

The Changing Environment & Ecosystem on the Newfoundland & Labrador Shelf

Presentation to
ICWPF2017

Made by: James W. Baird, Chairperson

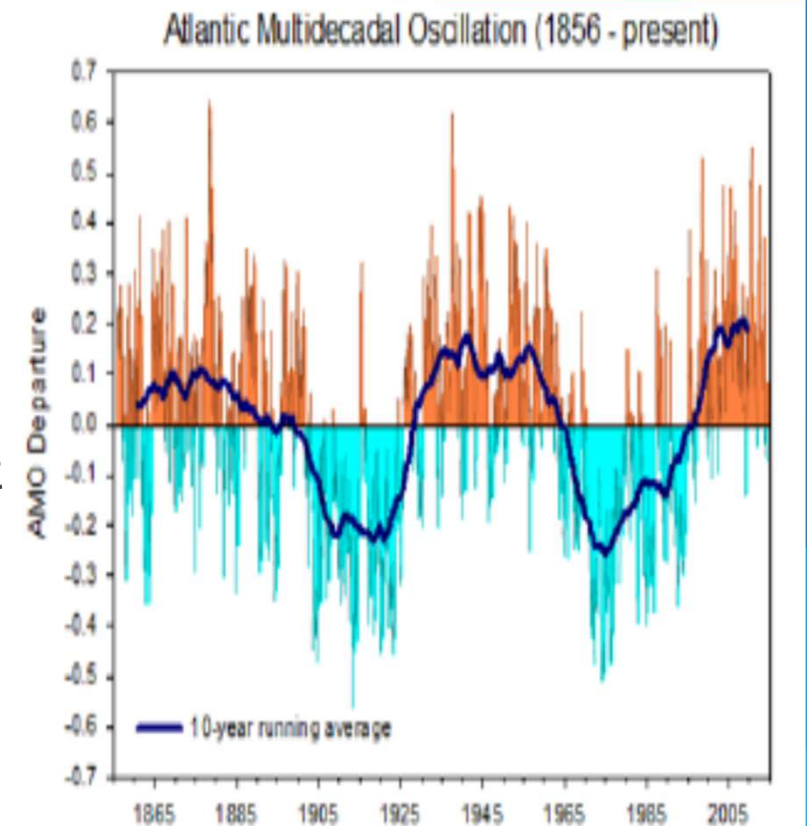
Presented by: Keith Sullivan, FFAW



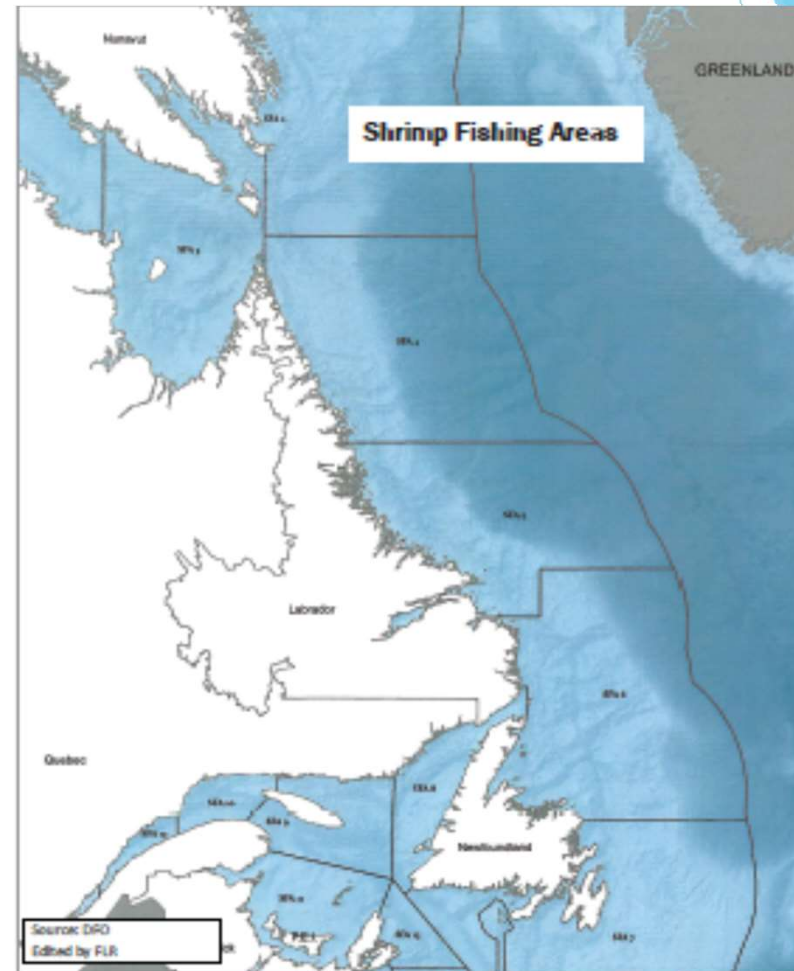
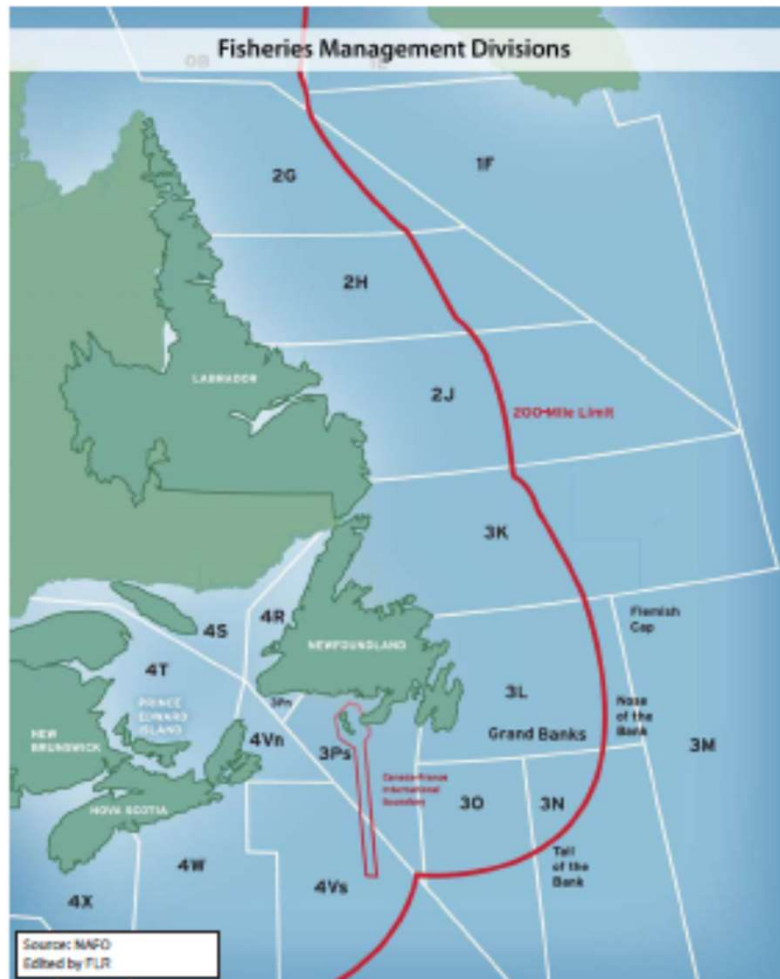
NEWFOUNDLAND & LABRADOR
GROUNDFISH INDUSTRY
DEVELOPMENT COUNCIL

