



NOAA
FISHERIES

Northern and southern red hake

Recent assessment, updated through 2019



Previous assessment - 2017 using data through 2016

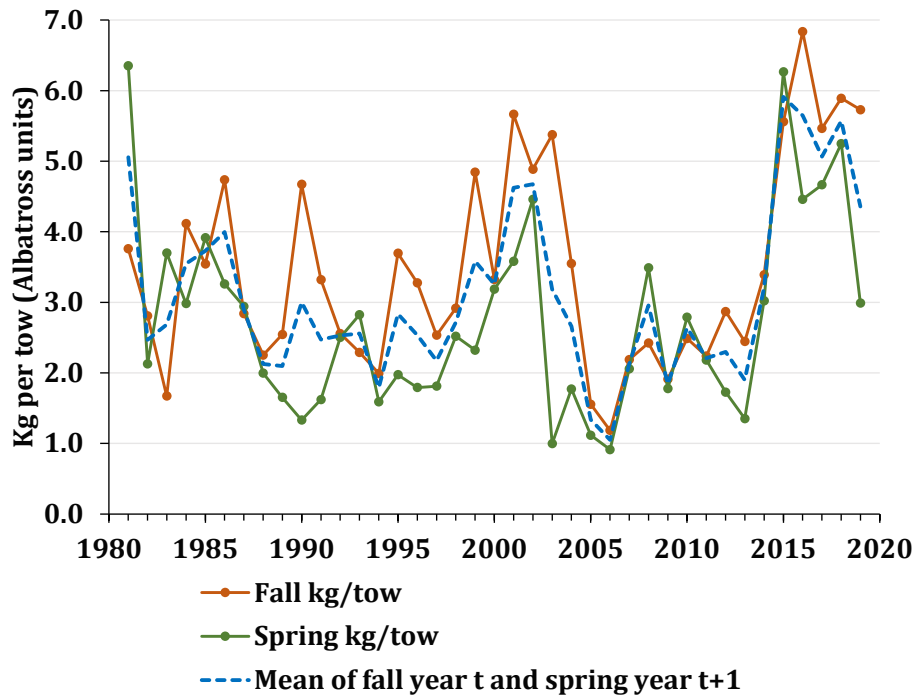
Using reference points from the AIM model:

Northern -- not overfished and overfishing not occurring

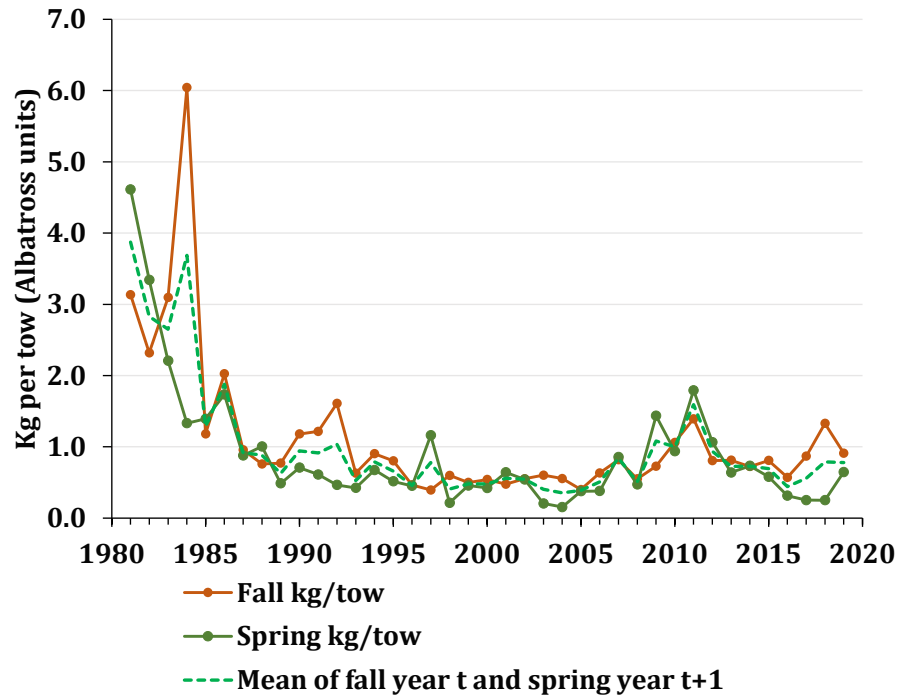
Southern -- overfished and overfishing occurring

Current assessment - using data through 2019, did not use AIM model as the Red Hake Stock Structure Research Track review panel rejected it due to poor fit.

