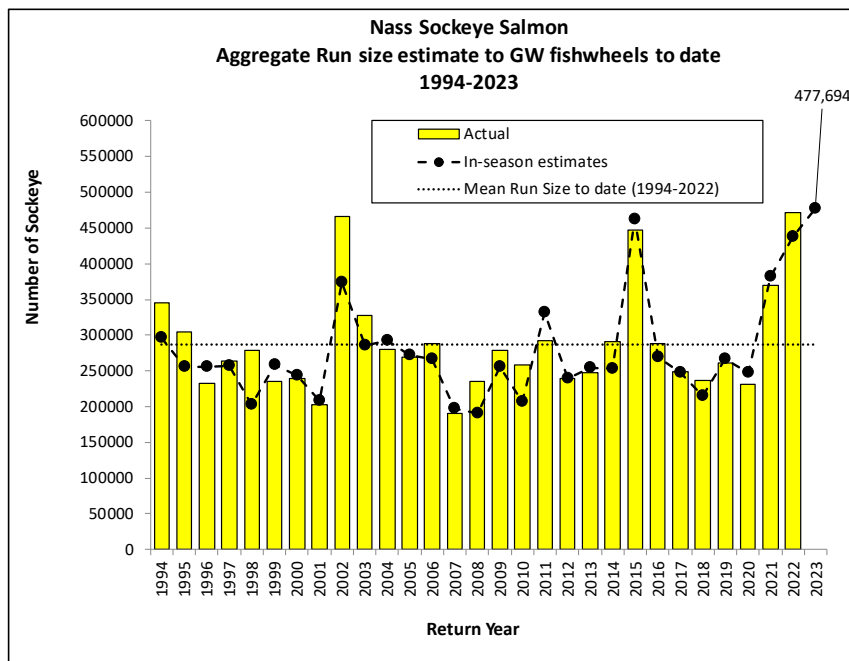
In-season estimates of run size and projected forecasts to Gitwinksihlkw fishwheels for adult Nass salmon and summer-run steelhead are shown in Table 4. For Nass Sockeye, estimates are based on mark-recapture methods as of June 24 when sufficient cumulative tag recoveries (> 25) occurred at GH fishwheels on June 29.

The current run sizes for 2023 are above average for Nass Sockeye and Coho and below average for Upper Nass Chinook salmon and summer-run steelhead when compared to means to date from 1994 to 2022. Summer-run steelhead estimates began on July 1. The Nass run-size target for summer-run steelhead is based on a minimum return goal as steelhead will continue to enter the Nass River after the fishwheels shutdown in mid-September.

Table 4. In-season run size estimates to Gitwinksihlkw fishwheels for Nass Sockeye, Chinook, Coho salmon and summer-run steelhead, 2023.

IN-SEASON RUN SIZE SUMMARIES	SOCK	CHIN	COHO	STEEL		31-Aug-23
IN-SEASON RUN SIZE ESTIMATE TO DATE	477,694	15,560	78,722	6,801		
HISTORICAL MEAN RUN SIZE TO GW FOR DATE (94-22)	287,000	18,600	75,070	10,420		
RUN SIZE TARGET 2023 (MIN. FOR STEELHEAD)	250,000	15,000	65,000	4,200		

In-season to actual estimates to **August 31** have tracked well for estimating returns for that date for Nass Sockeye (mean accuracy 91%) from 1994 to 2022 and Chinook (mean accuracy 80%) from 2000 to 2022.



In-season preliminary forecast projections for Nass salmon and summer-run steelhead above Gitwinksihlkw  
 Estimates to Gitwinksihlkw are based on two methods, mean run timing and linear-regression of the in-season to final estimates to date. The current run size projection estimates of runs passing Gitwinksihlkw to date are: 1) Nass Sockeye is 483,000 ( $r^2=0.98$ ; 95% CI: 435,000, 532,000), 2) Upper Nass Chinook is 15,700 ( $r^2=1.00$ ; 95% CI: 15,000, 16,000), 3) Upper Nass Coho is 91,000 ( $r^2=0.97$ ; 95% CI: 79,000, 109,000), and 4) summer-run steelhead is 10,000 ( $r^2=0.90$ ; 95% CI: 7,000, 12,000; Table 5). Current run size targets have been met or are projected to be met for each species.

*Table 5. In-season run size projections to Gitwinksihlkw fishwheels for Nass Sockeye, Chinook, Coho salmon and summer-run steelhead, 2023.*

IN-SEASON FORECASTS TO GW - METHODS:	SOCK	CHIN	COHO	STEEL		31-Aug-23
1. RUN TIMING METHOD (94-22) - Mean Run timing	489,000	16,000	90,000	8,000		
Lower (-2 S.D.)	471,000	15,000	79,000	7,000		
Upper (+2 S.D.)	508,000	16,000	104,000	12,000		In-season/Final
2. IN-SEASON TO FINAL (regression):	483,000	15,700	91,000	10,000		$r^2$ (CH) = 1.00
95% CI - lower	435,000	16,000	79,000	7,000		$r^2$ (SO) = 0.98
95% CI - upper	532,000	16,000	103,000	12,000		$r^2$ (CO) = 0.97
<i>GW RUN SIZE TARGET (DEPENDING ON HARVESTS ABOVE GW)</i>	<i>250,000</i>	<i>15,000</i>	<i>65,000</i>	<i>4,200</i>		$r^2$ (ST) = 0.90
Mean Run Timing % Return Estimate to GW fishwheels (94-22)	98%	99%	88%	80%		
Late run	94%	98%	74%	62%		
Early run	100%	100%	97%	100%		

Net Escapement Estimates for adult Nass salmon to date are shown in Table 6. Approximately 446,000 Sockeye, 14,000 Chinook, 78,000 Coho salmon, and 6,800 summer-run steelhead are estimated to have passed to the Upper Nass River to date. Preliminary net escapement targets have been reached. Harvest estimates include 18,326 Sockeye (including 11,446 estimated harvested in Gitanyow’s economic demonstration fishery permitted by DFO below Meziadin fishway), 64 Chinook (plus 4 jacks), 22 Coho, 10 Pink, and 1 steelhead as reported by Gitanyow Fisheries Authority.

*Table 6. In-season net escapement estimates above Grease Harbour for Nass Sockeye, Chinook, Coho salmon and summer-run steelhead, 2023.*

IN-SEASON NET ESCAPEMENT ESTIMATES	SOCK	CHIN	COHO	STEEL		31-Aug-23
HARVEST ESTIMATES ABOVE GW TO DATE	31,625	1,586	351	18		
<b>NET ESCAPEMENT (ABOVE GW):</b>	<b>446,069</b>	<b>13,974</b>	<b>78,371</b>	<b>6,783</b>		
<i>NET ESCAPEMENT TARGET (UPPER RIVER ONLY)</i>	<i>200,000</i>	<i>13,000</i>	<i>60,000</i>	<i>4,000</i>		

#### 4. HARVEST ESTIMATES FOR ADULT NASS SALMON & STEELHEAD

##### a) ALASKAN FISHERIES IN SE ALASKA (information courtesy from ADFG’s website):

The 2023 Alaskan Southeast fisheries started on 18 June for gillnet fisheries in District 101 (Tree Point) and District 106 (Sumner and Upper Clarence), and for seine fisheries, 2 July for Districts 101, 102, and 104, and 16 July for District 103. Preliminary estimates of catches of salmon are approximately 34,000,000 in Alaskan commercial net fisheries in Districts 101–106 (and mean catch comparisons from 2000 to 2022) and shown in Table 7. These estimates are based on preliminary catch data reported by ADFG including an update on 31 August when seine fisheries were closed for season as of 29 August. Catches for Pink and Chum salmon were 1.4x and 2.6 times the average catches from 2000-2022, respectively. Gillnet fisheries continue to be opened as of this update.

*Table 7. Southeast Alaska commercial gillnet and seine salmon catch estimates in Districts 101–104, 2023.*

IN-SEASON SE ALASKAN CUM. SALMON GILLNET/SEINE CATCH ESTIMATES (ADFG WEBSITE) - 2023									WEEK END:		2-Sep-23
DISTRICTS	AREA	SOCK CATCH	AVG (00-22)	CHIN CATCH	AVG (00-22)	PINK CATCH	AVG ODD (01-21)	CHUM CATCH	AVG (00-22)	COHO CATCH	AVG (00-22)
DIST 101 GN	TREE PT	21,500	57,000	900	1,500	146,100	342,100	350,500	216,000	9,100	19,800
DIST 106 GN	UPP. CLAR	39,900	75,000	400	1,400	142,900	359,000	153,100	144,000	20,550	65,000
DIST 101 SN	LOW CLAR	143,000	54,500	390	600	10,300,000	5,191,000	1,100,000	241,000	47,000	33,100
DIST 102 SN	MID CLAR	67,000	34,000	400	700	8,800,000	3,986,000	1,300,000	425,000	41,000	41,000
DIST 103 SN	CORDOVA	9,900	8,900	90	50	3,400,000	4,942,500	170,000	148,600	28,000	26,500
DIST 104 SN	NOYES/DALL	156,000	279,000	7,000	6,200	7,000,000	6,528,000	442,000	179,000	70,000	68,000
<b>CUMULATIVE TOTAL</b>		<b>437,000</b>	<b>508,000</b>	<b>9,000</b>	<b>10,000</b>	<b>29,789,000</b>	<b>21,349,000</b>	<b>3,516,000</b>	<b>1,354,000</b>	<b>216,000</b>	<b>253,000</b>

The average harvest of Nass salmon in Alaskan net fisheries from 2000 to 2022 was 107,000 Sockeye (range: 22,000–304,000), 62,000 Pink (range: 4,000–192,000), 136,000 Coho (range: 59,000–433,000), and 9,000 Chum (<500–40,000) based on estimates from NFWD. Of the total in-season Sockeye catch reported in the SE Alaskan fisheries in 2023 to date (437,000), approximately 15% (66,000) is estimated as Nass origin based on mean stock composition estimates from 1982 to 2022 and is below average (94,000) to date.

b) CANADIAN COMMERCIAL NET FISHERIES IN AREA 3 (information courtesy from DFO Prince Rupert):

DFO did not open Area 3 commercial net salmon fisheries in 2023 until July 10. Fishery planning for 2023 is based on DFO’s Integrated Fisheries Management Plan (IFMP) where a precautionary approach on reaching escapement targets for Nass salmon are primary objectives for 2023 while supporting DFO’s Pacific Salmon Strategy Initiative (PSSI; <https://www.canada.ca/en/fisheries-oceans/news/2021/06/minister-jordan-announces-long-term-commercial-closures-and-licence-tetirement-program-in-effort-to-save-pacific-salmon.html>).