Introduction

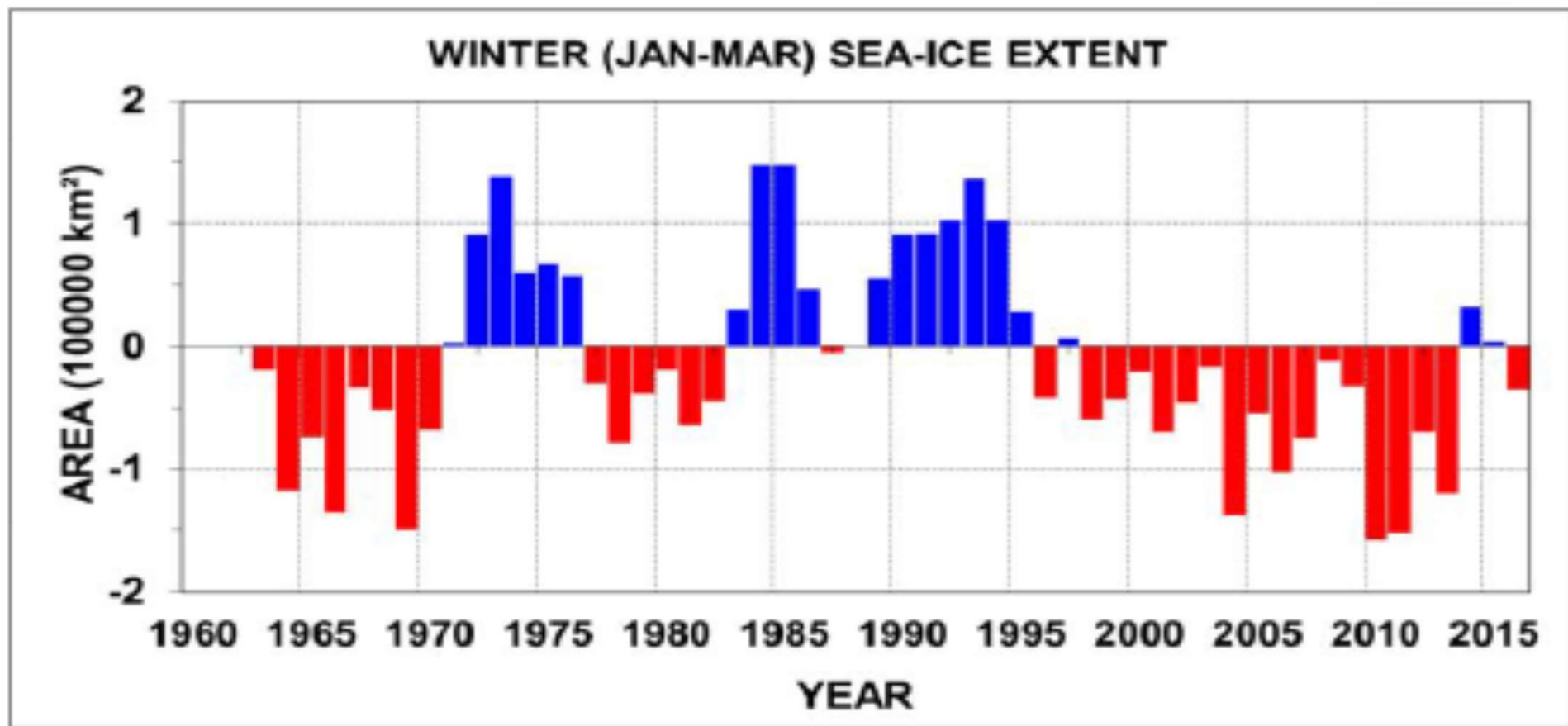
- ▶ Recent warming trend is driven by climate change and the warm phase of the AMO
- ▶ A warm ecosystem will almost certainly affect long-term changes in commercial species.
- ▶ NL marine ecosystem experienced a regime shift in the early 1990's which included a collapse of traditional dominating groundfish
- ▶ Shellfish (crab and shrimp) became the dominant group in the ecosystem
- ▶ Since the late 2000's shellfish stocks began to decline - cod & other groundfish began to increase
- ▶ Recent trends suggest that the system may be reverting back to a groundfish dominated fish community



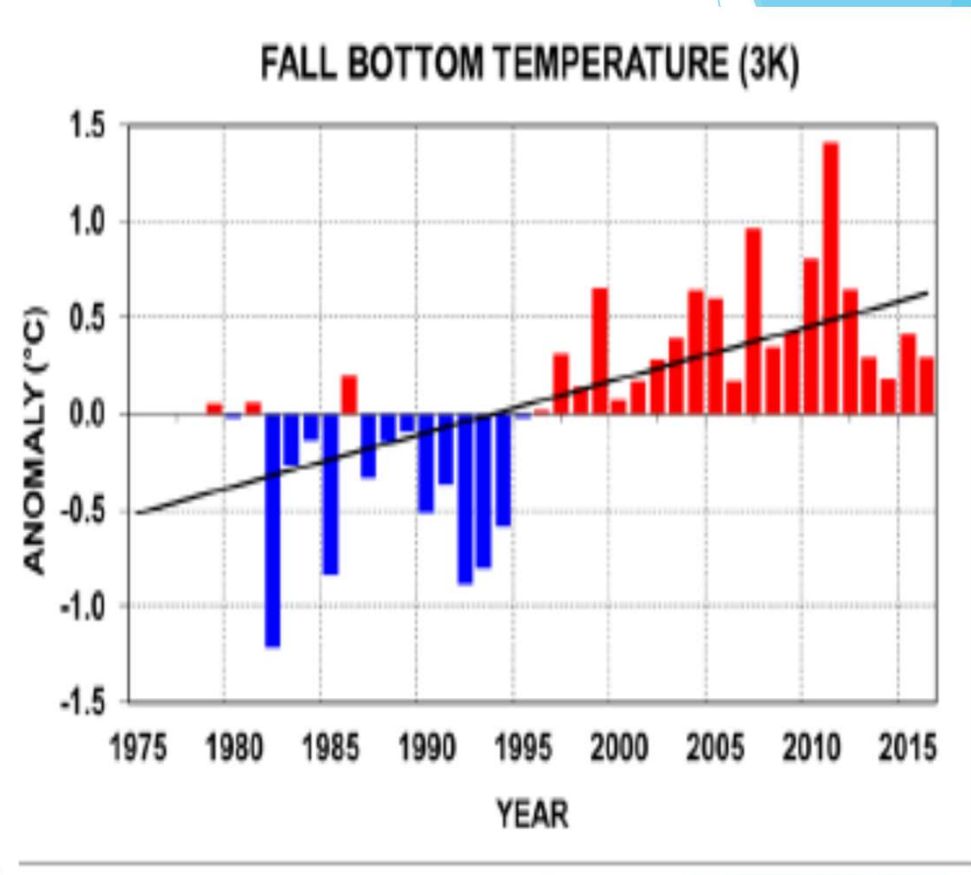
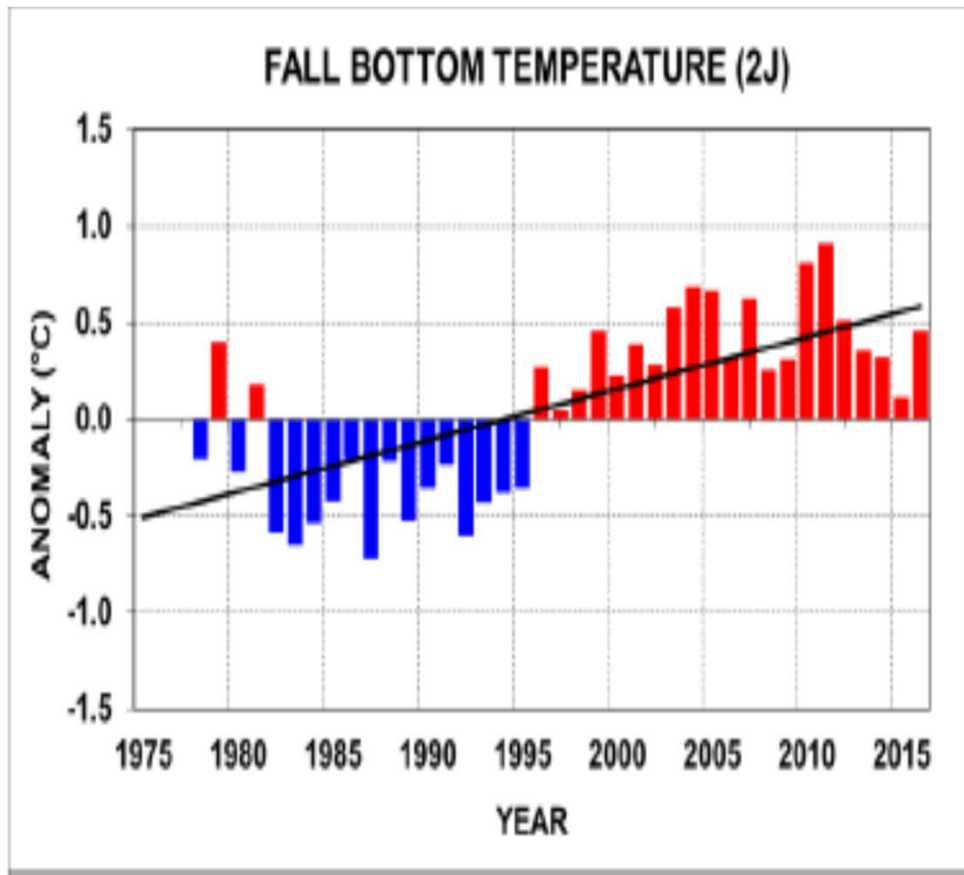
NAFO Divisions and Shrimp Fishing Areas