Northern red hake NEFSC BTS indices

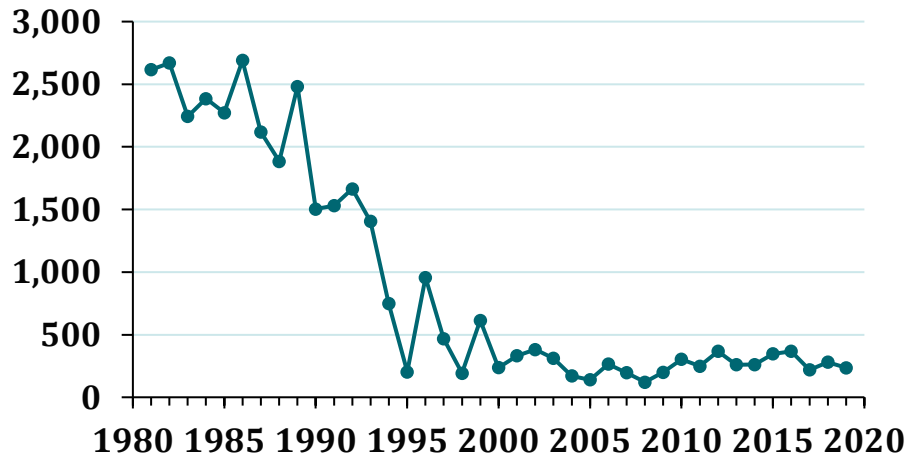


Southern red hake NEFSC BTS indices

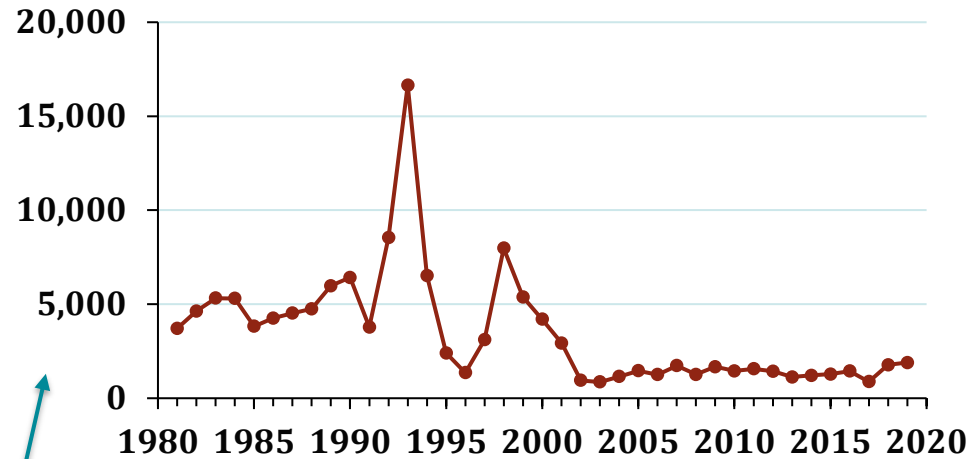


Survey indices

Northern red hake - total catch, mt



Southern red hake - total catch, mt



Note scale difference

Total catch

Plan A – Empirical approach based on estimating swept-area biomass using Bigelow net efficiencies for northern and southern red hake, then estimating exploitation rates as catch/biomass.

It was suggested reference points (B or F) could be the mean or median of the entire time series, or a subset of the time series estimated to represent a proxy.

