# Science Center Activities

November 16, 2021

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# Overview

- Survey Updates

- Salmon Bycatch 2002-2020

- Impact of Missing Survey Data on Stock Assessments

U.S. Department of Commerce | National Oceanic and Atmospheric Administration | National Marine Fisheries Service

# Survey Updates

# 2021 WC Groundfish Bottom Trawl Survey



Cornerstone, long-term time series for 90+ species and California Current Ecosystem.

Four vessel Survey: Two passes, two chartered vessels each, from Cape Flattery to US-Mexico border.

- **Successfully completed as scheduled.**

U.S. Department of Commerce | National Oceanic and Atmospheric Administration | National Marine Fisheries Service

# 2021 Joint U.S./Canada Integrated Ecosystem and Pacific Hake Acoustic Trawl Survey

Long-term time series (25+ years) of Pacific hake and environmental conditions in CCE

Joint survey effort of NWFSC & DFO.

Two vessel joint survey:

- *Shimada* (US) – 3 legs (June 27-Sept 23), coverage from Pt Conception, CA to S end of Vancouver Is
- *F/V Nordic Pearl* (Canada) – 2 legs (Aug 17-Sept 13), W coast Vancouver Is, QCS, Hecate Strait, Dixon Entrance and W coast Haida Gwaii

- **Successfully completed as scheduled**.



2021 Ecosystem Hake Survey
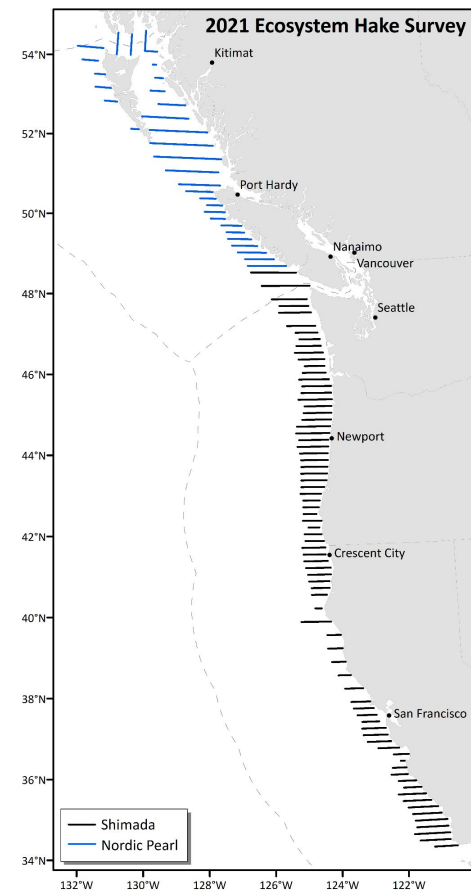
# The Southern California Rockfish Hook and Line Survey

3-vessel Hook & Line Survey (Mirage, Toronado, and Aggressor)

- **Leg 1:** Sept. 22-28

- **Leg 2:** Oct 1-7

- **Successfully completed as scheduled**

# Observed and Estimated Bycatch of Salmon in U.S. West Coast Fisheries, 2002–2020

Kate Richerson, Kayleigh A. Somers, Jason E. Jannot, Vanessa Tuttle, Neil B. Riley, and Jon McVeigh
Northwest Fisheries Science Center

Agenda Item E.1.b
Report: NMFS Report 1
Excel File: NMFS Supplement Report 2
November 2021

# Salmon bycatch 2002-2020

- Includes observed and estimated bycatch in sectors covered by the West Coast Groundfish Observer Program and the At-Sea Hake Observer Program

- 2020 Chinook bycatch:

  - Hake sectors had lowest bycatch since 2009

  - Shoreside (SS) non-hake and non-catch shares (NCS) bycatch similar to previous years

- 2020 Coho bycatch:

  - Similar or low compared to previous years
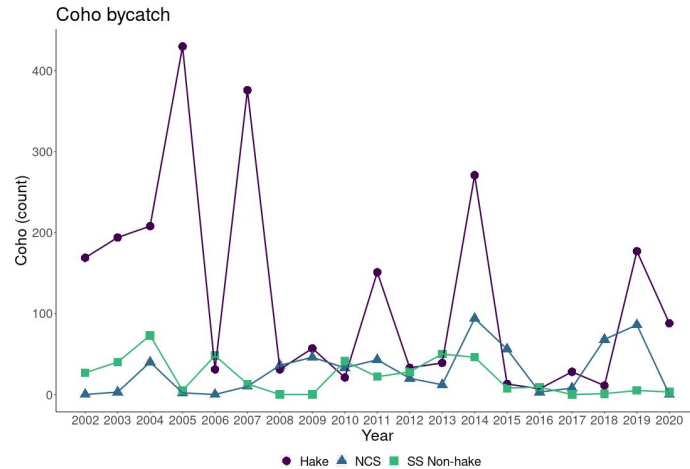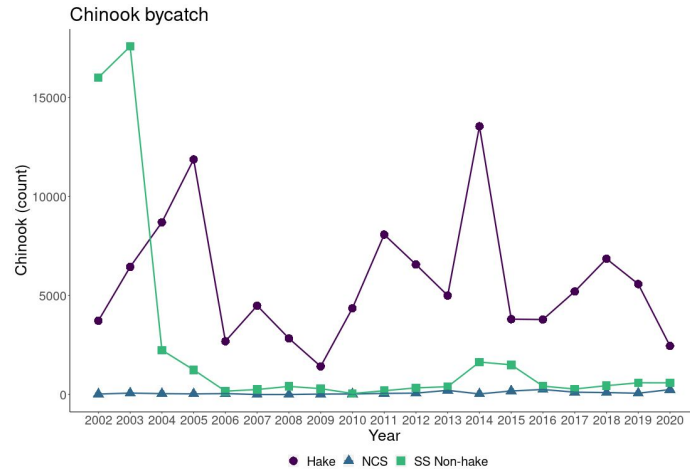


Sector groupings:

**Hake** = At-sea and shoreside hake

**NCS** = non-catch shares exempted fishing permits, sablefish primary, nearshore, OA CA halibut, pink shrimp, and OA hook & line

**SS non-hake** = LE and CS bottom trawl, CS fixed gear, CS midwater rockfish, and LE CA halibut

# Impacts of Missing Survey Data on Stock Assessments

Dr. Melissa Haltuch
Dr. Jim Hastie
Northwest Fisheries Science Center

# Missing Survey Data - Introduction

- During the June Council meeting, we were asked by the GAP about the impact on 2021 assessments from having:
  - ○ No bottom trawl survey in 2020, and
  - ○ Only half of a normal one (2 vessels, 1 in each pass) in 2019

- Missing terminal survey data primarily increases recruitment uncertainty
  - ○ Lack of repeated observations of recent year classes
  - ○ Commonly results in estimates drifting towards the long-term average

- The amount of change in assessments is a function of:
  - ○ If, and at what age, a species begins to be observed in the survey (& fishery)
  - ○ Age at which the species is fully selected by the survey (& fishery)
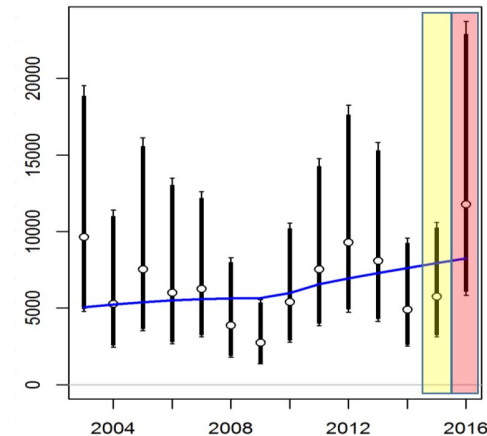  - ○ How long it takes a species to reach maturity (impact on status)

# Missing Survey Data - Examples

- We developed two examples to illustrate impacts, based on the 2019 Sablefish and 2017 POP assessments
  - Terminal survey year prior to each assessment removed (no comps or index)
  - Only one vessel is used from each pass for the previous year
  - Models re-run with re-estimated index and composition data