A total of 12 commercial fisheries were conducted in 2023 by DFO between 14 July and 25 August (Table 8). Most of the commercial fisheries occurred in outside Area 3 for the 11 seine (1-14 boats) and 1 gillnet (7 boats) fisheries conducted in 2023. Total catches (including releases) were: 15,048 Sockeye (3,056 released), 262,102 Pink (all harvested), 83,322 Chum (31,663 released), 4,049 Coho (all released), 367 Chinook (all released), and 0 steelhead. DFO management actions in 2023 included continued rebuilding of the Kwinageese Sockeye Salmon stock recovering from a migration blockage slide in 2011. DFO implemented a one-week commercial closure (gillnet) and non-retention of Sockeye Salmon (seine) in Area 3 from July 17–23. Of the total Sockeye estimated harvested in outside Area 3 (4,040) and northern Area 4 (38,326), approximately 7% (3,195) are estimated as Nass origin based on mean stock composition from northern boundary sockeye run reconstructions from 1982 to 2022.

Table 8. DFO’s Statistical Area 3 gillnet and seine salmon catch estimates, 2023.

GEAR	DATE	SO-harv	SO-Rel	CO-HARV	CO-Rel	PK-HARV	PK-Rel	Chum-harv	Chum-Rel	CH-harv	CH-Rel	STEEL-Rel
GN	2023-07-14	393	0	0	31	1,370	0	1,615	0	0	5	0
<b>GN Total</b>		<b>393</b>	<b>0</b>	<b>0</b>	<b>31</b>	<b>1,370</b>	<b>0</b>	<b>1,615</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>
SN	2023-07-10	2,200	0	0	200	12,000	0	8,800	0	0	30	0
	2023-07-11	3,000	0	0	250	24,000	0	22,765	0	0	118	0
	2023-07-17	0	409	0	161	16,530	0	9,159	0	0	24	0
	2023-07-18	0	1,688	0	257	34,200	0	9,320	0	0	36	0
	2023-07-25	6,399	0	0	1,400	106,102	0	0	18,863	0	131	0
	2023-08-13	0	481	0	366	19,750	0	0	4,850	0	11	0
	2023-08-14	0	300	0	370	13,300	0	0	3,500	0	7	0
	2023-08-19	0	84	0	214	11,800	0	0	1,050	0	0	0
	2023-08-20	0	55	0	240	15,750	0	0	1,390	0	0	0
	2023-08-24	0	34	0	440	6,250	0	0	1,660	0	5	0
	2023-08-25	0	5	0	120	1,050	0	0	350	0	0	0
<b>SN Total</b>		<b>11,599</b>	<b>3,056</b>	<b>0</b>	<b>4,018</b>	<b>260,732</b>	<b>0</b>	<b>50,044</b>	<b>31,663</b>	<b>0</b>	<b>362</b>	<b>0</b>
<b>Total</b>		<b>11,992</b>	<b>3,056</b>	<b>0</b>	<b>4,049</b>	<b>262,102</b>	<b>0</b>	<b>51,659</b>	<b>31,663</b>	<b>0</b>	<b>367</b>	<b>0</b>

LABELS: SO=SOCKEYE, PK=PINK, CO=COHO, CH=CHINOOK; HARV=HARVESTED, REL=RELEASED

c) NISGA’A FOOD, SOCIAL, CEREMONIAL (FSC) AND ECONOMIC FISHERIES:

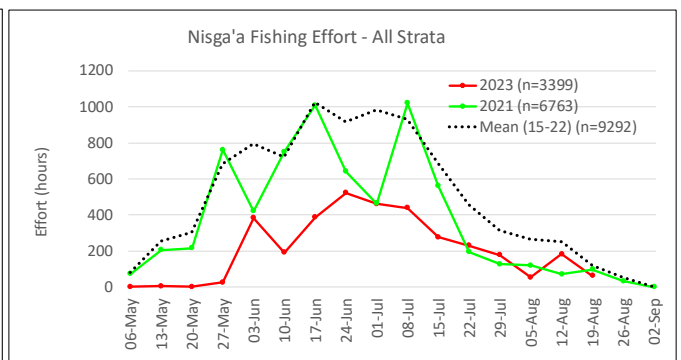
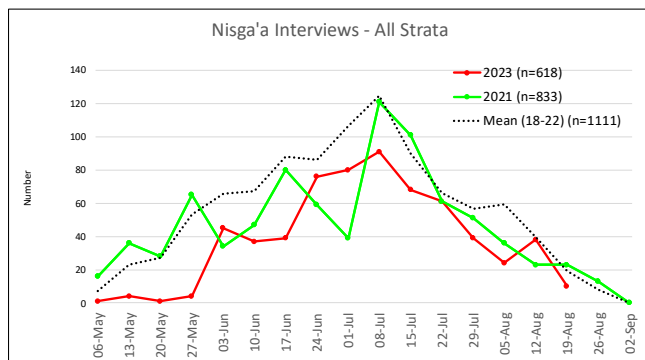
Nisga’a domestic and sale fisheries are monitored by the Nisga’a Fisheries and Wildlife Department and salmon catch monitoring began on May 1, 2023. Preliminary projected cumulative harvests in Nisga’a fisheries to week ending **September 2** are shown in Table 9. The current projected harvests of Nass salmon and steelhead estimated in 2023 for Nisga’a fisheries are above average for the Food, Social, and Ceremonial fishery (56,300 vs. 43,000) and below average for total catches (57,700 vs. 107,000) when including past sale fisheries and comparing harvests from 2000 to 2022 (Table 9).

Nisga'a fishing effort (net hours) for 2023 is below average (~3,450 vs. 8,841 hours) based on 618 interviews to August 19. Fishing effort was affected by high water for most of May and early June and record returns of pink salmon into the river in August (over 1 million) that reduced overall fishing efforts in 2023. Preliminary estimates are from May 1 to September 2 and include projected net catch estimates from August 20 to September 2 as well as preliminary additions for catch by angling gear, release mortality (60% of releases), and estimated unmonitored periods.

Table 9. Salmon and steelhead harvests in Nisga'a fisheries, 2023.

Reported Week Ending Period		DOMESTIC (FSC) HARVESTS TO WK END - 2023		TOTAL HARVESTS TO DATE INCLUDING ESTIMATED RELEASE MORTALITIES & SALE FISHERIES 2023	
NASS SPECIES	Wk end	Harvest	Mean	Harvest	Mean*
CHINOOK	2-Sep-23	3,200	5,100	3,203	5,700
SOCKEYE	2-Sep-23	43,441	31,600	43,449	77,400
PINK	2-Sep-23	8,144	3,315	9,528	14,760
COHO	2-Sep-23	1,330	2,147	1,338	8,416
CHUM	2-Sep-23	77	549	120	549
STEELHEAD	2-Sep-23	62	318	76	318
<b>TOTAL</b>		<b>56,300</b>	<b>43,000</b>	<b>57,700</b>	<b>107,000</b>

\* Total mean harvests from 2000-2022 for week end periods also include historical sale fisheries. Total harvests include all release mortality (60% of releases) and sale fisheries.



## 5. TOTAL RETURN TO CANADA (TRTC) AND NISGA'A ENTITLEMENT ESTIMATES FOR NASS SALMON

### a) Pre-season TRTC and Nisga'a entitlement forecasts:

Pre-season forecasts for Nass salmon Total Runs, Total Return to Canada (TRTC), and Nisga'a Treaty entitlement allocation ranges for 2023 were calculated using pre-season forecast models based on Nass salmon returns and age information for past years (NFWD 2022). The pre-season forecasts are used for general planning purposes until in-season data are available from Nass River salmon assessment programs starting mid-June. Pre-season forecast models used were a combination of sibling regressions (Nass Sockeye and Chinook only) and brood year mean returns (2 year even-year cycle (Pink), 3–4 year (Coho), and 4 year (Chum)) that project 25%, 50%, and 75% probability point estimates. Pre-season Total Return to Canada (TRTC) forecasts (50% probability estimates) for 2023 predicted below average returns for Nass Sockeye (366,000 vs. 616,000), Nass Chinook (27,000 vs. 30,000), and Nass Coho (132,000 vs. 176,000), and above average TRTC returns for Nass Chum (74,000 vs. 54,000) and odd-year Nass Pink (319,000 vs. 324,000), based on mean Total Run returns from 1992 to 2022 (Table 10; DFO IFMP 2023).

Table 10. Pre-season Total Return to Canada (TRTC) and Nisga'a Entitlement forecasts for Nass salmon, 2023.

PRE-SEASON TRTC & ENTITLEMENT FORECASTS	SOCK	CHIN	COHO	PINK-ODD	CHUM
HISTORICAL MEAN TRTC (1994-2022)	616,000	30,000	176,000	324,000	54,000
PRE-SEASON TRTC FORECAST (50% PROBABILITY)	<b>366,000</b>	<b>27,000</b>	<b>132,000</b>	<b>319,000</b>	<b>74,000</b>
75% probability	257,000	22,000	119,000	174,000	44,000
25% probability	522,000	32,000	146,000	586,000	123,000
TOTAL PRE-SEASON NISGA'A CATCH POTENTIAL	<b>55,000</b>	<b>5,700</b>	<b>11,000</b>	<b>16,000</b>	<b>5,900</b>
75% probability	27,000	4,600	9,500	1,000	4,000
25% probability	90,000	6,700	12,000	57,000	10,000

When reviewing Nass salmon TRTC returns over a 32-year period since 1992, the pre-season forecast projections predicted 2023 to be poor for Sockeye (8<sup>th</sup> worst), fair to average returns for Chinook (13<sup>th</sup> worst), Pink (11<sup>th</sup> worst) and Coho (13<sup>th</sup> worst), and above average for Chum (9<sup>th</sup> best). The overall return forecast for Nass salmon in 2023 (918,000 vs. 1,416,000 average) was predicted to be poor (the 8<sup>th</sup> worst return in 32 years).

b) In-season Total Return to Canada (TRTC) and Nisga'a entitlement estimates for Nass salmon 2023:

The in-season TRTC estimates for Nass Sockeye, Chinook, and Coho salmon are based on run-size projections from in-season to final regression methods and run timing to Area 3 to date for Nass Sockeye (97%; range: 92–100%), Chinook (99%; range: 97–100%, including lower/coastal stocks based on habitat capacity proportions), and Coho (81%; range: 59–93%, including lower/coastal stocks based on habitat capacity proportions). For Pink TRTC estimate, the current projection (nearly 3 million) is record high based on a linear regression estimate ( $r^2=0.81$ ,  $n=23$  years) from odd-year adjusted spawning ground counts conducted on Xnukw (Iknouk R.; 150,000 x 2 = 300,000) and Ksi Xts'at'kw (Stagoo R.; 15,000 x 2 =30,000) to predict total escapement and estimated marine commercial exploitation rates (15.0%; 0.7% CDN) from mean stock composition estimates for Nass Area origin (14%; 10% CDN). For Chum TRTC estimates, current projections are from a linear regression estimate ( $r^2=0.59$ ,  $n=63$  years) from observed spawning ground counts (4,440) adjusted for observer efficiency from Ksi Xts'at'kw (Stagoo R.) on August 7 and estimated marine commercial exploitation rates (25.8%; 0.6% CDN) based on the last odd-year commercial fishery (2021) that targeted Pink Salmon.