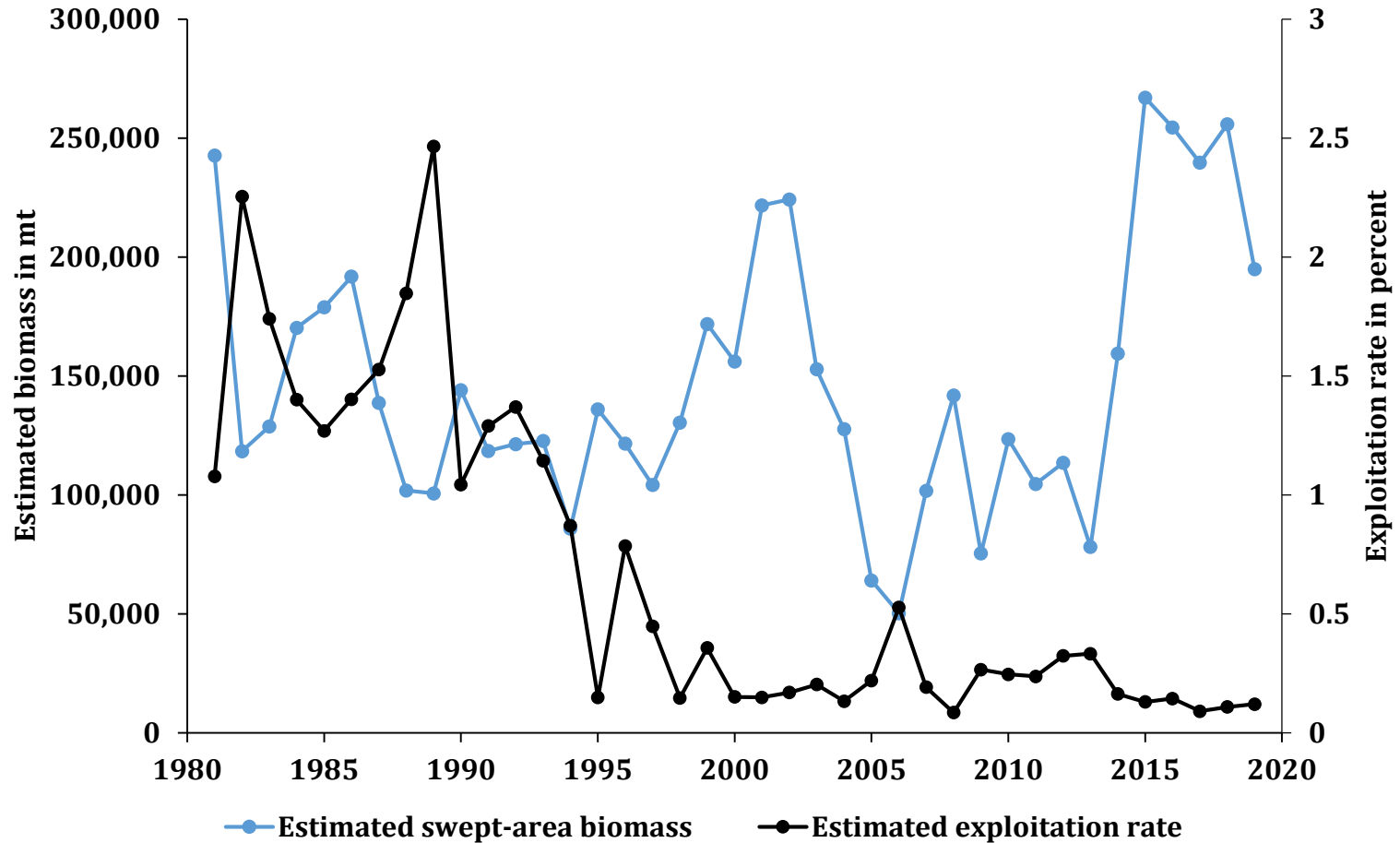
Example of SWAB method:

	Mean fall-spring index, Bigelow units, kg/tow	Swept- area biomass estimate if the Bigelow $q=1$	Efficiency of Bigelow net used	Annual swept-area biomass estimate (mt)	Total catch (mt)	Annual estimated exploitation rate (percent)
2005	4.40	15,063	0.235	64,097	141	0.22
2006	3.45	11,825	0.235	50,318	266	0.53
2007	6.99	23,926	0.235	101,815	196	0.19
2008	9.73	33,334	0.235	141,846	122	0.09
2009	5.95	20,364	0.270	75,423	201	0.27
2010	8.11	27,778	0.225	123,459	305	0.25
2011	6.57	22,498	0.215	104,641	249	0.24
2012	7.29	24,972	0.220	113,510	368	0.32
2013	6.05	20,711	0.265	78,155	261	0.33
2014	10.25	35,093	0.220	159,513	261	0.16
2015	18.71	64,084	0.240	267,018	348	0.13
2016	17.84	61,089	0.240	254,538	368	0.14
2017	15.74	53,922	0.225	239,655	220	0.09
2018	17.18	58,830	0.230	255,781	281	0.11
2019	13.37	45,809	0.235	194,931	236	0.12



