Prey availability

OUTLINE

- Abundance and fishing mortality of Canadian Chinook salmon stocks important for SRKW: Fraser River
- COSEWIC Status Designations of Fraser River stocks
- PST indices of Ocean Abundance

Abundance and fishing mortality of Fraser River Stocks

SRKW Prey Science: Abundance

2018 Abundance		
Fraser Chinook run	**Compared to 2017**	**Compared to 2013-2017 average**
Early (Spring, Summer)	30% less	50% less
Late (Fall)	30% more	20% less

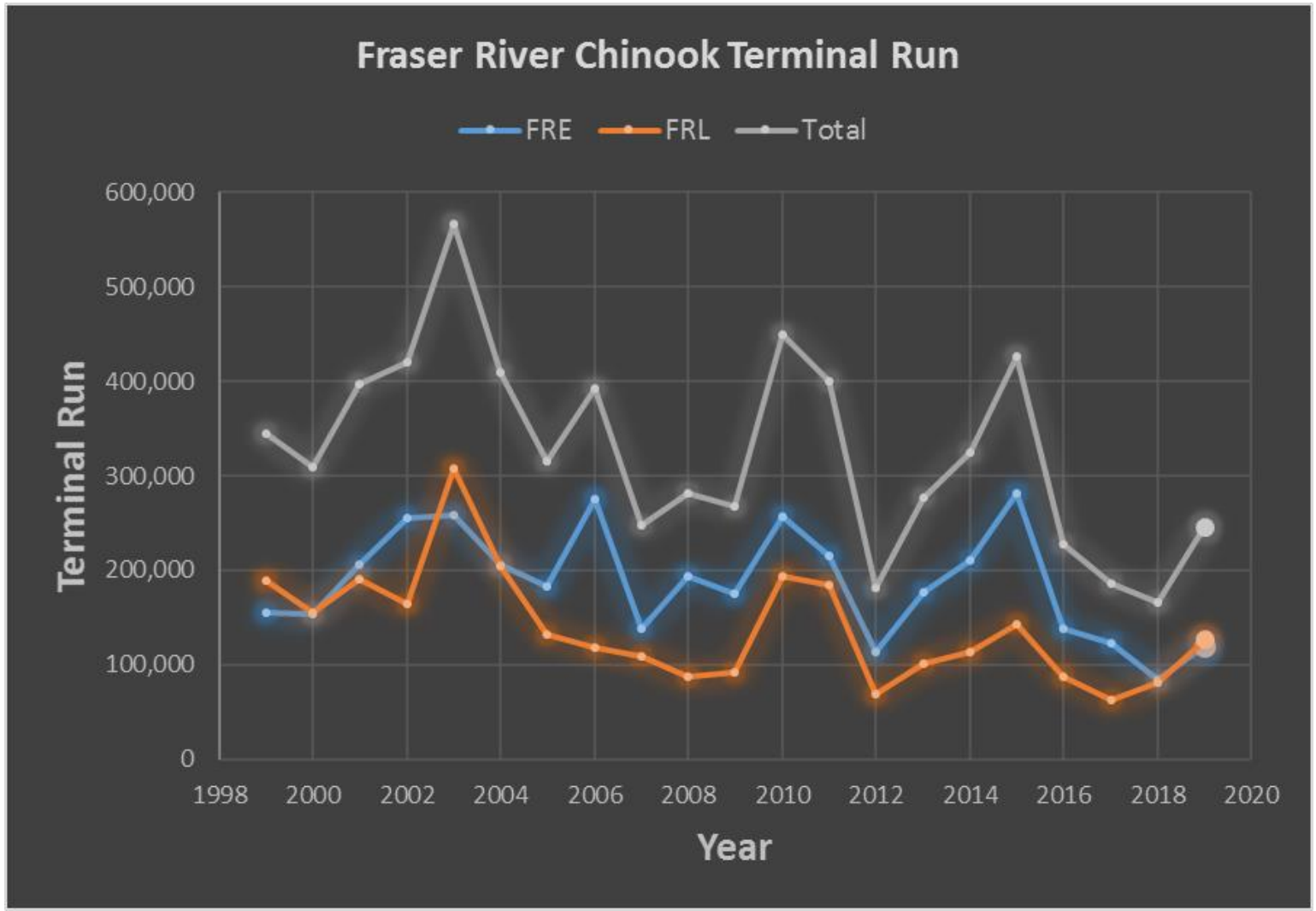
- Abundance = escapement + terminal catch
- 2019 terminal run forecasts for both Fraser Early and Fraser Late Chinook are for a 40-50% increase relative to those observed in 2018

