BSAI SAFE Report December 2007

W. Bering

Navarin

Commander Is.

Central Bering Sea

Eastern Bering Sea

Aleutian Islands Region

Bogoslof

Gulf of Alaska

BSAI Groundfish FMP Team
North Pacific Fishery Management Council

BSAI Plan Team Members
(13 Members in 2007)

NPFMC -- Jane DiCosimo (Plan Coordinator)

NMFS (AFSC) --Loh-Lee Low (Chair)
Mike Sigler (Vice Chair)
Grant Thompson
Lowell Fritz
Kerim Aydin
Dan Lew
NMFS (Region)Andy Smoker
USF&W -- Kathy Kuletz
ADF&G -- Ivan Vining (New Job, Resigned)
Dave Carlile
Univ.Alaska-- Brenda Norcross
WDF&W -- Theresa Tsou
Halibut Comm-Steve Hare

Safe Documents

1. Summary (Appendix A)
2. Status of Stocks Chapters
3. Ecosystems Considerations Chapter
4. Economics Chapter

2007 BSAI SAFE Reports
Many Contributors
from Various Agencies and Universities

35 Authors for Status of Stocks Section
97+ Contributors for Ecosystems Section
10+ Authors for Economics Chapter

Most Authors presented their reports to the Plan Team at its November 13-16 meeting

Stock Assessment Theme
Definition of ABC and Overfishing Levels
Appendix A Plan Team Summary, Pages 7-8

1. Determine Biomass from
   -- Surveys….Trawls, Hydroacoustics, Longline, etc.
   -- Models…..Mainly Age Structured Models

2. Determine Exploitation Rates
   (Fishing Control Rules of 6-Tier System)

Goal: Apply Specific Exploitation Rates on Estimated Biomass

Fishing Control Rules

Based of Quality of Data

(Page 8 of SAFE Plan Team Summary in Appendix A)

Tier 1 -- Reliable B, Bmsy, pdf of Fmsy

Tier 2 -- Reliable B, Bmsy, Fmsy, F35, F40

Tier 3 – Reliable B, B40, F35, F40

Tier 4 – Reliable B, F35, F40

Tier 5 -- Reliable B and M

Tier 6 – Reliable Catch History Data

Parameters of Special Attention

Biomass Levels:

Bmsy (of the exploitable population)

FSB (Female Spawner Biomass)

Fishing Mortality Rates:

-- F *overfishing ……. **Example** F 35%*

-- F *abc* …………… **Example** F *40%*

Ecosystem Considerations

- **Most chapters now have EC sections**
  - **Have extended discussions**
  - **Data and analyses incorporated**

- **Analyses have added effects of regime shifts on recruitment**
  - **Cod, all flatfish except turbot and "other**

- **EBS was cold again in 2007 as in 2006**
  - **Ice extent was fuller and ice retreat was later**
  - **Transition from warmer 1989-2005 period into another regime?**
 - **Indications of better gadid recruitment**

Alaska Fisheries Catch 2006
## Catch Weight = 2,578,700 MT
Catch Value = $1.35 Billion

Weight

- Groundfish 85 %
- Herring 1.4 %
- Salmon 11 %
- Shellfish 1.3 %
- Halibut 1.3%

Value

- Salmon 20 %
- Herring 0.5 %
- Shellfish 9 %
- Halibut 14%
- Groundfish 56 %

Dollar Value of Alaska's Fisheries has actually dropped
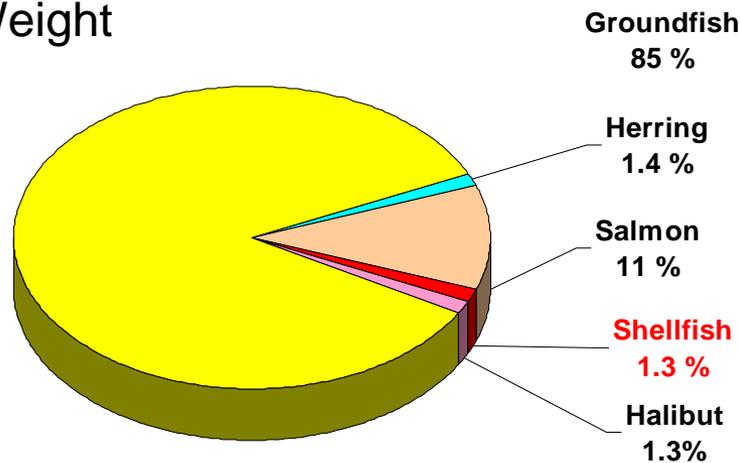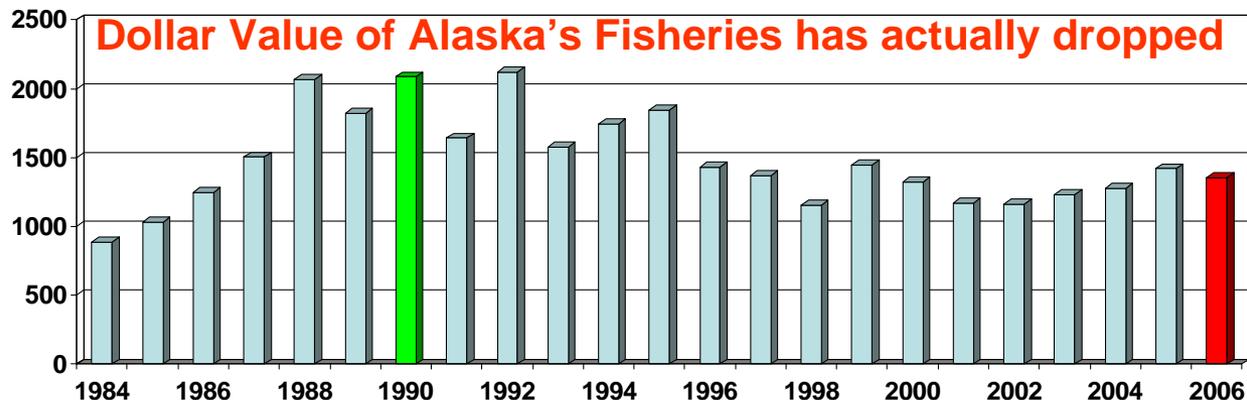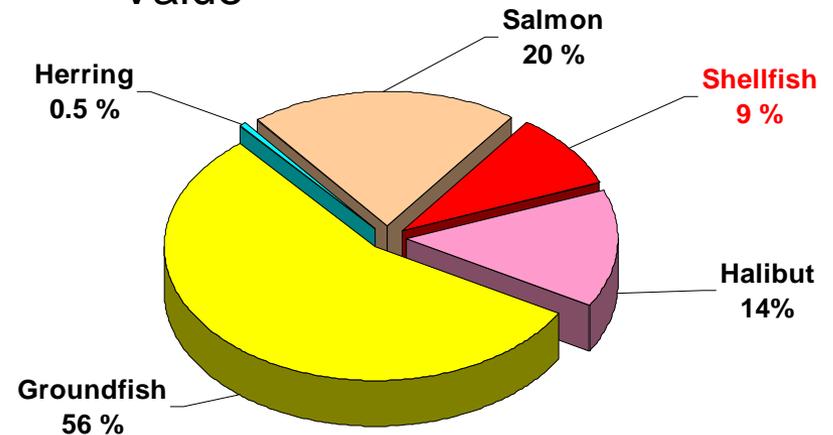
53-Year Catch History of Total BSAI Groundfish 1954-2007 (Thousands of MT)
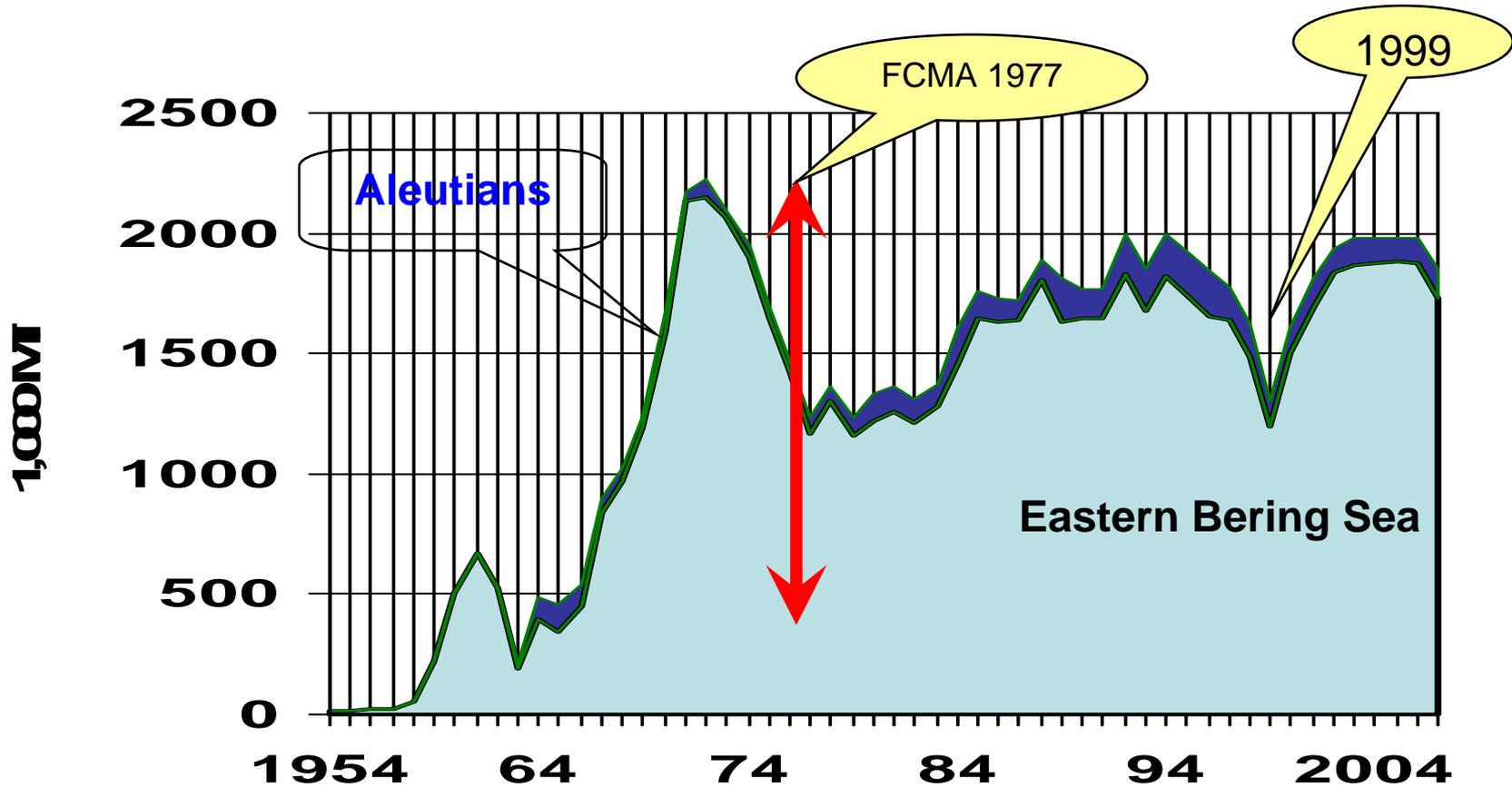
AFSC 2004 Groundfish Survey Effort
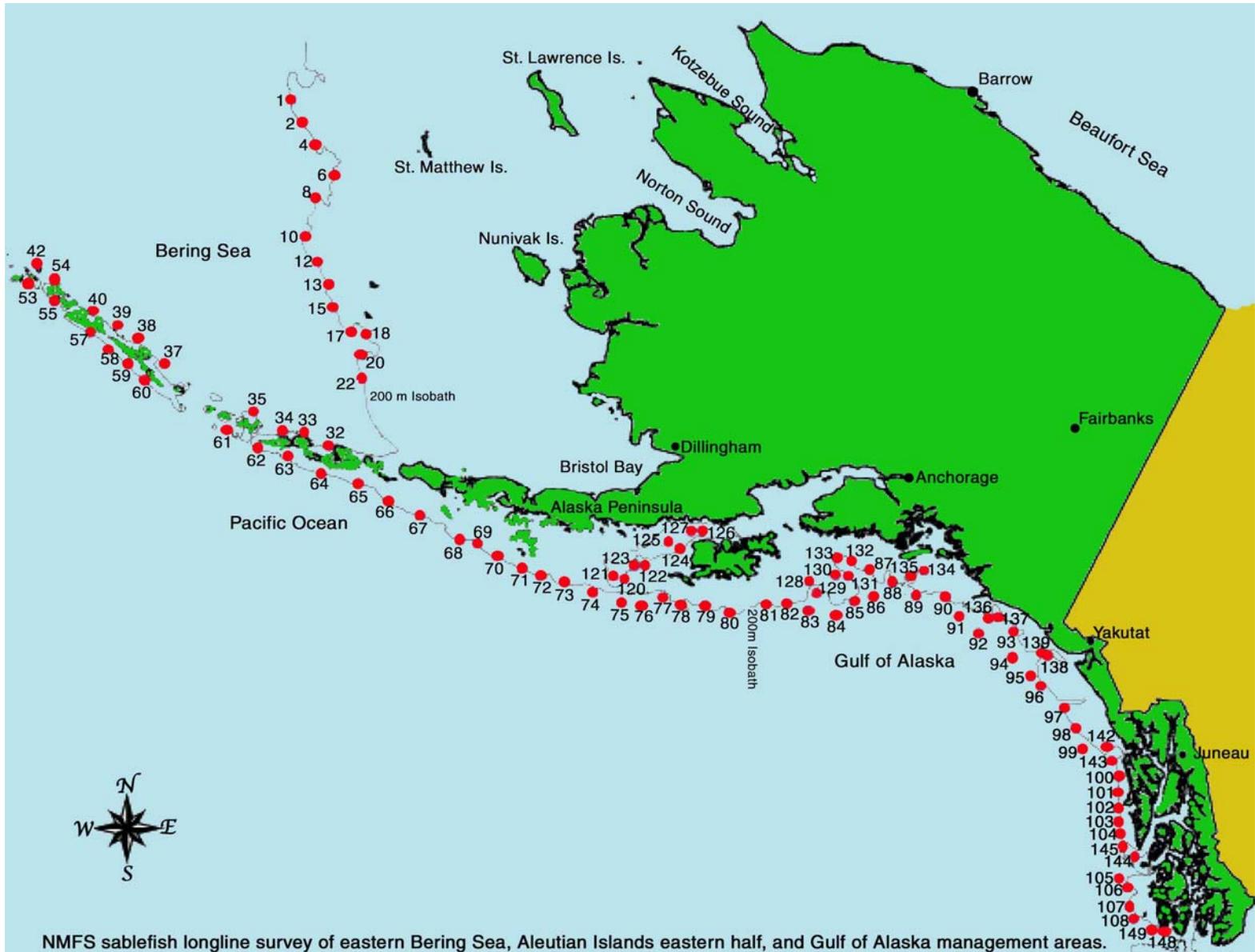
Eastern Bering Sea
Shelf Survey - 413 hauls

Eastern Bering Sea Upper
Continental Slope Survey - 240 hauls

Aleutian Islands Survey - 472 hauls

ALASKA

ALASKA PENINSULA

Legend

VESSEL

- Arcturus
- Aldebaran
- Northwest Explorer
× Sea Storm
× Gladiator

0   62.5   125   250   375   500
Miles

Sabelfish Longline Survey

NMFS sablefish longline survey of eastern Bering Sea, Aleutian Islands eastern half, and Gulf of Alaska management areas.

Average Bottom temperature, 1982-2007
Eastern Bering Sea NMFS Standard Survey Stations
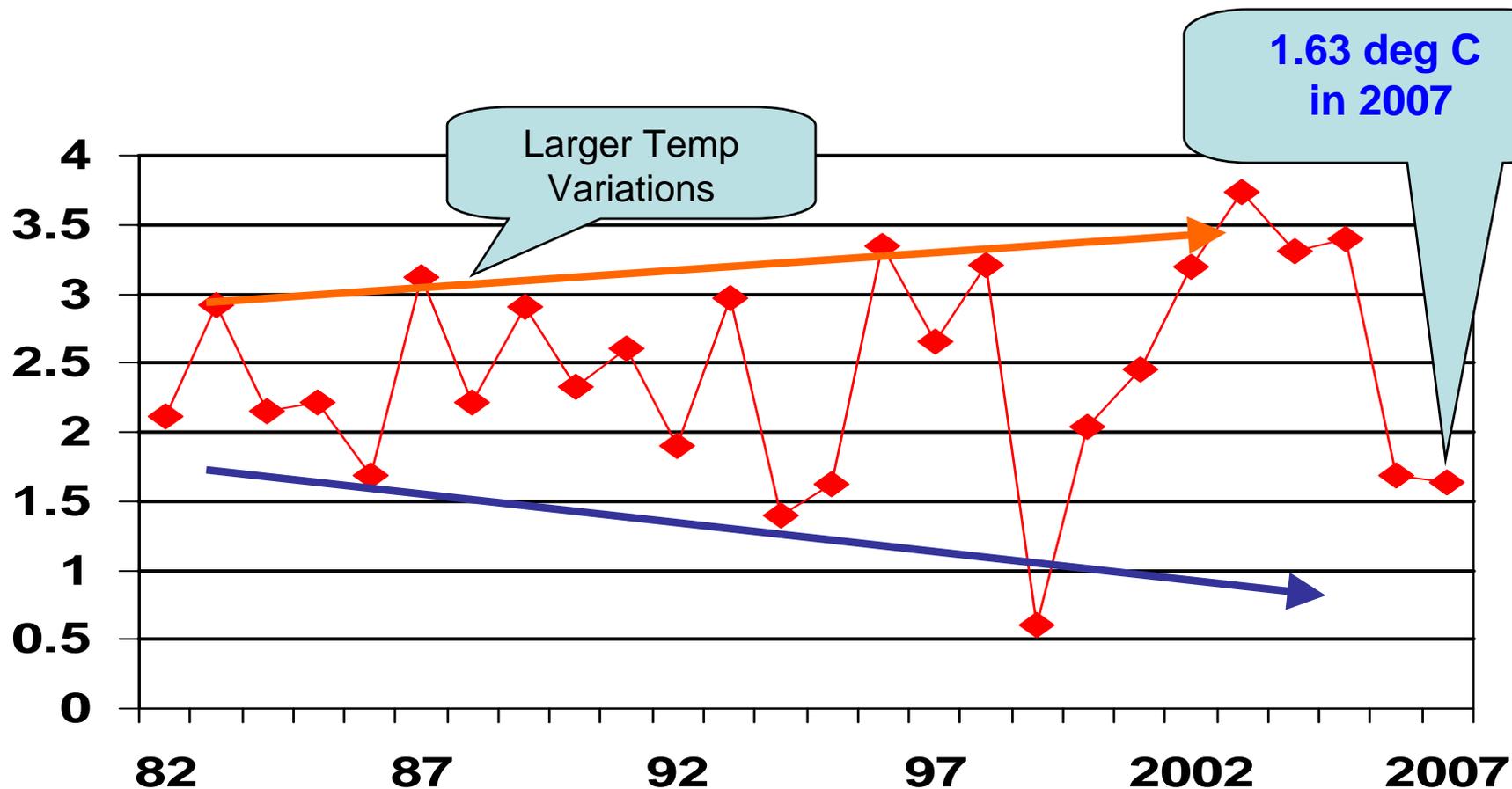
# Sea Bottom Temperature Profiles from Surveys, 2004-2007