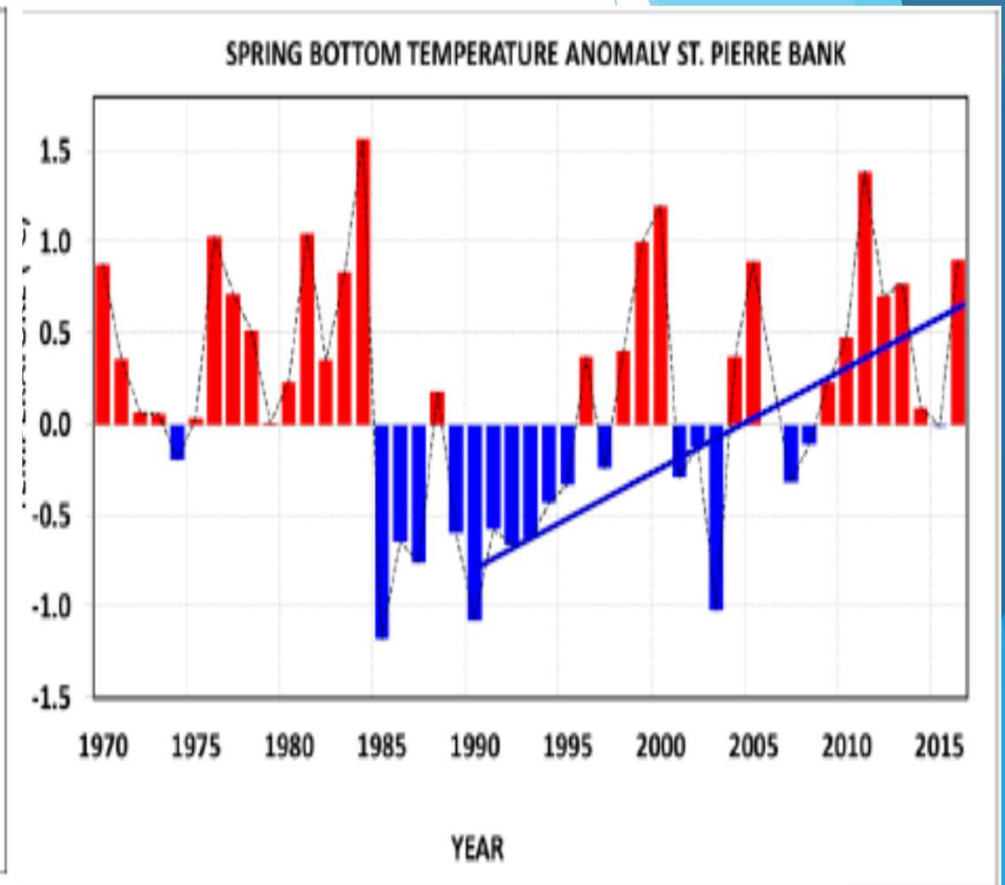
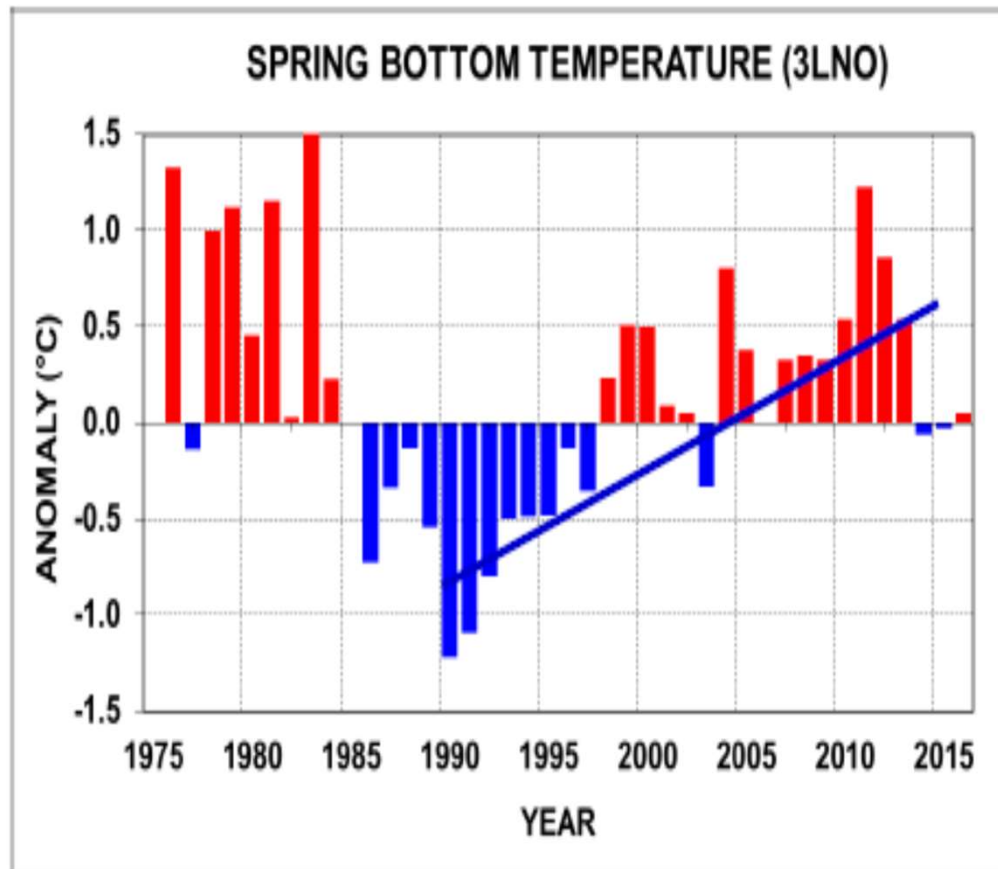
NL Sea Ice



Bottom temperatures from RV



Bottom temperatures from RV



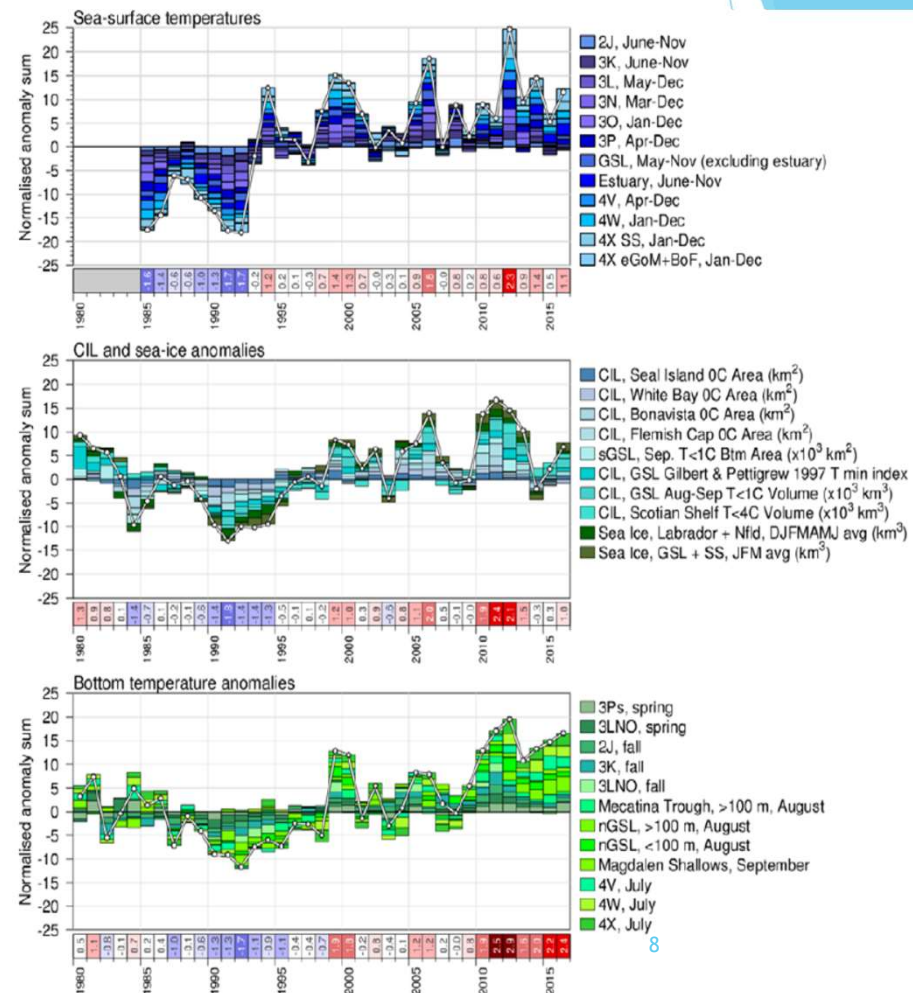
Additional Observations from 2016

DFO - Atlantic Zonal Monitoring Program

- ▶ Winter SSTs were at record levels in November from the southwest Grand Bank (Division 3O), through St. Pierre Bank (Div. 3P), the Gulf of St. Lawrence and the St. Lawrence Estuary.
- ▶ Winter average sea ice extent was near normal on the Newfoundland and Labrador (NL) Shelf but was 4th lowest since records began in 1969 in the Gulf of St. Lawrence.
- ▶ Summer CIL conditions were mostly above normal on the NL Shelf, but were much warmer than normal in the Gulf of St. Lawrence and the Scotian Shelf.
- ▶ Bottom temperatures were normal to above normal across the zone, including a 33-year record high in 3Ps and a 100-year record high in the deeper waters of the northern Gulf of St. Lawrence (200-300m)