Summary of in-season TRTC estimates for Nass Area salmon estimated by NFWD to August 3 are:

- Nass Sockeye: 488,000 (range: 478,000–498,000)
- Nass Chinook: 22,000 (range: 21,000–22,000)
- Nass Coho: 141,000 (range: 123,000–160,000)
- Nass Pink: 2,966,000 (range: 1,447,000–4,485,000) and
- Nass Chum: 45,000 (range: 33,000–57,000).

In-season TRTC and Nisga'a entitlement estimates for Nass salmon to date are higher for Sockeye (25%), Coho (6%), and Pink (89%), and lower for Chinook (-23%) and Chum (-64%) when compared to pre-season forecasts for 2023.

Table 11. In-season Total Return to Canada (TRTC) and Nisga'a Entitlement forecasts for Nass salmon, 2023.

IN-SEASON TRTC & ENTITLEMENT ESTIMATES - PRELIMINARY	SOCK	CHIN	COHO	PINK-ODD	CHUM
PROJ. TRTC BASED ON INSEASON TO FINAL REGRESSION TO AREA 3D	<b>488,000</b>	<b>22,000</b>	<b>141,000</b>	<b>2,966,000</b>	<b>45,000</b>
Lower (95% CI)	478,000	22,000	123,000	1,447,000	34,000
Upper (95% ci.)	498,000	22,000	160,000	4,485,000	57,000
ESTIMATED %TRTC TO DATE: MEAN. RUN TIMING (AREA 3D)	97%	99%	81%	93%	75%
Late run	92%	97%	59%	78%	42%
Early run	100%	100%	93%	100%	93%
IN-SEASON NISGA'A ENTITLEMENT TARGET	<b>82,000</b>	<b>4,600</b>	<b>11,300</b>	<b>417,000</b>	<b>3,600</b>
Lower (95% CI)	80,000	4,600	10,000	189,000	3,000
Upper (95% ci.)	84,000	4,600	13,000	645,000	5,000

Nisga'a salmon harvest entitlement ranges for 2023 to date are based on TRTC (Table 11) and catch (Table 12) estimates with updates to Nisga'a harvest estimates to August 20 and projected to August 26:

- Nass Sockeye is between 80,000 and 84,000 with point estimate 81,000. Current harvest estimate is 43,441 (plus 8 release mortalities);
- Nass Chinook is between 4,400 and 4,600 with point estimate 4,600. Current harvest is 3,200 (plus 3 release mortalities);
- Nass Coho is between 10,000 and 13,000 with point estimate 11,200. Current harvest is 1,330 (plus 8 release mortalities);
- Nass Pink is between 189,000 and 645,000 with point estimate 417,000. Current harvest is 8,144 (plus 1,384 release mortalities);
- Nass Chum is between <500 (below esc. goal) and 5,000 with point estimate 3,600. Current harvest is 77 (plus 44 release mortalities); and
- Nass steelhead, upper limit is 1,000 summer-run and no limit for winter/spring run, with current harvest of 62 (plus 14 release mortalities).

*Table 12. Nisga'a salmon and summer-steelhead total harvests by fishery, 2023.*

<b>NISGA'A TOTAL HARVEST SUMMARY</b>	<b>SOCK</b>	<b>CHIN</b>	<b>COHO</b>	<b>PINK-ODD</b>	<b>CHUM</b>	<b>STEEL</b>
MARINE SALE FISHERY TOTAL	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
IN-RIVER SALE FISHERY TOTAL	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
<b>INDIVIDUAL SALE (IS) FISHERY TOTAL</b>	<b>CLOSED</b>	<b>CLOSED</b>	<b>CLOSED</b>	<b>CLOSED</b>	<b>CLOSED</b>	<b>CLOSED</b>
NLG COMMUNAL SELECTIVE TREATY FISHERY - GH FISHWHEELS	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
NLG COMMUNAL SELECTIVE TREATY FISHERY - SEINE	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
<b>DOMESTIC (FSC) GILLNET FISHERY - WK END: SEP 2 (PROJECTED)</b>	<b>43,449</b>	<b>3,203</b>	<b>1,338</b>	<b>9,527</b>	<b>120</b>	<b>76</b>
<b>SUB TOTAL (NLG TREATY FISHERIES)</b>	<b>43,449</b>	<b>3,203</b>	<b>1,338</b>	<b>9,527</b>	<b>120</b>	<b>76</b>
NLG SOCK DEMONSTRATION FISHERY HARVEST - DFO INVENTORY	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
<b>GRAND TOTAL</b>	<b>43,449</b>	<b>3,203</b>	<b>1,338</b>	<b>9,527</b>	<b>120</b>	<b>76</b>

The preliminary TRTC total estimate for all five Nass salmon species is currently estimated as the best return (3.7 million vs. 1.4 million average) for Nass salmon over 32 years (Table 13). However, most of the return (81%) is Nass Area Pink Salmon. In addition, when reviewing Nass salmon TRTC returns over the 32-year period since 1992, returns to date are still tracking below average for Nass Sockeye (17<sup>th</sup> worst), Chinook (11<sup>th</sup> worst), Coho (15<sup>th</sup> worst), and Chum (18<sup>th</sup> worst).

Of note to larger Nass salmon returns observed in 2023 for some species, DFO's implementation of the Pacific Salmon Strategy Initiative (PSSI) launched in 2021 appears to have been successful in contributing more Nass salmon to their spawning grounds (including at Meziadin River) from reduced commercial fisheries from 2021–2023. Before 2021, returns of Sockeye Salmon to Meziadin River were well below escapement targets (160,000) and only averaged 139,000 (range: 88,000-185,000) after the large return in 2002 (332,000). Although Meziadin Sockeye Salmon have returned above the escapement target over the past three years (274,000–390,000 [projected for 2023]), more Sockeye Salmon escaping into Meziadin Lake will make up for the lack of spawners over the previous 5-year period (2016–2020) that only averaged 108,000 (range: 88,000-126,000). The success of DFO's PSSI program on rebuilding Nass salmon can be considered largely due to the commitment of the Area 3 commercial fishing fleet and the Nisga'a Nation in foregoing most of their economic fisheries over the past three years. The good news of better returns of Nass Sockeye in the past three years, even though the total returns were below average, is hopefully to mitigate in the future of potentially lower Nass Sockeye returns with contributions from the 2020 spawning return. The 2020 Nass Sockeye return was the lowest return to Canada (295,000) since 1975 (40-year period) and only 95,000 above escapement goal.



Table 13. Ranking of Nass salmon Total Return to Canada estimates from lowest (1) to highest (32) including 2023 in-season estimates, 1992–2023.

NASS SALMON TOTAL RETURN TO CANADA ESTIMATES, 1992-2022 & PREDICTED 2023							NASS TRTC RANKING BY YEAR FOR SALMON: POOREST RETURN FROM 1 TO 32 YEARS					
Year	Sockeye	Pink	Chinook	Coho	Chum	Total Salmon	Sockeye	Pink	Chinook	Coho	Chum	Total Salmon
1992	1,572,000	328,009	35,400	160,210	53,817	2,149,436	31	11	22	17	21	29
1993	1,586,000	874,099	45,400	62,481	238,610	2,806,590	32	24	30	2	32	31
1994	590,000	183,958	42,800	351,220	105,452	1,273,431	22	6	27	30	29	14
1995	855,000	829,319	21,700	68,032	83,001	1,857,053	28	23	10	3	26	24
1996	694,000	465,482	41,600	126,240	40,410	1,367,731	26	17	26	11	17	17
1997	574,000	416,004	36,300	33,182	30,787	1,090,273	21	15	23	1	14	11
1998	446,000	142,601	45,700	72,387	182,007	888,696	14	3	31	4	31	7
1999	645,000	1,258,752	29,000	107,028	68,042	2,107,821	24	30	17	7	24	27
2000	539,000	292,035	32,800	133,589	26,153	1,023,577	20	10	19	14	13	10
2001	380,000	994,702	48,000	243,156	35,897	1,701,755	8	28	32	26	16	23
2002	1,279,000	364,867	28,400	314,180	17,744	2,004,191	30	13	16	28	7	26
2003	1,024,000	1,018,901	43,600	171,932	75,960	2,334,393	29	29	28	19	25	30
2004	681,000	696,270	33,100	131,881	57,729	1,599,980	25	20	21	12	22	21
2005	522,000	1,348,144	28,100	211,287	33,198	2,142,729	19	31	15	23	15	28
2006	637,000	135,913	43,600	125,945	60,478	1,002,936	23	2	28	10	23	9
2007	351,000	896,058	39,600	174,940	12,911	1,474,509	6	25	25	20	4	18
2008	333,000	51,341	30,200	132,418	3,751	550,710	4	1	18	13	1	1
2009	425,000	809,704	39,200	354,879	21,781	1,650,564	12	22	24	31	9	22
2010	392,000	184,697	27,400	179,914	9,143	793,154	9	7	14	21	3	5
2011	458,000	173,951	18,400	122,816	7,030	780,196	15	4	6	9	2	4
2012	419,000	270,319	15,800	153,338	16,485	874,942	11	9	3	16	6	6
2013	437,000	975,543	16,400	443,322	15,272	1,887,537	13	27	4	32	5	25
2014	487,000	399,270	22,700	291,953	21,529	1,222,452	16	14	12	27	8	12
2015	753,000	421,726	33,000	91,646	53,754	1,353,125	27	16	20	6	20	16
2016	362,000	348,942	17,700	225,765	23,879	978,286	7	12	5	24	11	8
2017	341,000	925,835	11,100	240,037	23,312	1,541,285	5	26	2	25	10	20
2018	294,000	255,834	10,641	89,620	47,064	697,160	2	8	1	5	19	2
2019	326,000	174,641	20,300	162,734	24,558	708,233	3	5	8	18	12	3
2020	265,000	743,787	21,100	107,332	102,247	1,239,467	1	21	9	8	28	13
2021	413,000	566,787	19,400	188,836	119,777	1,307,800	10	19	7	22	30	15
2022	520,000	502,000	23,000	345,000	99,000	1,489,000	18	18	13	29	27	19
2023	488,000	2,966,000	22,000	141,000	45,000	3,662,000	17	32	11	15	18	32
<b>MEANS:</b>							<b>COLOR CODING:</b>					
Odd year:							BEST RETURN: 32					
92-22	600,000	779,000	30,000	181,000	55,000	1,416,000	WORST: 1					
* Color coding from mean averages from 1992-2022: Green - above average; Tan - below average but higher than 1 SD; and Red - below average and lower than 1 SD.							Good		21-32			
							Average		11-20			
							Poor		1-10			