Warmer 2004-05

Colder 2006-07
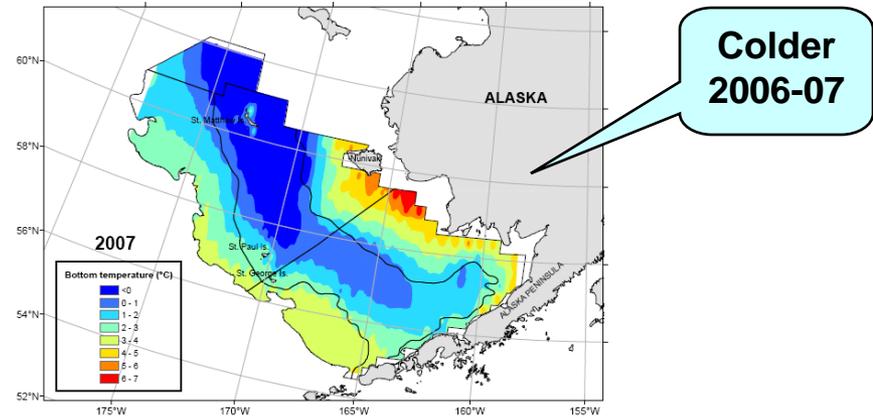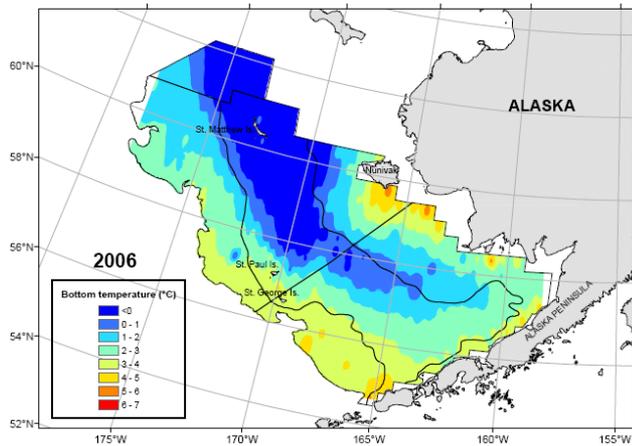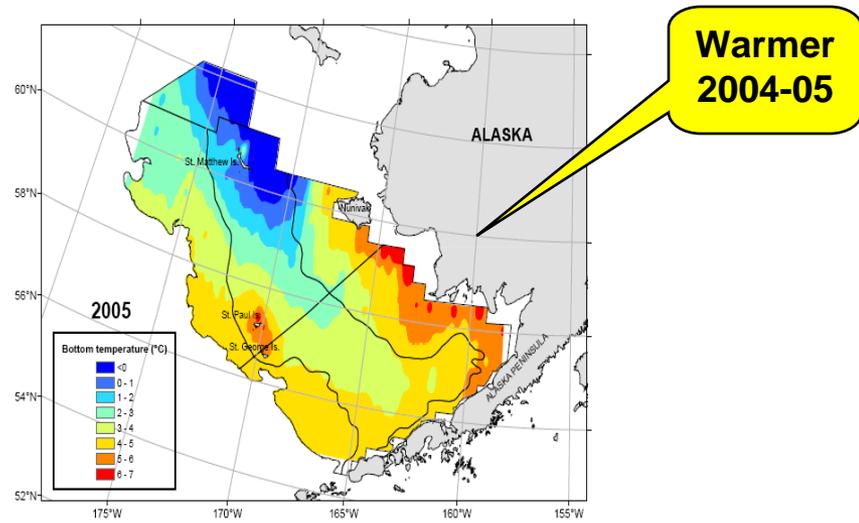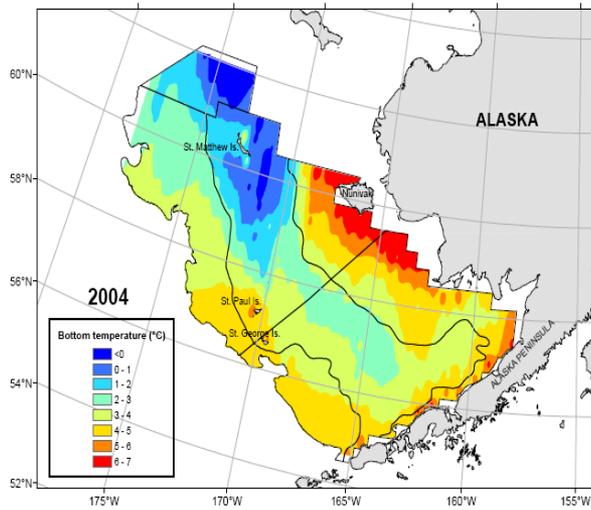
Warm (2003) vs Cold (2007) Years
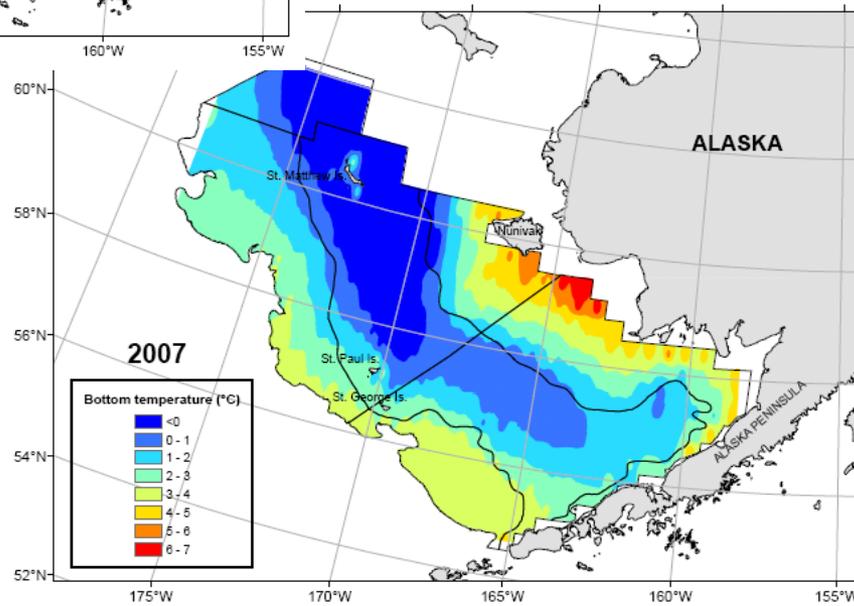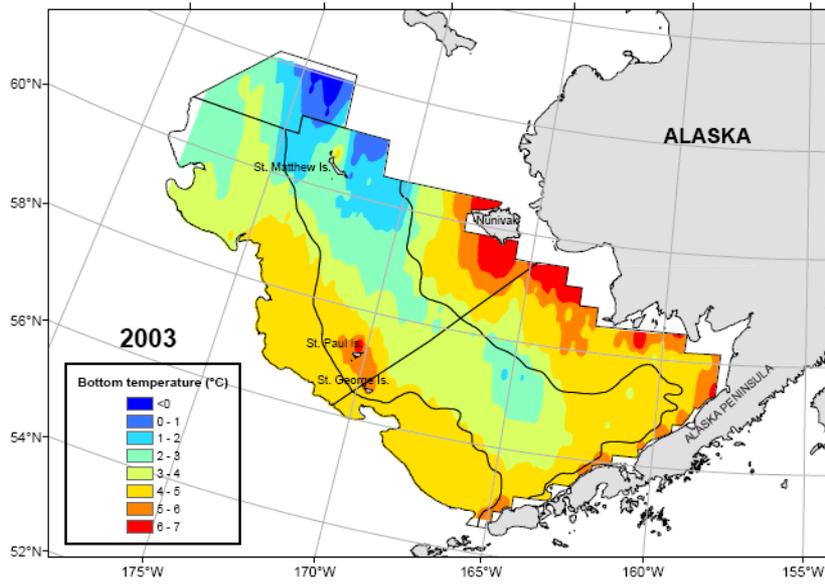
Overview of
Exploitable Biomass

By
Major Species Groups

Summary Result of Dec 2007 Assessment
BSAI Exploitable Biomass
Year 2008 Total = 16.6 MMT
(down 2.5% from last year)

Flatfish 54%

Pacific Cod 7%

Pollock-Bogoslof 2%

Pollock-AI 1%

Pollock-EBS 26%

Sablefish 0%

Rockfish 4%

Atka Mackerel 2%
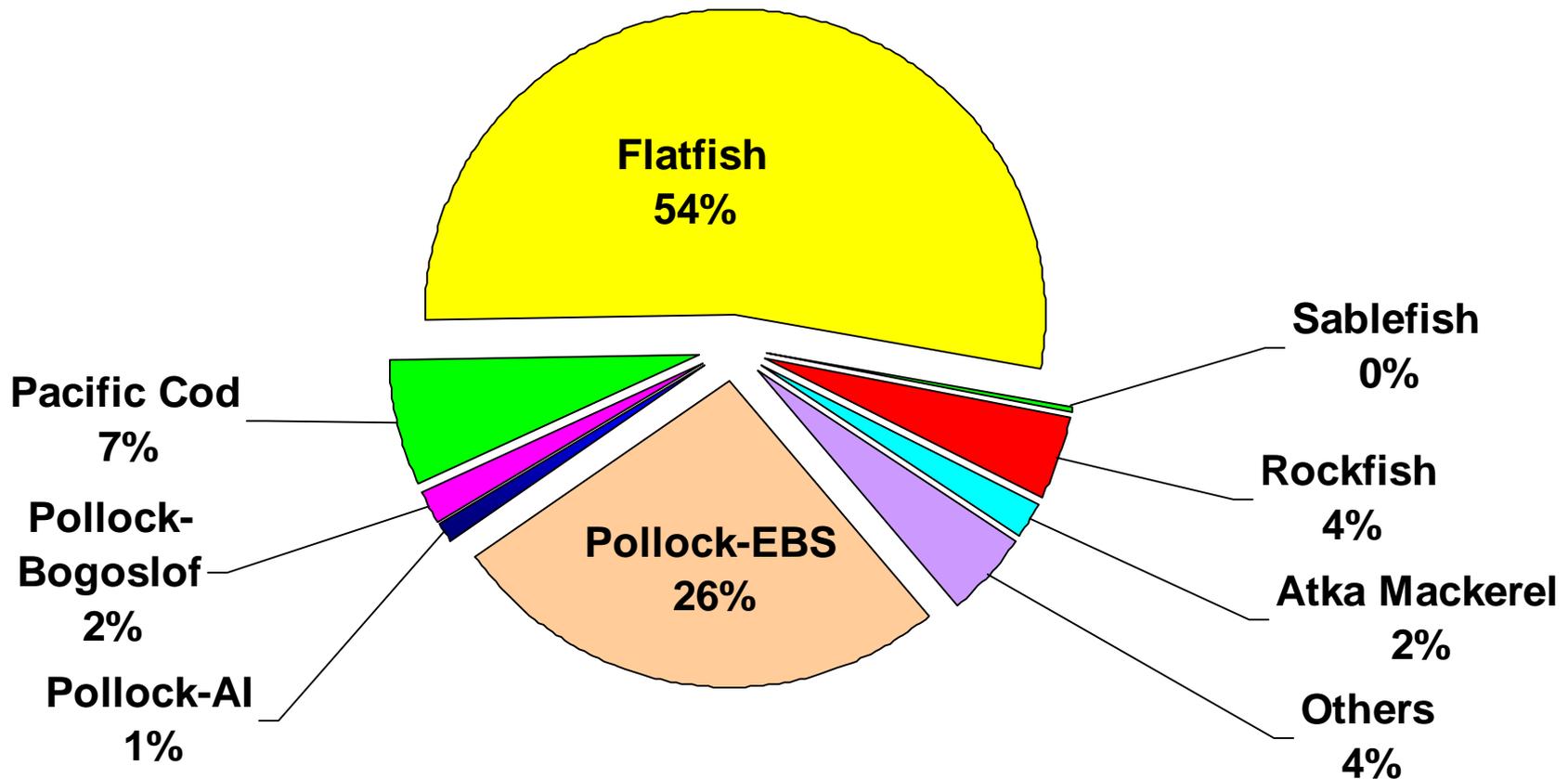
Others 4%

BSAI Groundfish Biomass, Changes by Major Groups

- Gadids (down 1.7 mmt, down 23%)
- Flatfish (up 1.4 mmt, up 18%)
- Rockfish (Unchanged)
- Others (up 0.4 mmt, up 3%)
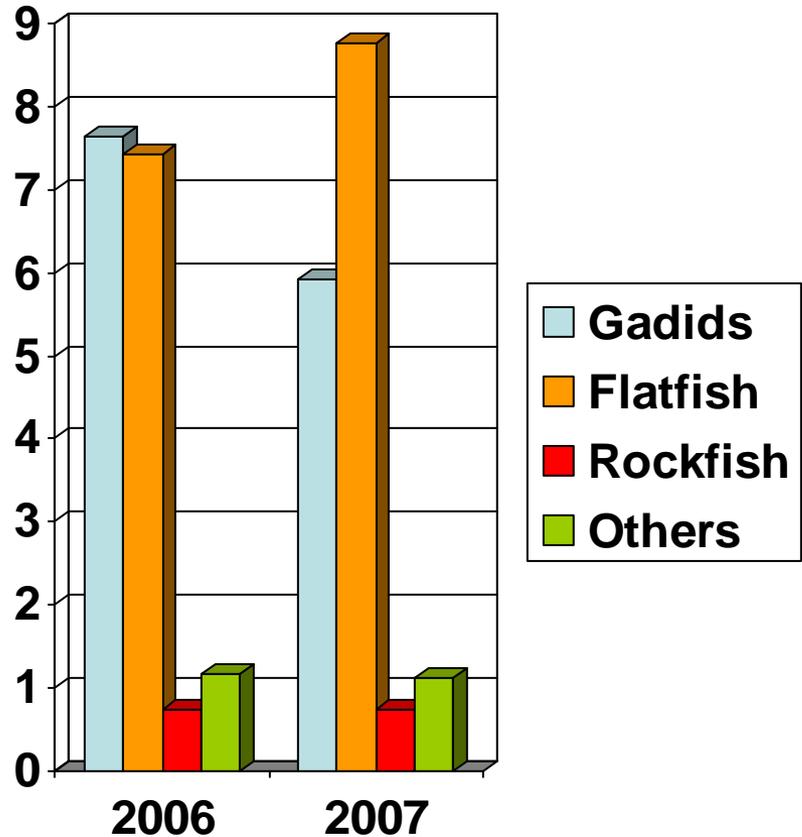
Nov 2007 Assessment
BSAI Flatfish Complex Biomass
Year 2007 Total = 8.784 MMT
(up 18 % from last year)

Arrowtooth Flounder 17 %

Flathead Sole 12 %

Other flatfish 2 %

Greenland Turbot 2 %

Yellowfin Sole 27 %

Rock Sole 22 %

Alaska Plaice 18 %
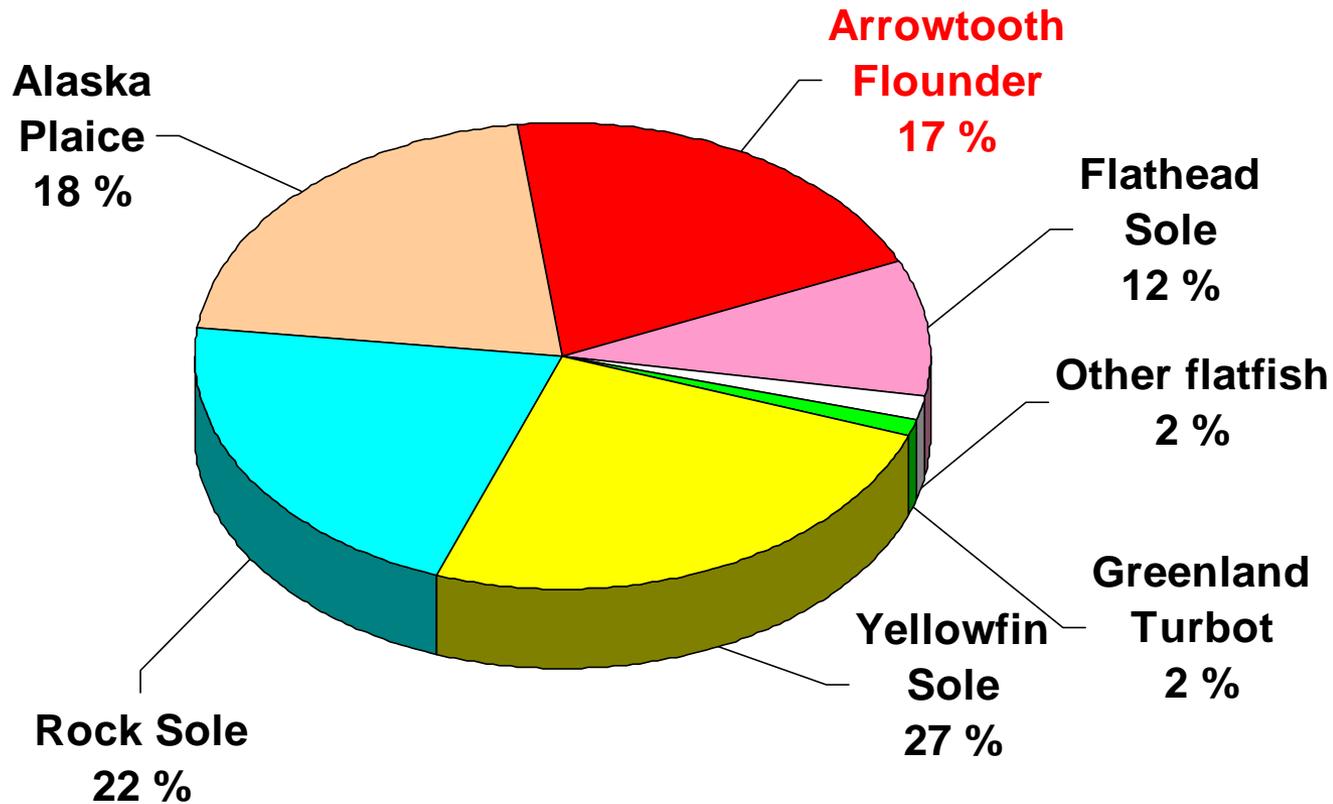
Nov 2007 Assessment
BSAI Rockfish Complex Biomass
Yr 2007 Total = 731,400 MT
(No Sig. Update, minor or no change)