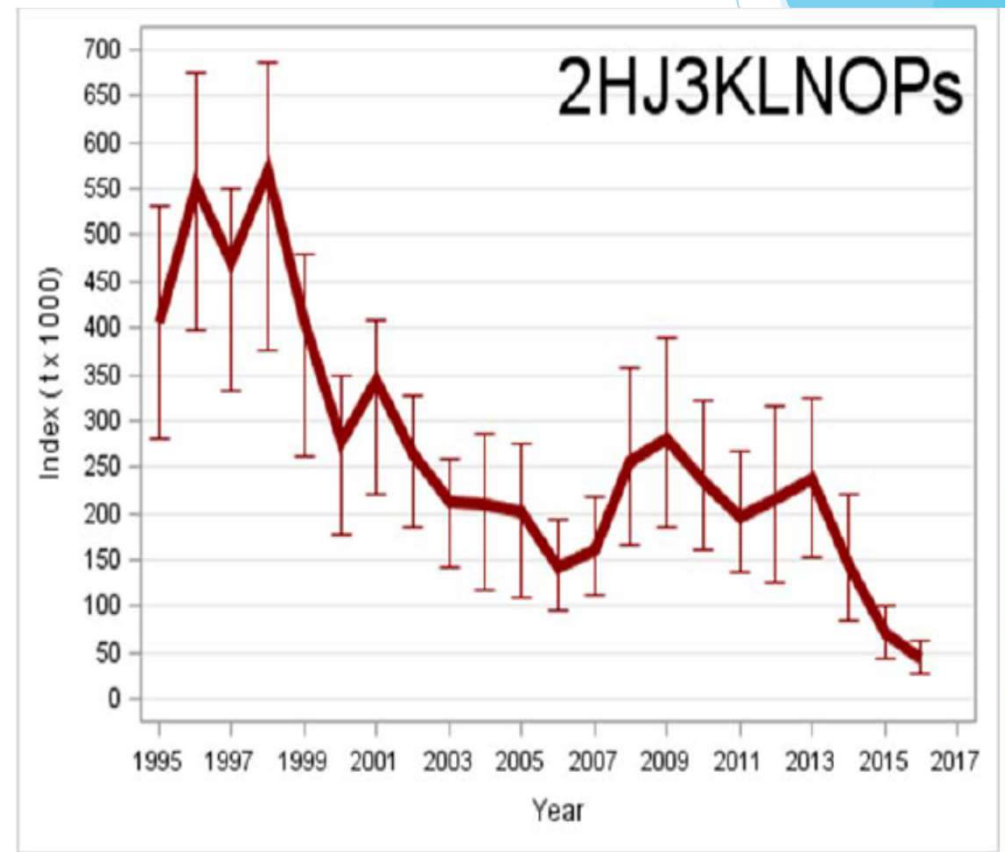
Composite index time series

- ▶ Described:
 - ▶ Sea-surface Temperatures
 - ▶ CIL and sea ice
 - ▶ Bottom Temperatures
- ▶ This plot shows the coherence of the different components observed and in various areas
- ▶ Conditions in 2016 were above normal for all three components.
- ▶ Bottom temps were overall 3rd highest in the time series, however 3LNO were near normal
- ▶ There were 44 indices examined related to temperature within the AZMP area
- ▶ Only 1 was colder than normal, 10 were close to normal and 33 were above normal, indicating a continuation of warmer than normal oceanographic conditions in 2016 across much of the Atlantic Zone.

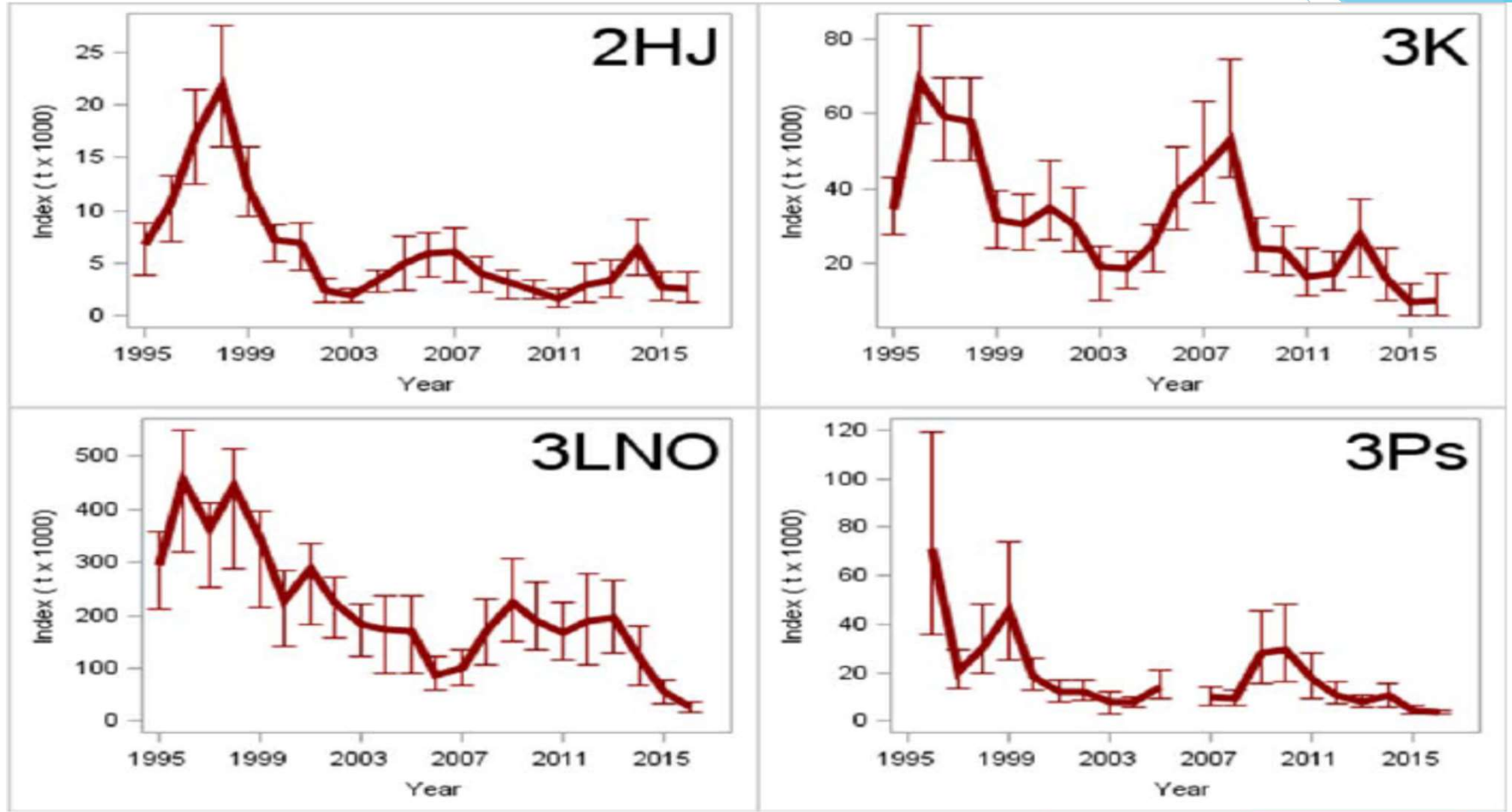


Snow crab biomass index from RV surveys

- ▶ The overall exploitable biomass index has declined by 80% since 2013.
- ▶ All divisions are at or near their lowest observed levels of biomass, with an overall decline of 40% in 2016.
- ▶ Fishery catch per unit of effort (CPUE) was at or near historical lows in most divisions in 2016.
- ▶ Overall recruitment into the exploitable biomass was at its lowest observed level in 2016.

