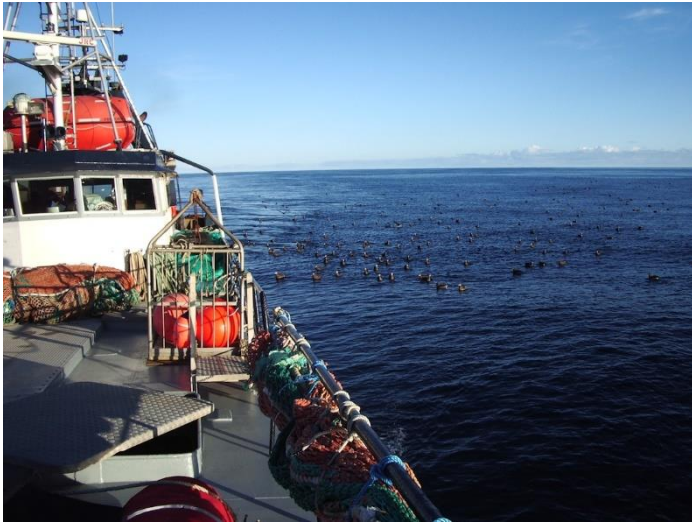




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Salmon bycatch in the groundfish trawl fishery

April 2023

FSMB JTWG

Pacific Region Groundfish Trawl Fishery

- Managed via Individual Transferable Quotas (ITQs)

Fleet consists of different vessel and license types:

- Option A
 - Wet boats: land catch fresh, typically shorter trips
 - Receiving Tank Vessels (RTV): process and freeze catch at sea. Approximately 6 active vessels
- Option B
 - Bottom trawl in PFMA 12 to 20 and 29 only
- Catch reports and further information [available online](#)



Monitoring and catch disposition

- All groundfish trawl trips are subject to at-sea electronic monitoring and independent dockside validation. At-sea observers were required up until March 2020.
- Salmon catch is recorded in fisher logs as retained or released, by species when possible
- Landed catch is validated by dockside observers. Logbook retained estimates are adjusted accordingly.
- Electronic Monitoring (EM) used to verify a random sample of fishing events:
 - 10% of tows reviewed for wet boats
 - 25% of tows reviewed for freezer boats (RTVs)
 - Trips where reviewed data is not compliant are subject to additional EM review at vessel expense
- Pacific salmon spp. are prohibited species and may not be fished for or retained

Timelines – trawl salmon bycatch monitoring

- 2020 Jun - catch summary on salmon bycatch created, internal discussions occur on accuracy of estimates, CWT collection methods, and data gaps
- 2020 Nov - memo provided to Groundfish Trawl Advisory Committee (GTAC) on recommendations to improve monitoring of salmon bycatch
- 2021 Jan - trawl salmon bycatch TWG initiated to develop and implement monitoring improvements. Membership includes DFO Science, FM, monitoring service providers, and GTAC representatives
- 2021 Nov – initiate enhanced monitoring pilot program for an RTV vessel to test new sampling and retention procedures
- 2022 Feb – monitoring pilot program concludes. Discussions continue with TWG on fleet-wide implementation of enhanced monitoring program and funding options
- 2022 Sep – initiation of enhanced monitoring program for all option A trawl vessels

Enhanced bycatch monitoring and sampling program

Objectives:

1. Accurately estimate the catch in numbers of fish of each salmon species;
 2. Ensure sufficiently accurate and representative CWT sampling to quantify the fishery mortality for Chinook indicator stocks;
 3. Use genetic stock identification (i.e. DNA) where feasible to identify the stock composition of Chinook catch, including for populations that do not have CWT indicator stocks; and
 4. Estimate the spatial and temporal distribution of Chinook catch to determine when and where exploitation on stocks of concern may be occurring.
- Effective Sept 26, 2022 for all option A trawl vessels
 - 6 RTV (freezer) boats and ~40 wet boats
 - Retention, catch processing, and reporting requirements modified via scientific license
 - Pacific salmon spp. remain prohibited and may not be targeted or sold, but mandatory retention in effect for Option A vessels

Enhanced bycatch monitoring and sampling program

RTV (freezer) boats:

- Vessels responsible for retaining heads, plus bagging and labelling according to instructions provided by DFO
- For 100% of trips, all bags of salmon heads submitted to dockside observer
- All heads shipped to lab for independent validation of species counts
- All heads to be analyzed for CWT. DNA being analyzed to the extent possible.

