

Closed Areas in Quota Managed Fisheries

Presentation to the CATT and Groundfish PDT

Owen Liu

Environmental Defense Fund



Background

- Wanted to look at examples of closed areas in other quota-managed fisheries to inform the CATT process
- Temperate zones, similar species, habitats, and gears
- Chose four case studies
 - Iceland
 - Scotian Shelf
 - The North Sea “Plaice Box”
 - British Columbia



Structure

- Purpose
 - What was the closed area(s) designed to do?
- Outcome
 - What did the closed area(s) actually do, relative to the original purpose and/or ancillary effects?
- Context
 - Why was the outcome observed?
 - Closed area attributes, e.g. number, size, spacing
 - Other factors, including management, stock status, ecosystem change



Iceland

- Purpose
 - Network of seasonal, year-round, and “real-time” closures, mostly to protect spawning and/or juvenile areas
- Outcome
 - For two areas closed year-round in 1993, significant and rapid increases relative to the open areas for larger size classes of cod and haddock were observed
 - One area was reopened in 1997, and effects were quickly reversed to pre-closure state
- Context
 - Closures instituted at a time of low SSB, and TAC was reduced 42% between 1992 and 1995
 - Combination of ITQs and spatial management network has contributed to the highest estimate of stock size in three decades

Reglugerðir og friðunarsvæði við Ísland

Birt með fyrirvara: Ef frávik eru frá birtingu reglugerðar gilda stjórnartíðindi.

Á milli lína r.v. 315 ° frá Straumnesi að línu r.v. 270° frá Blakknesi og utan 12 sml. frá viðm. línu eru síldveiðar leyfðar með síldarflotvörpu. rgl.: 770/2006

Kolmunnalína rgl.: 1271/2007

Togveiðibann þó opið fyrir togveiðum frá kl. 20:00 - 08:00 rgl.: 875/2005

Rgl. um friðun steinbits. Veiðibann 27/9 til 31/3 rgl. 805/2006

Bann við veiðum með fiskibotnvörpu. rgl.: 162/2002

Togveiðibann þó opið fyrir togveiðum frá kl. 20:00 - 08:00 frá og með 1. okt til og með 1. apríl rgl. 310/2007

Dökk ská-röndótt svæði eru friðunarsvæði fyrir tog-veiðum. rgl. 310/2007

Opið fyrir togveiðum á Mehlsack frá og með 1. feb. til og með 15. apr. rgl. :310/2007

Á Tánni er lokað fyrir togveiðum frá og með 1. júní til og með 31. okt. rgl.: 310/2007

Blá röndótt svæði með lóðréttum línun. Skiljusvæði fyrir togveiðar. Rgl.: 749/2006

Fjölublá ská-röndótt svæði eru friðunarsvæði fyrir togveiðum og línu. rgl.: 310/2007

Bann við veiðum með línu og fiskibotnvörpu. rgl.: 68/2003

Bann við rækjuveiðum rgl.: 766/2004

Kolmunnalína rgl. 1271/2007

Blá röndótt svæði með lóðréttum línun. Skiljusvæði fyrir togveiðar. rgl. 752/2006;; 751/2006