Northern 29 %

Others 5 %

Shortraker 3 %

Rougheye 1 %

POP 62 %
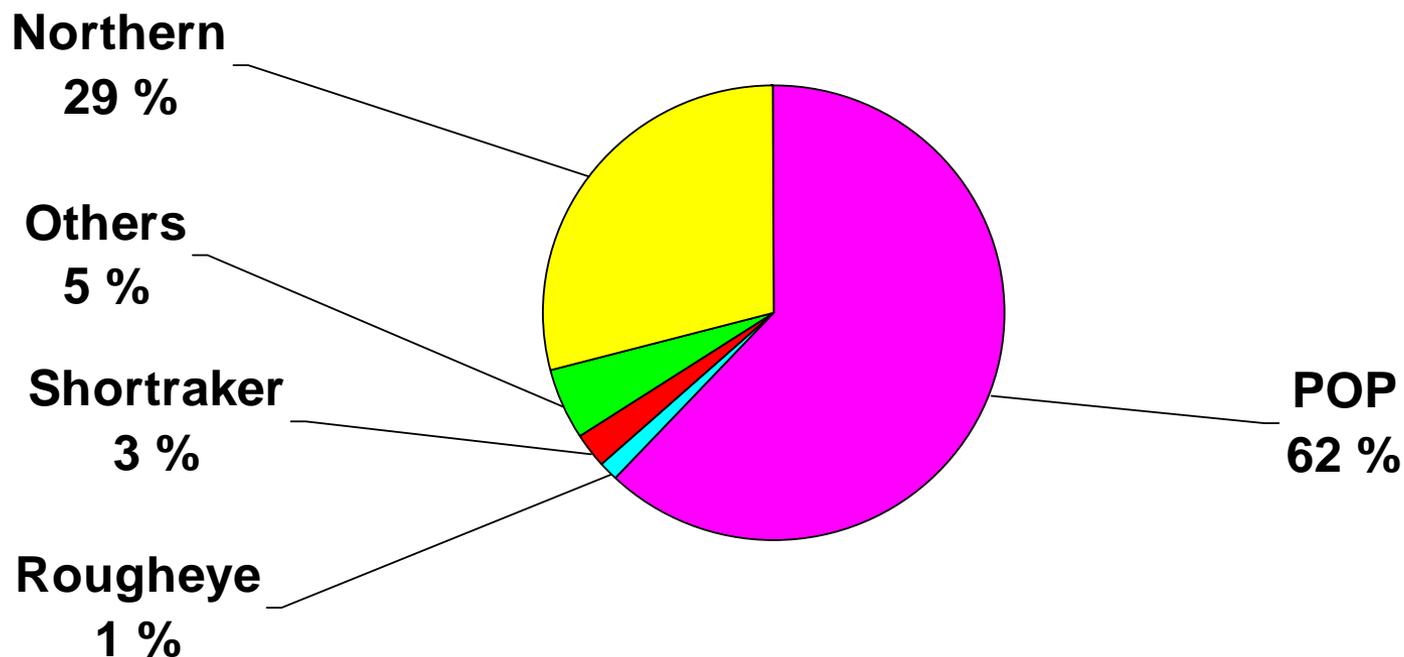
Plan Team's Estimates of Biomass, OFLs and ABCs

- **Plan Team numbers are in Table 5 of Appendix A of SAFE report**
- **SSC estimates are different for 2 Species Groups – Pacific Cod and Skates**
- **General Trends of overall groundfish biomass and ABCs**
  - **Down, 8 Species/Groups (EBS pollock, Cod)**
  - **Up, 8 Species/Groups (6 Flatfish Species)**
  - **Essentially unchanged, Rockfish group & Squid**

Summary (Pollock)
(From Table 5,Team Summary Appendix A)

Stock	Biomass (mt)	ABC (mt)	ABC Change from 2006
Pollock, EBS	4,360,000	1,000,000	Down 23%
Pollock, AI	197,000	28,200	Down 37%
Pollock, Bogoslof	292,000	7,970(SSC)	Up 53 %

Summary (Cod and Sablefish)
(From Table 5,Team Summary Appendix A)

Stock	Biomass (mt)	ABC (mt)	ABC Change From 2006
Pacific Cod, BSAI	1,080,000	150,000 (SSC=176,000)	Down 15%
Sablefish, EBS	41,000	2,860	Down 4 %
Sablefish, AI	34,000	2,440	Down 13 %

Summary (Flatfishes)

(From Table 5, Team Summary Appendix A)

Stock	Biomass (mt)	ABC (mt)	ABC Change from 2006
YellFn. Sole	2,200,000	248,000	Up 10 %
Grn. Turbot	104,100	2,540	Up 4%
Arrow. Fl.	1,280,000	244,000	Up 54 %
N.RockSole	1,880,000	301,000	Up 52 %
Flathead S	820,000	71,700	Down 9%
Alaska Plaice	1,850,000	194,000	Up 2 %
Other Flats	150,000	21,600	Up 1 %

Summary (Rockfishes)
(From Table 5,Team Summary Appendix A)

Stock	Biomass (mt)	ABC (mt)	ABC Change From 2006
POP, BSAI	453,000	21,700	Up 1 %
Northern R	212,000	8,190	No Update
ShortRaker	18,900	424	No Update
Rougheye	10,800	202	No Update
Other Rock	36,700	999	No Update

Summary (Atka Mackerel & Other Species)

(From Table 5,Team Summary Appendix A)

Stock	Biomass (mt)	ABC (mt)	ABC Change From 2006
Atka Mackerel	323,000	60,700	Down 18 %
Squid	NA	1,970	No Change
Other Species	725,600	71,800	Down 0.1%

Status of Stocks
Relative to Overfishing Levels

Bering Sea and Aleutian Islands Region

Dec 2006 Summary: No Stock was Overfished nor Approaching Overfishing

Y-axis: 2006 Catch / msy

X-axis: B 2007 /Bmsy

Pcod, POP, EBSPollock, Yellowfin, Sablefish, Atka, Nrthrn_RF, Rock_sole, Flathead, Grnlnd_turbot, AKPlaice, Arrowtooth
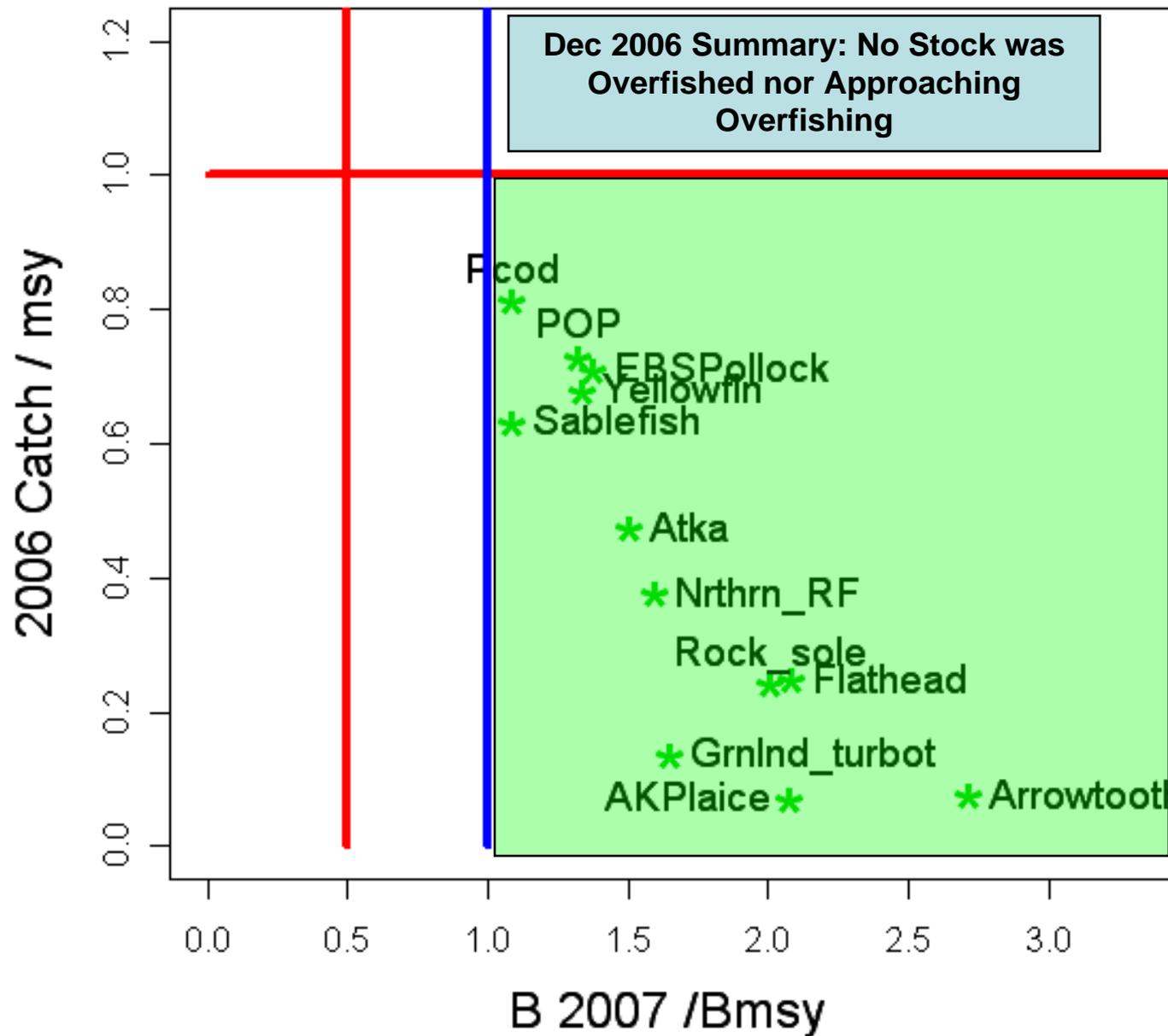
Bering Sea and Aleutian Islands Region

BSAI groundfish status relative to 2007 catch levels (vertical axis) and projected 2008 spawning biomass relative to *Bmsy* levels.

Dec 2007 Update: No stock is still being overfished nor approaching; but abundance of EBS pollock & Pcod are below Bmsy
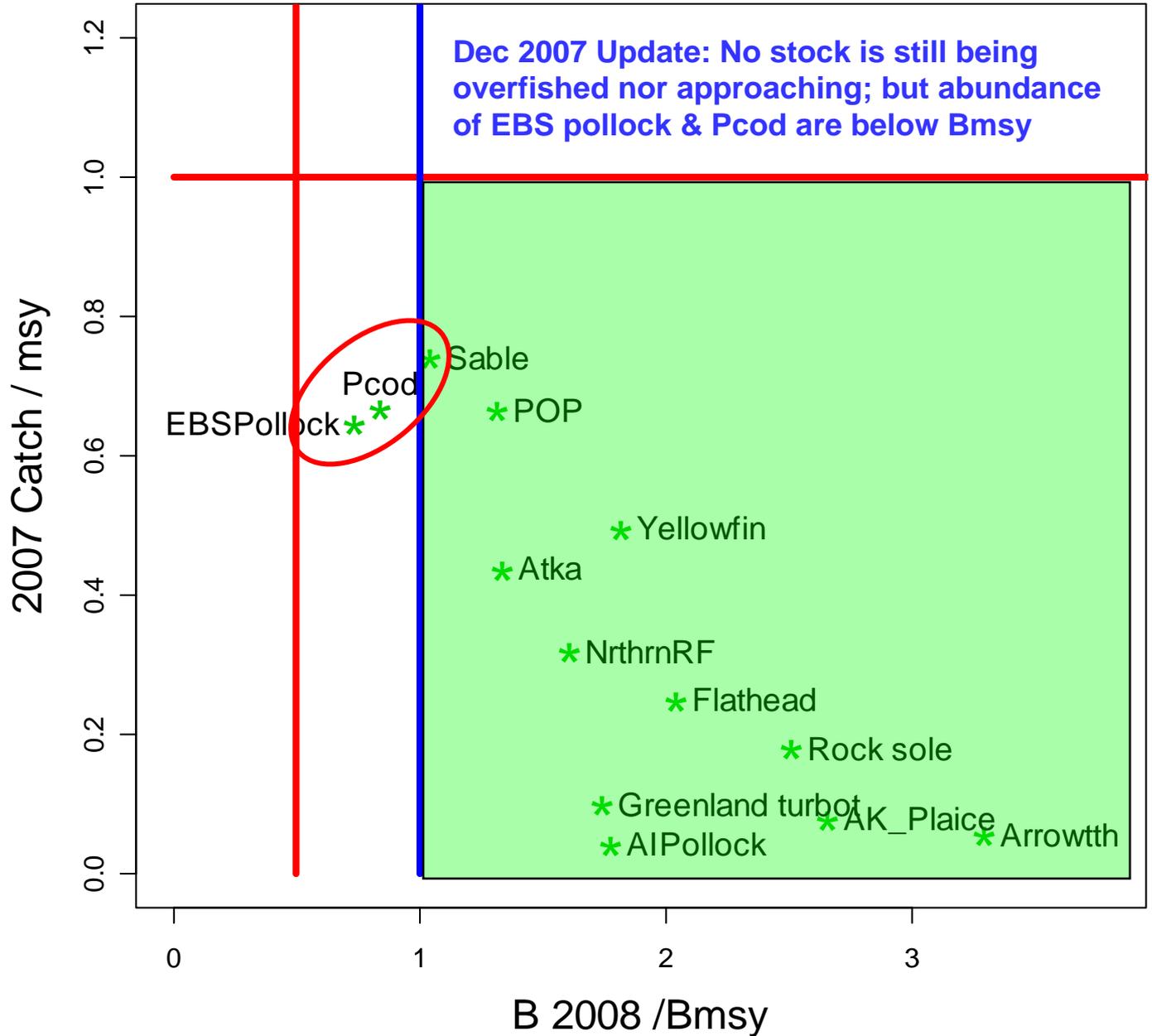
Pollock Catch by Areas, 1964-2007
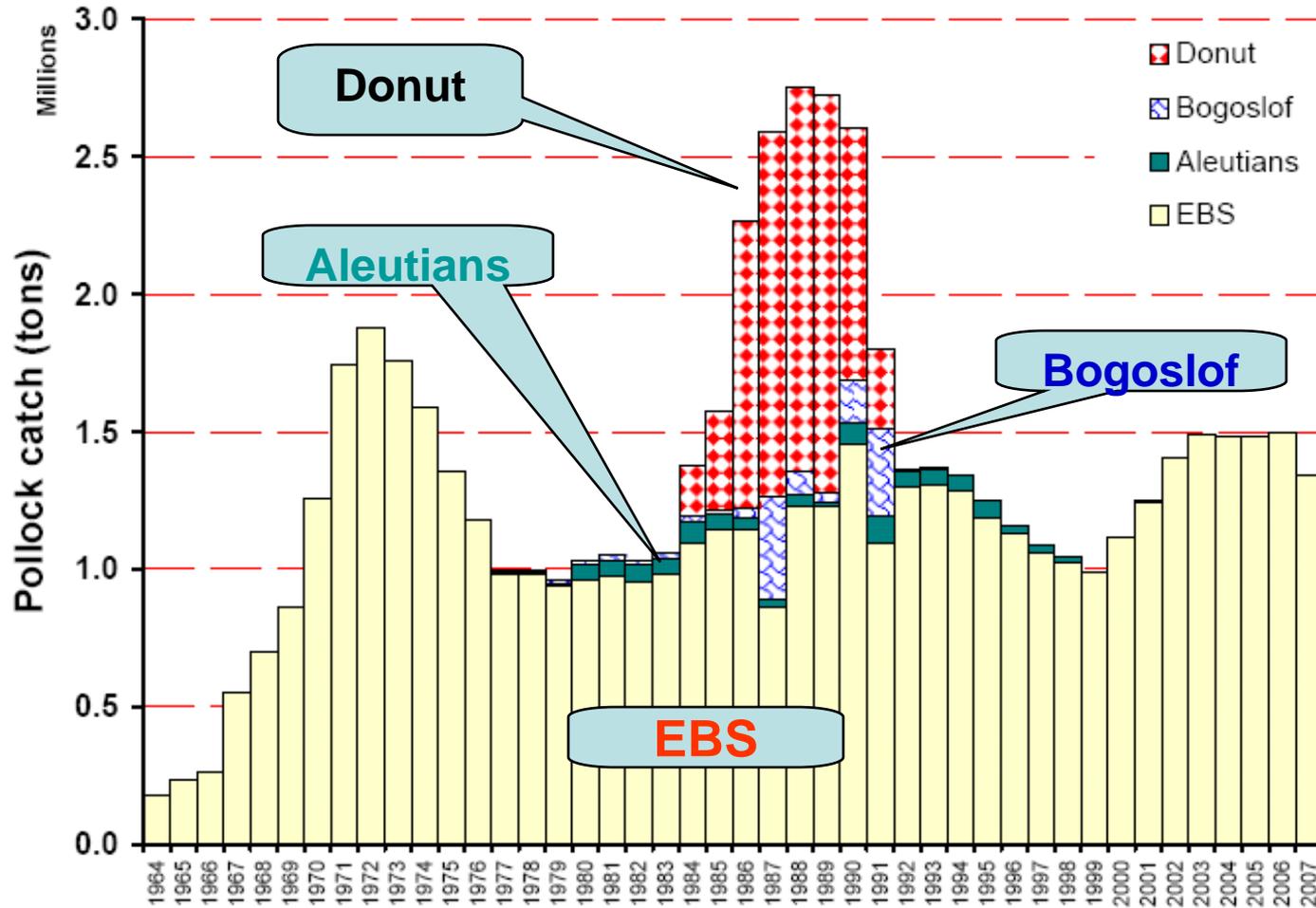
Pollock Fishery Patterns……A versus B seasons, 2007
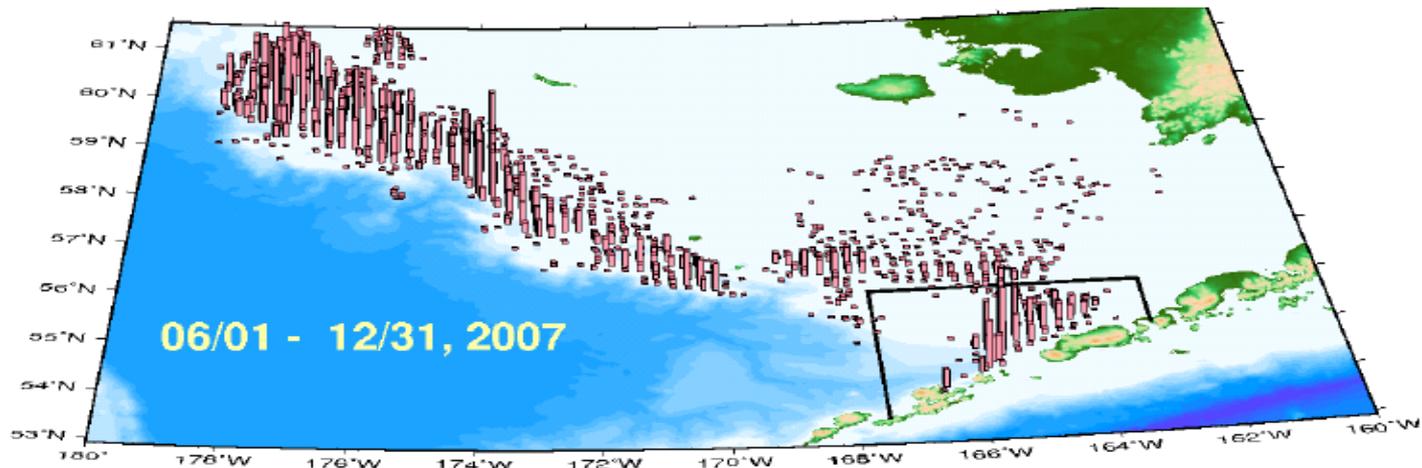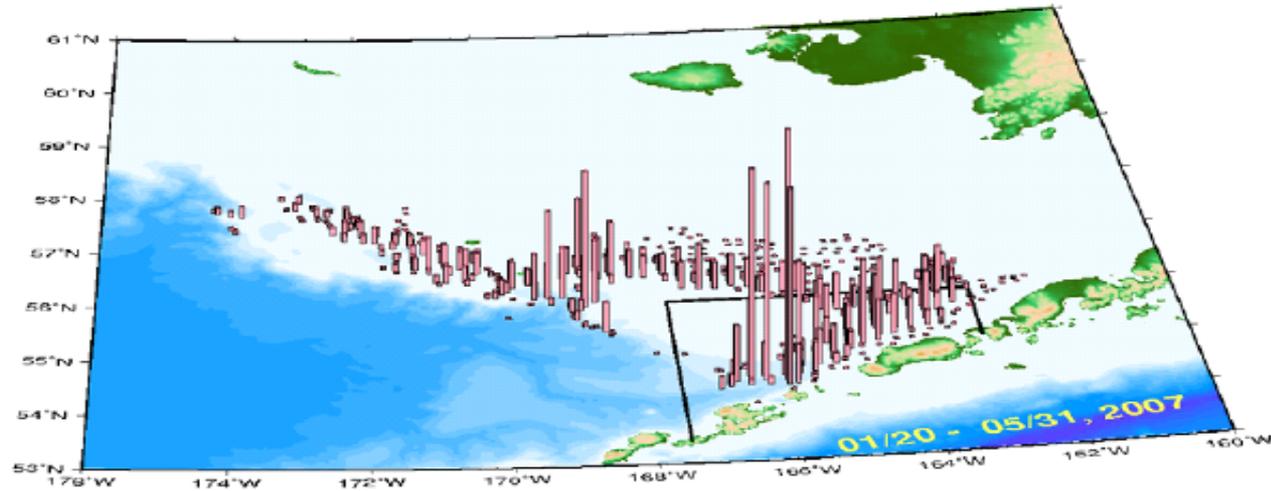
NMFS Conducted two series of Surveys on Pollock in 2007