The next Nass River general stock assessment update from the Nisga’a Fisheries and Wildlife Department is planned for: **Monday, 11 September 2023.**

Nass stock assessment updates are available at the following links (no passwords are required):

- Dropbox: <https://www.dropbox.com/scl/fo/ahrrza0aplzcnamatapar/h?dl=0&rlkey=n51s6qgu0yze0vrphue8dk4ap>
- DFO: <http://www.pac.dfo-mpo.gc.ca/fm-gp/northcoast-cotenord/nass-eng.html>
- NLG: <http://www.nisgaanation.ca/nass-river-stock-assessments>

**Photo Documentation of Nass salmon and non-salmon caught at fishwheels between August 26–Sep 1 prior to release – salmon are tagged in water filled trough with pumped water from river during handling:**

*Photos courtesy of NFWD’s senior crew leader, Ben Guno Jr, and other NFWD staff.*



Photo 1. Sockeye Salmon caught and spaghetti tagged at Gitwinksihlkw fishwheels, 28 August 2023.



Photo 2. Sockeye Salmon caught and spaghetti tagged at Gitwinksihlkw fishwheels, 30 August 2023.



Photo 3. Chinook Salmon caught and operculum tagged at Gitwinksihlkw fishwheels, 31 August 2023.



Photo 4. Chinook Salmon caught and operculum tagged at Gitwinksihlkw fishwheels, 27 August 2023.



Photo 5. Coho Salmon caught and anchor tagged at Gitwinksihlkw fishwheels, 1 August 2023.



Photo 6. Coho Salmon caught and anchor tagged at Gitwinksihlkw fishwheels, 30 August 2023.



Photo 7. Chum Salmon caught and operculum tagged at the Gitwinksihlkw fishwheels, 1 September 2023.



Photo 8. Chum Salmon caught and operculum tagged at the Gitwinksihlkw fishwheels, 28 August 2023.



Photo 9. Steelhead caught and fin marked at Gitwinksihlkw fishwheels, 1 September 2023.



Photo 10. Steelhead caught and fin marked at Grease Harbour fishwheels, 31 August 2023.



Photo 11. Steelhead caught and fin marked at Grease Harbour fishwheels, 26 August 2023.



Photo 12. Dolly Varden caught and fin marked at Gitwinksihlkw fishwheels, 31 August 2023.



Nisga'a Lisims Government

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**2023 NASS STOCK ASSESSMENT UPDATE**

FISHWHEEL OPERATIONAL DATA TO:	31-Aug-23
WATER LEVEL FOR DATE AT GITWINKSIHLKW (m)	1.4
HISTORICAL LEVEL FOR DATE - MEAN 94-22 (m)	1.6
WATER TEMPERATURE FOR DATE AT GITWINKSIHLKW (m)	8.0
HISTORICAL WATER TEMP FOR DATE - MEAN 94-22 (m)	9.0

FISHWHEEL CATCH SUMMARIES	SOCK	CHIN	COHO	STEEL	PINK-ODD	CHUM	LAMP
FISHWHEEL TOTAL CATCH OF ADULTS	66,576	2,370	14,022	601	213,546	187	2,142
HISTORICAL AVG CUM CATCH (00-22) TO DATE	43,800	4,200	11,700	710	23,110	90	700
HISTORICAL AVG CUM TOTAL CATCH (00-22)	45,000	4,200	13,000	900	25,000	130	740
AVERAGE DAILY CATCH (5 D) OF ADULTS - GW	66	1	78	9	296	5	1
AVERAGE DAILY CATCH (5 D) OF ADULTS - GH	330	0	291	13	399	2	12
FISHWHEEL TOTAL TAGGED (OR ADIPOSE FIN MARKED)	9,913	2,056	1,902	457	1,425	165	1,180
FISHWHEEL TOTAL JACKS	6,244	3,327	238	NA	NA	NA	NA
HISTORICAL MEAN JACKS (00-22) TO DATE	3,762	777	556	NA	NA	NA	NA

IN-SEASON RUN SIZE SUMMARIES	SOCK	CHIN	COHO	STEEL	31-Aug-23
IN-SEASON RUN SIZE ESTIMATE TO DATE	477,694	15,560	78,722	6,801	
HISTORICAL MEAN RUN SIZE TO GW FOR DATE (94-22)	287,000	18,600	75,070	10,420	
RUN SIZE TARGET 2023 (MIN. FOR STEELHEAD)	250,000	15,000	65,000	4,200	

IN-SEASON FORECASTS TO GW - METHODS:	SOCK	CHIN	COHO	STEEL	31-Aug-23
1. RUN TIMING METHOD (94-22) - Mean Run timing	489,000	16,000	90,000	9,000	
Lower (-2 S.D.)	471,000	15,000	79,000	7,000	
Upper (+2 S.D.)	508,000	16,000	104,000	13,000	In-season/Final
2. IN-SEASON TO FINAL (regression):	483,000	15,700	91,000	10,000	r <sup>2</sup> (CH) = 1.00
95% CI - lower	435,000	16,000	79,000	7,000	r <sup>2</sup> (SO) = 0.98
95% CI - upper	532,000	16,000	103,000	12,000	r <sup>2</sup> (CO) = 0.97
GW RUN SIZE TARGET (DEPENDING ON HARVESTS ABOVE GW)	250,000	15,000	65,000	4,200	r <sup>2</sup> (ST) = 0.90
Mean Run Timing % Return Estimate to GW fishwheels (94-22)	98%	99%	88%	77%	
Late run	94%	98%	74%	51%	
Early run	100%	100%	97%	100%	

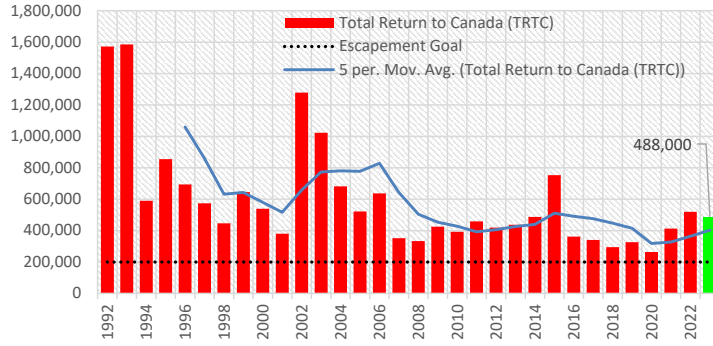
IN-SEASON NET ESCAPEMENT ESTIMATES	SOCK	CHIN	COHO	STEEL	31-Aug-23
HARVEST ESTIMATES ABOVE GW TO DATE	31,625	1,586	351	18	
NET ESCAPEMENT (ABOVE GW):	446,069	13,974	78,371	6,783	
NET ESCAPEMENT TARGET (UPPER RIVER ONLY)	200,000	13,000	60,000	4,000	

NISGA'A TOTAL HARVEST SUMMARY	SOCK	CHIN	COHO	PINK-ODD	CHUM	STEEL
MARINE SALE FISHERY TOTAL	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
IN-RIVER SALE FISHERY TOTAL	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
INDIVIDUAL SALE (IS) FISHERY TOTAL	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
NLG COMMUNAL SELECTIVE TREATY FISHERY - GH FISHWHEELS	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
NLG COMMUNAL SELECTIVE TREATY FISHERY - SEINE	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
DOMESTIC (FSC) GILLNET FISHERY - WK END: SEP 2 (PROJECTED)	43,449	3,203	1,338	9,527	120	76
SUB TOTAL (NLG TREATY FISHERIES)	43,449	3,203	1,338	9,527	120	76
NLG SOCK DEMONSTRATION FISHERY HARVEST - DFO INVENTORY	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
GRAND TOTAL	43,449	3,203	1,338	9,527	120	76

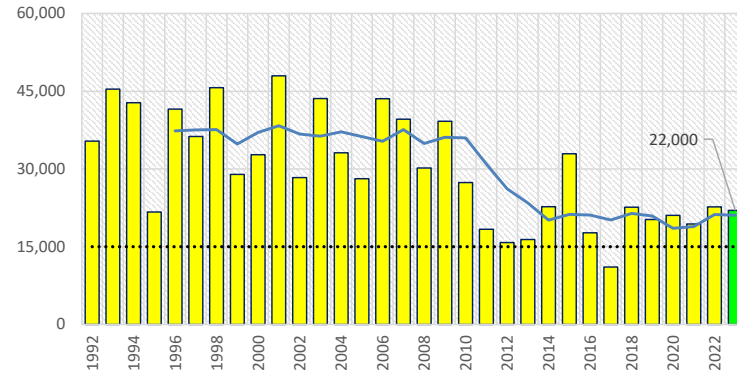
PRE-SEASON TRTC & ENTITLEMENT FORECASTS	SOCK	CHIN	COHO	PINK-ODD	CHUM
HISTORICAL MEAN TRTC (1994-2022)	616,000	30,000	176,000	324,000	54,000
PRE-SEASON TRTC FORECAST (50% PROBABILITY)	366,000	27,000	132,000	319,000	74,000
75% probability	257,000	22,000	119,000	174,000	44,000
25% probability	522,000	32,000	146,000	586,000	123,000
TOTAL PRE-SEASON NISGA'A CATCH POTENTIAL	55,000	5,700	11,000	16,000	5,900
75% probability	27,000	4,600	9,500	1,000	4,000
25% probability	90,000	6,700	12,000	57,000	10,000