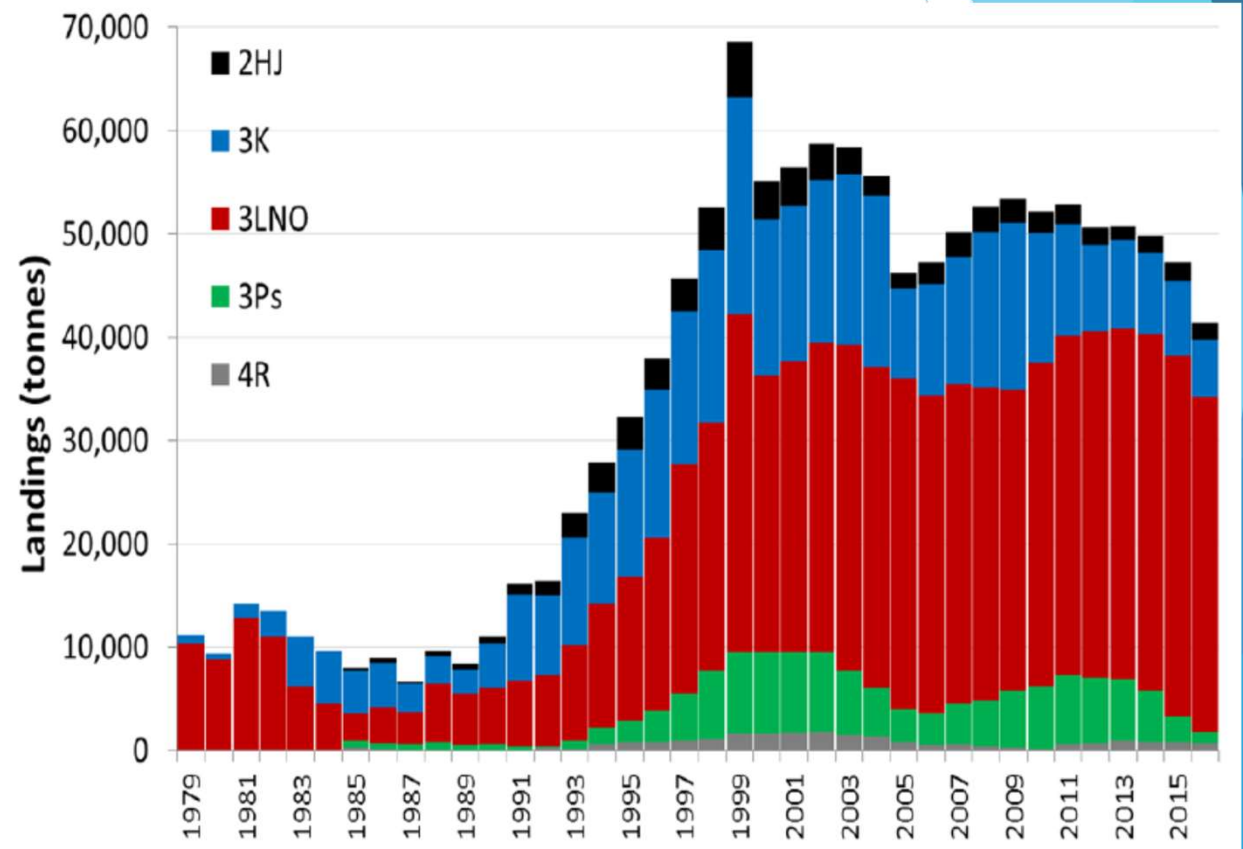


Snow crab biomass by Management Area

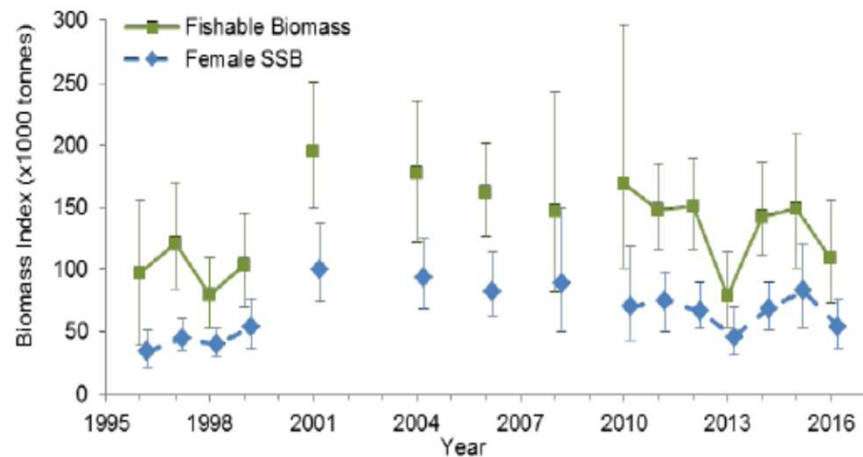


Snow crab landings 1979-2016

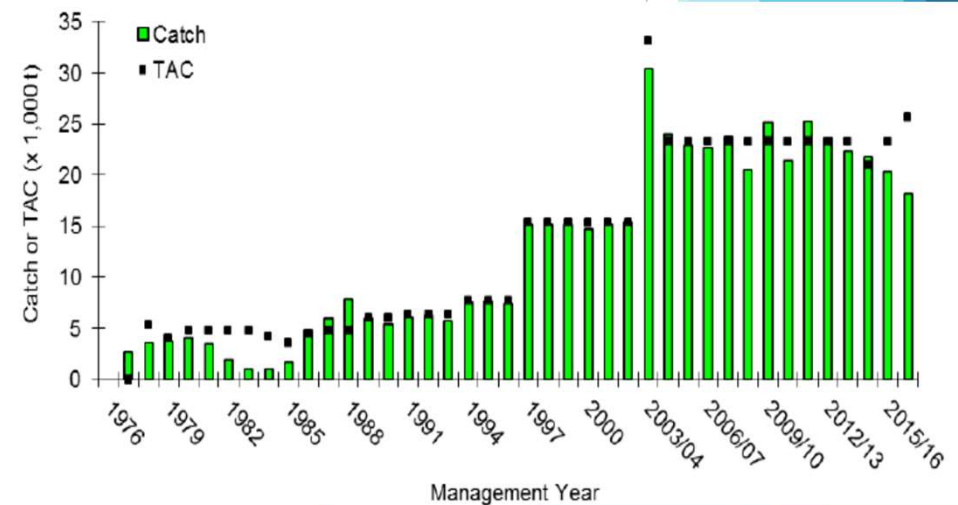
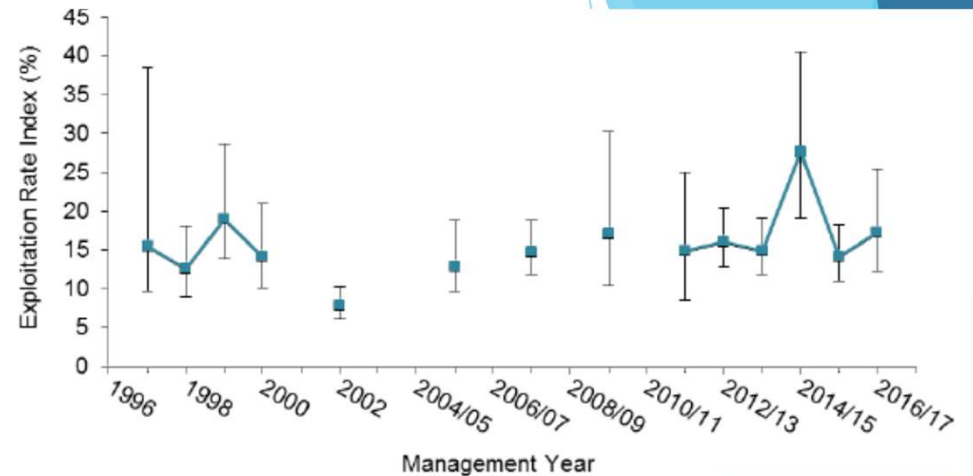
- ▶ Landings had a recent peak at 53,500 t in 2009 and have since gradually declined to 42,000 t in 2016.
- ▶ Landings will be just over 30,000 t in 2017.
- ▶ Divisions 3LNO have accounted for about 80% of the landings in recent years.
- ▶ Total mortality in exploitable crabs has increased to be at or near time series' highs.