1. Bottom Trawl survey with 2 vessels charted from Industry (Arcturus & Aldebaran)

1. Hydro-acoustic survey by NOAA R/V Miller Freeman (with Calibration with new NOAA vessel Oscar Dyson)

The role of *Miller Freeman* & *Oscar Dyson* for Echo Integration-Trawl Survey
(estimates signals 14 m from surface to 3 m off bottom)
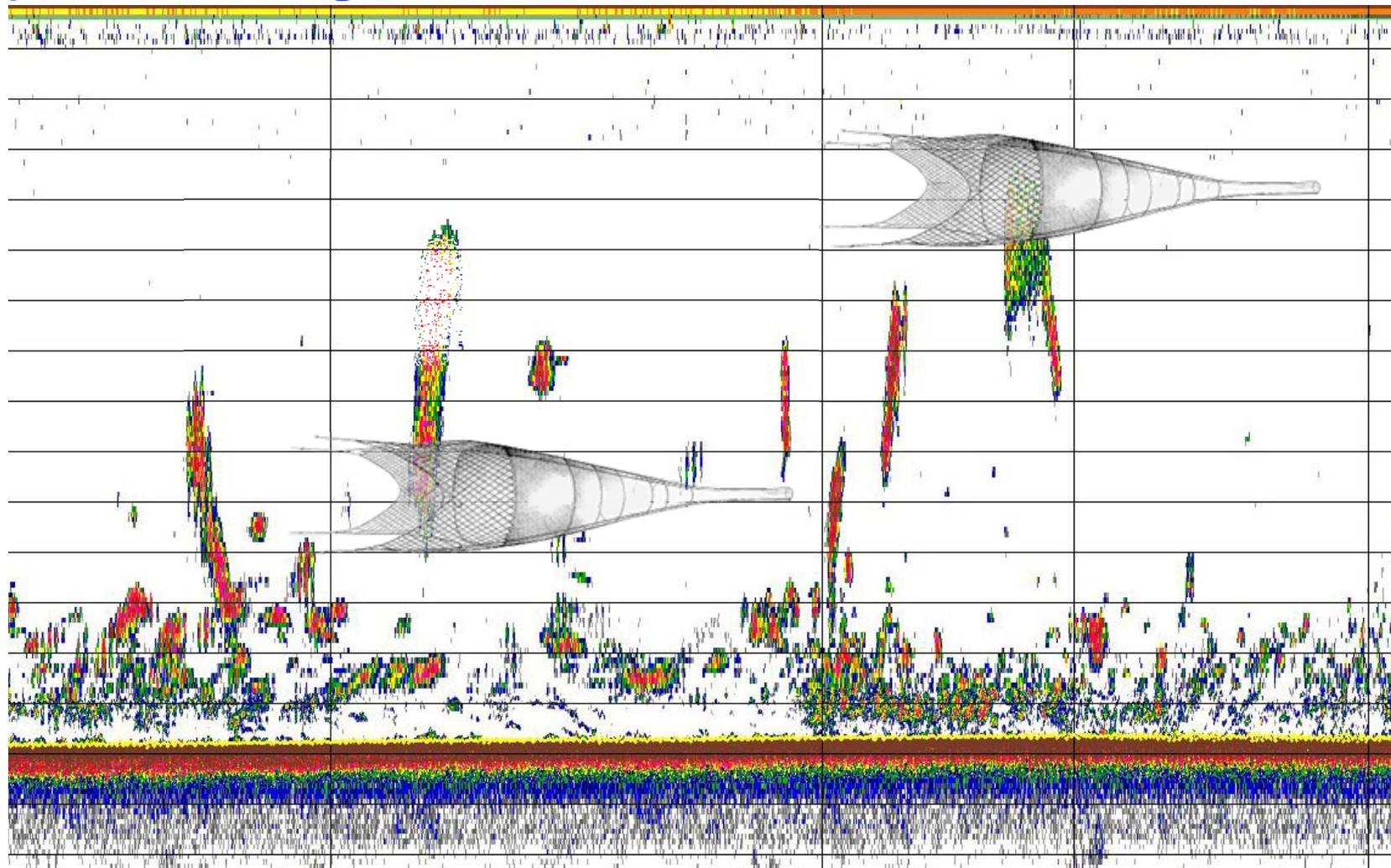
NMFS Bottom Trawl Survey Biomass Patterns, 2007
(Pollock moved to slope and farther north;
Low Catches on shelf)

BTS CPUE 2007
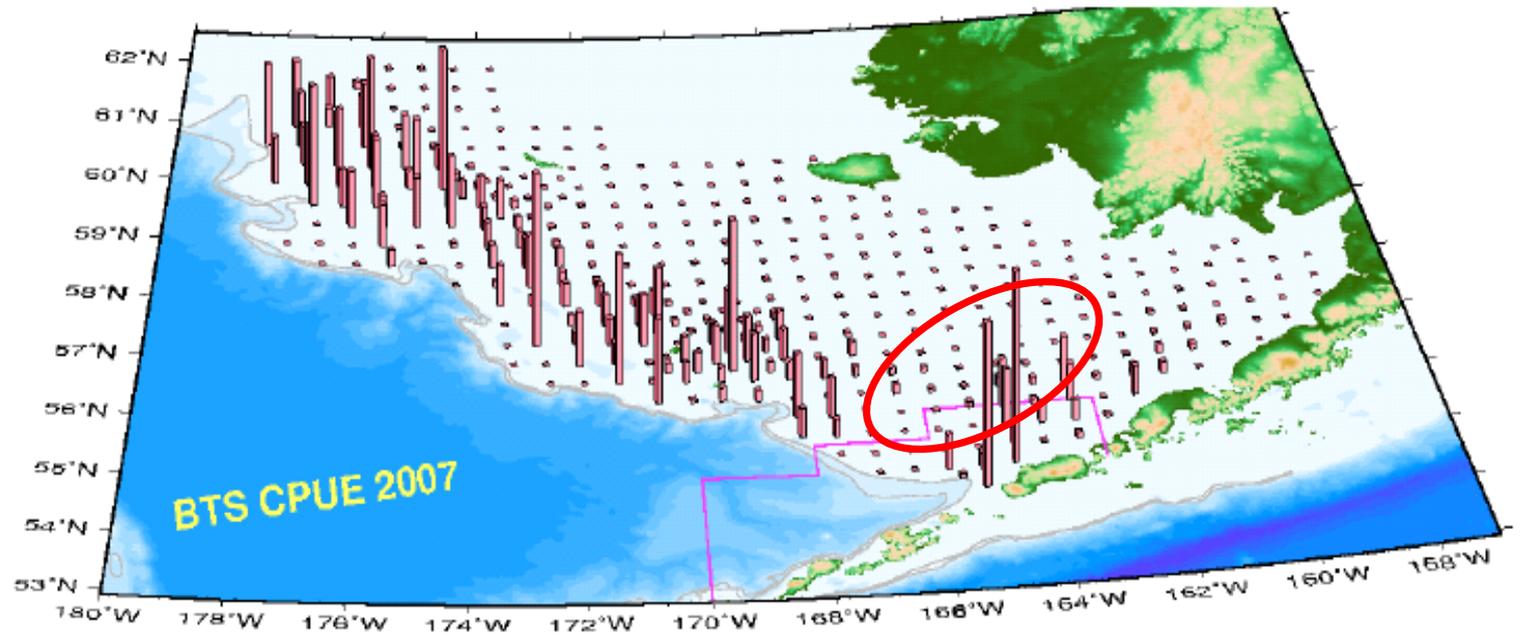
Intrusion of Cold Pool of Water into EBS Shelf in 2007

(Pollock movement due to Cold water pool?)
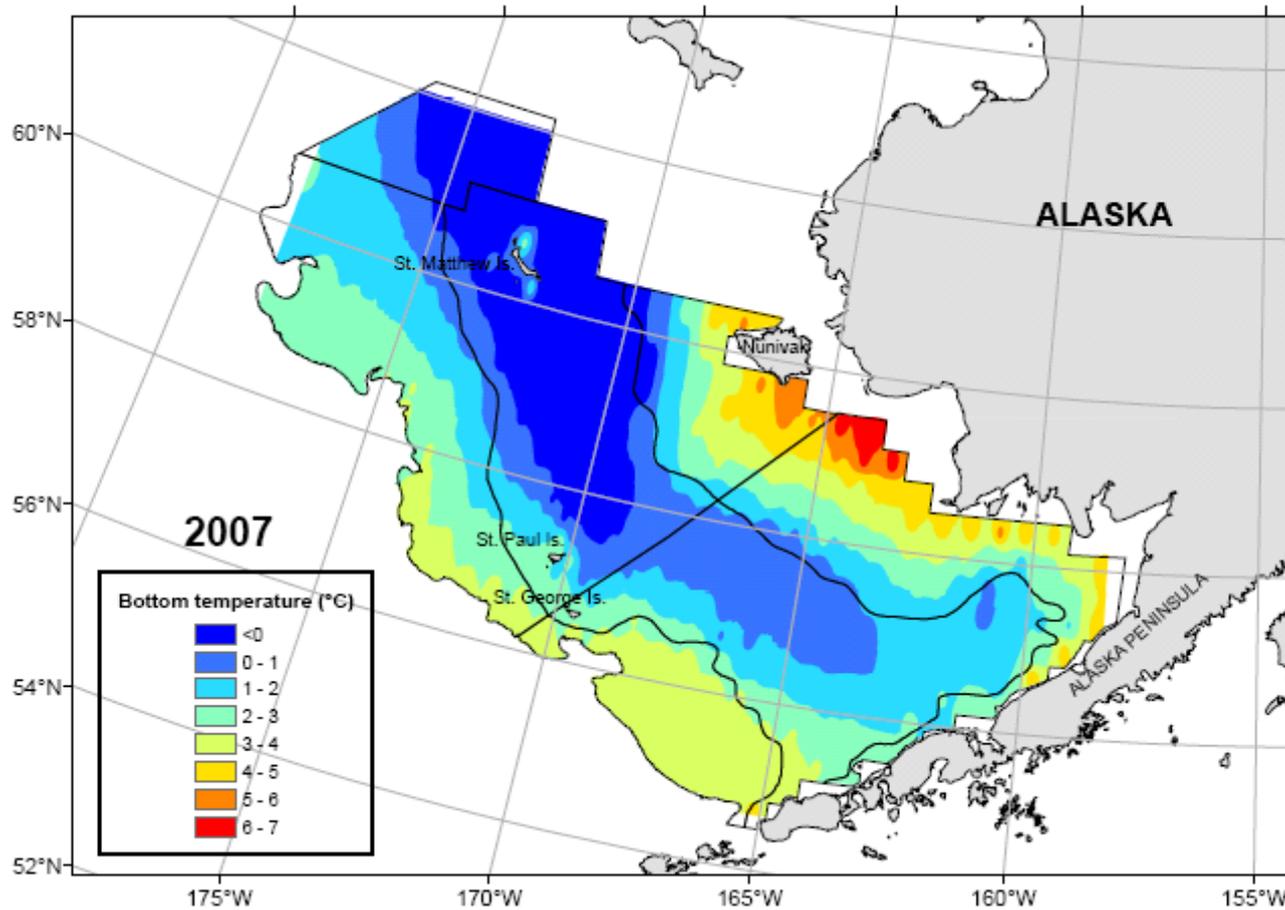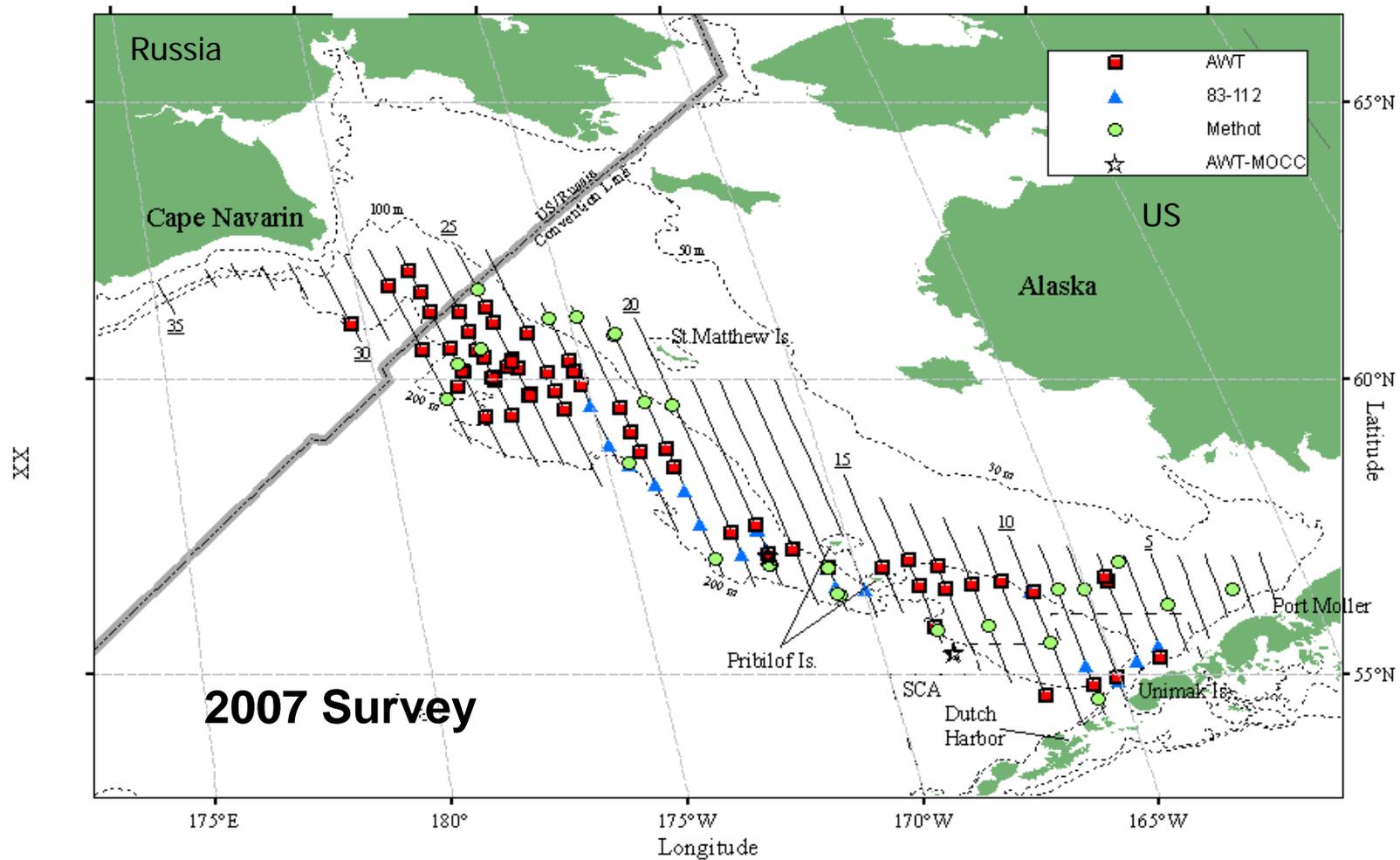
Transect and haul locations by haul type, during the summer 2007 EIT EBS survey for walleye pollock
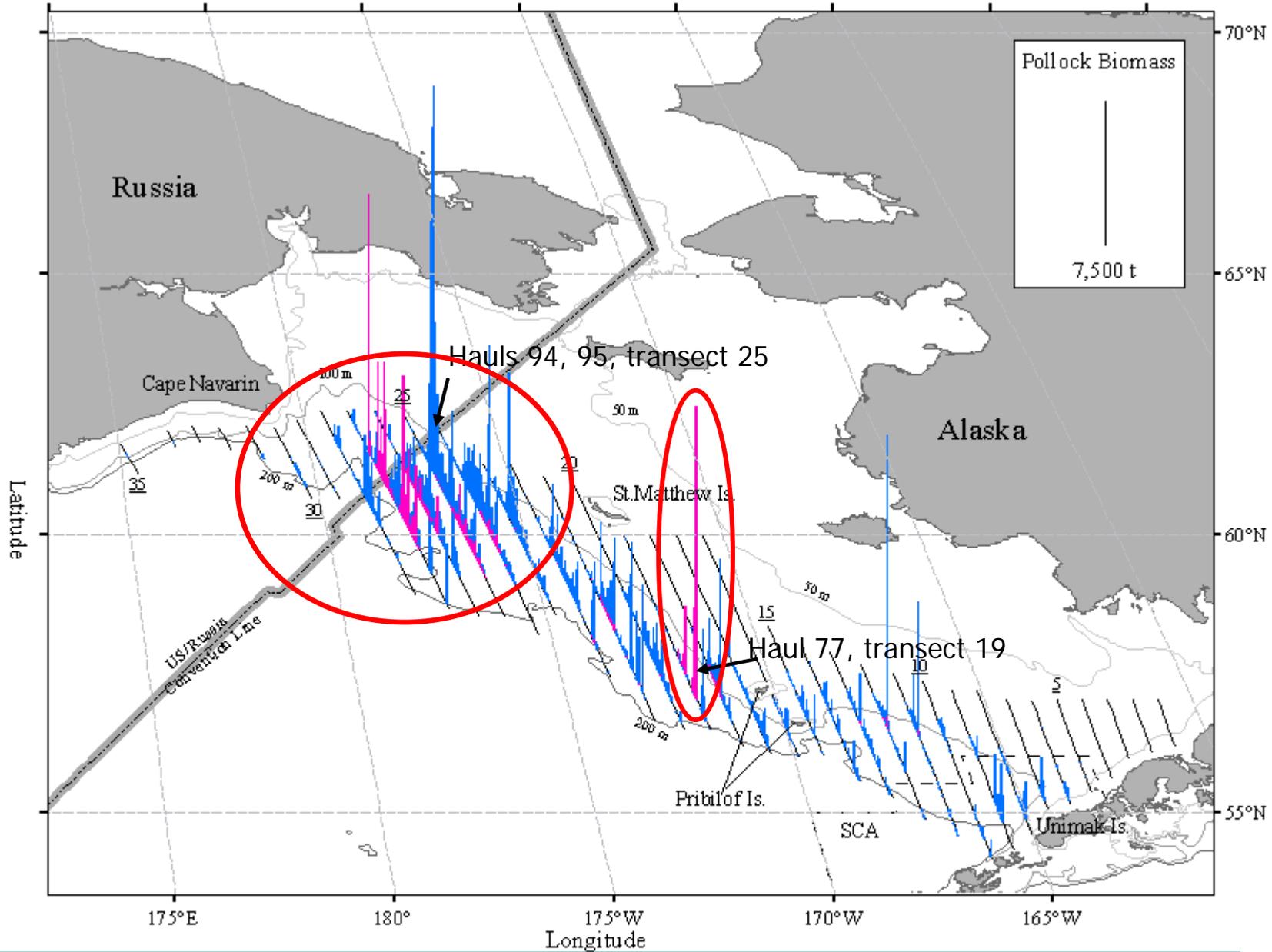
Adult (blue) and juvenile (< 30 cm FL, magenta) pollock biomass estimated between 14 m from the surface and 3 m off bottom from the summer 2007 EBS EIT survey