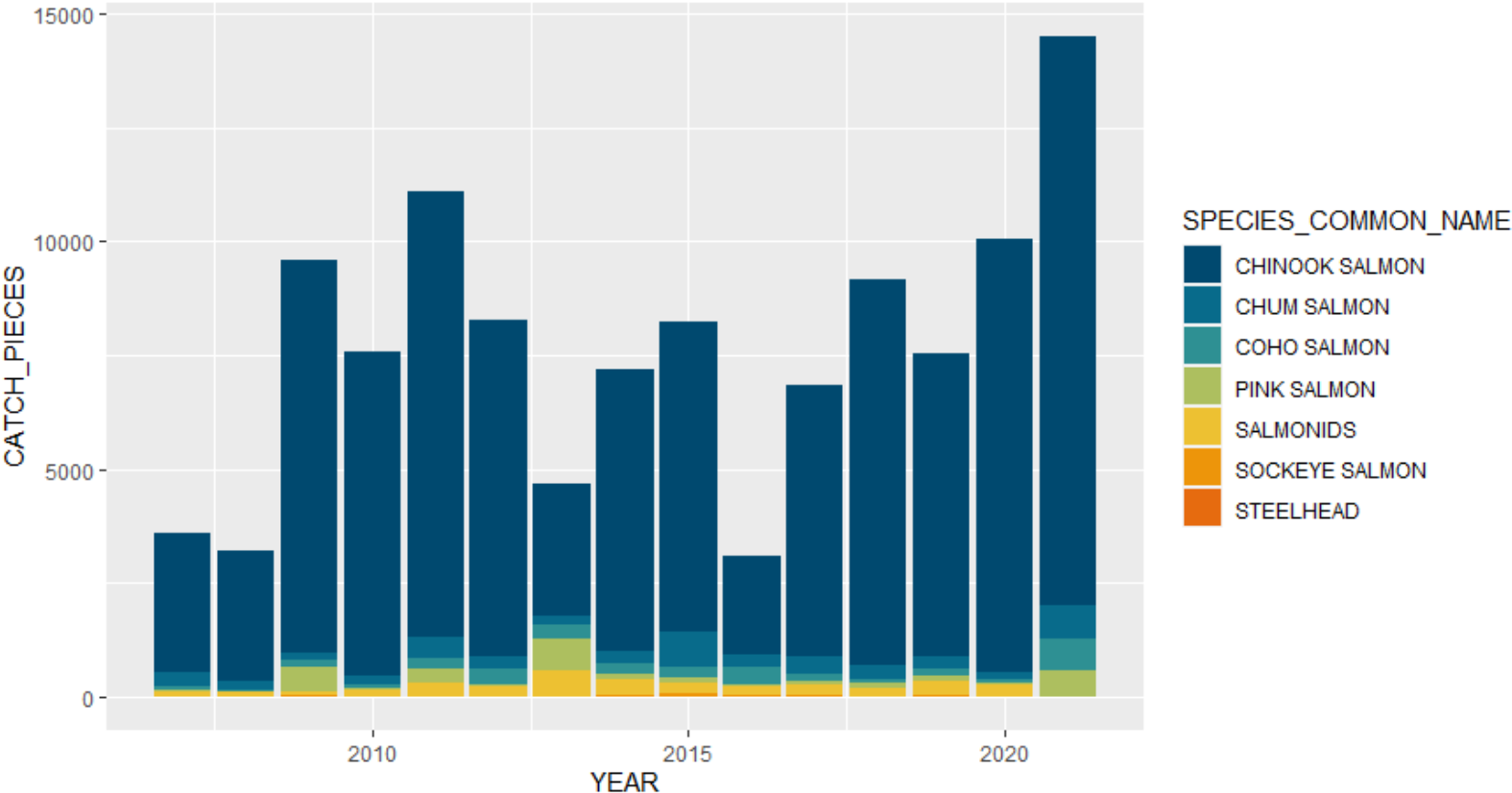
Wet boats:

- All salmon (entire body) shall be retained and counted by species by independent dockside observer
- For 25% of trips selected at random, heads of Chinook and Coho salmon collected by dockside observer
- All heads shipped to lab for CWT analysis. DNA being analyzed to the extent possible.

