

Walking a Tight Line: Management of Arctic Fisheries In the Presence of Spatially Differentiated Ecological- Economic Externalities

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RUSSIA

Svalbard

26° Norwegian Open access line
(2007)

Russia offshore RKC

<- transforming Benthic Habitat with RKC (1960s on)

Norwegian damages to cod, capelin
1980s-90s;

1994 exp fishery to compensate; ramped up
2007 shift with RUS joint mgmt

Norway and ROW

Economic differences RU/NO ([Dis]-incentives for cooperation)

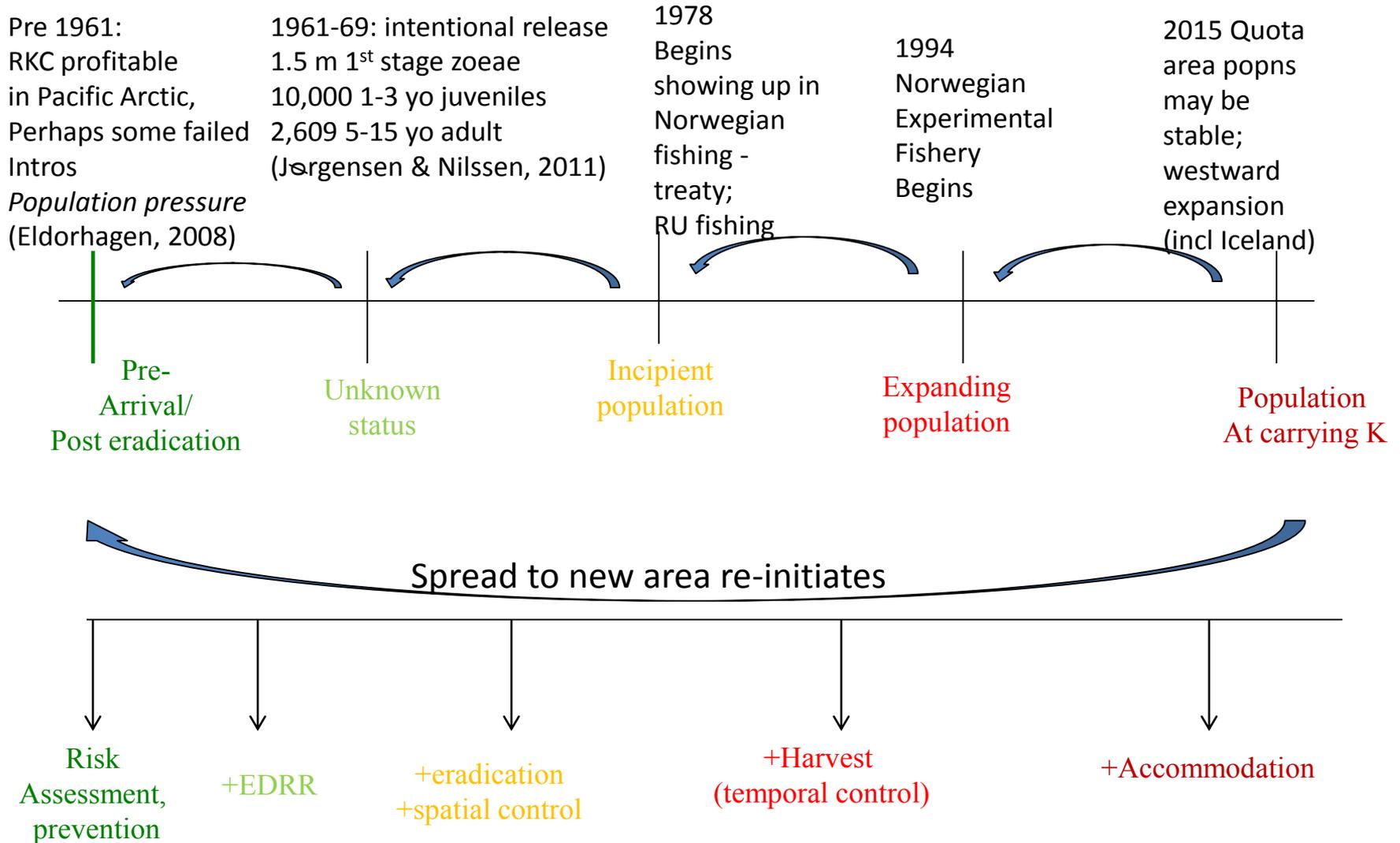
Norway

- Small scale fjord fishery
 - ~500 boats under 11 meters
 - Mainly live catch and export; may command higher price
- Cod/ capelin fisheries gear damage add opportunity cost
- Local tourism industry developing
- Invasion frontier