2006 Survey
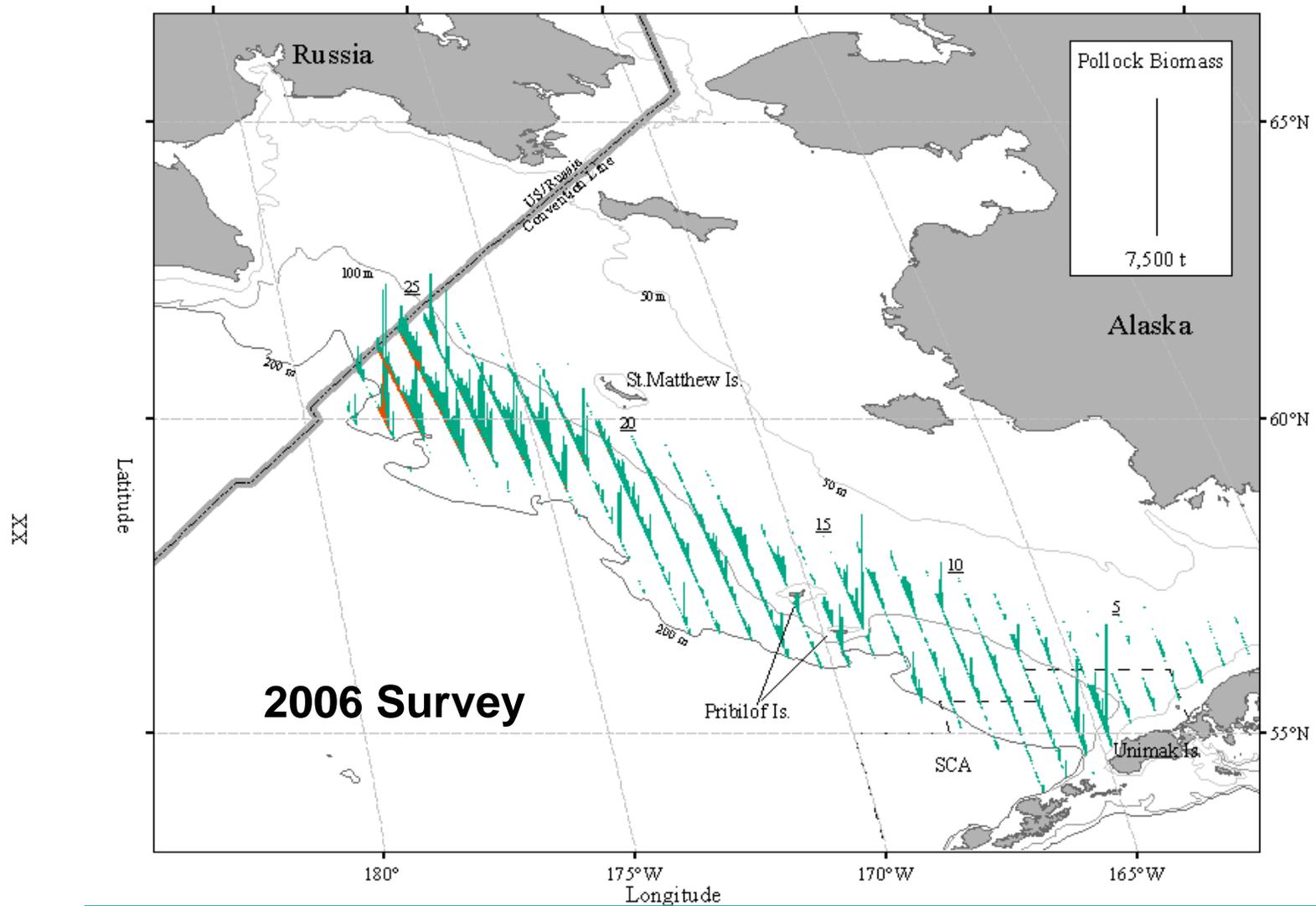
Adult (green) and juvenile (<30 cm FL, orange) biomass estimated between 12 m from the surface and 3 m off bottom from the 2006 EBS EIT survey of walleye pollock

EBS Pollock Surveys - Notable Features (#1)

1. **Biomass from Surveys**
   1. **Bottom Trawl Biomass = 4.3 mmt, up 42% from 2006 survey; but only 87% of LT mean**
   2. **EIT survey Biomass = 1.88 mmt, up 20% from 2006 survey but only 55% of LT mean**

Question: Why recent declines in biomass?

..Colder ocean temperatures moved fish twrds slopes

..Lower abundance of pollock reflecting 5 continuous years of poor recruitment

EBS Pollock Assessment - Features (# 2)

Year 2007 Modeling -- Has 8 scenarios of Age-Structure Models

Scenario 8 with all of the data was selected by Analyst to best assess the EBS pollock stock. This model shows

- **Age3+ Biomass for 2007 = 4.36 mmt, down 31% from 2006 and lowest in the time series since 1980**

- **Spawning biomass to be 4% above Bmsy but projected spawning would be 28% below Bmsy in 2008 and remain so till at least 2010**

Model Biomass, 1964-2007 (mmt)
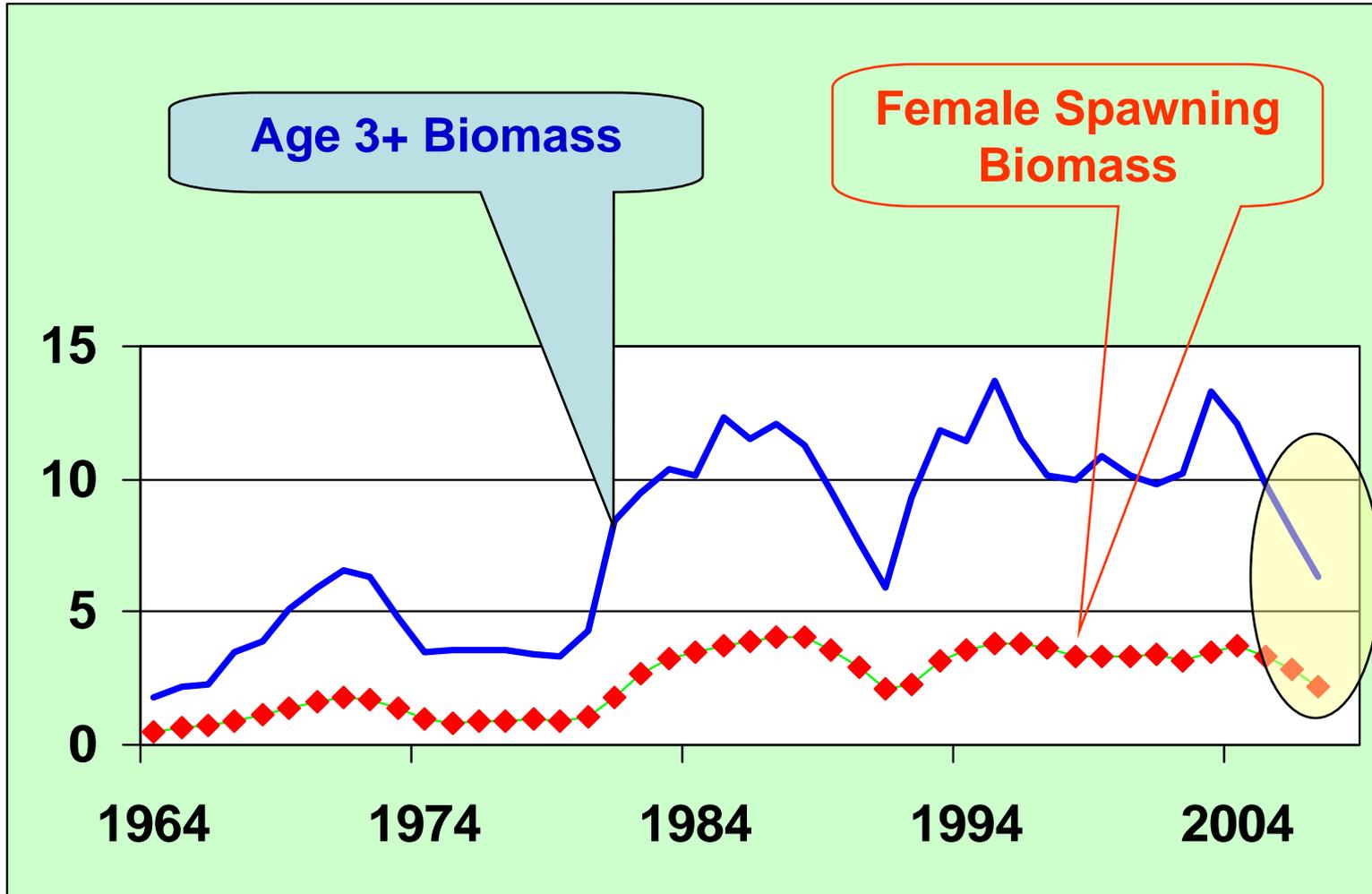
Feature #3 -- Recruitment Trends

1. Unprecedented 5 consecutive years of below-average weak year classes (2001-2005).

2. The 2006 Year Class appears substantially above average

3. We will have to watch the progression of this and future year class contribution to the stocks.

Recruitment, 1964-2007
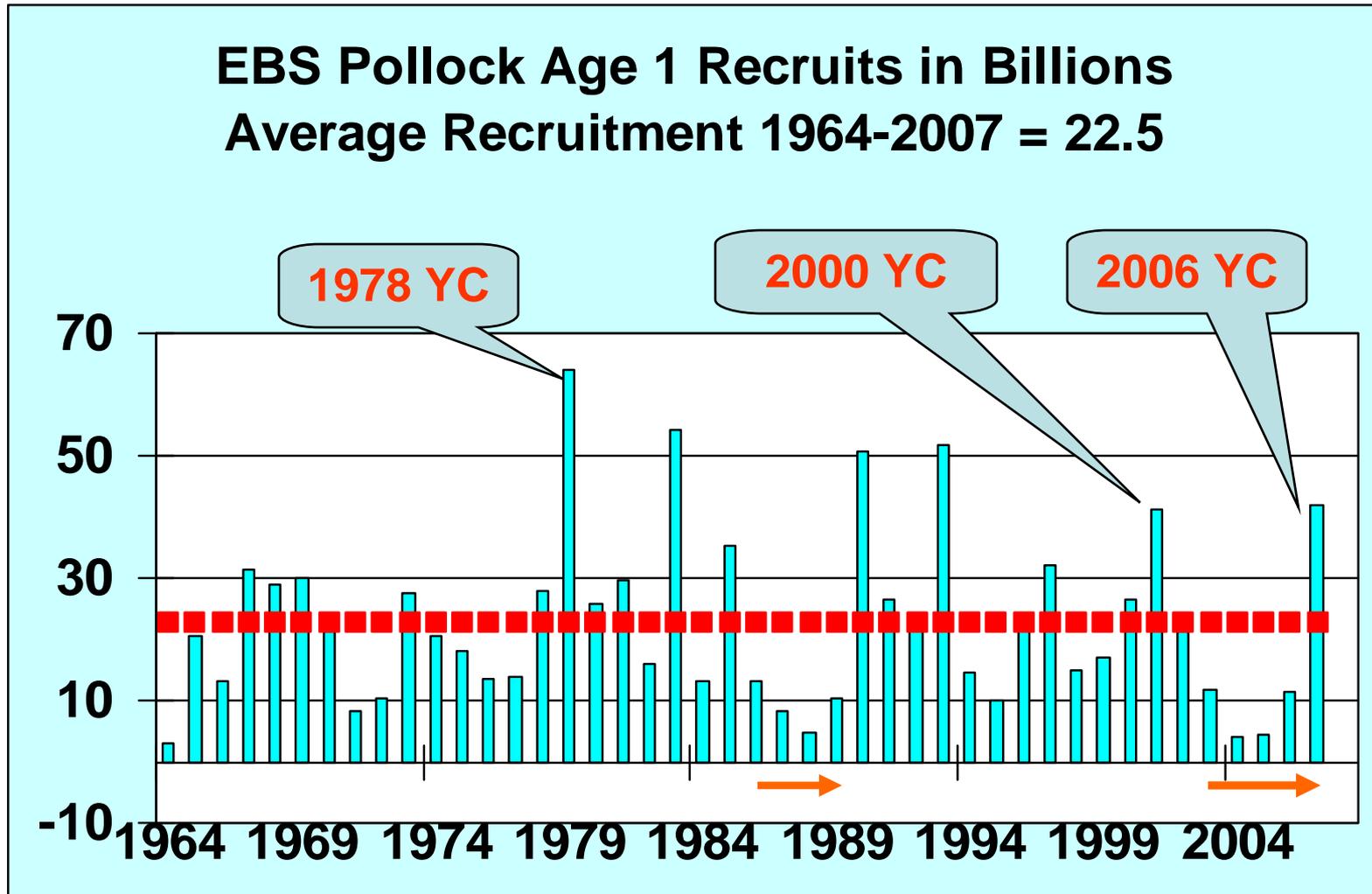
EBS Pollock Assessment - Notable Features (# 4)

Feature #4: Arguments in support of ABC = Tier 1b max. permissibleABC

Tier 1b Max ABC = 1.17 mmt; Tier 3 ABC = 0.555 mmt

1. Tier 1 harvest control rule has already built-in precautionary features
2. Uncertainty is already factored into Tier 1 harvest control rule
3. 2008 Tier 1b ABC is already a large 16% decline from 2007 ABC of 1.394 mmt
4. Biomass is projected to build up to Bmsy as would under ABCs that are more conservative than max. permissible ABC

Feature #5: Arguments for Lowering ABC

Tier 1b Max ABC = 1.17mmt; Tier 3 ABC = 0.555 mmt

1. Setting ABC = 1.17 mmt would lead to high exploitation rate on spawning biomass (26%)
2. We should build biomass to B40% sooner than later to increase chances of stronger recruitments
3. There has been experience cases when stocks have rebuilt when catch is 1 mmt or less
4. Five consecutive weak 2001-2005 year classes calls for more precaution