Salmon bycatch data

- The salmon bycatch data presented on the following slides were queried from the Groundfish Fisheries Observation System (GFFOS) database based on:
 - Dockside monitoring program estimates for landed catch
 - Prior to 2020, at-sea observer and fisher logbook estimates for released catch
 - Since March 2020, fisher logbook estimates for released catch, subject to EM review
- Catch numbers from 2022 and data from the enhanced monitoring program are currently under review and not included. Information will be shared when quality control, analysis and review of the data is complete.

Trawl salmon catch by species 2007-2021



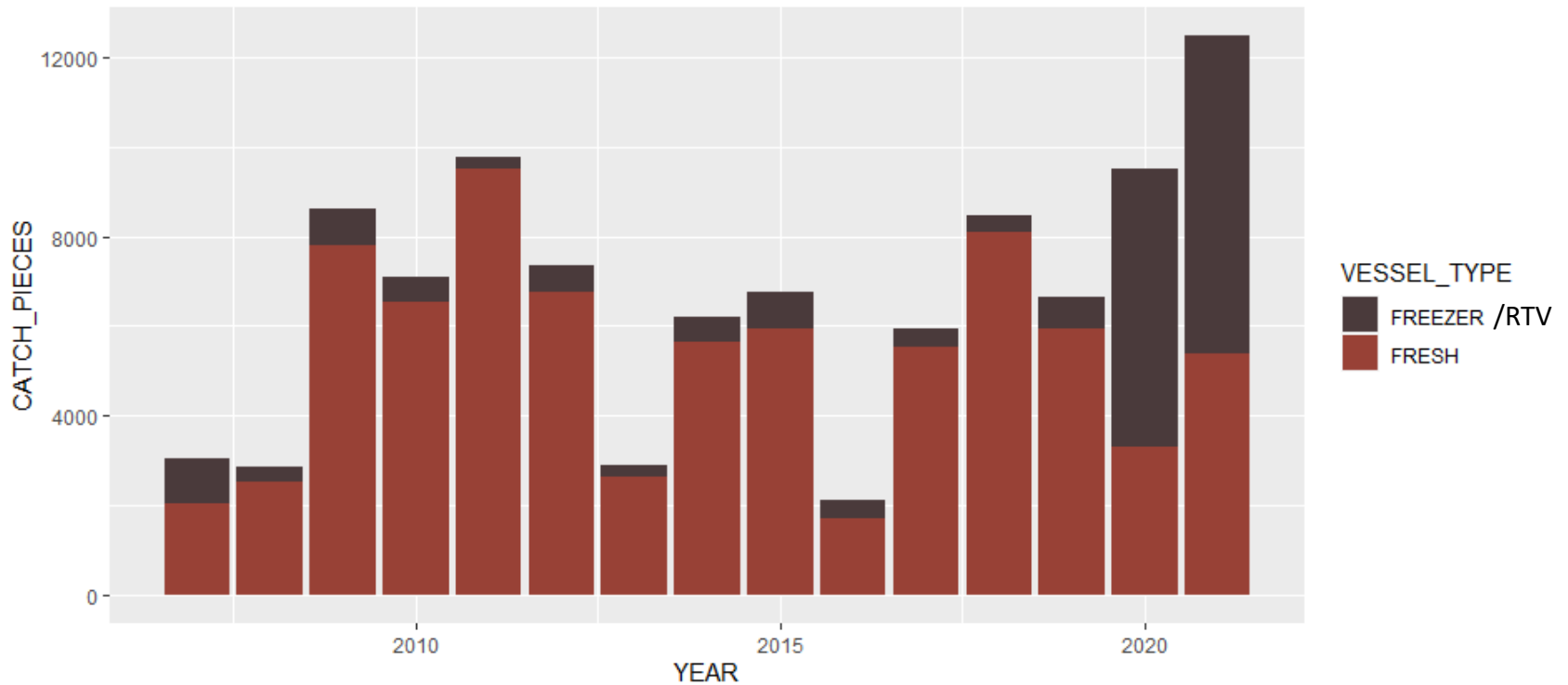
Proportion of catch by gear type	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
BOTTOM TRAWL	13%	23%	13%	13%	14%	16%	18%	14%	26%	38%	15%	4%	7%	2%	1%	12%
MIDWATER TRAWL	87%	73%	85%	82%	84%	83%	80%	83%	71%	60%	84%	96%	92%	97%	98%	86%