SRKW Prey Science: Prey Mortality (Fishing)

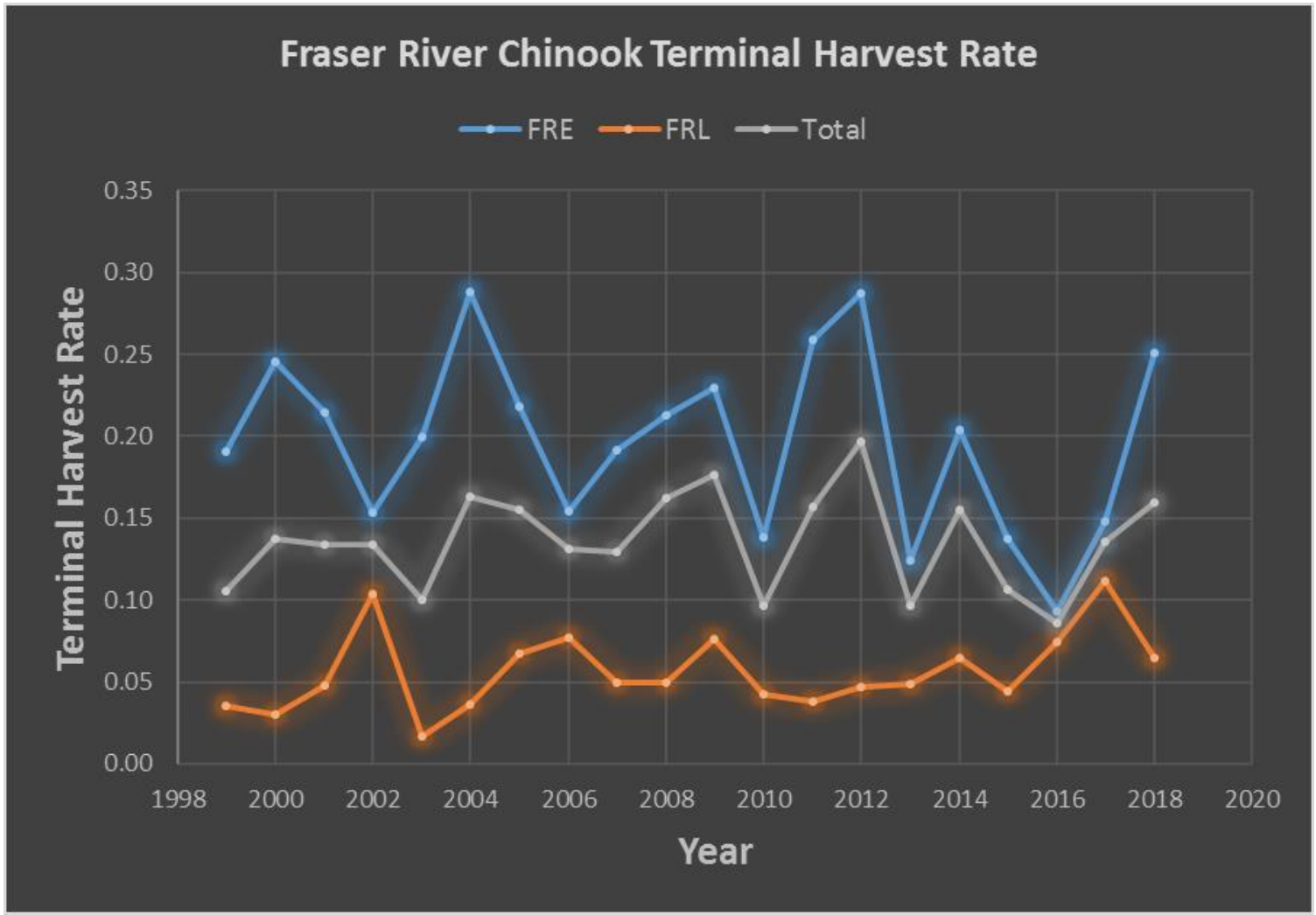
2018 Mortality (fishing)		
Pre-terminal mortality distribution in mixed-stock Canadian ocean fisheries (Northern BC WCVI troll and sport)		
Fraser Chinook run	**Compared to 2017**	**Compared to 2013-2017 average**
Early indicator stocks	40% less	30-35% less
Late indicator stocks	60% less	20-40% less
Non-terminal mortality distribution in Southern BC sport fisheries		
Fraser Chinook run	**Compared to 2017**	**Compared to 2013-2017 average**
Early indicator stocks	10% less	15% more
Late indicator stocks	50% less	5% less
Terminal net and sport harvest rates		
Fraser Chinook run	**Compared to 2017**	**Compared to 2013-2017 average**
All	20% more	40% more