Shrimp Fishing Area 5

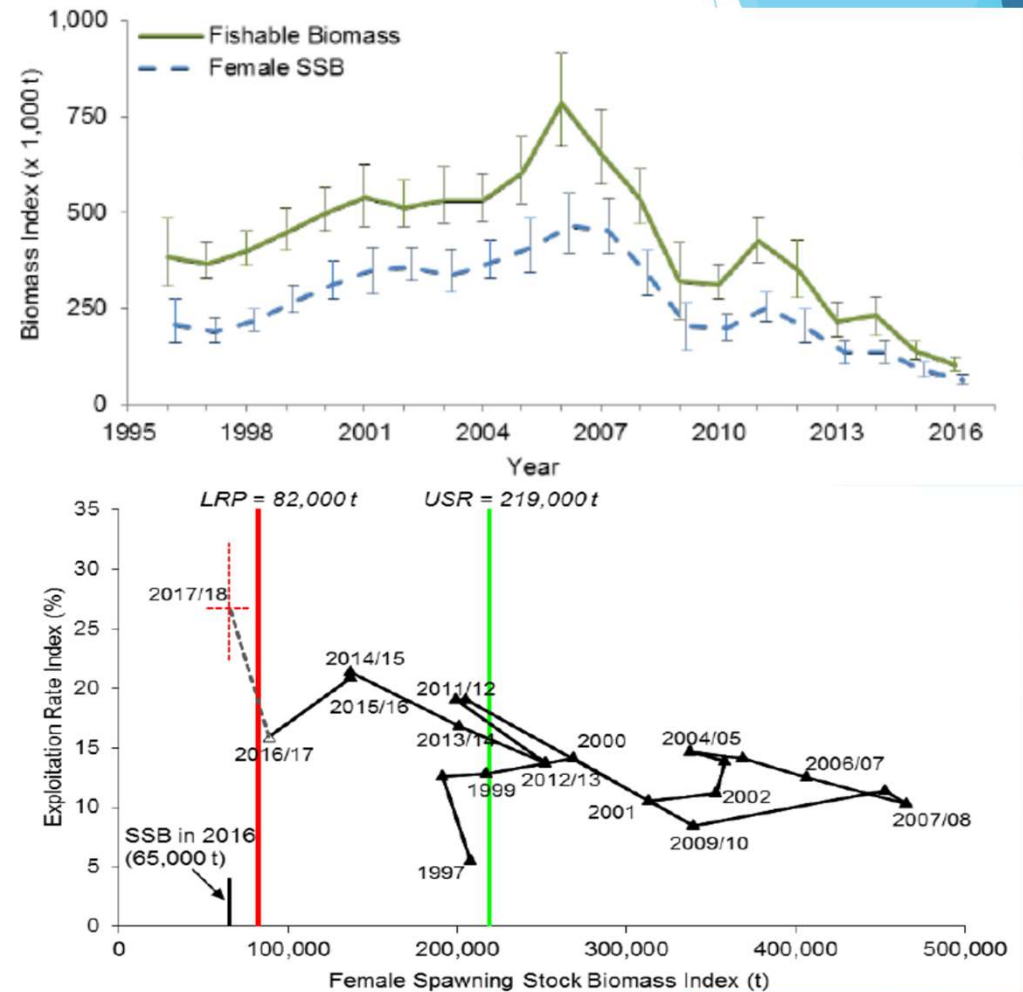


- ▶ Fishable biomass and female SSB indices have decreased, by 27% & 35% respectively from 2015 to 2016.
- ▶ Standardized large-vessel CPUE over the last five years has been stable at relatively high levels.
- ▶ The exploitation rate index has varied without trend around 15% from 1997-2016/17.
- ▶ TAC was increased by 10%, to 25,630 t, from 2015/16 to 2016/17 and back to 22,000 t in 2017/18 (in line with 20% exploitation)



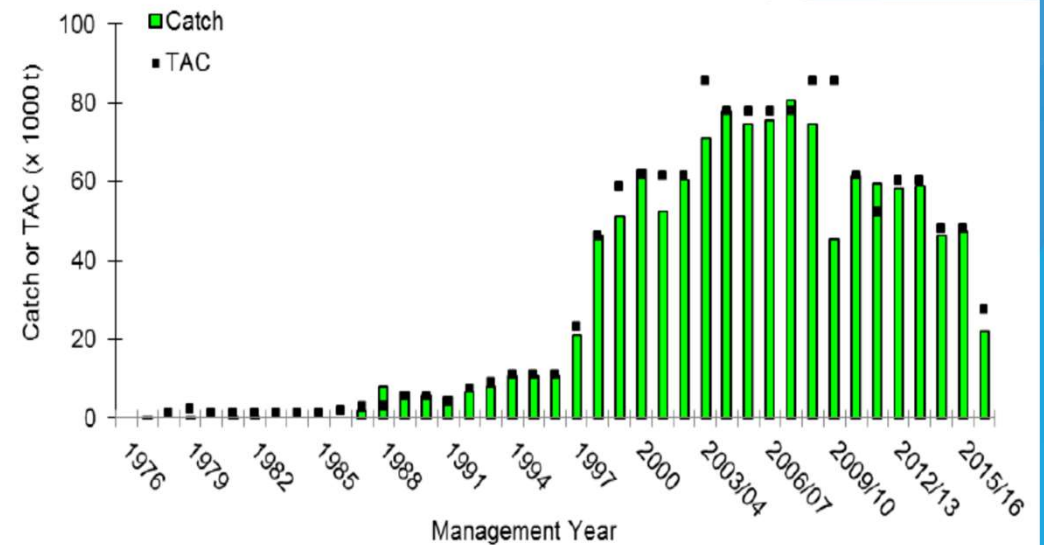
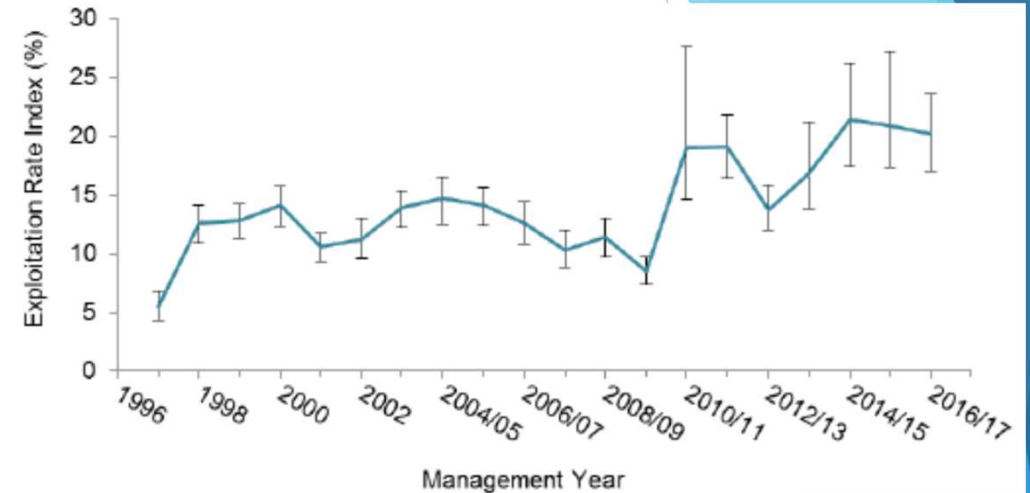
Shrimp Fishing Area 6

- ▶ Fishable biomass index declined from 785,000 t in 2006 to 104,000 t in 2016, which is the lowest in the time series.
- ▶ Female SSB index declined from 466,000 t in 2006 to 65,000 t in 2016 which is the lowest in the time series.
- ▶ The annual commercial CPUE has had a declining trend for about the last ten years.
- ▶ Commercial and survey data show a contraction of the resource within recent years.
- ▶ The female SSB index is currently in the Critical Zone, of the Precautionary Approach (PA) Framework, with greater than 99% probability.