NW Survey index from 2019 Sab. assessment
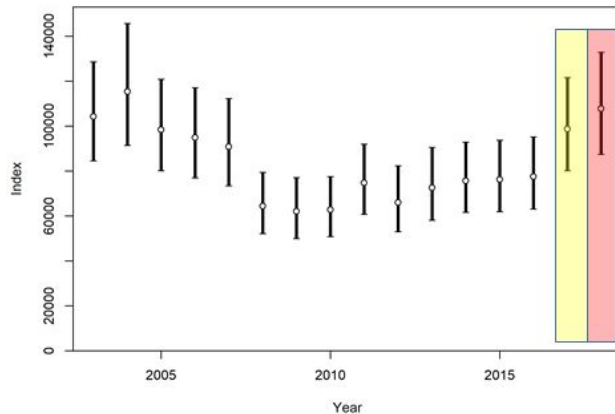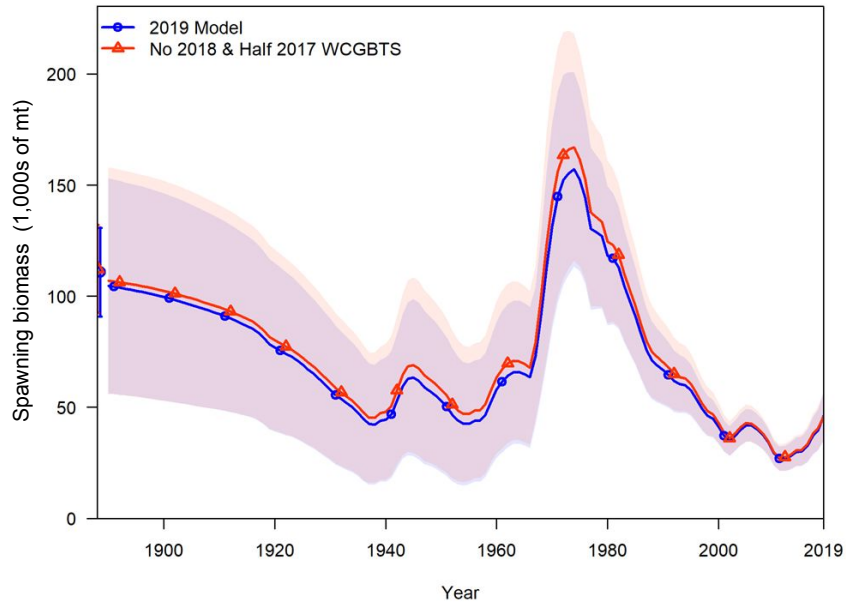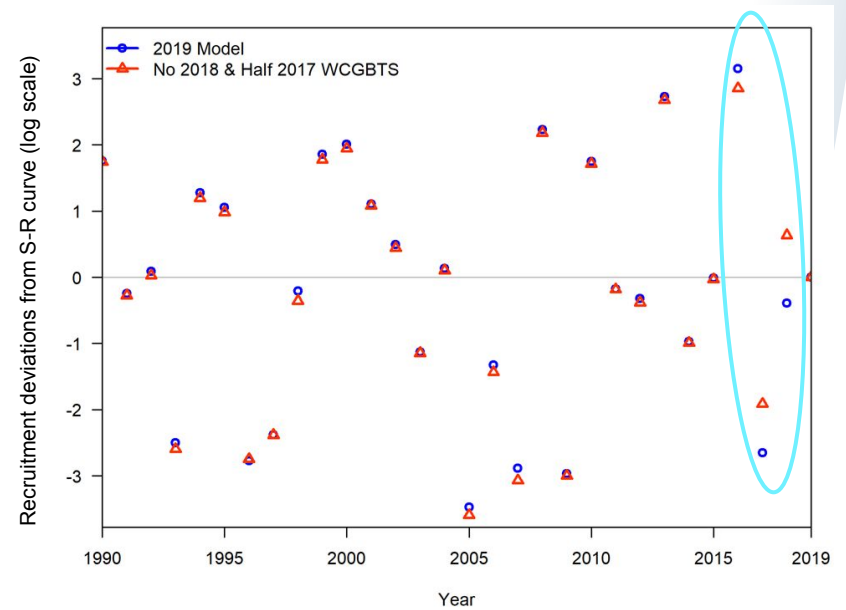
NW Survey index from 2017 POP assessment