- Early CWT indicator stocks – Nicola (Spring 4_2), Lower & Middle Shuswap (Summer 4_1)
- Late CWT indicator stocks – Harrison, Chilliwack (Fall 4_1)
- Changes in terminal fishing mortality do not directly affect prey availability to SRKW but would influence the number of spawners contributing to the next generation of Chinook salmon

Fraser Stock (supplementary slides)



Terminal harvest rate (THR) is calculated as terminal catch divided by the sum of escapement and terminal catch (i.e., terminal run) for a stock. This means that THRs of FRE and FRL are not additive when it comes to computing the Total THR.


Fraser River Chinook Terminal Harvest Rate
FRE
FRL
Total
Terminal Harvest Rate
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
Year

COSEWIC Status Designations of Fraser River stocks

1. Fraser Chinook - COSEWIC Status Designations

- In November 2018, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) released the results for an assessment of 16 southern BC chinook designatable units (DUs).
  - 3 DUs outside the Fraser river, 1 DU (East Vancouver Island Stream Spring; Nanaimo River) was assessed as *endangered* and 2 Southern Mainland DUs were *data deficient*
- COSEWIC expected to submit these assessments to the Government of Canada via the annual report anticipated in November 2019. This annual report will initiate the formal process to consider whether or not to these DUs will be listed under the *Species at Risk Act* (SARA).
- COSEWIC assessments of the remaining southern BC chinook populations is planned for 2019.

Mgmt Unit	# DUs	Designatable Unit Status
Spring 4_2	2	1 *endangered*, (1 *not assessed)*
Spring 5_2	6	4 *endangered*; 1 *threatened*; 1 *special concern*
Summer 5_2	5	2 *endangered*; 2 *threatened*; (1 *not assessed*)
Summer 4_1	2	1 *not at risk*; (1 *not assessed)*
Fall 4_1	1	1 *threatened*
Total	**16**	***7 endangered; 4 threatened; 1 special concern; 1 not at risk; (3 not assessed)***

2. Fraser Chinook - Summary of 2018 Outcomes

Management Unit	Parental Spawners (from 2013 or 2014 based on age)	2018 Spawners (i.e. Offspring)	% Change in Spawners	Current Productivity
Spring 4_2	24,867	2,100	-92%	0.04-0.08
Spring 5_2	15,947	8,399	-47%	0.6-0.9
Summer 5_2	12,604	5,443	-57%	0.5-0.8
Summer 4_1	84,700	46,543	-45%	0.85-0.93
Fall 4_1 (Harrison)	44,686	46,094	3%	0.98