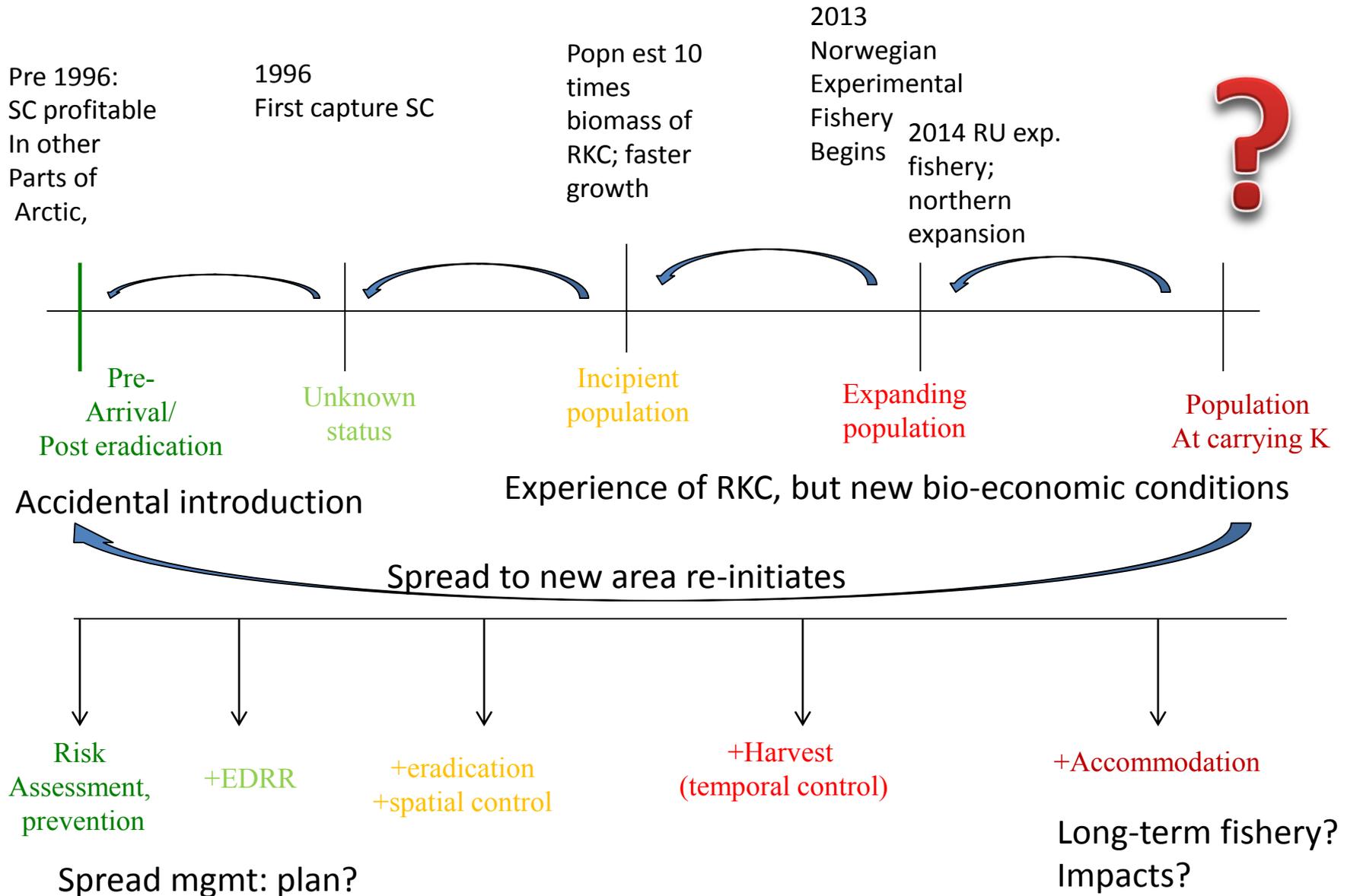
Russia

- large scale offshore fishery
 - flash frozen on board
 - Monopolized with Eastern Russian fishing
- Not significant previous fisheries
- Non-commercial fishing not allowed