Historical Spawning Exploitation Rates, 1964-2007
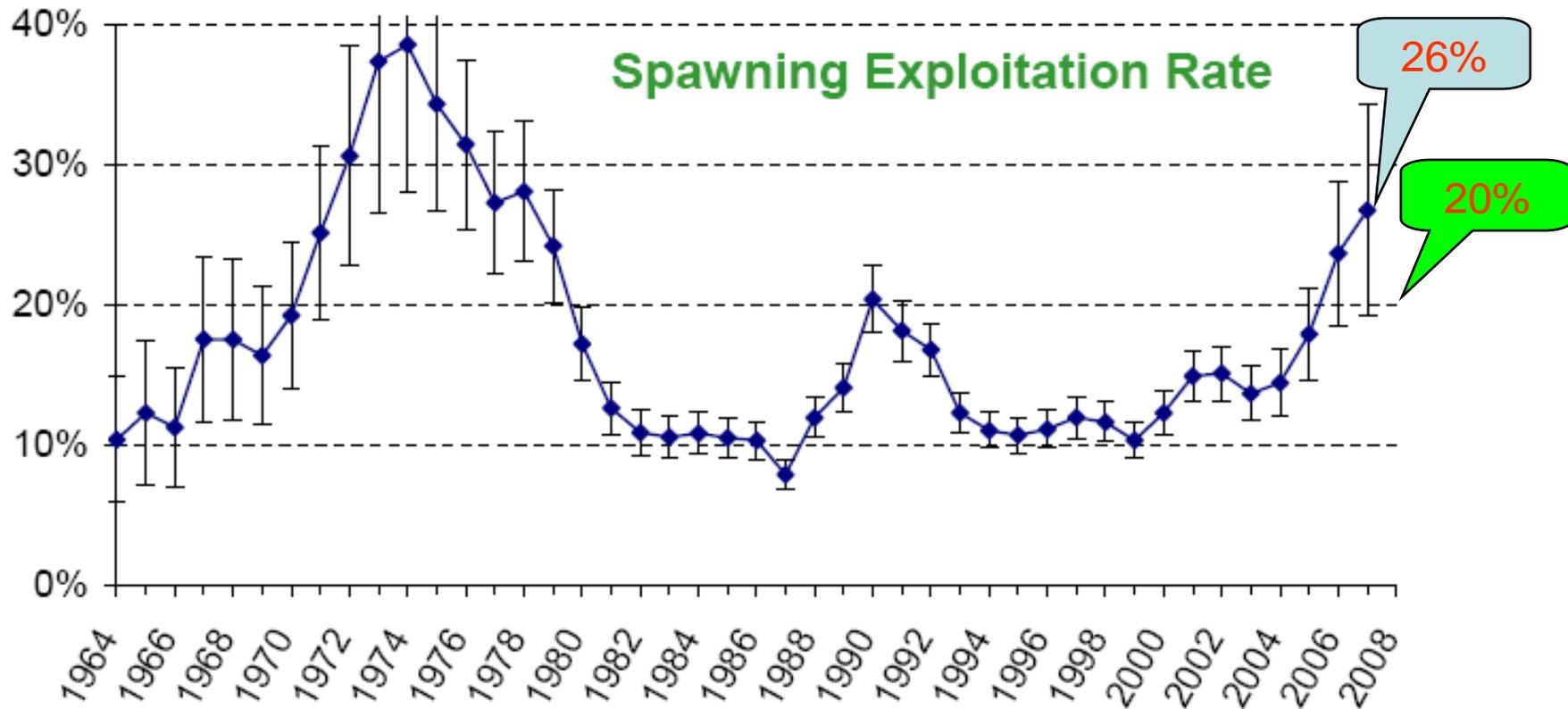
Projections of FSB to 2012
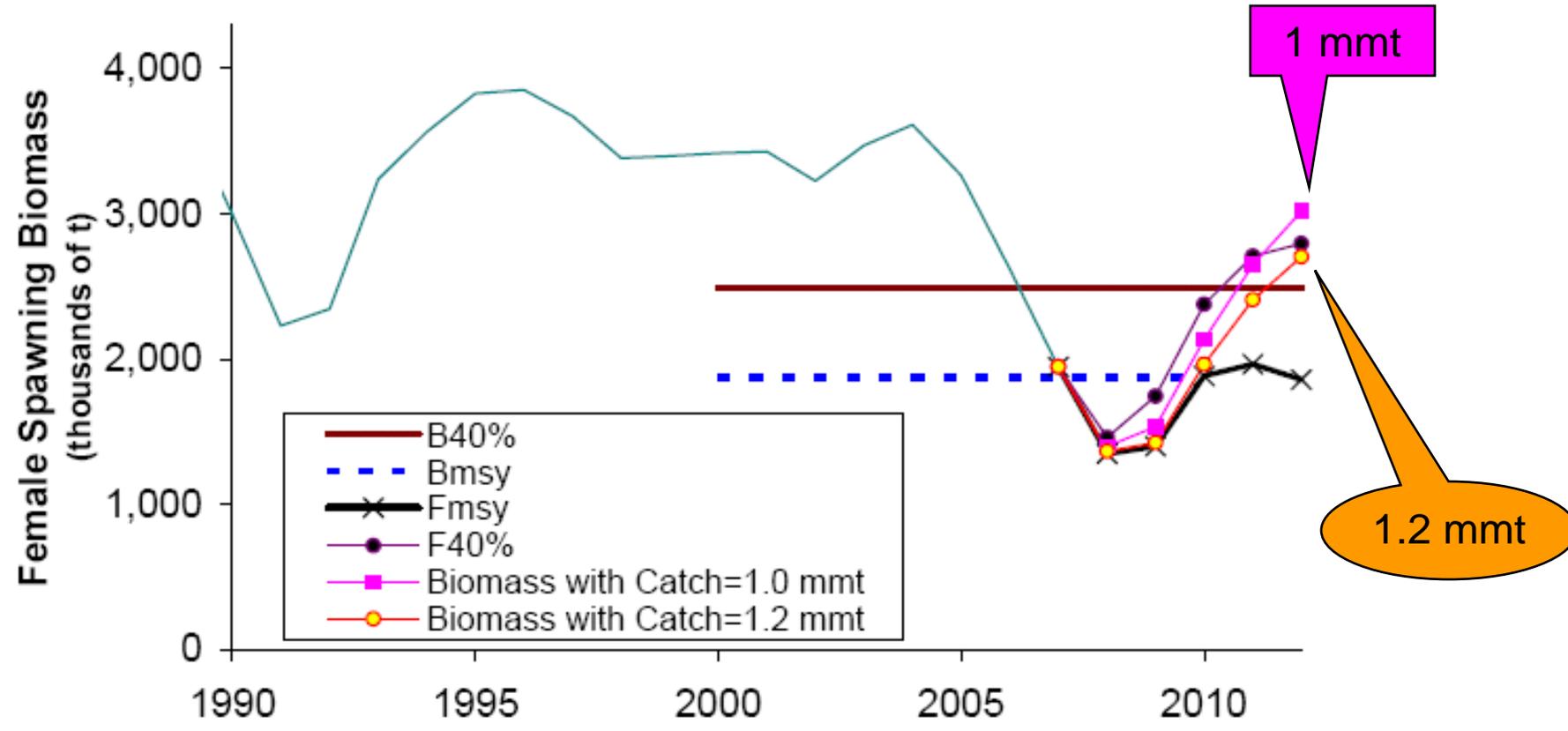
Recent FSB Exploitation Rates
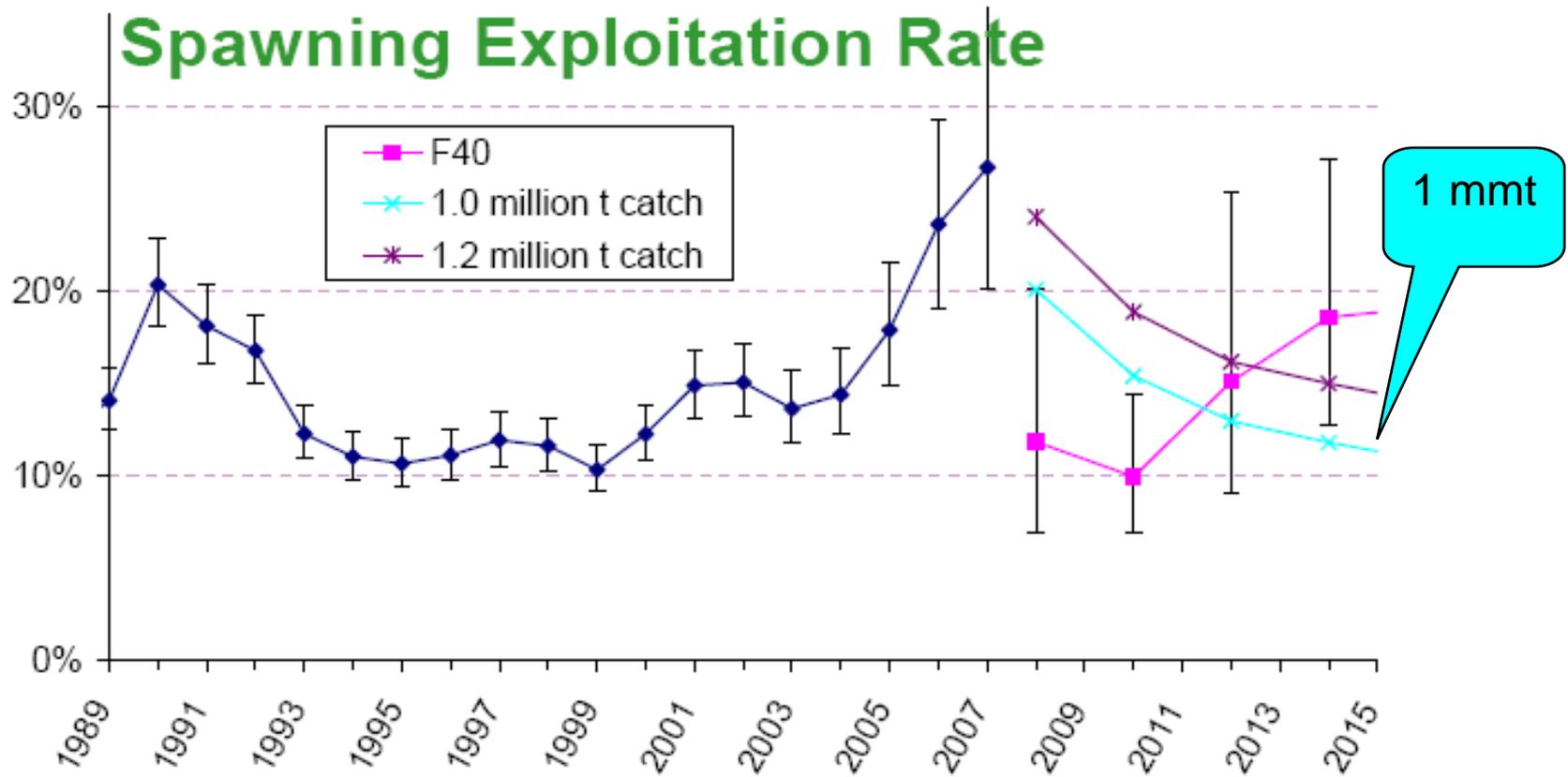
C1 - EBS Pollock Stock Assessment, Dec 2007

Catch (1,000 M.Tons) 1964-2007
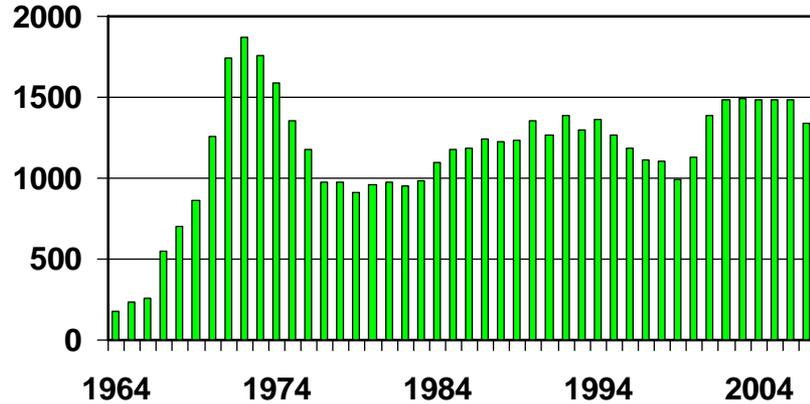
Survey Biomass 1979-2007
Line=On-Bottom Trawl, Diamonds Dots = Off-Bottom
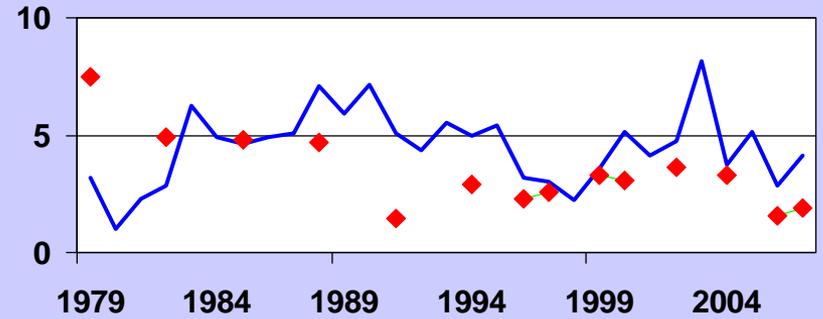
EBS Pollock Age 1 Recruits in Billions
Average Recruitment 1964-2007 = 22.5
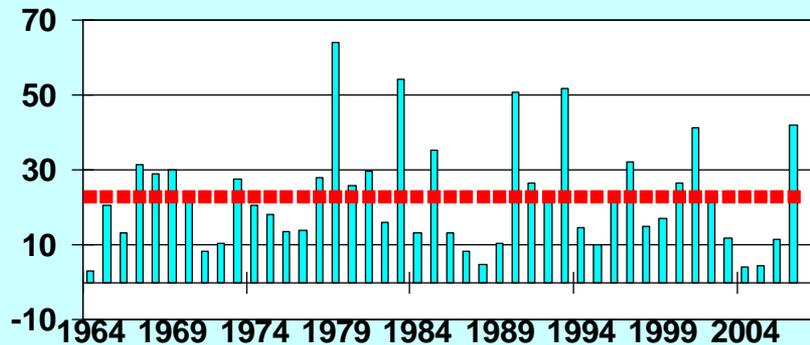
Model Biomass 1964-2009
Line=Age 3+ Biomass, Diamonds Dots = Female Spawning Biomass
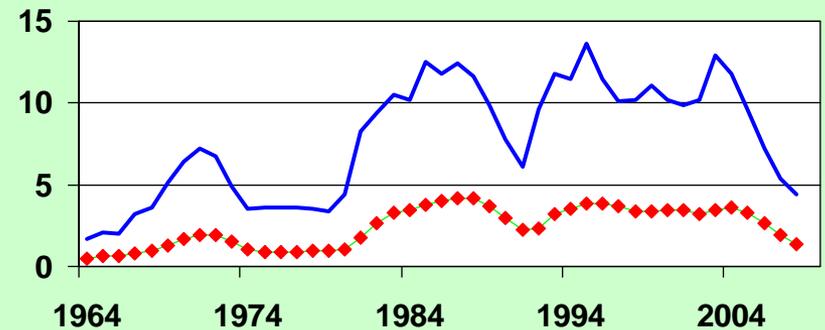
Aleutian Islands Region Pollock Assessment

A. Fishery

    1.   Pollock fishing has been closed from 1999.

    2.   Fishery reopened in 2005 (19,000 t TAC to the Aleut Corp). Took < 200 t of pollock. POP bycatch rates were high.

    3.   This allocation continued In 2006 and 2007. Catches were low (932 t in 2006 & 1,100 t in 200)

B. Fish Distribution

    1. Pollock schools are patchy and hard to find.

C. Stock Assessment

    1.   Age Structured Model was first developed in 2003. Model 2B was accepted by the SSC in 2006

    2.   The Team recommends to use this Model 2B this year

C. ABC Determination

    1. This is a Tier 3a Stock

    2. All the essential estimates are provided by the Model.

Pollock
Aleutian Islands RA Region
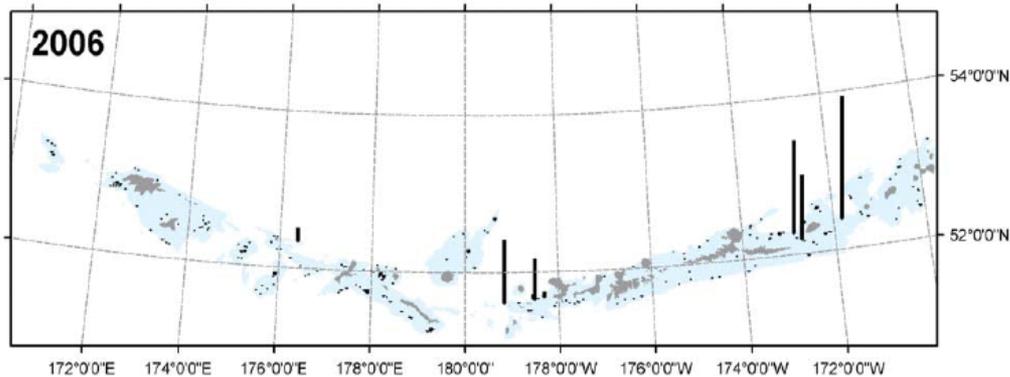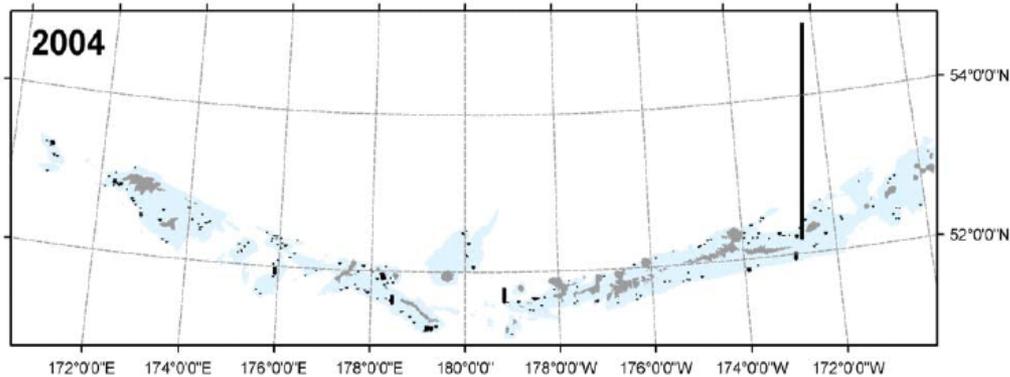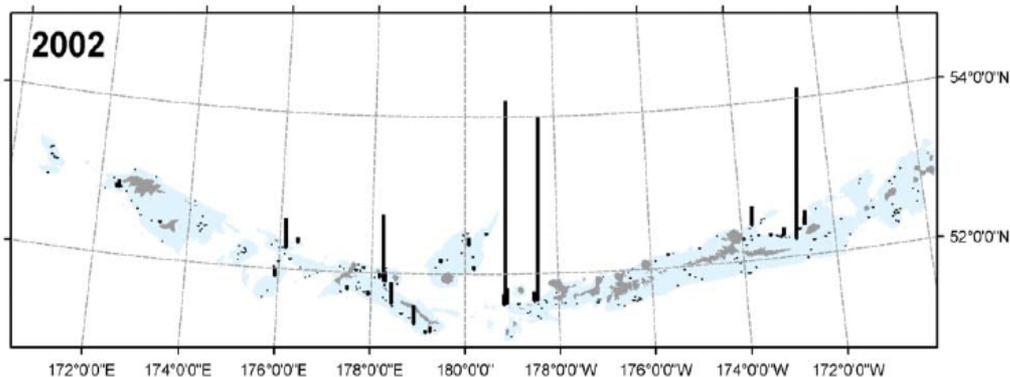
2002	175,000
2004	130,000
2006	95,000

C1a - Aleutian Islands Pollock Assessment, Dec 2007

Catch (1,000 M.Tons)