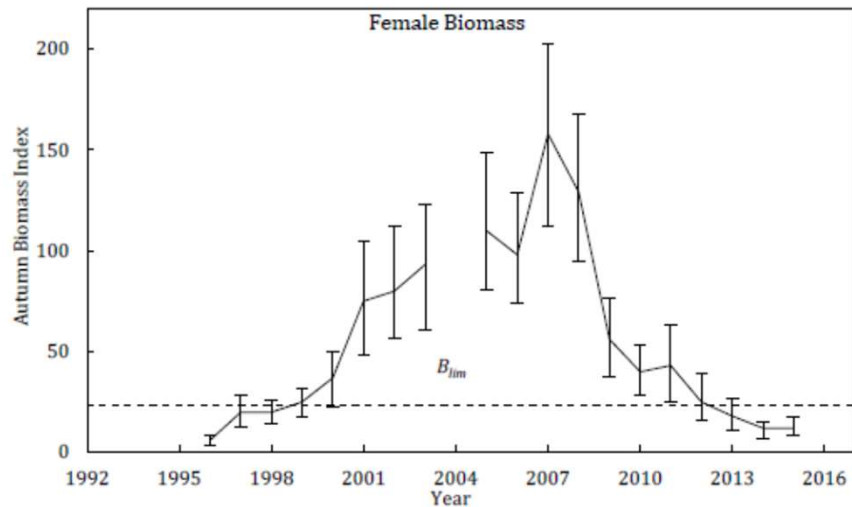


Shrimp Fishing Area 6

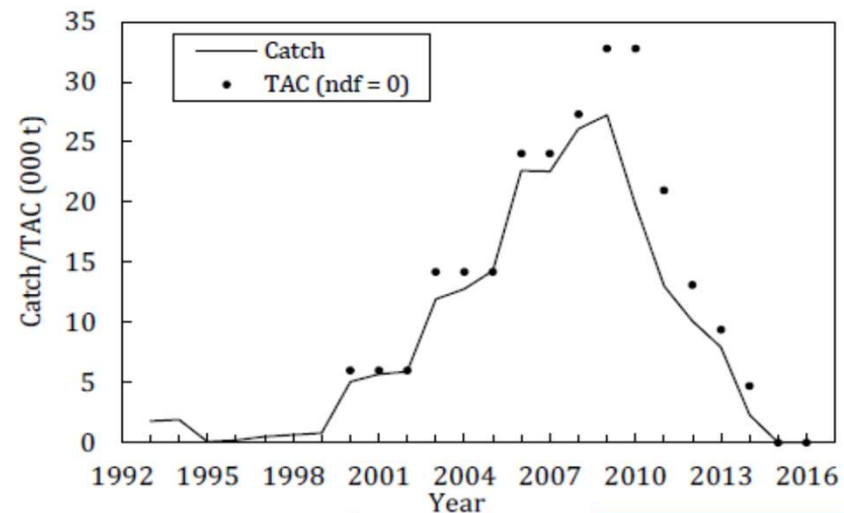
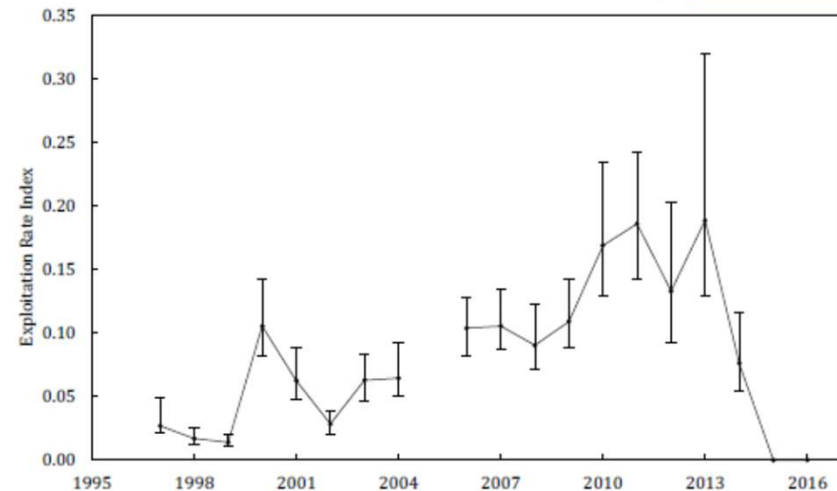
- ▶ The exploitation rate index ranged between 5.5% and 21.4% from 1997 to 2016/17, and has averaged 17.8% in the last five years.
- ▶ TAC was reduced by 42%, to 27,825 t, from 2015/16 to 2016/17. The TAC in 2017/18 was further reduced to 10,400 t
- ▶ Shrimp per-capita production has declined since the mid-2000s.
- ▶ Environmental conditions and increasing predation pressure appear as important drivers for the decline.
- ▶ Recent environmental conditions could lead to improved shrimp production but are unlikely to trigger rebuilding of the resource over the medium term because of the impact of high predation pressure.



Shrimp Fishing Area 7

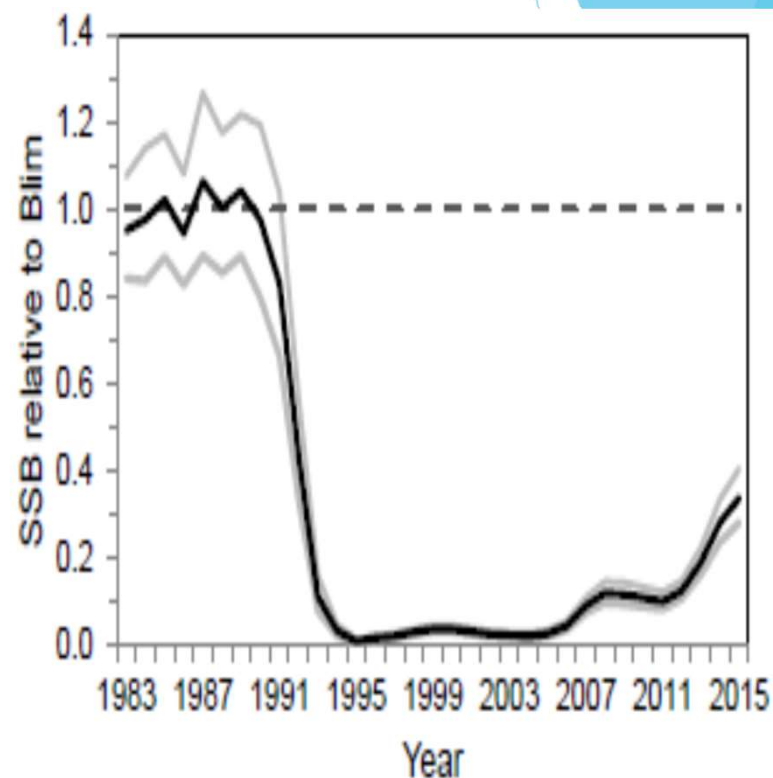


- ▶ The stock has declined since 2007, and in 2015 the risk of being below B_{lim} is greater than 95%.
- ▶ Spring and autumn biomass indices have decreased considerably since 2007.
- ▶ The index of exploitation generally increased over the 1997 - 2013 period but declined sharply in 2014, was zero in 2015 and 2016 (moratoria).
- ▶ Given expectations of poor recruitment the stock is not predicted to increase in the near future.



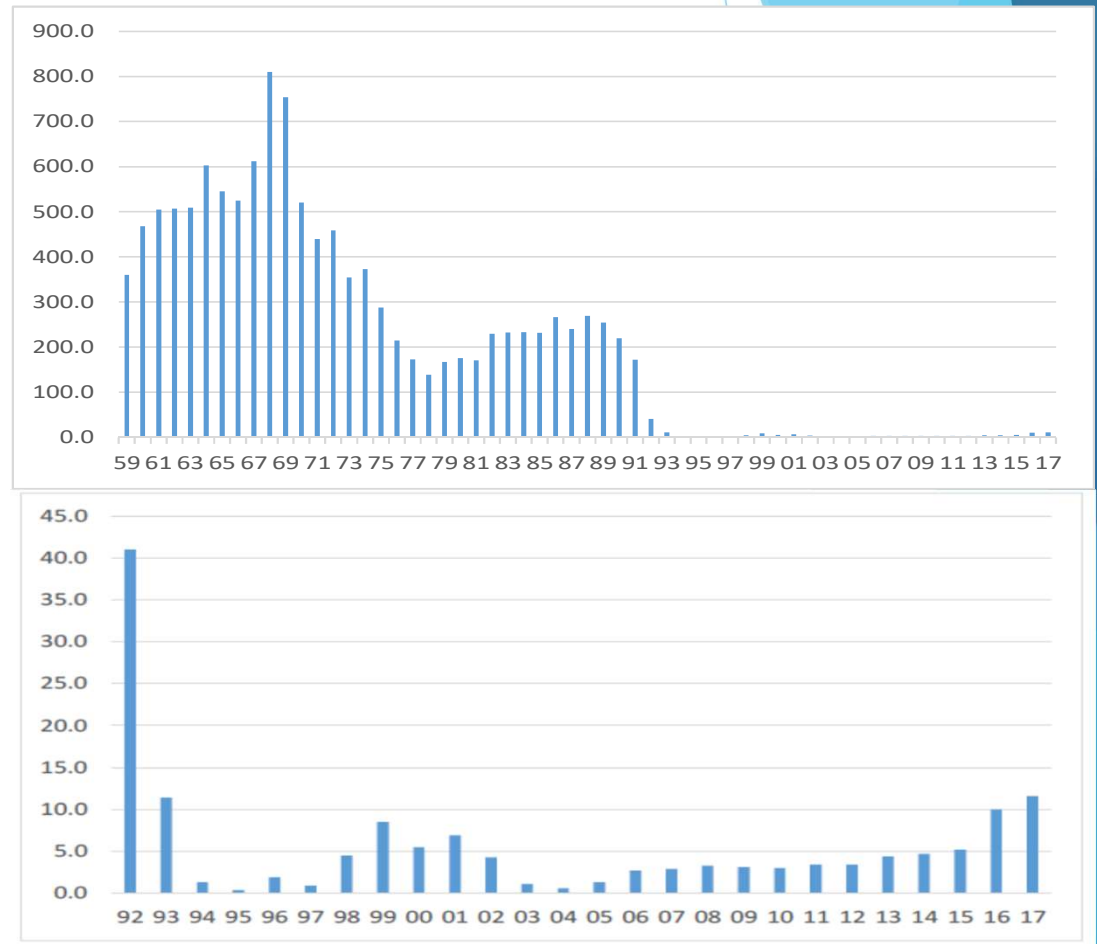
2J3KL Cod Resource Status

- ▶ 2016 science report showed considerable growth in 2J3KL cod
- ▶ SSB 34% of biomass limit
- ▶ Projected to be 60-65% of biomass limit in 3 years (2018)
- ▶ 2016 RV Survey showed continued growth in the stock, but not as much as expected
- ▶ No full assessment in 2017
- ▶ DFO committed to full assessment for the next 5 years - 2018-2022.