# Missing Survey Data – 2019 Sablefish example

## Spawning Stock Trends

## Recruitment

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# Missing Survey Data – 2019 Sablefish example

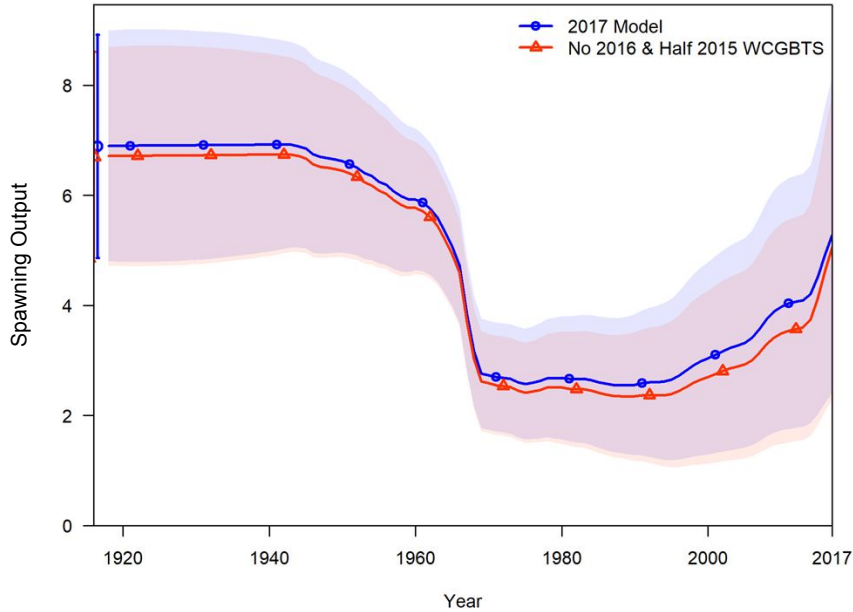| Year | Estimated Age-0 Recruits | | | | | | Spawning Biomass | | Summary Biomass | | Estimated OFL | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 2019 Model | | | Reduced Survey | | | 2019 Model | Reduced Survey | 2019 Model | Reduced Survey | 2019 Model | | Reduced Survey | |
| | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | | | | | Mean | Std. Dev. | Mean | Std. Dev. |
| 2015 | 2,557 | 553 | 21.6% | 2,713 | 591 | 21.8% | 30,254 | 30,821 | 74,417 | 75,878 | | | | |
| 2016 | 62,008 | 7,917 | 12.8% | 49,689 | 7,220 | 14.5% | 32,576 | 33,382 | 69,889 | 71,141 | | | | |
| 2017 | 194 | 149 | 77.0% | 437 | 389 | 88.8% | 37,101 | 38,046 | 100,714 | 103,009 | | | | |
| 2018 | 4,771 | 2,499 | 52.4% | 14,440 | 8,790 | 60.9% | 39,751 | 40,623 | 97,909 | 99,925 | | | | |
| 2019 | 7,330 | | | 7,880 | | | 46,131 | 45,870 | 94,902 | 96,624 | | | | |
| 2020 | 7,618 | | | 8,121 | | | 55,516 | 52,753 | 148,686 | 137,833 | | | | |
| 2021 | 7,765 | | | 8262.2 | | | 61,537 | 57,597 | 146,408 | 133,868 | 7,881 | 1,294 | 7,652 | 1,348 |
| 2022 | | | | | | | 63,675 | 60,367 | | | 7,908 | 1,238 | 7,780 | 1,347 |