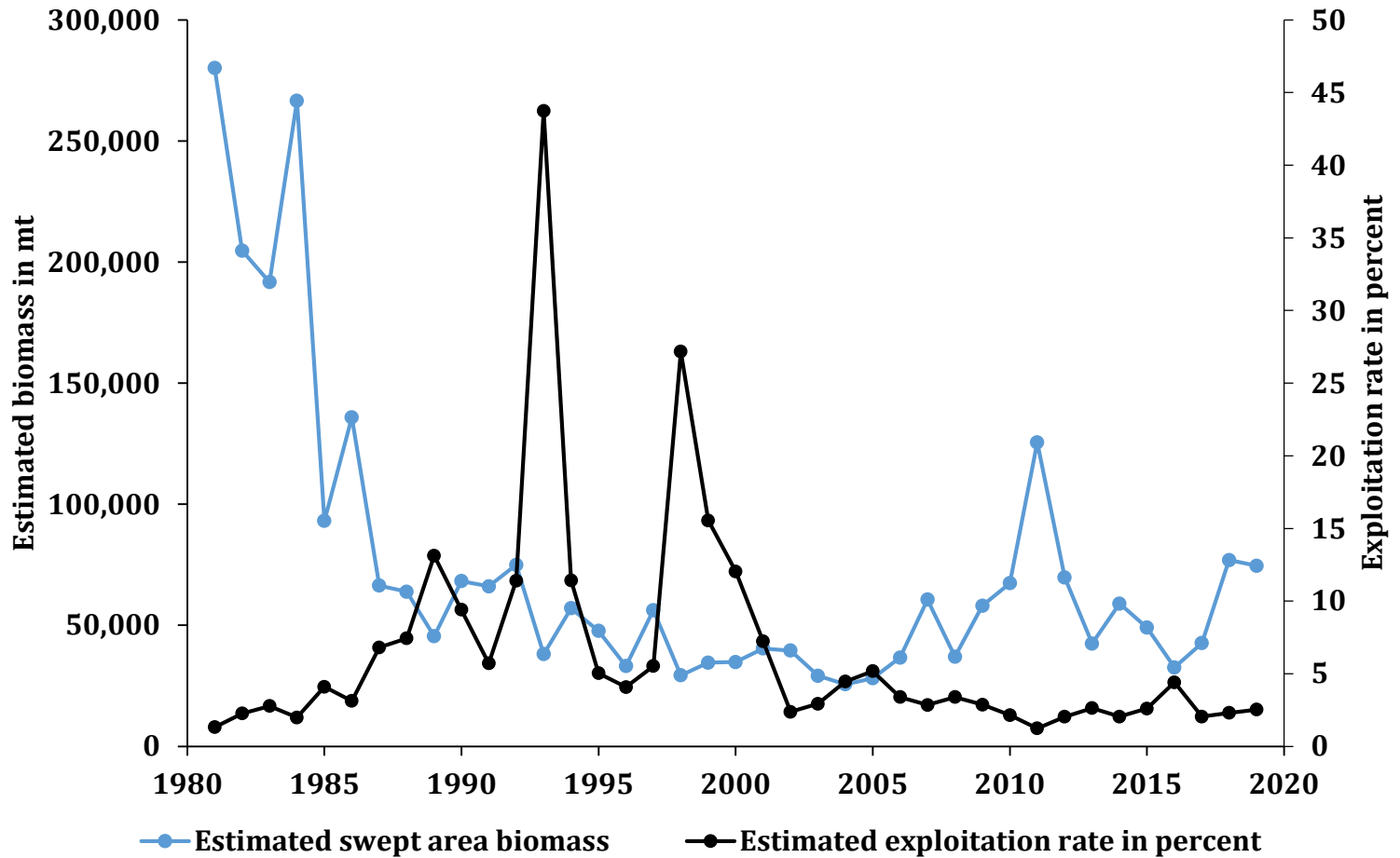
Northern red hake

Empirical approach results



Southern red hake

Empirical approach results



Potential reference points based on the empirical SWAB method discussed during the management track: time periods used for comparison to current conditions. Similar to previous assessments that compared current conditions to 1981-2010 time period.

Mean exploitation rate/biomass 2017-2019 (recent catch)

→ No strong rationale

Mean exploitation rate/biomass during 1981-2010 (AIM comparison period)

→ Based on AIM

Mean exploitation rate/biomass 2009-2019 (Bigelow years)

→ No strong rationale

Mean exploitation rate/biomass 1981-2019 (whole time series)

→ No strong rationale

Mean exploitation rate/biomass 1994-2019 (~management years)

→ Not appropriate

The (MTA) Panel concluded that the updated swept-area biomass estimates provide qualitative information about stock trends, but the relative exploitation rates do not provide a basis for scientific advice.