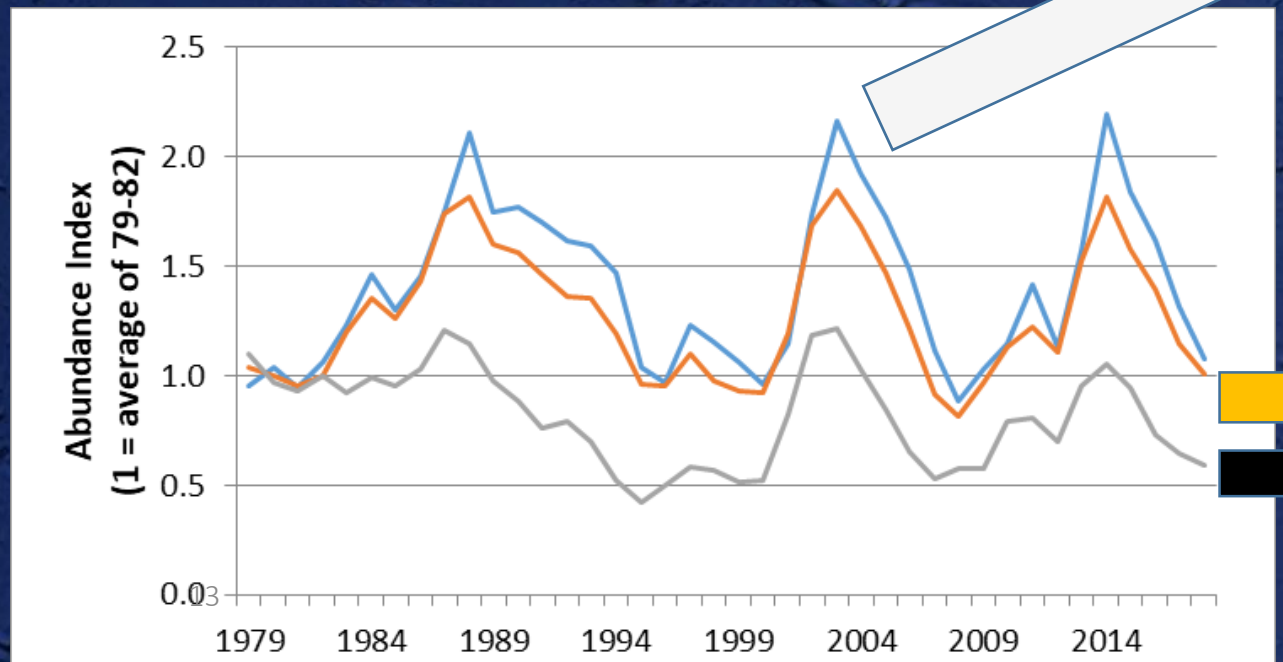
- Large declines in spawner abundance in 2018 and very poor productivity with populations not replacing themselves.
- Productivity provides an index of the number of returning offspring per parent spawner. A productivity value of 1 means the population is replacing itself with 1 offspring for 1 parent spawner. For productivity values less than 1 the population is expected to decline as there are not enough offspring being produced to replace the parent generation. For example, current productivity of Spring 4_2 chinook of 0.04 to 0.08 means only 4 to 8 offspring are returning for every 100 parent spawners; as a result, spawner abundance declined by 92% over the last generation.
- Harrison - productivity is calculated by Brood Year because age-specific data are available. Productivity calculations for other stocks are based on return year because age data are not available at the stock group level. The 3% increase in escapement is for ages 3 to 5 combined, and the 0.98 productivity is for the most recently completed BY.

What is causing the declines in Chinook?

- Large-scale patterns of environmental change and increased environmental variability have been associated with broad declines in productivity of Chinook Salmon across their range (including BC, Alaska, WA/OR) in recent decades.
- Chinook Salmon productivity is estimated to have declined from 25-40% since the early 1980s across many BC indicator stocks. (http://publications.gc.ca/collections/collection_2018/mpo-dfo/fs70-7/Fs70-7-2018-035-eng.pdf)
- Declining productivity is still a concern for many Chinook Salmon stocks and current estimates of sustainable exploitation may be too high for current very low productivity levels.
- An Independent science panel report (2013) did not find a single cause but noted that low early marine survivals were a primary contributor and likely contributions from a range of other threats including effects of: fishery harvests, freshwater habitat, hatchery management, pathogens, and climate change and variation likely contribute. (https://www.psc.org/publications/workshop-reports/southern-bc-chinook-expert-panel-workshop/)