Proportion of catch pieces by species 2007-2021

Year	CHINOOK	CHUM	COHO	PINK	SOCKEYE	STEELHEAD	SALMONIDS*	ATLANTIC
2007	84.8%	8.8%	1.8%	1.5%	0.3%	0.0%	2.8%	0.0%
2008	89.5%	5.9%	0.8%	0.6%	0.0%	0.0%	3.2%	0.0%
2009	89.8%	1.9%	1.3%	5.9%	0.3%	0.0%	0.9%	0.0%
2010	93.6%	2.7%	0.9%	0.6%	0.3%	0.0%	2.0%	0.0%
2011	88.0%	4.1%	2.2%	2.9%	0.2%	0.0%	2.5%	0.0%
2012	89.2%	3.1%	4.5%	0.3%	0.2%	0.0%	2.6%	0.0%
2013	62.0%	4.5%	6.2%	14.9%	0.3%	0.0%	12.1%	0.0%
2014	86.2%	3.3%	3.4%	1.7%	0.3%	0.1%	5.0%	0.0%
2015	82.4%	9.7%	2.6%	1.4%	1.0%	0.0%	2.8%	0.0%
2016	69.2%	9.4%	13.0%	0.9%	0.9%	0.1%	6.5%	0.0%
2017	86.9%	5.8%	1.9%	1.4%	0.6%	0.0%	3.5%	0.0%
2018	92.4%	3.1%	1.2%	0.9%	0.2%	0.0%	2.1%	0.1%
2019	88.0%	3.9%	2.0%	1.3%	0.7%	0.1%	3.9%	0.1%
2020	94.4%	1.8%	0.8%	0.4%	0.1%	0.0%	2.5%	0.0%
2021	85.7%	5.0%	4.8%	3.9%	0.1%	0.0%	0.0%	0.5%