IN-SEASON TRTC & ENTITLEMENT ESTIMATES - PRELIMINARY	SOCK	CHIN	COHO	PINK-ODD	CHUM
PROJ. TRTC BASED ON INSEASON TO FINAL REGRESSION TO AREA 3D	488,000	22,000	141,000	2,966,000	45,000
Lower (95% CI)	478,000	22,000	123,000	1,447,000	34,000
Upper (95% ci.)	498,000	22,000	160,000	4,485,000	57,000
ESTIMATED %TRTC TO DATE: MEAN. RUN TIMING (AREA 3D)	97%	99%	81%	93%	75%
Late run	92%	97%	59%	78%	42%
Early run	100%	100%	93%	100%	93%
IN-SEASON NISGA'A ENTITLEMENT TARGET	82,000	4,600	11,300	417,000	3,600
Lower (95% CI)	80,000	4,600	10,000	189,000	3,000
Upper (95% ci.)	84,000	4,600	13,000	645,000	5,000

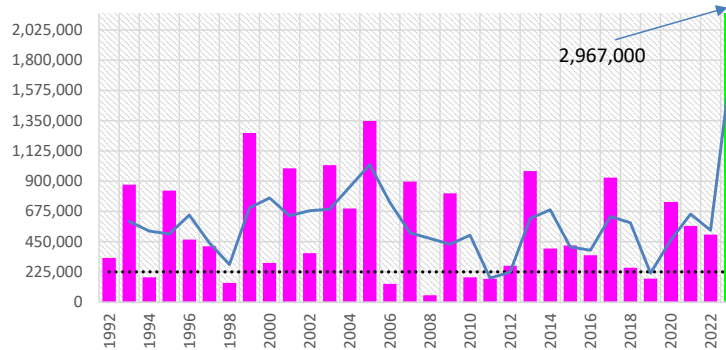
**Nass Sockeye - TRTC**



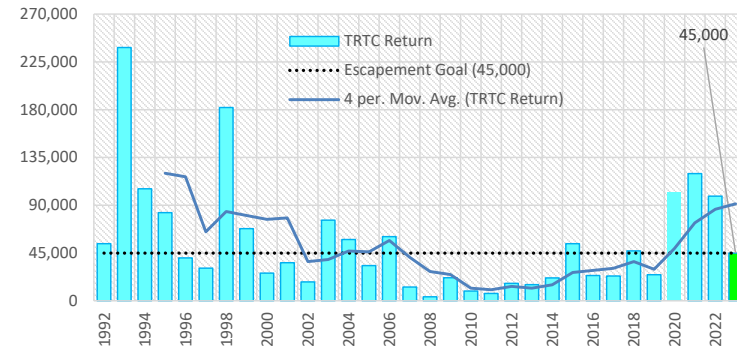
**Nass Chinook - TRTC**



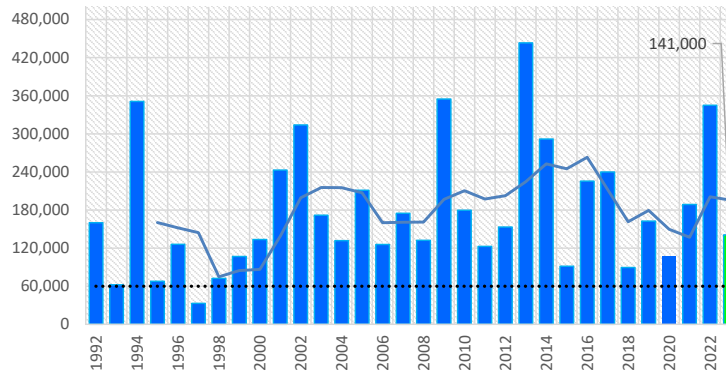
**Nass Pink - TRTC**



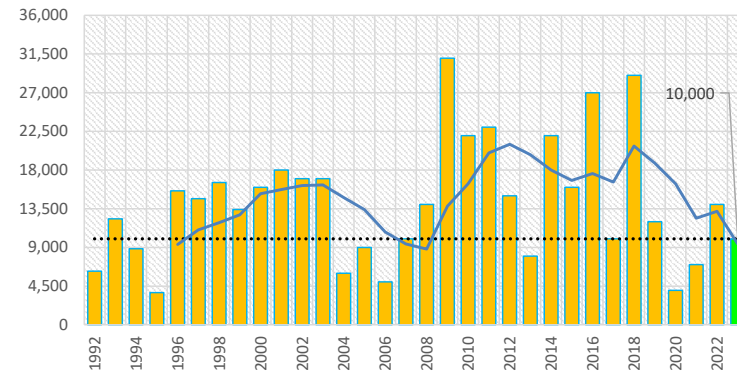
**Nass Chum - TRTC**

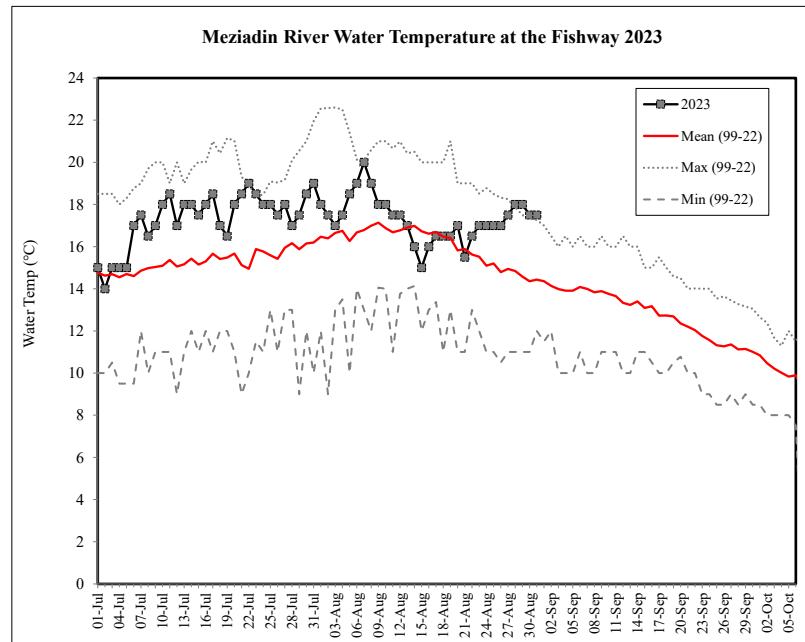
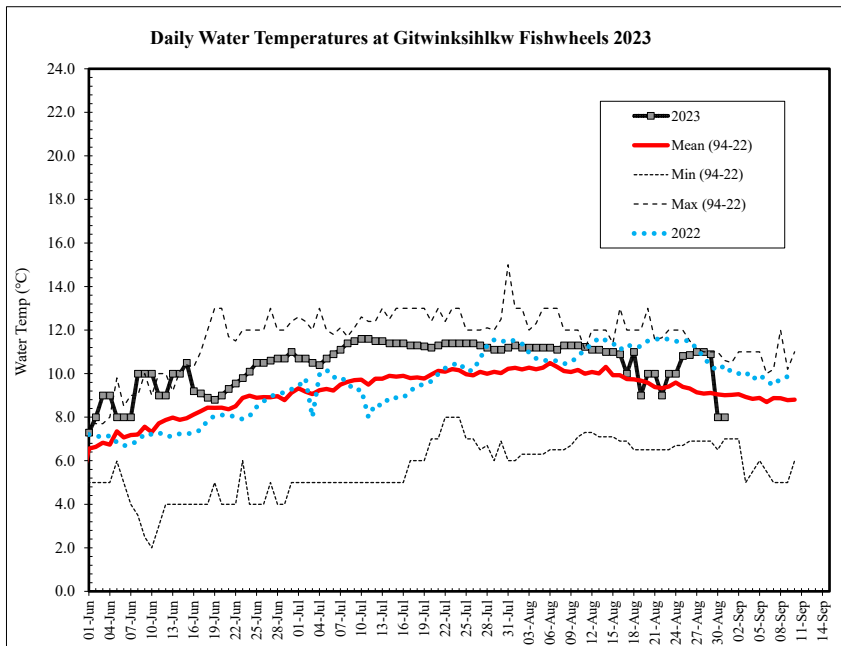
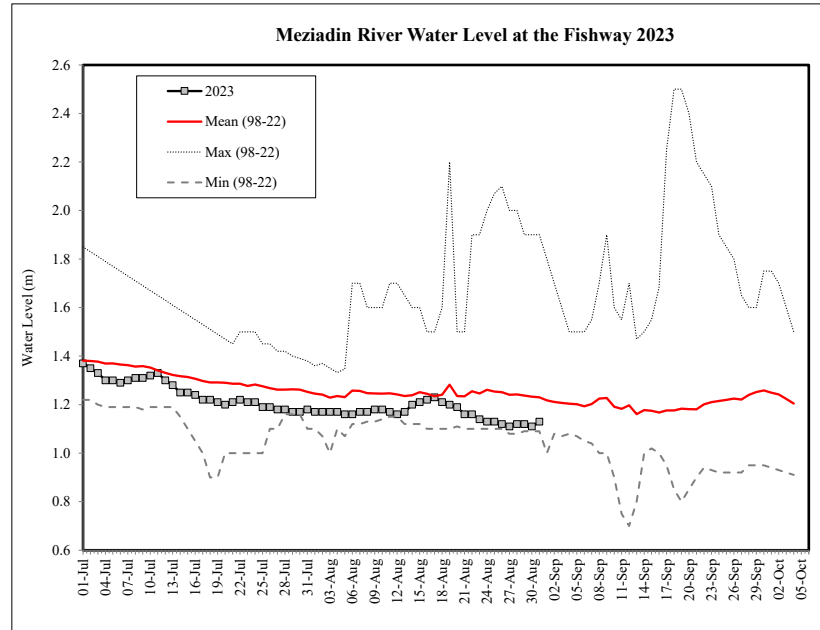
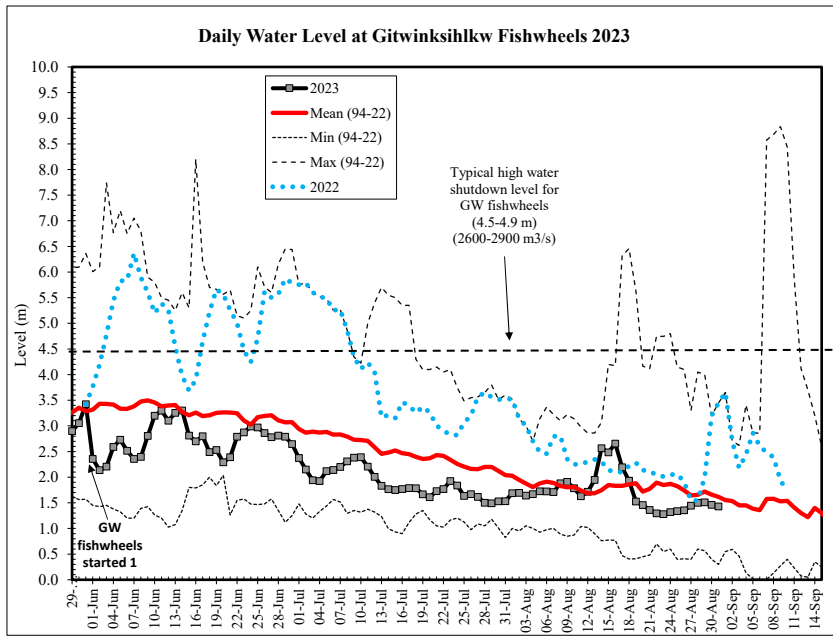