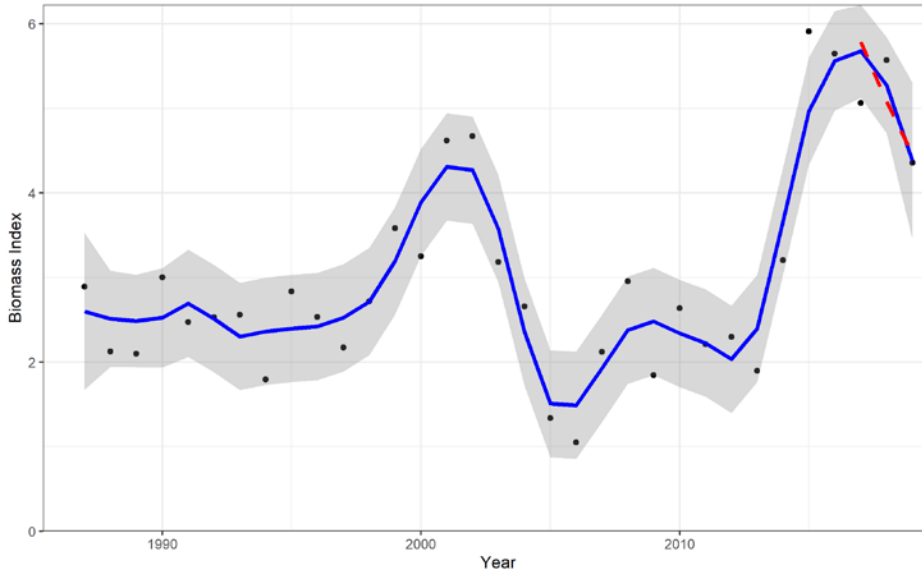
North: The Panel....concluded that the exploitation rates are currently low, and that overfishing is not likely occurring. Additionally, recent survey estimates indicate that the population is at a relatively high level and it is unlikely that the stock is overfished.

South: The Panel....concluded that the exploitation rates are currently low, and that overfishing is not likely occurring. Additionally, southern stock indices are near the lowest in the time series, and the overfished status is unknown.

Plan B: “Plan B Smooth” approach. Loess smooth applied to biomass time series, then slope calculated for the most recent three years. The slope determines the rate and direction of change of the population, and acts as a multiplier. Increase catch for increasing trend and decrease catch for decreasing trend. The MTA review panel did not review this approach. The approach has been accepted for use several times recently for catch advice (Georges Bank cod, monkfish).



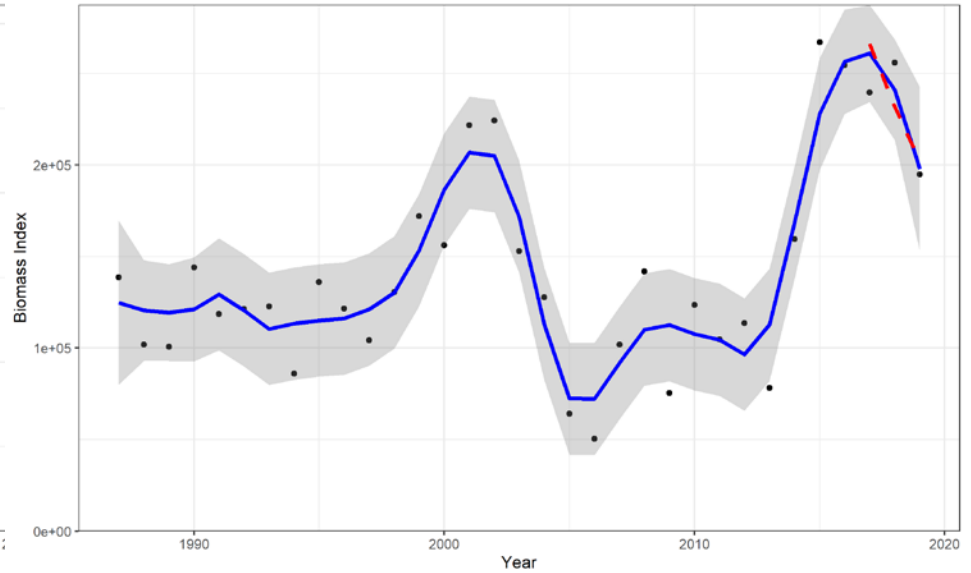
Northern Red Hake, Mean Spring and Fall Index
Multiplier = 0.878