Timeline scenario of invasion and intervention: Red King Crab in the Barents Sea



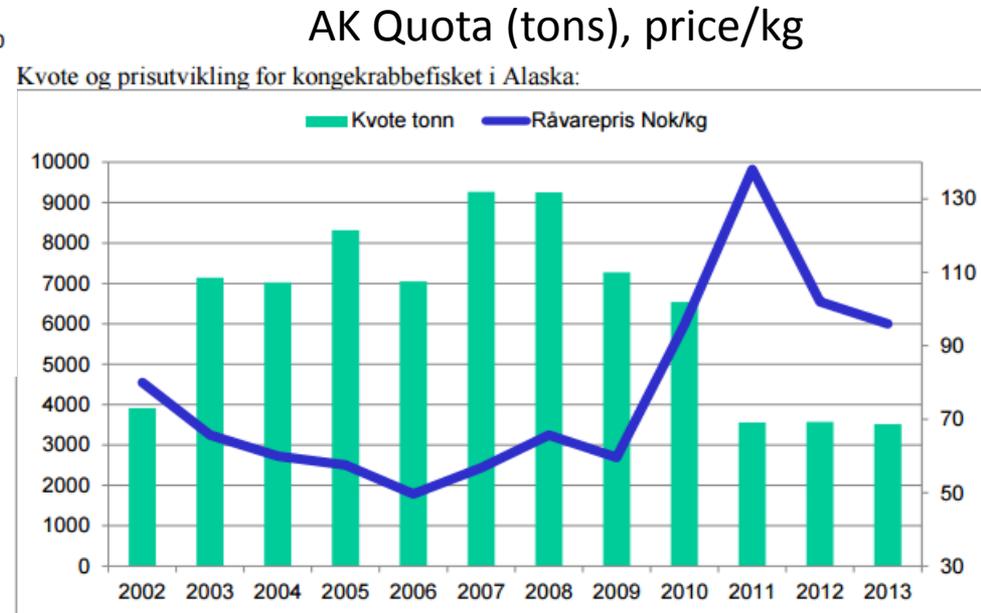
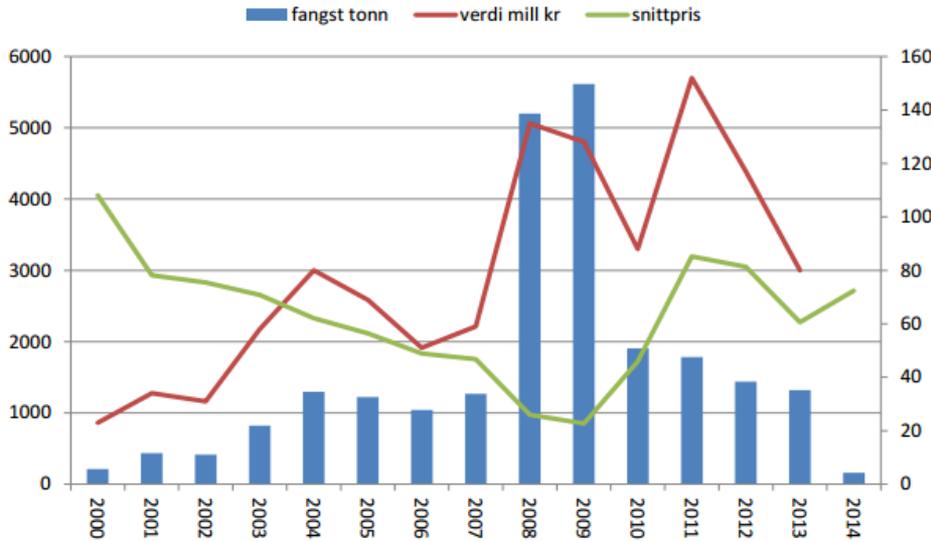
Timeline scenario 2 of invasion and intervention: Snow Crab in the Barents Sea