**Nass Coho - TRTC**

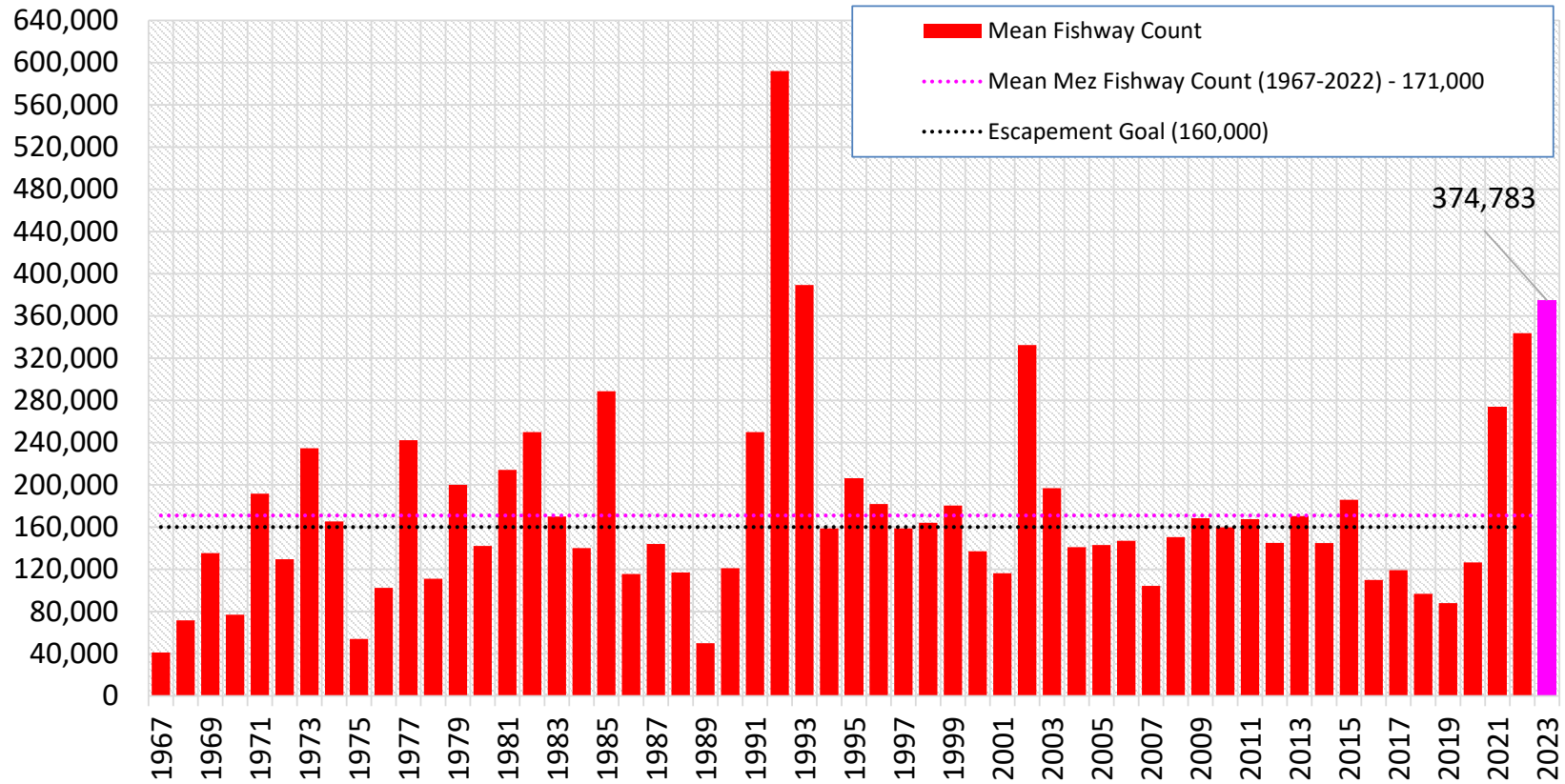


**Nass Steelhead - TRTC**

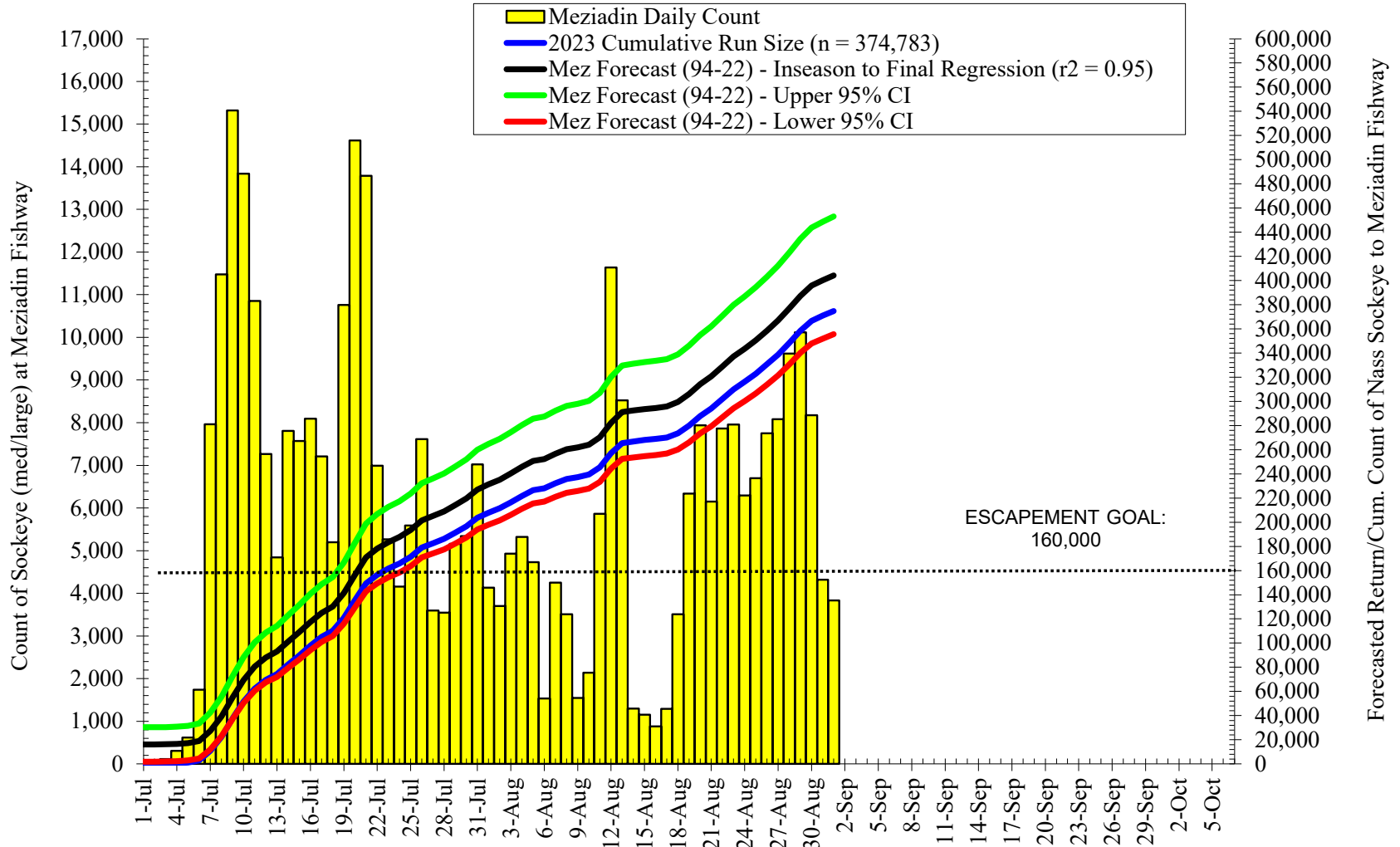




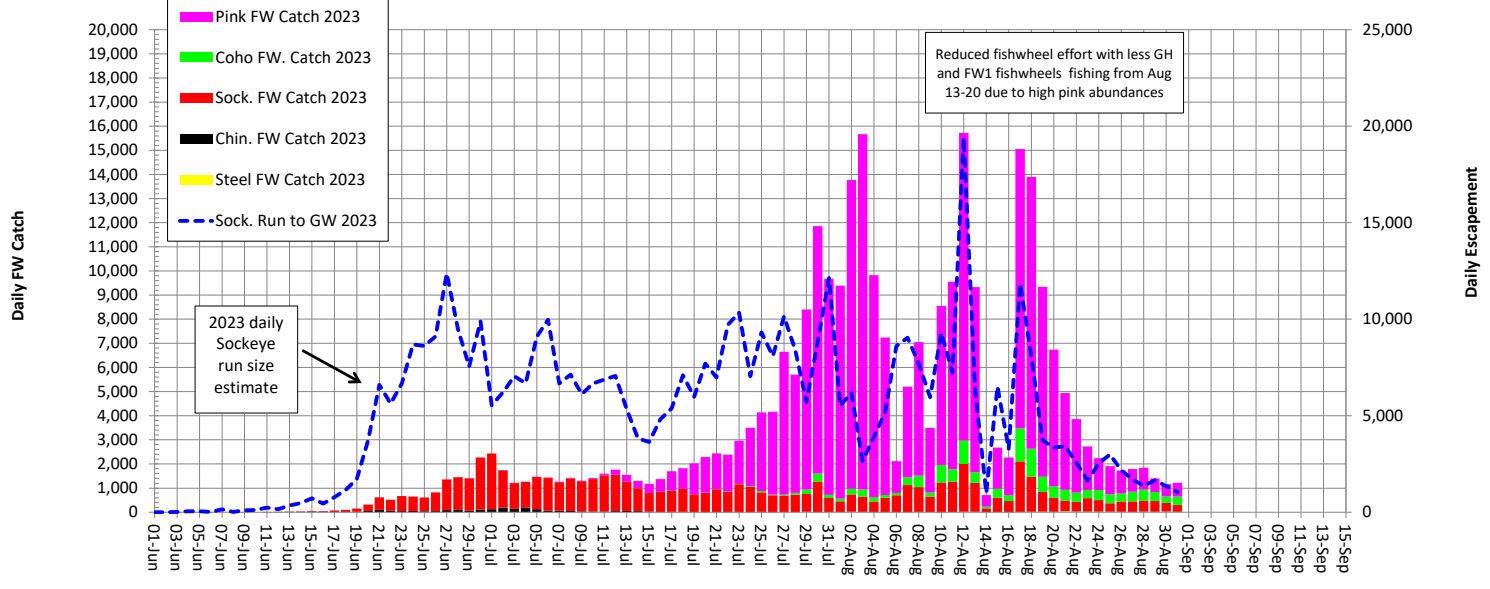
### Nass Sockeye - Meziadin



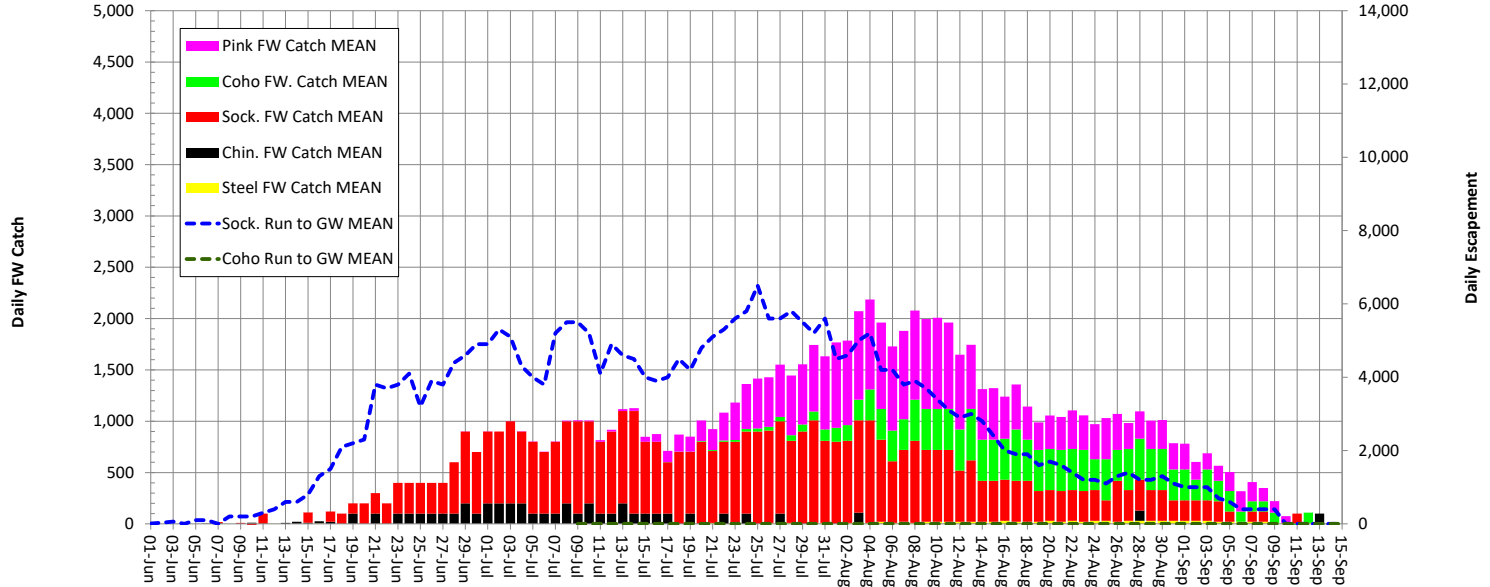
## Meziadin Fishway Sockeye Counts & In-season Forecast Data 2023