Smáfiskaskiljusvæði. Síldveiðar með flotvörpu leyfðar 770/2006 ; 747/2006

Smáfiskaskiljusvæði rgl.: 748/2006

Bann við kolmunnaveiðum án meðaflaskilju rgl.: 696/2005

Bann við kolmunnaveiðum á Bórsbanka. rgl.: 794/2004

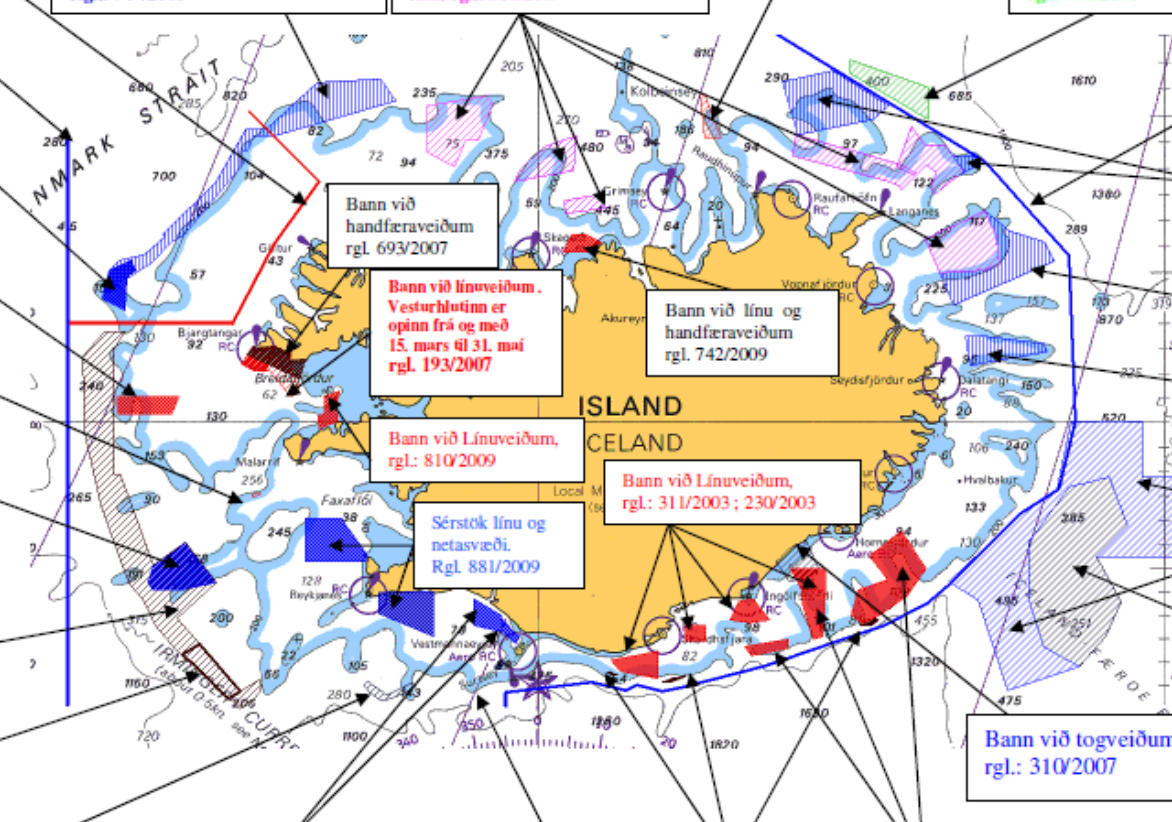
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Bann við togveiðum rgl.: 861/2006;100/2008

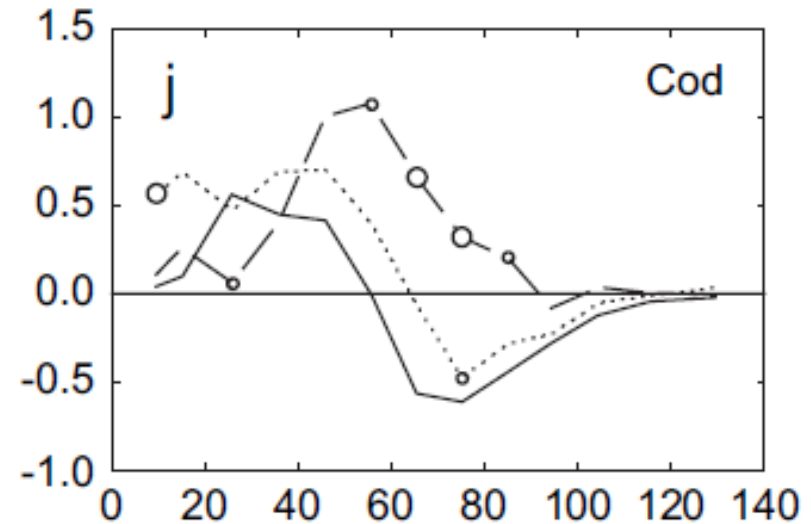
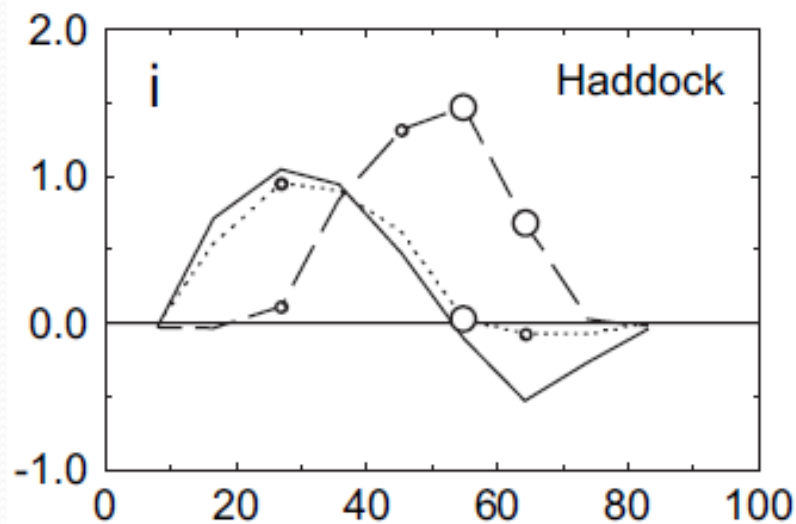
Friðunarsvæði Surtsey rgl. 50/2006