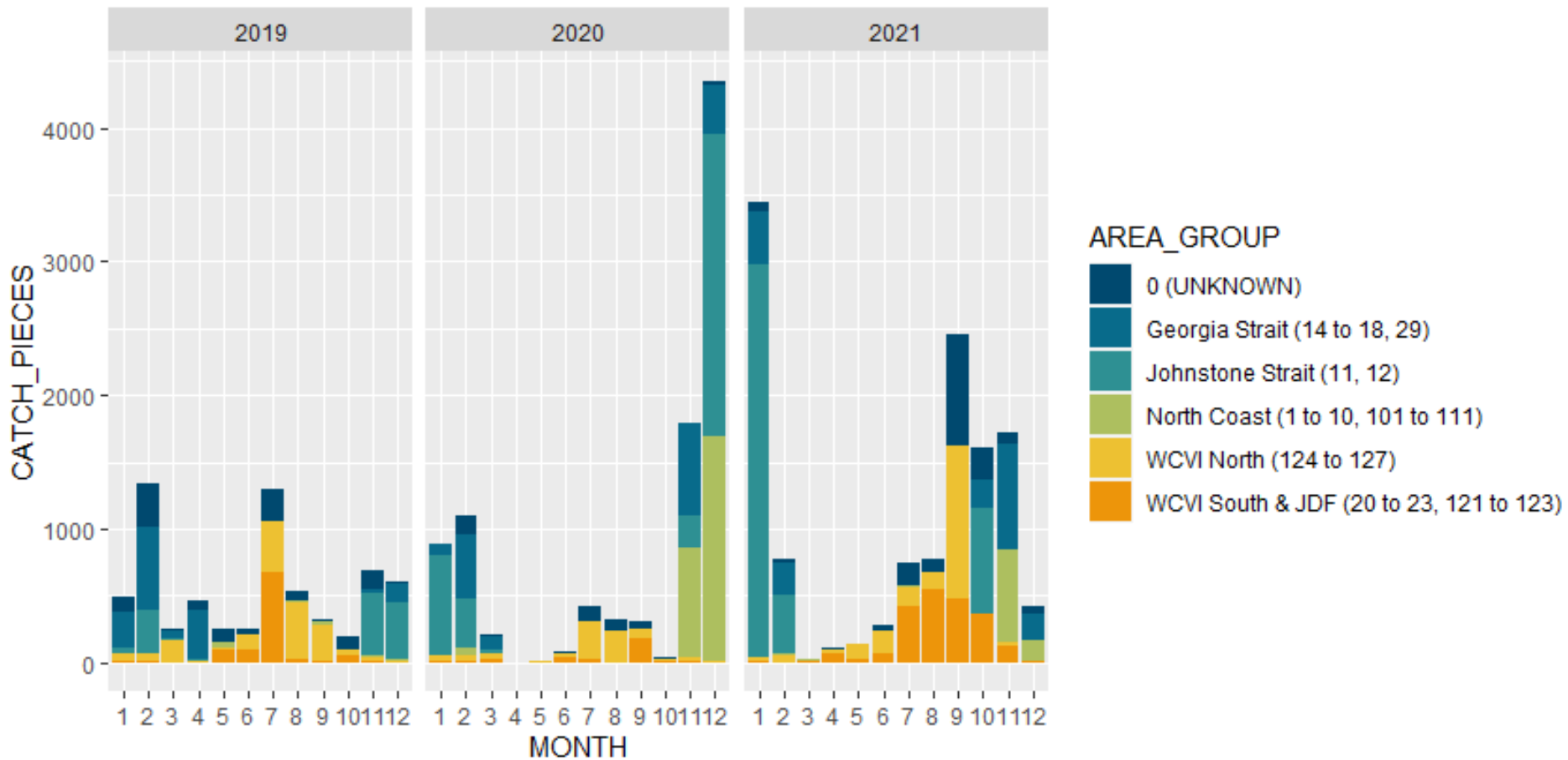
* Salmonids = unidentified species

Chinook salmon catch by vessel type 2007-2021



Chinook catch pieces by area

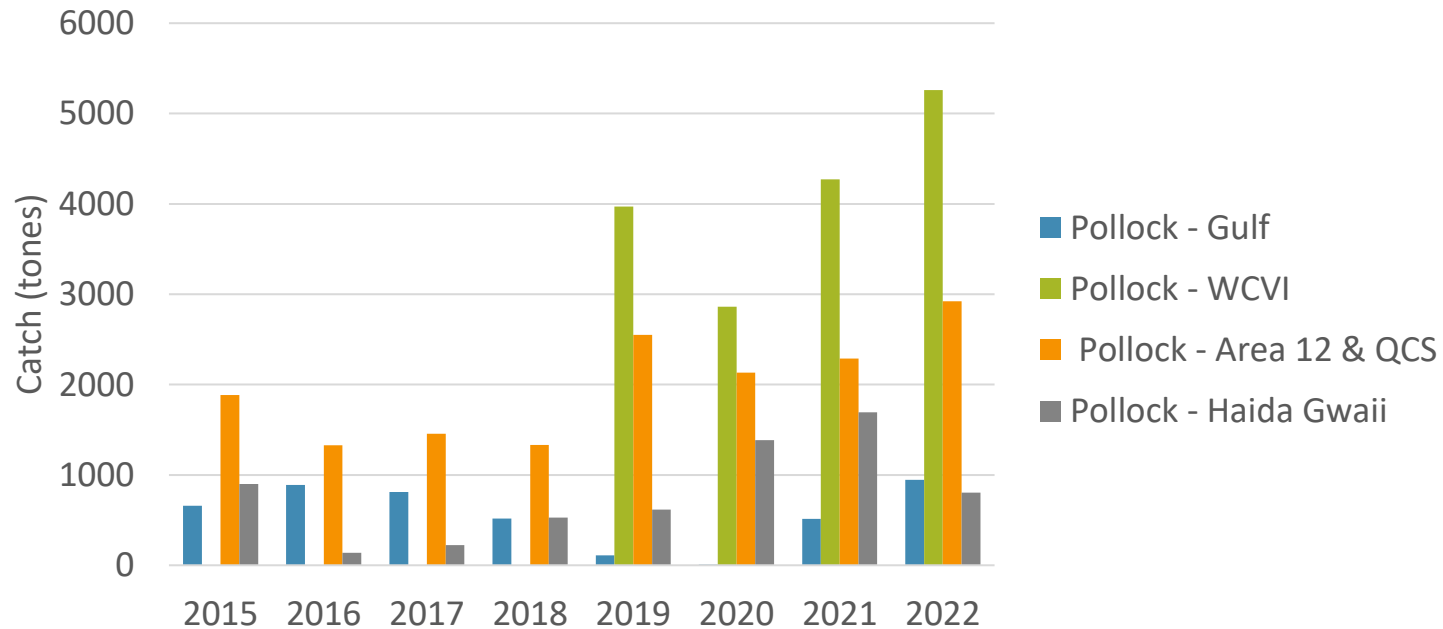
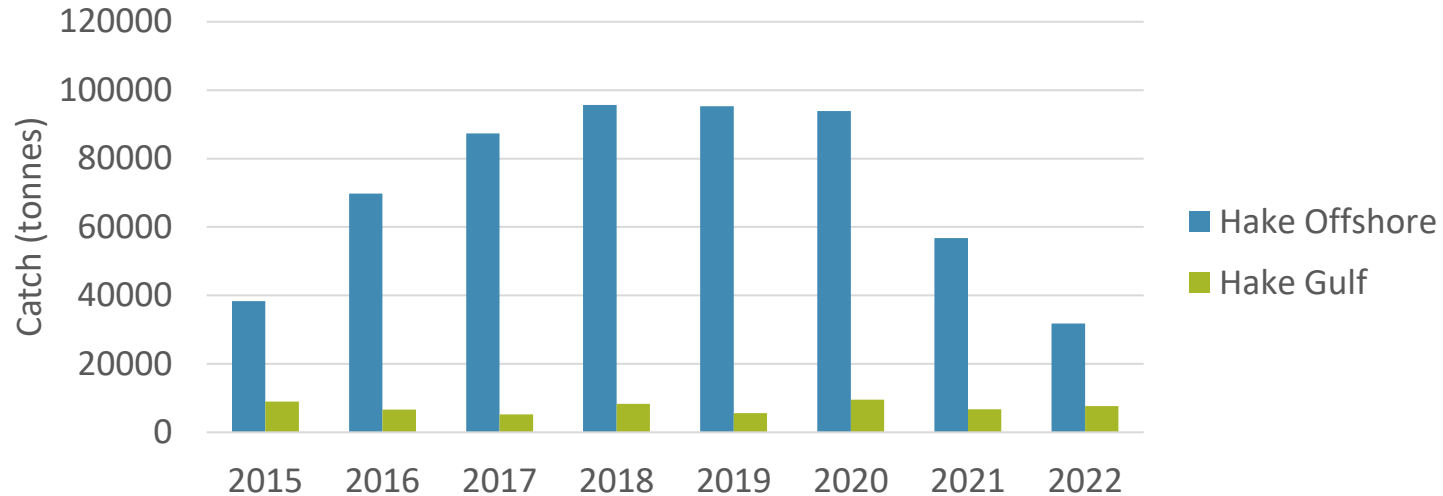
2019-2021



Hake and Pollock GF trawl catches

Source: [Pacific groundfish reports and publications | Pacific Region | Fisheries and Oceans Canada \(dfo-mpo.gc.ca\)](https://www.dfo-mpo.gc.ca/pacific-groundfish-reports-and-publications/Pacific-Region/Fisheries-and-Oceans-Canada)

Year	Pollock total catch (tonnes)	Hake total catch (tonnes)
2015	3445	47314
2016	2358	76421
2017	2494	92623
2018	2383	103967
2019	7250	100935
2020	6385	103483.6
2021	8766	63523
2022	9933.94	39449.65



Summary of salmon bycatch

- Chinook are the dominant catch species, representing >80% of catch in most years
- Most bycatch occurs when mid-water trawling, especially in recent years (>95% since 2018)
- Catch estimates from freezer vessels was small historically, but has increased since 2019
- Catches in 2021 were highest on record with an estimate of 14,573 salmon caught (12,490 Chinook)
- Most catch is occurring in South Coast across WCVI, Johnstone Strait, and the Strait of Georgia when targeting hake and pollock
- Enhanced monitoring and sampling procedures implemented in 2022 are designed to provide more accurate catch numbers and stock ID/CWT information

Next steps

- Review of monitoring program results is ongoing
 - Comparison of logbook to lab validated catch numbers by species
 - Analysis of CWT results and estimation of exploitation rates
 - Analysis of stock composition using DNA
- Information on 2022 salmon bycatch will be shared when available
- Discussions underway on continuation of enhanced monitoring program for FY 2023/24