RKC Recent Market Incentives

Norwegian Catch (tons),
Value (million NOK),
average price/kg

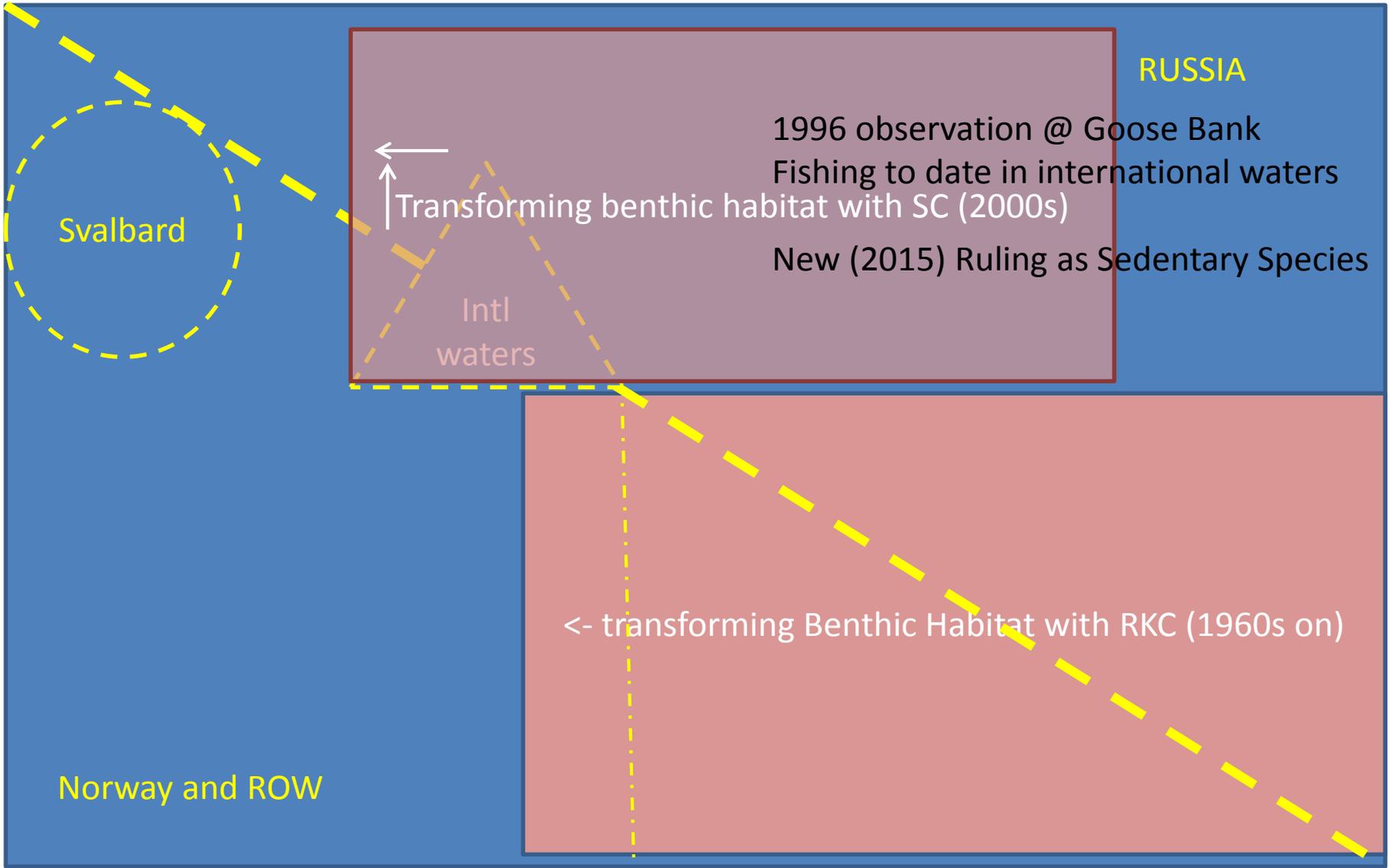
Source:
Kongekrabbe markedreport 2014
Norges Raafisklag



Catch steady; price falling

Kvotetall tonn - Alaska, Russland og Norge							
år/sesong	2008	2009	2010	2011	2012	2013	2014
Norge	2375	1185	900	1200	900	1000	1100
RØS-Barentshavet	13 000	7800	5700	4000	5500	6000	6500
Alaska	9256	7277	6540	3561	3570	3518	

Eastern Russia not shown
Since IUU fishing so high
It is not representative!



RUSSIA

1996 observation @ Goose Bank
Fishing to date in international waters
New (2015) Ruling as Sedentary Species



Transforming benthic habitat with SC (2000s)

Intl
waters

<- transforming Benthic Habitat with RKC (1960s on)

Svalbard

Norway and ROW

Bio-Economic Differences

Snow Crab (SC) and RKC

- Offshore for both Nor, Rus – SC mostly in Russian or international waters
- Much higher biomass expected; more rapid spread
- Intentional high-propagule introduction (RKC) vs more indirect (uncertain path) introduction (SC) – way of the future?
- More rapid, larger role in international markets
- Institute for Marine Research (Norway) suggesting SC could be second only to cod in market value in the Barents
- All benthic habitat at risk, but SC more “Arctic”, more unknown...

Some Further investigations

- Has RKC management in Barents been “mistaken”? E.g. costs>benefits?
 - Russian perspective: *probably no*
 - Norwegian perspective: *enough to halt further expansion, not enough to push eradication in quota area*
 - *Different path with better information, e.g. Iceland – at cost to Russian fisheries*
 - Alaskan perspective: *yes. More market uncertainty.*
 - Global perspective: *likely yes. what happens with further spread? With unique ecosystem losses?*
- Snow crab invasion: key bio-economic differences for management
 - faster growth, northerly spread (incl international waters and Svalbard), and lower global size-insensitive demand than RKC
 - Are Russian & Norwegian incentives better aligned for SC? *Yes, but...*