Koralsvæði rgl.: 1140/2005

Bann við línuveiðum, rgl.: 887/2009



Cod and Haddock in Breiddalsgrunn



X-axis: Length(cm)

Y-axis: Difference between protected and reference areas (log fish/tow) before the closure (solid line), after the closure (dashed line) and after reopening (dotted line).



Scotian Shelf

- Purpose
 - Emerald/Western Bank closed to mobile groundfish gear in 1987 to protect juvenile haddock from discarding
- Outcome
 - No effect on recruitment, and juvenile survival decreased, comparing before (1970-1986) and after (1987-1994) closure
 - Some species saw large increases, including herring, winter flounder, redfish
- Context
 - Whole area under moratorium for cod and haddock since 1994
 - Not fully closed (fixed gear, scallop dredging) and only a single closed area
 - Species “center of abundance” shift
 - Overall stock productivity declines

Species abundance anomalies in the closed area

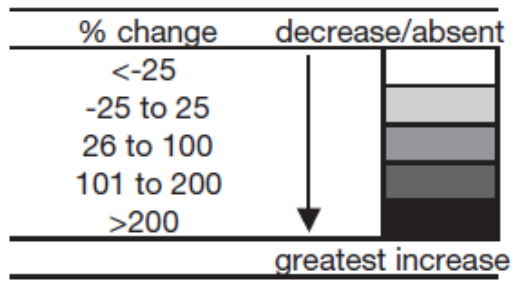
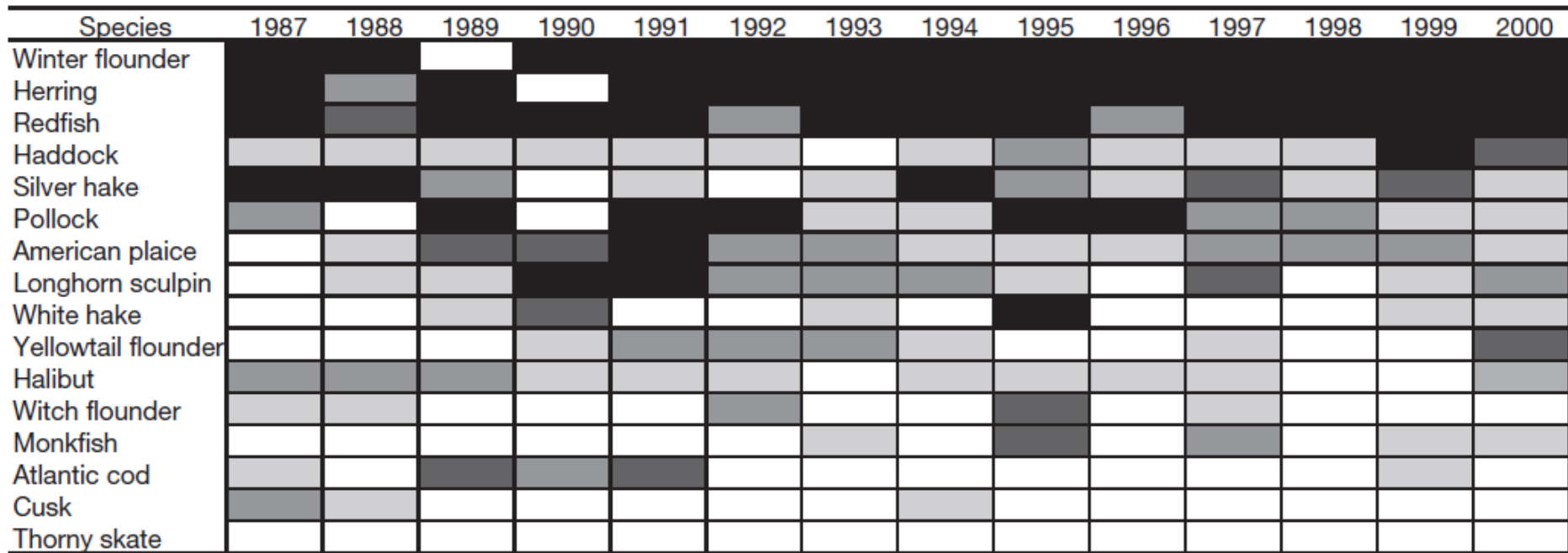
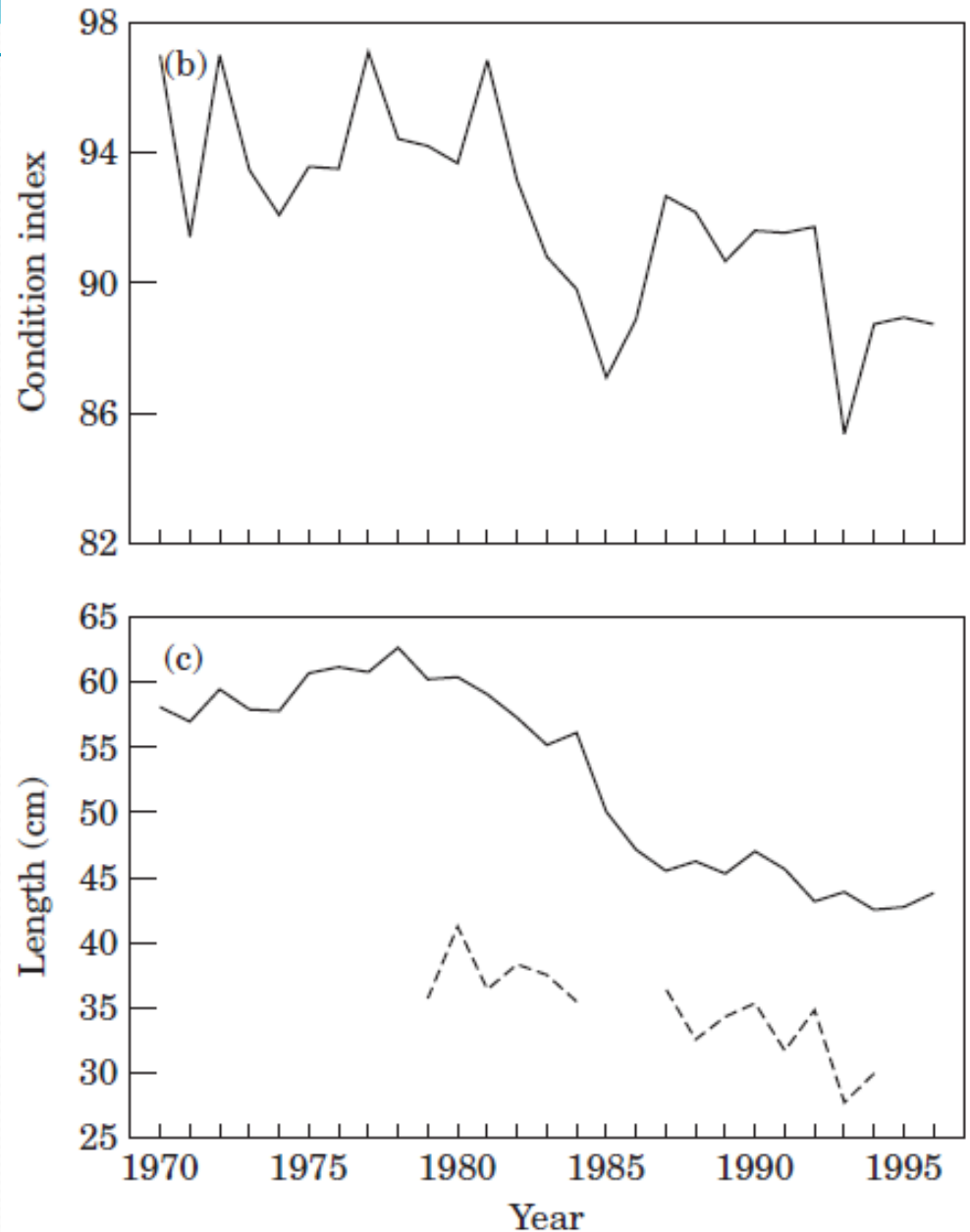