North – mean fall-spring survey index

Multiplier = 0.878

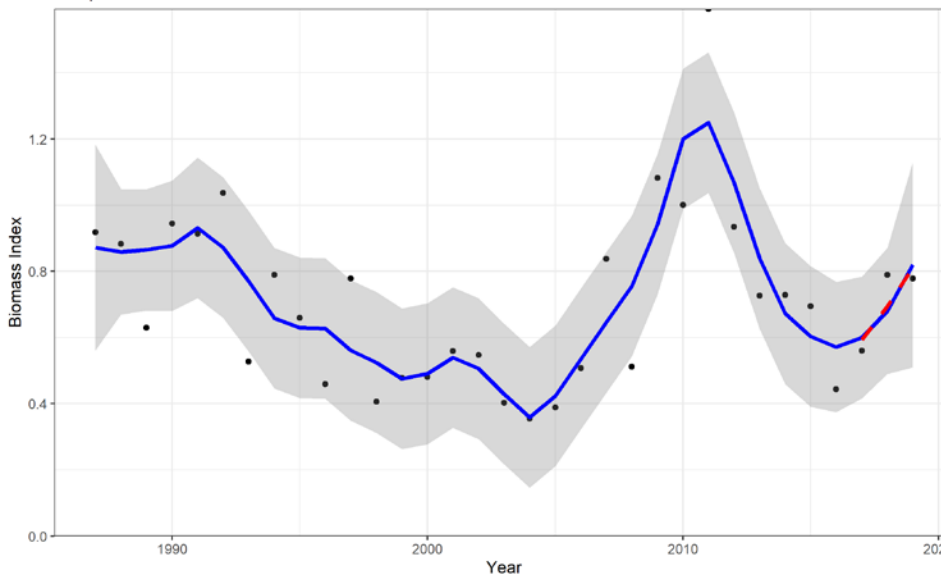
Northern Red Hake, Mean Spring and Fall Index, Swept-area Biomass
Multiplier = 0.871



North – mean fall-spring SWAB

Multiplier = 0.871

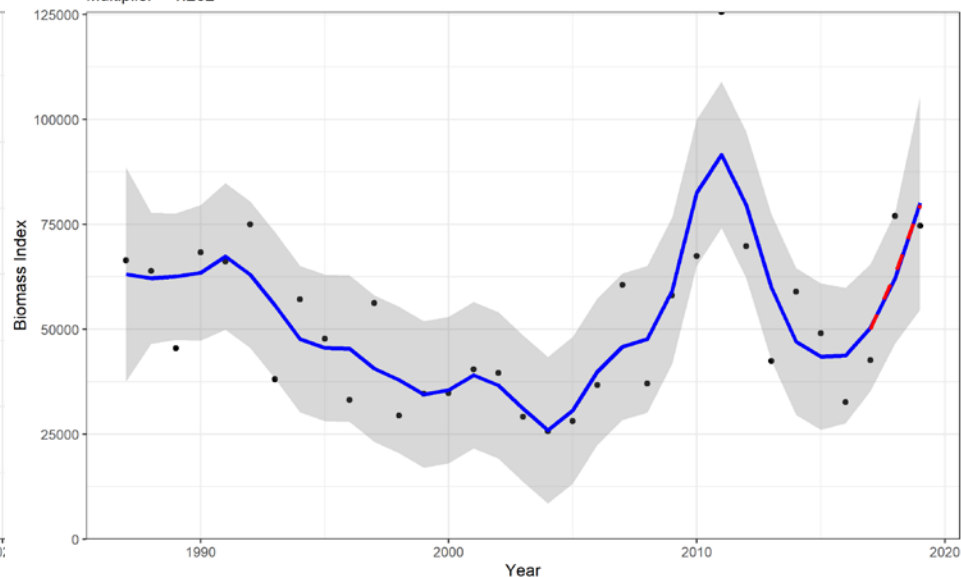
Southern Red Hake, Mean Spring and Fall Index
Multiplier = 1.169



South – mean fall-spring survey index

Multiplier = 1.169

Southern Red Hake, Mean Spring and Fall Index, Swept-area Biomass
Multiplier = 1.262



South – mean fall-spring SWAB

Multiplier = 1.262

Where we stand:

- Plan A rejected for scientific advice
- Plan B not reviewed
- The whiting PDT was requested to investigate potential approaches for setting 2021-2023 catch specifications based on the available information about each stock.