PST Ocean Abundance Indices

Pacific salmon Commission Chinook model Abundance indices

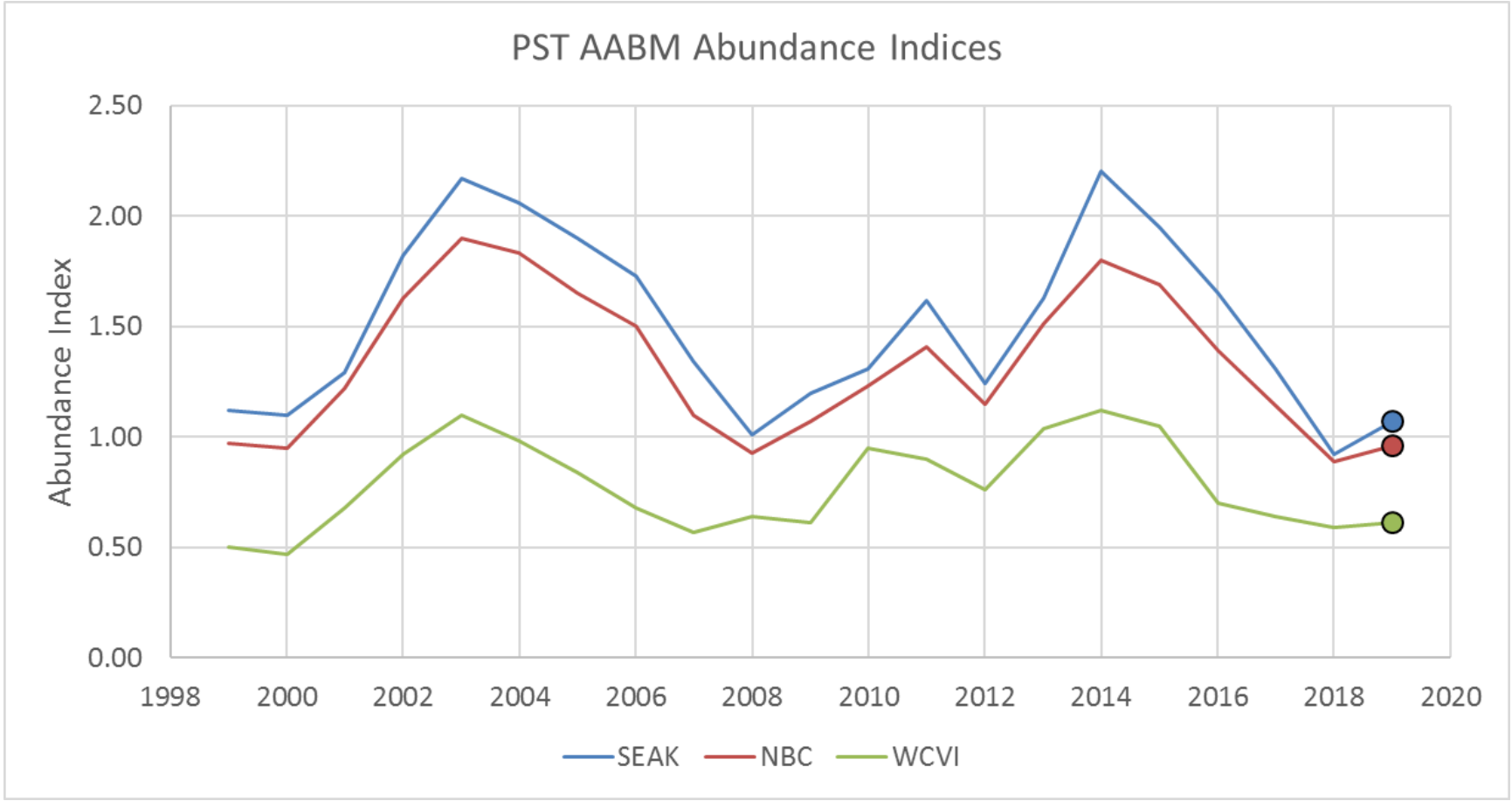


Summary of AABM chinook harvest reductions in new PST

Southeast Alaska (SEAK) AABM Fishery	
Abundance Index (A.I.)	Reduction to Current Catch Limits
A.I. less than 1.805	-7.5%
A.I. between 1.805 and 2.2	-3.25%
A.I. greater than 2.2	-1.5%

West Coast of Vancouver Island (WCVI) AABM Fishery	
Abundance Index (A.I.)	Reduction to Current Catch Limits
A.I. less than 0.93	-12.5%
A.I. between 0.93 and 1.12	-4.8%
A.I. greater than 1.12	-2.4%

Recent postseason AIs and 2019 forecast from 2019 PSC Chinook Model Calibration)



2019 AI forecasts
SEAK - 1.07
NBC - 0.96
WCVI - 0.61

Ongoing Work – Stock Assessment

- PST Implementation
  - Improvements to escapement monitoring (all species);
  - Improvements to CWT tagging and recovery (Chinook)
  - Improvements to catch monitoring (all species)

- Bill C-68 (Fishery Act stock rebuilding provisions)
  - $107.4M/$17.6M ongoing announced in Fall economic statement
  - Ensure stock sustainability (PA Framework Compliance)
  - Rebuilding plan must be produced when stock listed under legislation is below LRP
  - 179 major stocks on SFF checklist – includes groundfish, invertebrates, pelagic species, salmon