Fig. 5. Species abundance anomalies (relative to the 1970 to 1986 average) in the closed area for 8 species that generally increased relative to their abundance since closure and 8 additional common species that exhibited decreasing or variable trends. Magnitude of the change shown in key

TOP: Predicted weight (g/10) of a 45 cm fish as an index of condition from the July research vessel survey

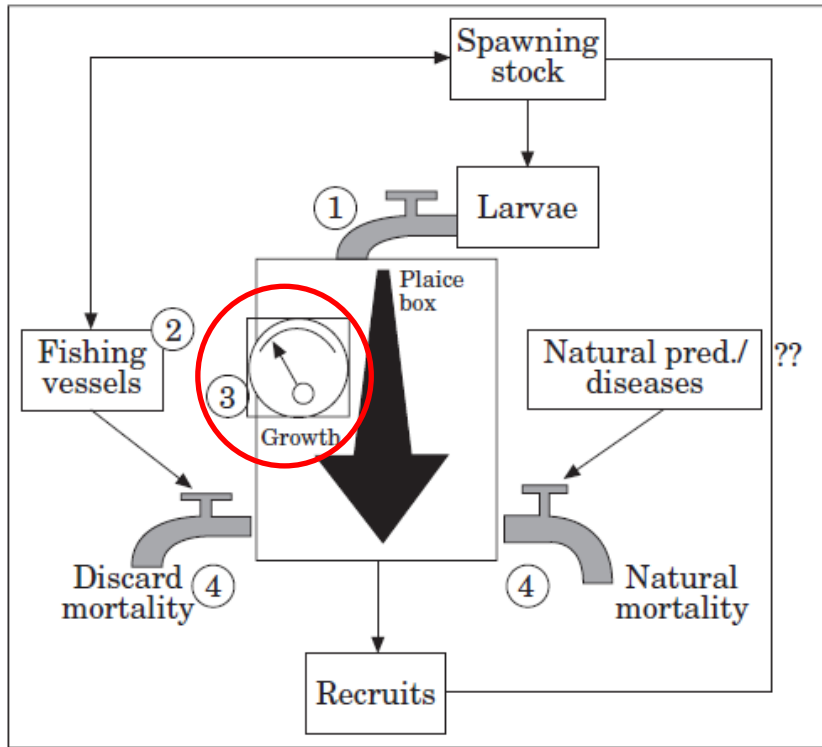
BOTTOM: Mean length at age 7 (solid line) and at 50% maturity for females (dashed line)