### DAILY CATCHES OF NASS SALMON AND STEELHEAD AT THE FISHWHEELS 2023

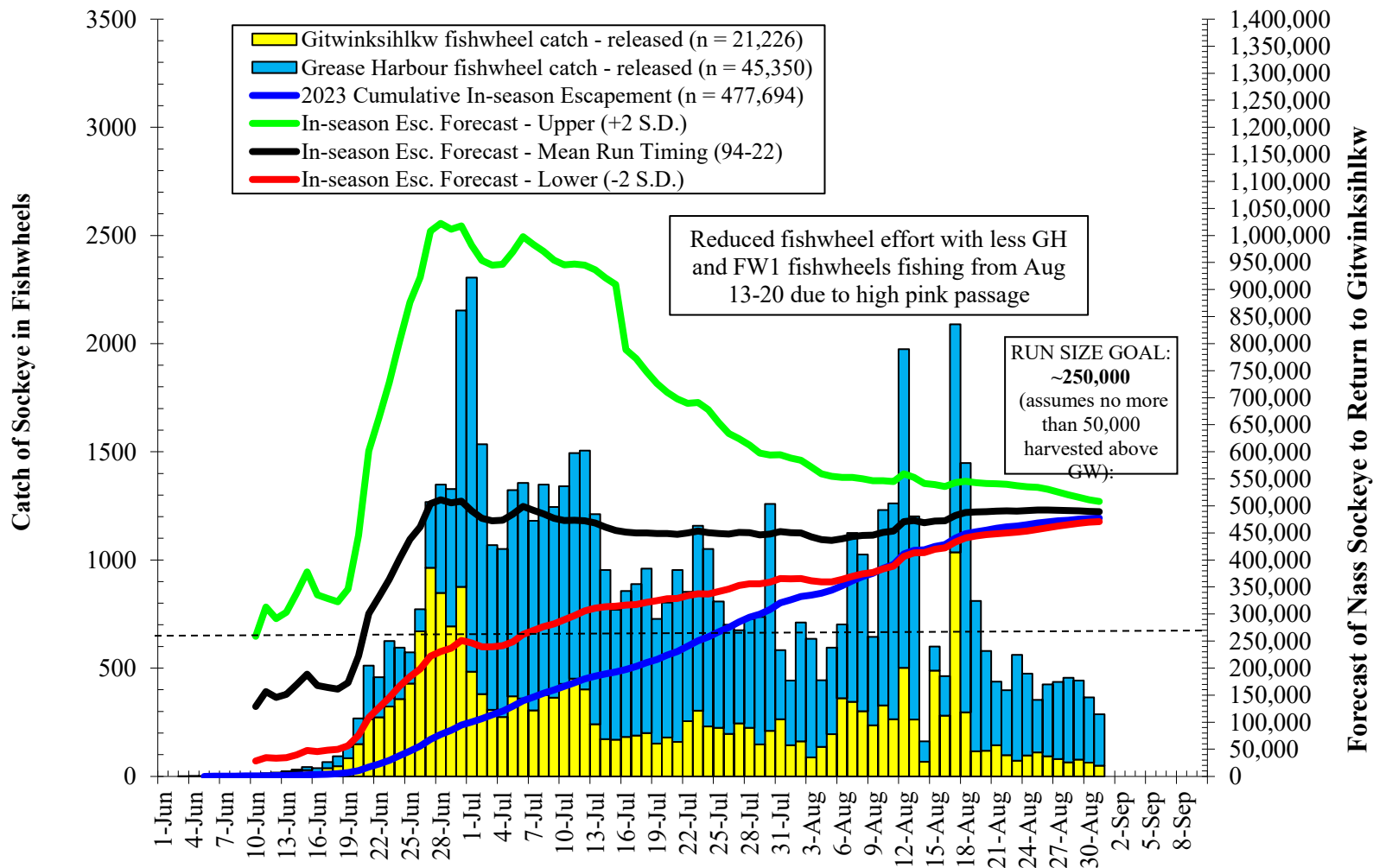


### MEAN DAILY CATCHES OF NASS SALMON AND STEELHEAD AT THE FISHWHEELS - 2000-2021 (Odd YR PINK)

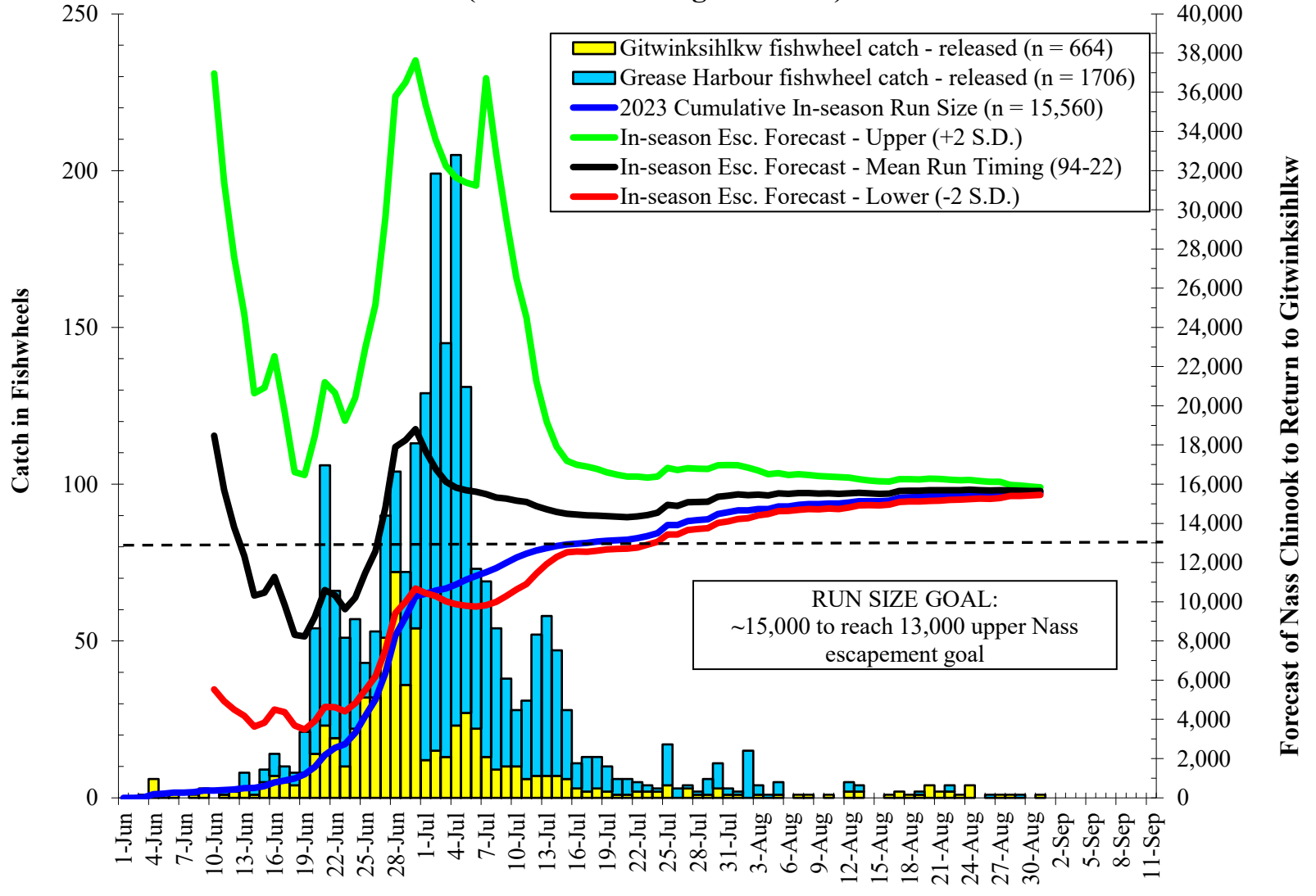




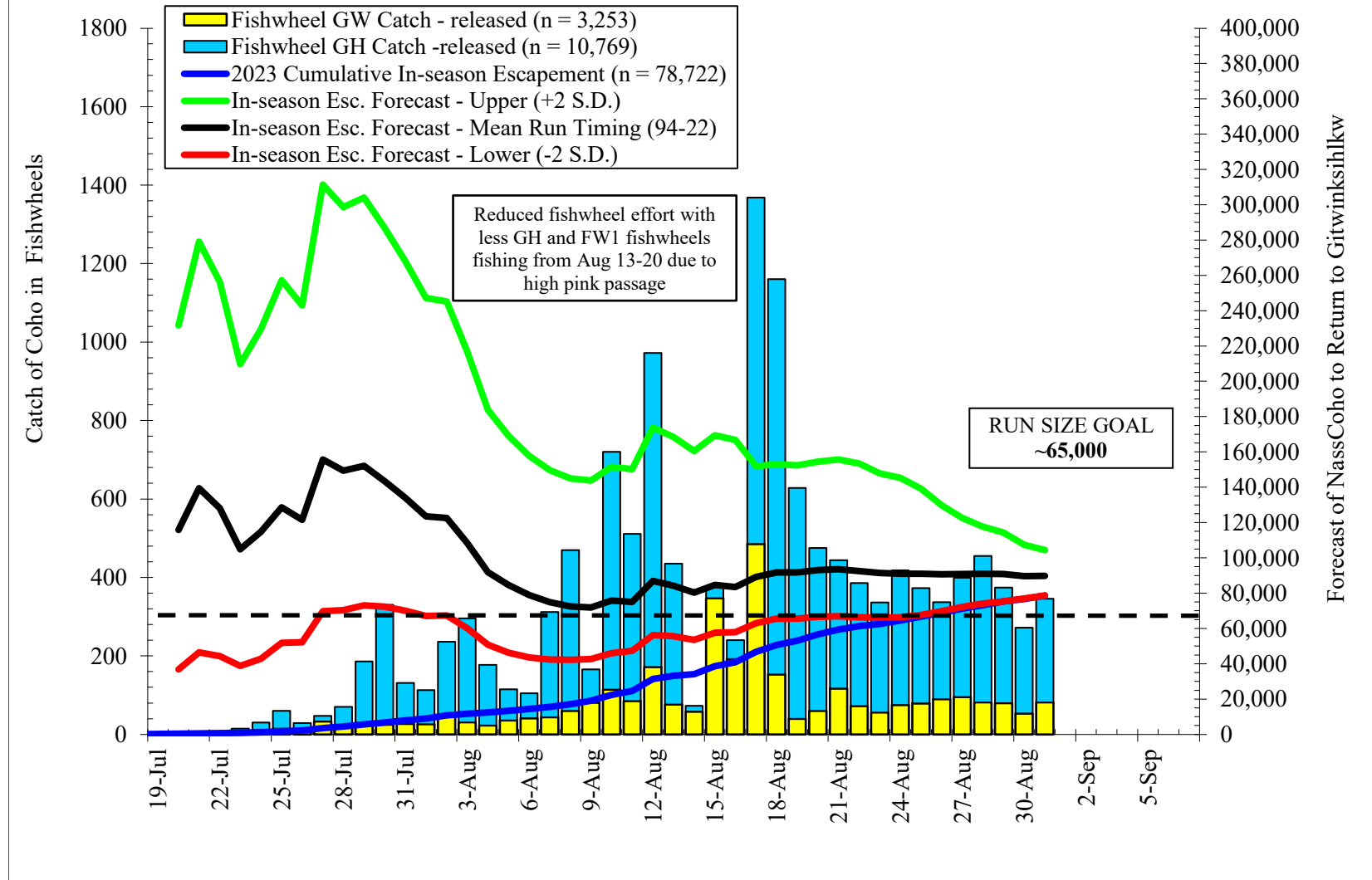
## Nass Sockeye ( $\geq 45$ cm NFL) Run Forecasts to Gitwinksihlkw Fishwheels 2023 (Mean Run timing - 1994-22)



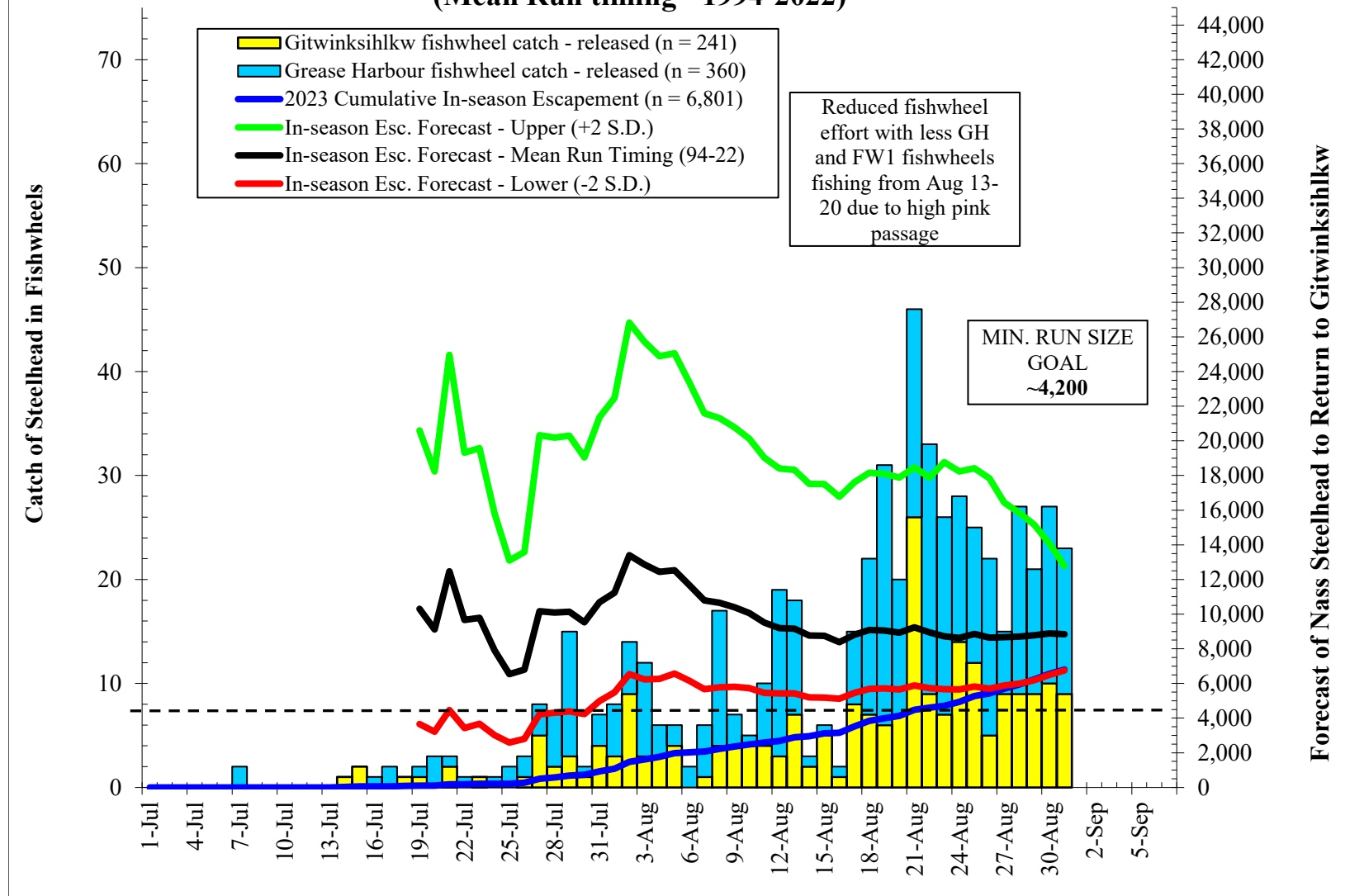
### Nass Chinook ( $\geq 50$ cm NFL) Forecasts to Gitwinksihlkw Fishwheels 2023 (Mean Run timing - 1994-22)



### Nass Coho ( $\geq 40$ cm NFL) Forecasts to Gitwinksihlkw Fishwheels 2023 (Mean Run timing - 1994-2022)



## Nass Summer Run Steelhead Forecasts to Gitwinksihlkw Fishwheels 2023 (Mean Run timing - 1994-2022)



### Nass Pink Salmon Returns to Gitwinksihlkw and Grease Harbour Fishwheels 2023