NMFS Survey Biomass in NRA Areas

Age 2 Recruits in Millions
Average Recruitment 1990-06 = 54.5

Blue line = Age 3+ Biomass
Red Dots = Female Spawning Biomass
Units in Thousands of mt
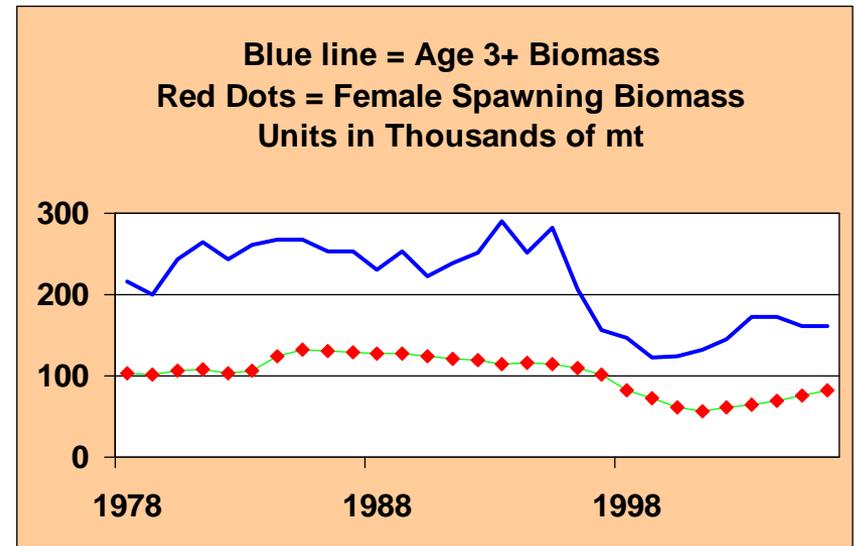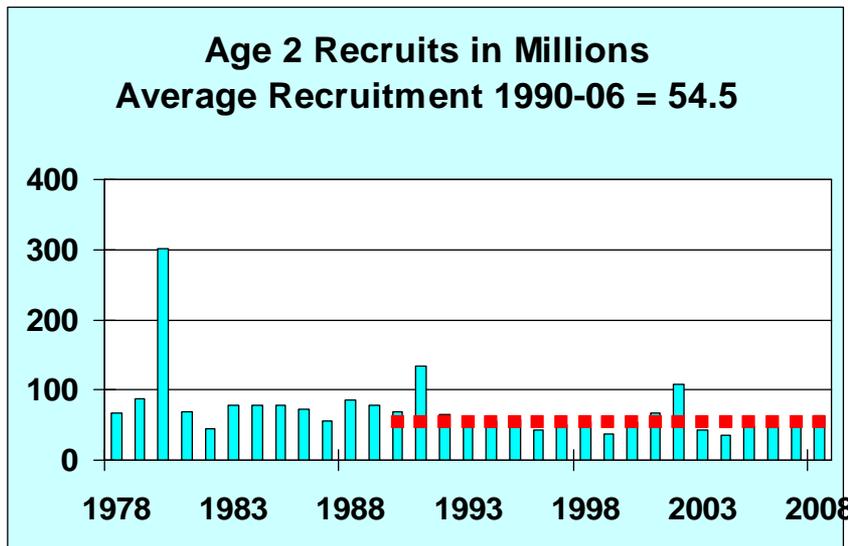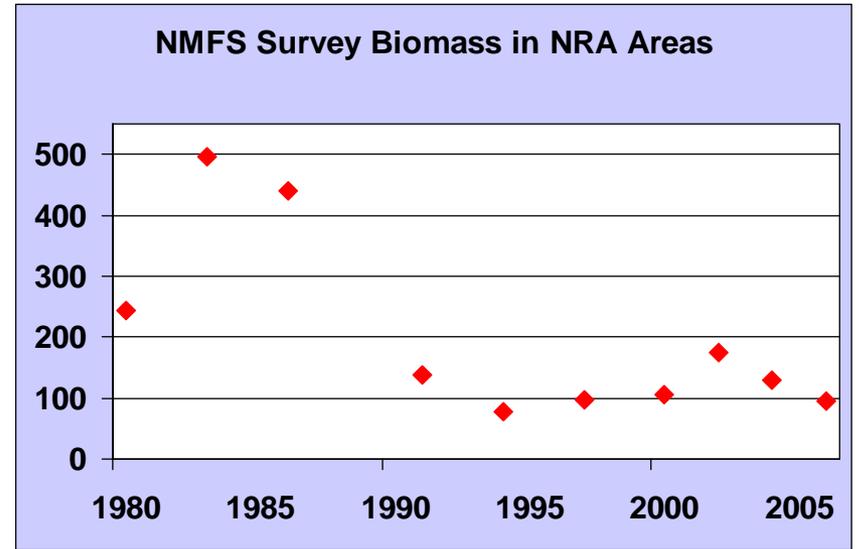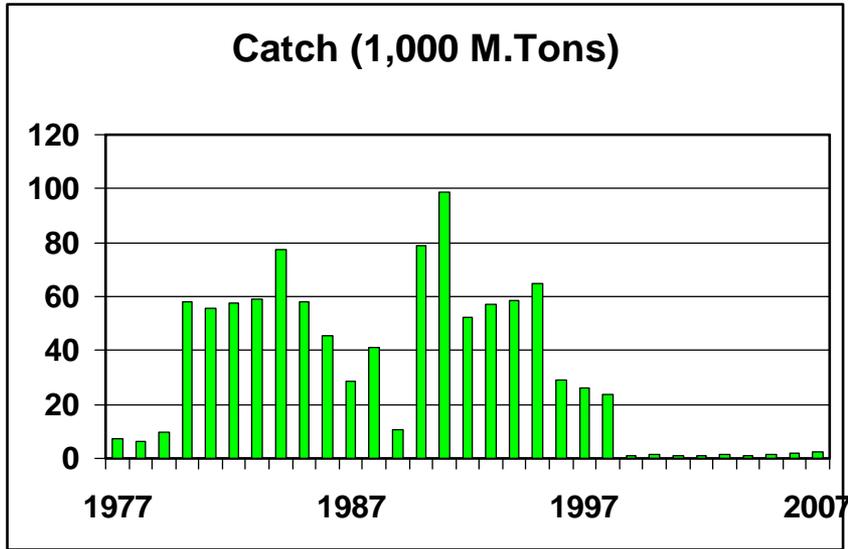
Bogoslof Pollock Stock

1. **New survey in 2007 by R/V *Miller Freeman***
    -- Biomass = 292,000mt, up 22 % from 2006

2. **Age Structured Model developed since 2003 for Management Strategy Evaluations**
    - -Model shows 1978 Yr Class was very high that built up the stock biomass to peak in 1983.
    -- At normal year class conditions, biomass would be much lower.
    -- Model still could not incorporate stock inter-relationships and there is doubt that the Bogoslof stock can be modeled as a closed population.

3. **Thus model is not quite Ready for Use and Plan Team dropped down to using Tier 5 to calculate ABC**
    ABC (Plan Team) = 7,970 mt

# C1b - Bogoslof Island Pollock Assessment, Dec 2007

Catch (1,000 M.Tons)

NMFS Survey Biomass in Standard Area (Million M.Tons)

Age 5 Recruits (Thousands, Ave=385)

Model 4 Biomass in Million M.Tons, Line = Age 5+ Exploitable Biomass, Diamond Dots = Female Spawning Biomass
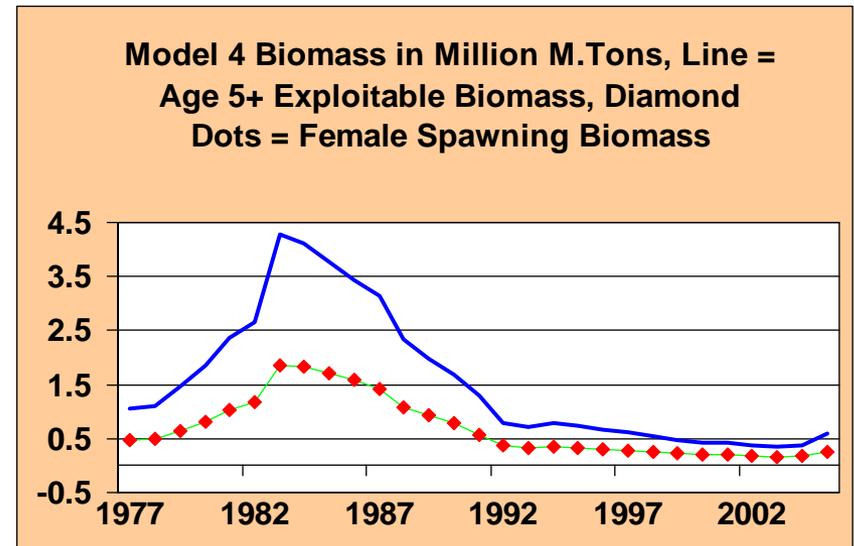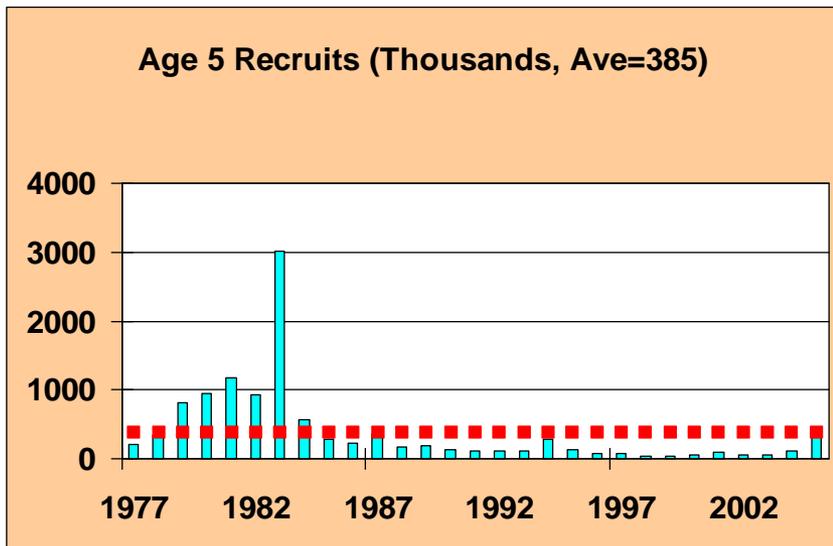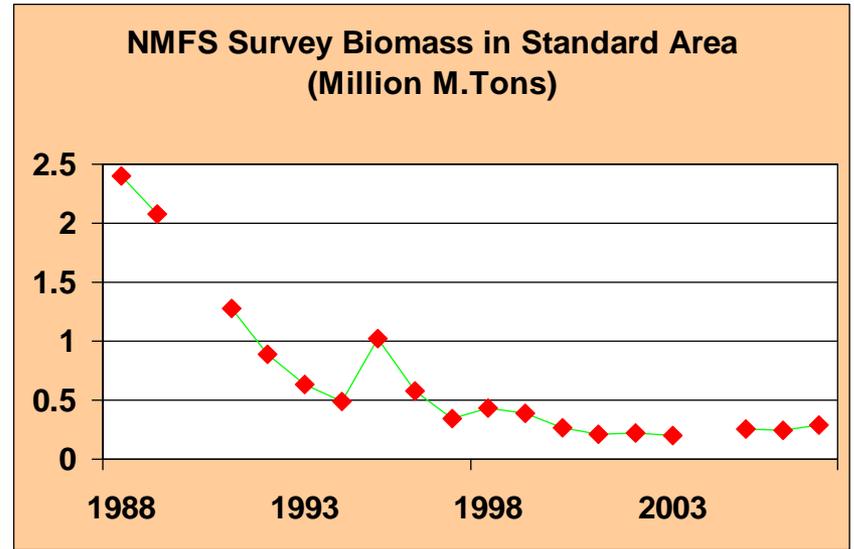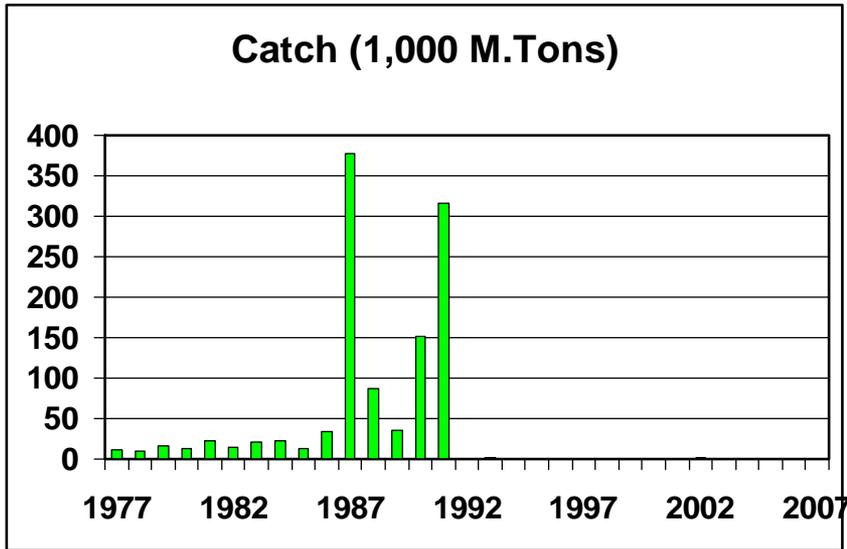
BSAI Pacific Cod Catch History by Gear Type
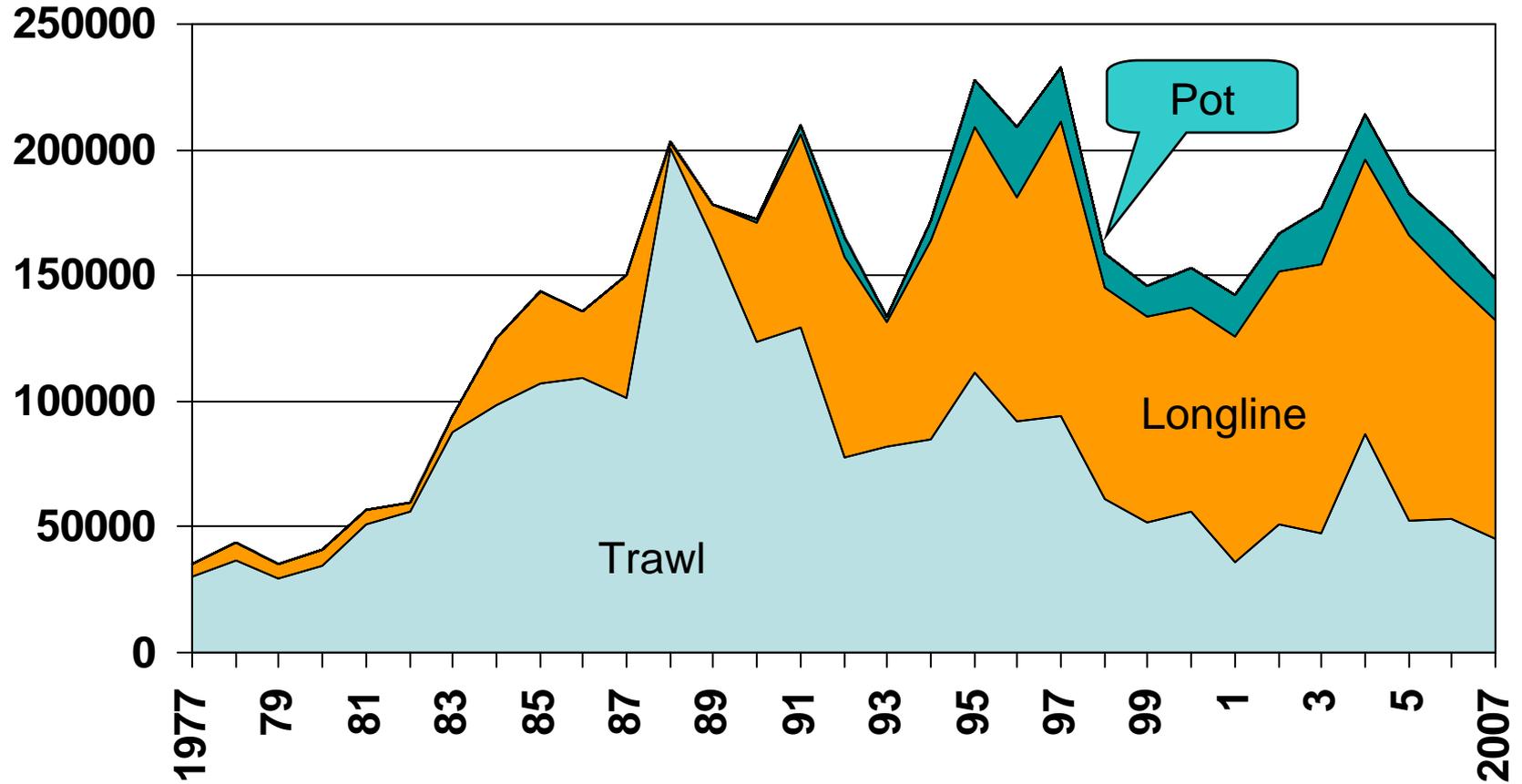
2007 Pacific Cod Fisheries, Jan-May
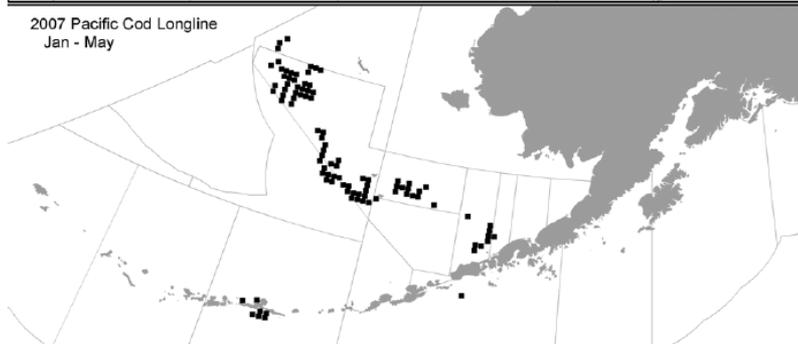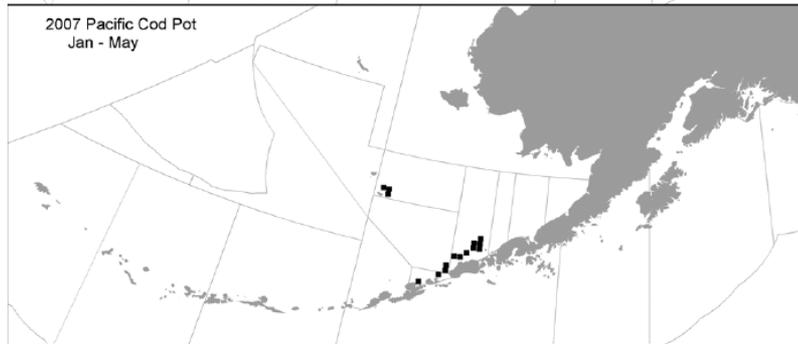
2007 Pacific Cod Fisheries, June-Aug