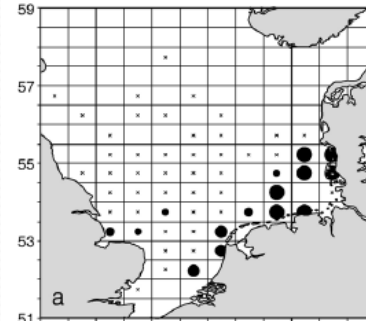
The Plaice Box

- Purpose
 - Area closed in SE North Sea in 1989 to reduce discards of undersized European plaice on their nursery grounds
- Outcome
 - Abundance of marketable size classes increased
 - Increase in abundance of non-target species
 - Overall yield and SSB have decreased substantially
- Context
 - Only closed to the largest boats (>300 hp), and 1989-1994 only closed seasonally
 - Single closure, not part of network
 - Overall decreased growth rate of plaice
 - Spatial shift in stock, in response to elevated water temperatures

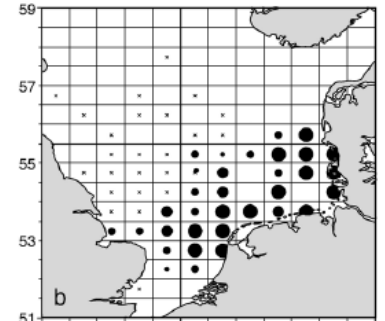


1902-1909

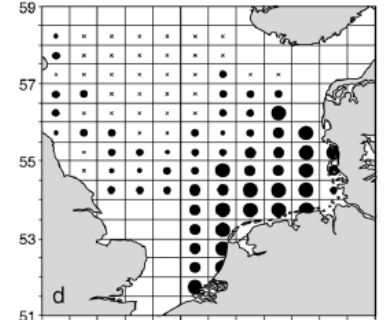
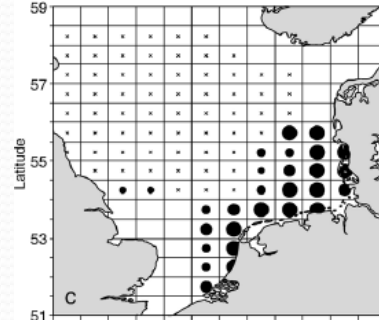
15-19 cm



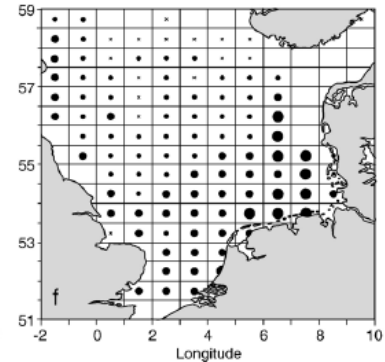
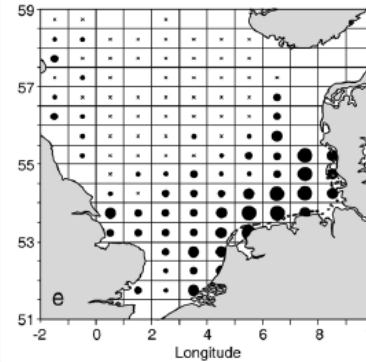
20-29 cm



1983-1987



1999-2003





British Columbia

- Purpose
 - “Freezing the footprint” of the groundfish trawl fishery, primarily to protect coral and sponge areas and to reduce habitat impacts, including representative habitats of all types, through an agreement between industry and conservation groups
 - Many other closures, including 164 inshore Rockfish Conservation Areas, seasonal spawning closures, and traditional First Nations fishing areas
- Context
 - ITQs since 1997, after a period of continual TAC overruns, large amounts of discarding
 - 100% at-sea and dockside monitoring
 - Sponge and coral bycatch limits and allocation
 - Besides a couple of rockfish species, most species in B.C. are not overfished