A lower 2016 recruitment est. produces lower forecasted biomass and lower, more-uncertain OFLs
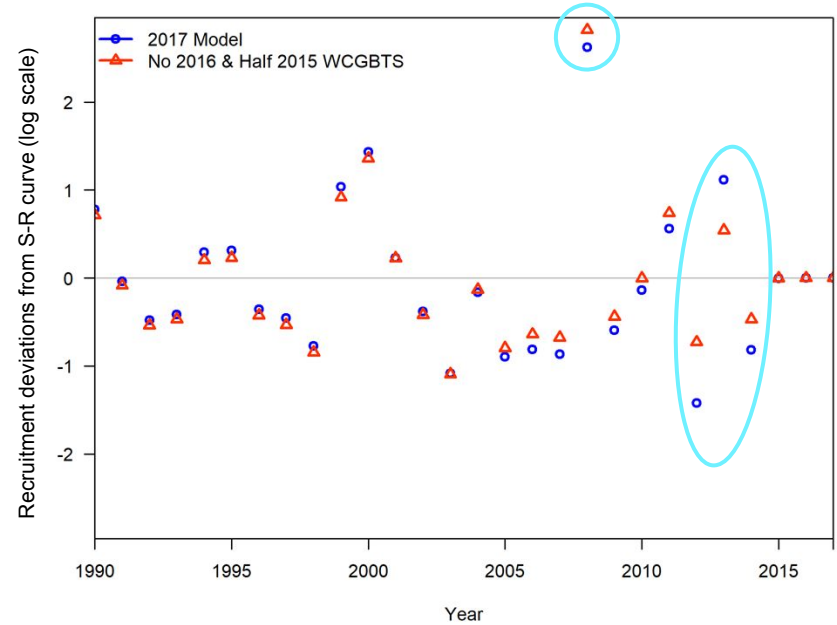
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# Missing Survey Data – 2017 POP example



Spawning Stock Trends

Recruitment

# Missing Survey Data – 2017 POP example

| Year | Estimated Age-0 Recruits | | | | | | Spawning Biomass | | Summary Biomass | | Estimated OFL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2017 Model | | | Reduced Survey | | | 2017 Model | Reduced Survey | 2017 Model | Reduced Survey | 2017 Model | | Reduced Survey | |
| | Mean | Std. Dev. | CV | Mean | Std. Dev. | CV | 2017 Model | Reduced Survey | 2017 Model | Reduced Survey | Mean | Std. Dev. | Mean | Std. Dev. |
| 2008 | 116,198 | 33,682 | 29.0% | 131,015 | 38,872 | 29.7% | 3,745 | 3,290 | 86,351 | 75,491 | | | | |
| 2009 | 4,728 | 2,116 | 44.8% | 5,103 | 2,356 | 46.2% | 3,886 | 3,409 | 86,855 | 76,070 | | | | |
| 2010 | 7,500 | 2,852 | 38.0% | 7,970 | 3,238 | 40.6% | 3,977 | 3,486 | 86,829 | 76,223 | | | | |
| 2011 | 15,192 | 5,404 | 35.6% | 16,817 | 6,521 | 38.8% | 4,034 | 3,536 | 98,248 | 89,186 | | | | |
| 2012 | 2,100 | 982 | 46.8% | 3,886 | 1,969 | 50.7% | 4,069 | 3,571 | 103,791 | 95,959 | | | | |
| 2013 | 28,942 | 11,349 | 39.2% | 15,157 | 7,204 | 47.5% | 4,093 | 3,601 | 109,343 | 102,826 | | | | |
| 2014 | 4,619 | 2,646 | 57.3% | 6,091 | 3,768 | 61.9% | 4,200 | 3,739 | 115,168 | 110,056 | | | | |
| 2015 | 10,663 | | | 10,081 | | | 4,520 | 4,136 | 119,283 | 115,608 | | | | |
| 2016 | 11,022 | | | 10,497 | | | 4,934 | 4,638 | 125,082 | 121,147 | | | | |
| 2017 | 11,259 | | | 10,790 | | | 5,284 | 5,061 | 128,611 | 125,144 | | | | |
| 2018 | 11,420 | | | 10,990 | | | 5,542 | 5,380 | 131,597 | 128,302 | | | | |
| 2019 | 11,540 | | | 11132.9 | | | 5,746 | 5,626 | 133,992 | 130,750 | 4,755 | 1,304 | 4,807 | 1,337 |
| 2020 | | | | | | | 5,747 | 5,635 | | | 4,634 | 1,262 | 4,645 | 1,281 |

OFLs are slightly higher in the missing-data case, despite lower overall biomass, because the larger 2008 cohort is more fully selected by the fishery than are older fish.

A higher 2008 recruitment est. largely offsets much lower 2008 biomass by 2017-21; similar OFLs

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# Questions?