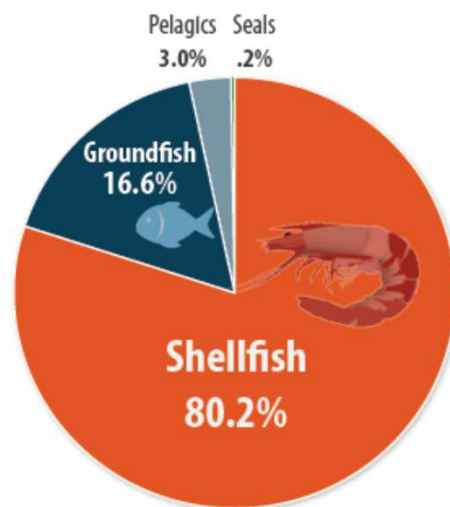


The 2J3KL Cod Fishery

- ▶ Catches 1959-2017
- ▶ Historically this stock produced high landings
 - ▶ > 400,000 t in the 1960's
 - ▶ > 200,000 t in the 1980's
- ▶ Stewardship landings at 5,000 t or less prior to 2016
- ▶ The 2016-2017 landings are the highest since 1993.
- ▶ Over 12,000 t in 2017
- ▶ This occurred while still maintaining a low Fishing Mortality



Total landings by Species Group

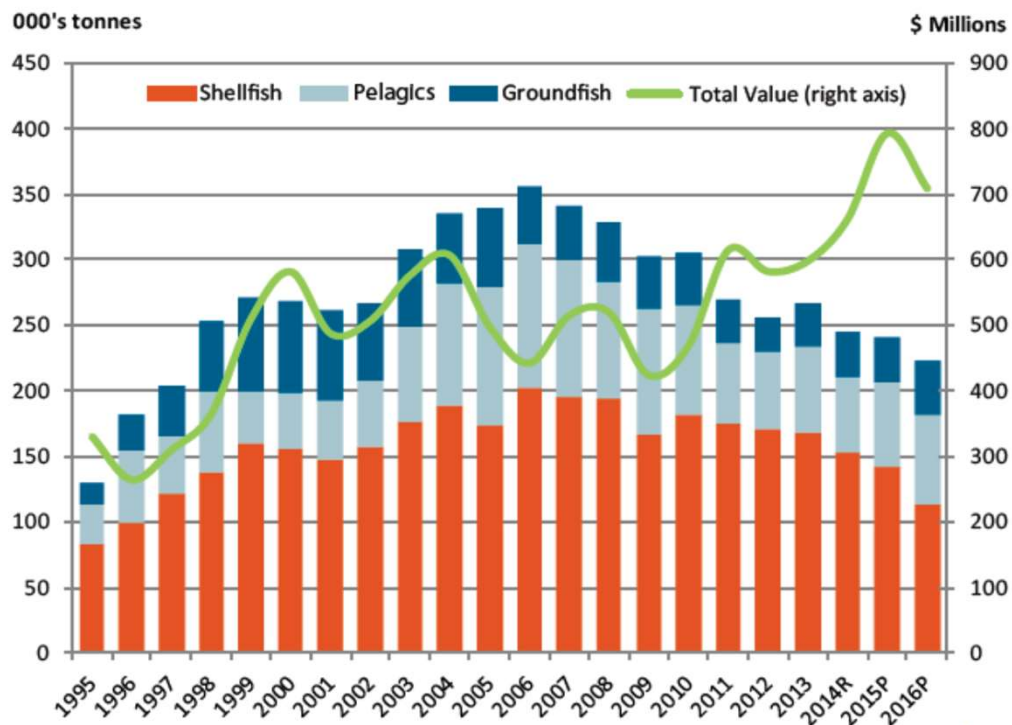


Wild Fisheries Landed Value
by Species Group, 2016

Note: Total landed value = \$708 million.
Source: DFO; FLR

FISH LANDINGS BY SPECIES GROUP

Newfoundland and Labrador



Shellfish/Groundfish landings 2015/2016

SPECIES GROUP	2015 REVISED		2016 PRELIMINARY		2015-16 COMPARISON	
	VOLUME (TONNES)	VALUE (000'S)	VOLUME (TONNES)	VALUE (000'S)	VOLUME	VALUE
SHELLFISH						
Snow Crab	47,302	\$257,571	41,726	\$273,875	-11.8%	6.3%
Shrimp	72,303	\$317,373	47,865	\$203,919	-33.8%	-35.7%
Lobster	2,751	\$32,797	2,770	\$35,173	0.7%	7.2%
Scallops	1,382	\$3,434	1,395	\$3,080	0.9%	-10.3%
Whelk	2,564	\$5,024	1,479	\$2,950	-42.3%	-41.3%
Other Shellfish	15,742	\$40,089	17,302	\$48,796	9.9%	21.7%
SHELLFISH	142,044	\$656,289	112,536	\$567,792	-20.8%	-13.5%
GROUNDFISH						
Turbot	11,051	\$67,017	10,281	\$57,021	-7.0%	-14.9%
Cod	10,723	\$14,336	16,285	\$21,631	51.9%	50.9%
Flounders	7,008	\$9,916	8,969	\$12,743	28.0%	28.5%
Halibut	654	\$7,082	805	\$8,445	23.1%	19.3%
Redfish	4,262	\$8,598	3,451	\$6,791	-19.0%	-21.0%
Haddock	264	\$474	435	\$937	64.9%	97.6%
Hake	241	\$239	524	\$522	117.6%	118.2%
Pollock	215	\$202	378	\$347	76.0%	71.7%
Skate	179	\$45	383	\$92	113.1%	105.7%
Other Groundfish	48	\$9,116	100	\$9,331	107.6%	2.4%
GROUNDFISH	34,646	\$117,023	41,611	\$117,860	20.1%	0.7%

Transition to Groundfish - people are talking!

- ▶ NL-GIDC - Established April 2016
 - ▶ Initially with the FFAW and 5 processors/now 11 processors & 4 ex-officio members
 - ▶ Mandate to begin the discussions that will guide how this transition occurs with a focus on a plate to Ocean approach
- ▶ The Way Forward - Announced by the Premier of NL in November 2016
 - ▶ This is a vision for sustainability and growth for Newfoundland & Labrador
 - ▶ Two fisheries related initiatives included:
 1. Transition to Groundfish/Establishment of a Fisheries Advisory Council
 2. Support growth in the aquaculture industry / 50,000 t salmon & 10,750 t mussels annually
- ▶ Fisheries Advisory Council - Council chair announced March 2017 (Bill Wells)
 - ▶ To provide stakeholders with opportunities to provide input to government
 - ▶ To assist the seafood industry to adjust to the transition already underway
 - ▶ Some NL-GIDC members are also part of the FAC
- ▶ CCFI Cod Conference - Announced July 2017
 - ▶ An opportunity to look at NL cod in a global context on market demand & supply
 - ▶ NL-GIDC are part of the Steering committee for this conference

NL-GIDC 2016-2017

- ▶ Prepared proposals in 2016 and 2017 that were accepted by the Canadian Government for management of the 2J3KL Cod Stewardship Fishery.
 - ❑ Low fishing mortality strategy for the stewardship harvest
 - ❑ Season went from 2-4 weeks prior to 2016 to 19 & 21 weeks in 2016/17
- ▶ Recently developed an NL-GIDC 2018-2020 Strategic Plan based on two overarching and interconnected objectives for the fishing industry for this period.
 - ❑ To catch and land a consistent supply of top quality raw material over an eight (8) to (10) month season.
 - ❑ To produce prime quality fresh fish, salt fish and once frozen groundfish products for sale in international markets.
- ▶ The strategic objectives represent the pillars upon which the vision of a sustainable, economically viable and internationally competitive industry will be achieved.

NL-GIDC Strategic Plan - Priority Issues

- ▶ To achieve progress on each of the strategic objectives nine (9) priority issues have been identified.
- ▶ The priorities focus on the key issues that will arise with the redevelopment of the NL groundfish industry and include:
 - Strategic Objective #1 - Top Quality Raw Material
 - ✓ *Extended Seasons*
 - ✓ *Fish Handling Practises*
 - ✓ *Gear Diversification*
 - ✓ *Fish Stowage Systems*
 - Strategic Objective # 2 - Prime Quality Fish Products
 - ✓ *Strategic Landing Ports*
 - ✓ *Landing Port Infrastructure*
 - ✓ *Onshore Handling and Transportation*
 - ✓ *Processing Plant Modernization*
 - ✓ *Product Branding*

References

- ▶ Colbourne, E., G. Maillet and P. Pepin. 2017. Oceanographic conditions on the NL Shelf and NW Atlantic. WWF/DFO Capelin Workshop 22-23 June, 2017.
- ▶ DFLR. 2016. Seafood Industry Year in Review 2016. Department of Fisheries and Land Resources. St. John's NL, Canada A1B 4J6.
- ▶ DFO. 2014. Short-Term Stock Prospects for Cod, Crab and Shrimp in the Newfoundland and Labrador Region (Divisions 2J3KL). DFO Can. Sci. Advis. Sec. Sci. Resp. 2014/049
- ▶ DFO. 2016. Stock Assessment of Northern Cod (NAFO Divs. 2J3KL) in 2016. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2016/026.
- ▶ DFO. 2017. An assessment of Northern Shrimp (*Pandalus borealis*) in Shrimp Fishing Areas 4- 6 and of Striped Shrimp (*Pandalus montagui*) in Shrimp Fishing Area 4 in 2016. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2017/012.
- ▶ DFO. 2017. Assessment of Newfoundland and Labrador (divisions 2HJ3KLNOP4R) Snow Crab. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2017/023.
- ▶ DFO. 2017. Oceanographic conditions in the Atlantic zone in 2016. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2017/031.
- ▶ NAFO. 2016. NAFO/ICES PANDALUS Assessment Group Meeting, 7-14 September 2016. NAFO SCS Doc 16/17 Serial No. N6611.