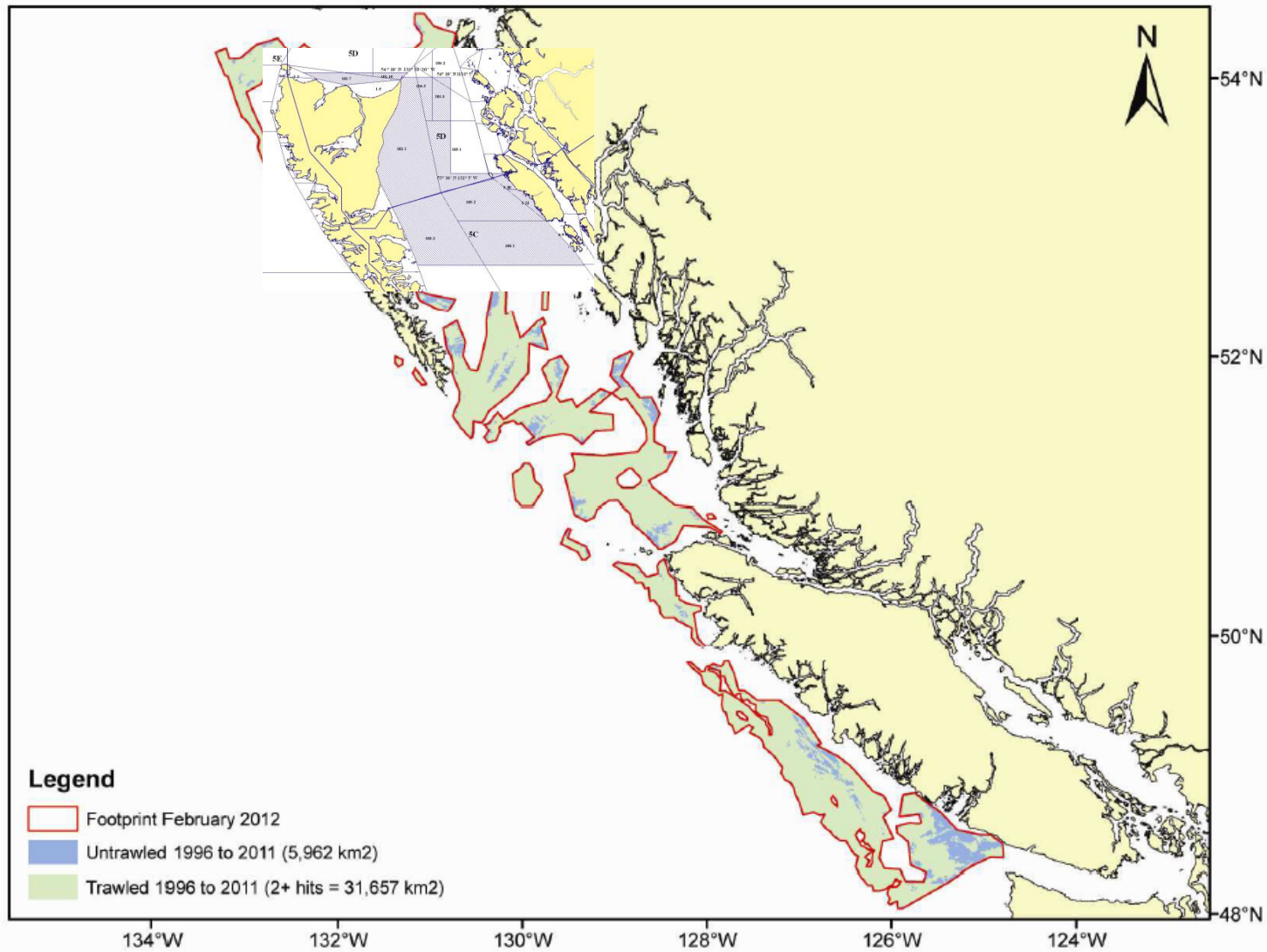


Figure 2. Trawled and untrawled areas within Option A groundfish bottom trawl boundaries.



Summary

- Purpose of closures
 - Protection of juveniles, usually from discarding, not juvenile habitats per se
 - Seasonal spawning closures
 - Closures protecting vulnerable, unique, or representative habitats
- Outcomes
 - Some closures did not lead to stock rebuilding
 - In almost all cases, saw increases for marketable sizes of target species in year-round closures
 - In all cases, ancillary effects on other, non-target species
- Context
 - Areas with a network of spawning and juvenile areas (Iceland) seemed to perform better than single areas (Plaice box, Scotian Shelf)
 - Factors outside of closed areas were identified as important in evaluation, especially changing stock productivity (e.g. growth) and changing environmental factors leading to species shifts

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