2007 Pacific Cod Trawl
Jun - Aug

Trawl

2007 Pacific Cod Longline
Jun - Aug

Longline

2007 Pacific Cod Pot
Jun - Aug
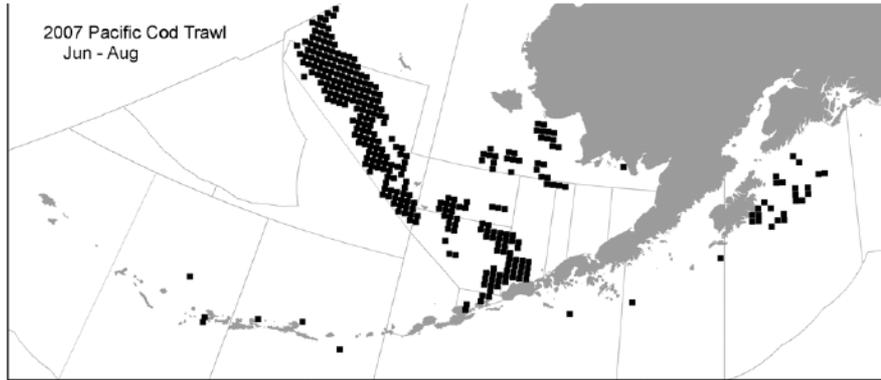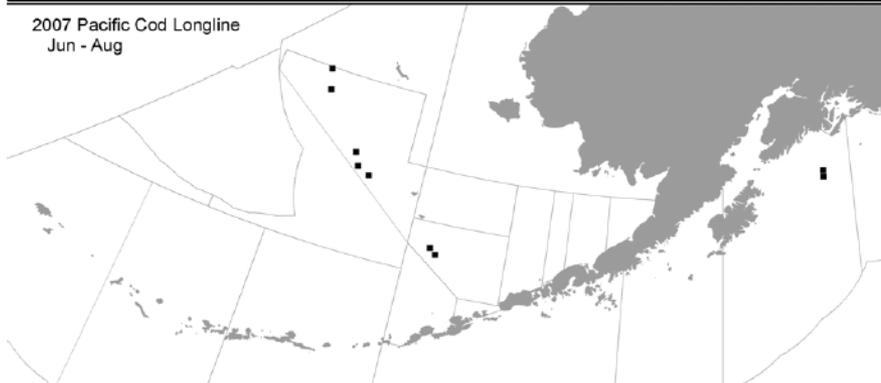
Pot

Pacific Cod Assessment
Notable Features

1. Fisheries Gear Types are Trawl, Longlines, Pot & Jigs

2. Trawl Survey Biomass is down 18% from 2006-2007

3. Modeling Assessments
   1. Major review of the Cod Assessment process and Models was conducted in April 2007
   2. Refinements of Modeling were reported by the Analyst to the Plan Team in September 2007 PT meeting
   3. Results of Assessments were reported to the Plan Team in November
   4. Assessments have been particularly difficult as more refinements are made to the models and applications of the data

Pacific Cod Assessment
Notable Model Features for 2007

1. Four versions of the Assessment Model were used this year
    1. Model 1 was developed to respond to SSC comments. M = 0.34
    2. Model 2 is the same as Model 1, except M = 0.37 as used in previous years
    3. Model 3 is the same is Model 1 except that M is estimated internally, and
    4. Model 4 differs from Model 1 in several respects to respond to public input on the use and fitting of data

2. Nine major categories of new input data were applied to the above 4 model configurations. The following data features stand out:
    - A new biomass was estimated from the 2007 NMSF survey at 424,000 mt and is the all-time low of NMFS survey estimates
    - The 2006 year class of P. cod was estimated to be significantly strong
    - The addition of this year class data has a material impact on the projection of P. cod numbers and biomass into the future

3. Three major selection criteria were applied to the model results
    1. The model should use a reasonable estimate of M
    2. The model should estimate the mean trawl survey lengths for ages 1-3
    3. The model should estimate a reasonable average for the product of trawl survey catchability and trawl survey selectivity for the 60-81 cm size range

# Pacific Cod Assessment
Notable Model Features for 2007

1. **Model 1 (M=0.34) was selected by the Analysts and endorsed by the Plan Team**

   1. All Model biomass and recruitment trends were similar. They are all able to estimate these trends but the biomass scale is sensitive to the values of M

   2. Model 4 ignored age data when age data are very informative for year class prediction in the model. It's M value = 0.46 is also considered too high.

   3. Model 3 fits the data best but M value is internally predicted to be too low (M=0.22). Model 2 with M=0.37 is considered too high

   4. Model 1, with M= 0.34, is the most appropriate model to use.

2. **In endorsing Model 1 selection, the Plan Team made the following notes:**

   • The 2008 ABC of 150,000 mt reflects a commensurate biomass drop of 18%.

   • The five (2001-2005) consecutive weak year classes are real and keeping biomass low.

   • The 2006 YC is significantly strong. The strength of this year class will have a material impact on the projection of P. cod numbers and biomass into the future; thus this YC contributions to the population must be well watched.

# Pacific Cod Model Biomass
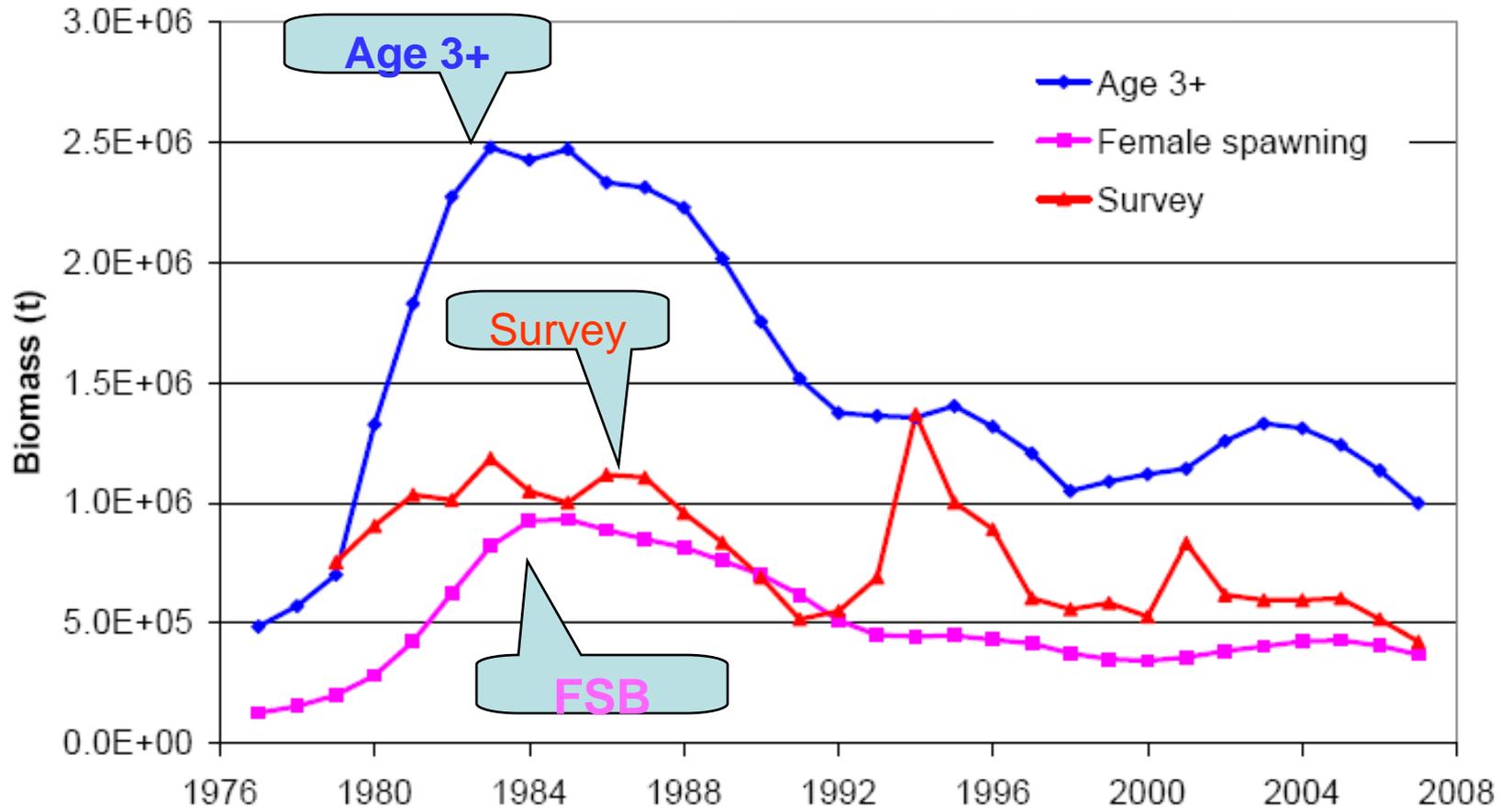
Important Recruitment Features
2001-2005 Year classes were below average
2006 Year Class may be the 2nd strongest of 30 Year History
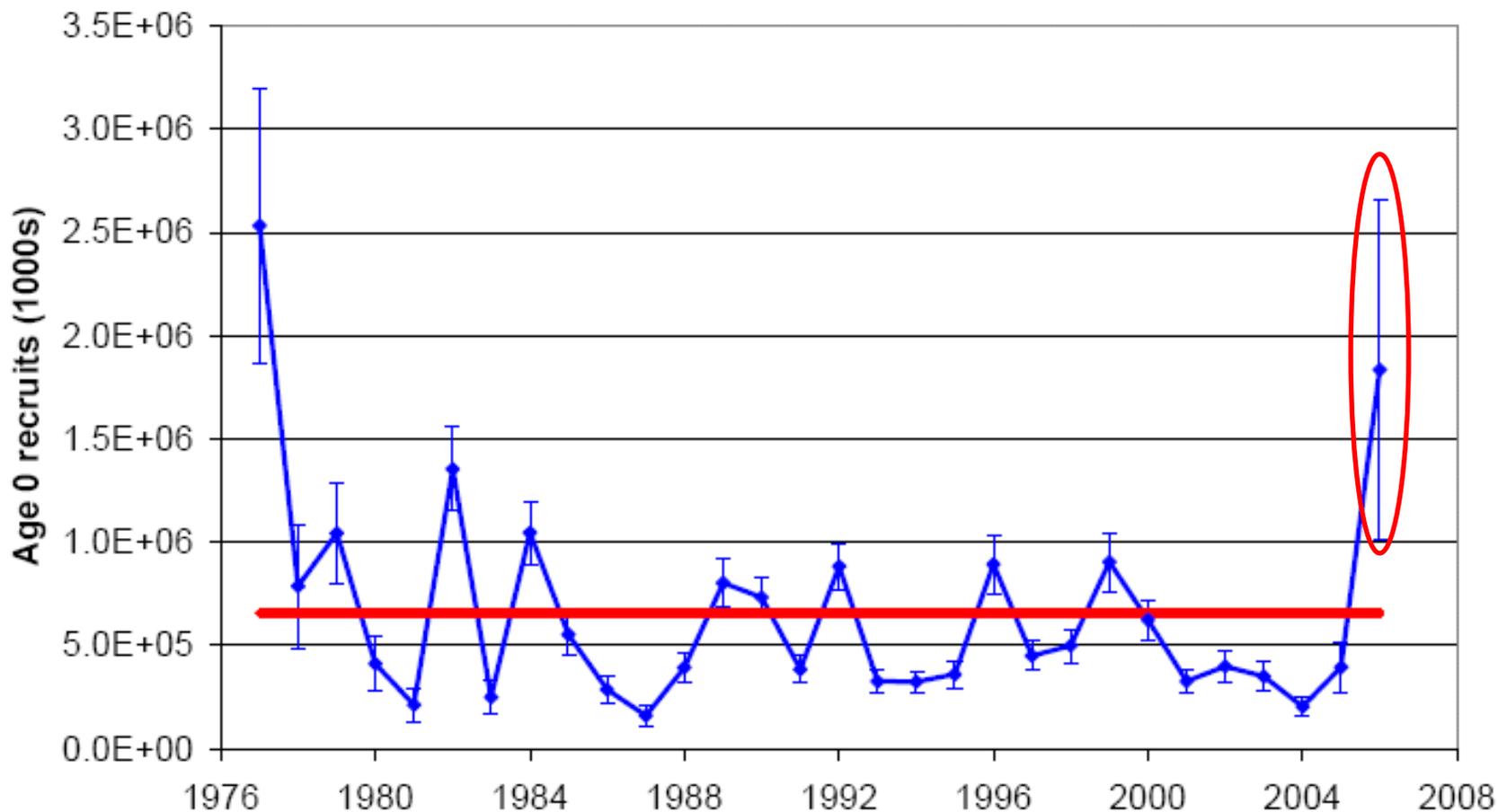
C2- Pacific Cod Stock Assessment, Dec 2007

Catch (1,000 M.Tons in bars)and ABC (red line)

NMFS EBS Survey Biomass in Thousands of M.Tons

Model 1-BS Age 0 Recruits (30-Yr Ave=0.66 Billion)

EBS Model Biomass in Million M.Tons, Line = Age 3+ Exploitable Biomass, Diamond Dots = Female Spawning Biomass
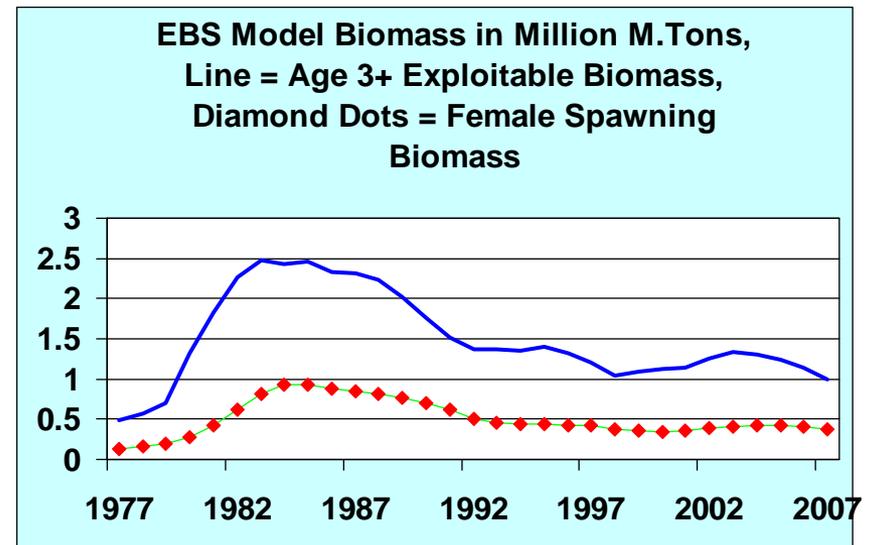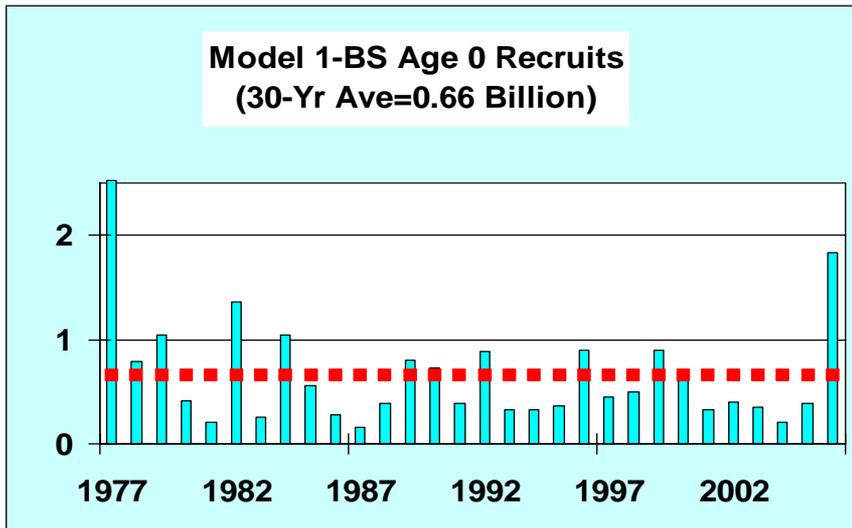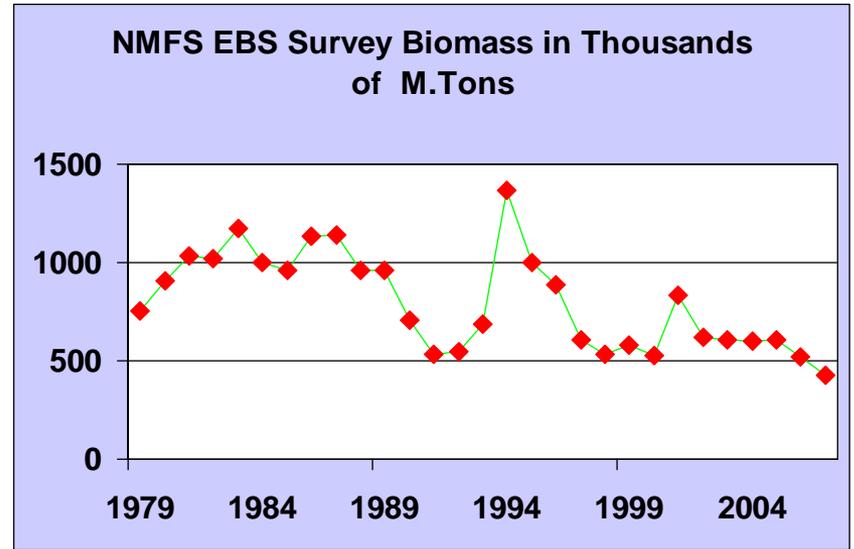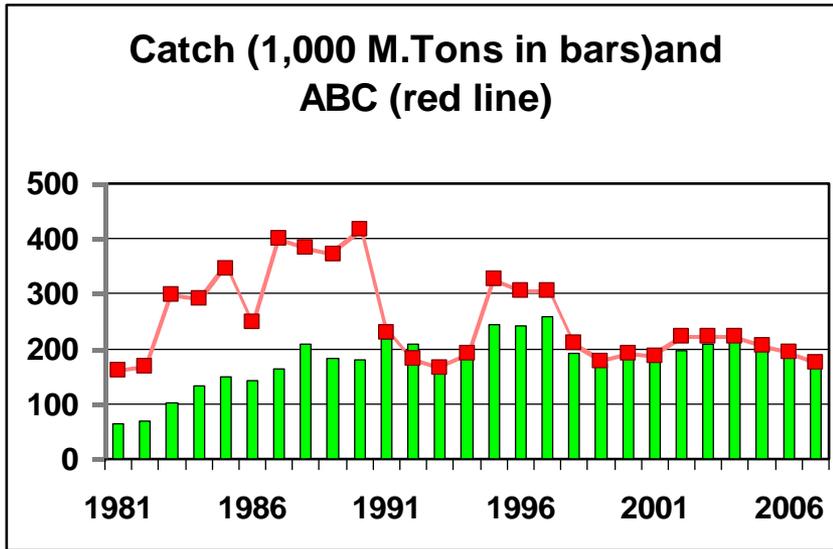
Sablefish Assessment
Notable Features

1. **Sablefish is assessed as one Coast-wide stock and the BSAI ABCs are apportionments of the entire stock ABC**

   This year's assessment is the same as last year that incorporated split-sex analyses in model with several technical changes

2. **Standard Longline Surveys**

   -- Survey abundance Index decreased 14% from 2006 to 2007

3. **ABC is based on Tier 3b**

   Apportionment of ABC to EBS and Aleutians is based on Relative Population Weight based on the surveys

NMFS Longline Survey

© Sigler 1972

NMFS sablefish longline survey of eastern Bering Sea, Aleutian Islands eastern half, and Gulf of Alaska management areas.

NMFS Longline survey

Longline Survey Numbers

1,300

2006

2007

0 250 500 1,000 km

GOA Trawl survey

Trawl Survey Numbers
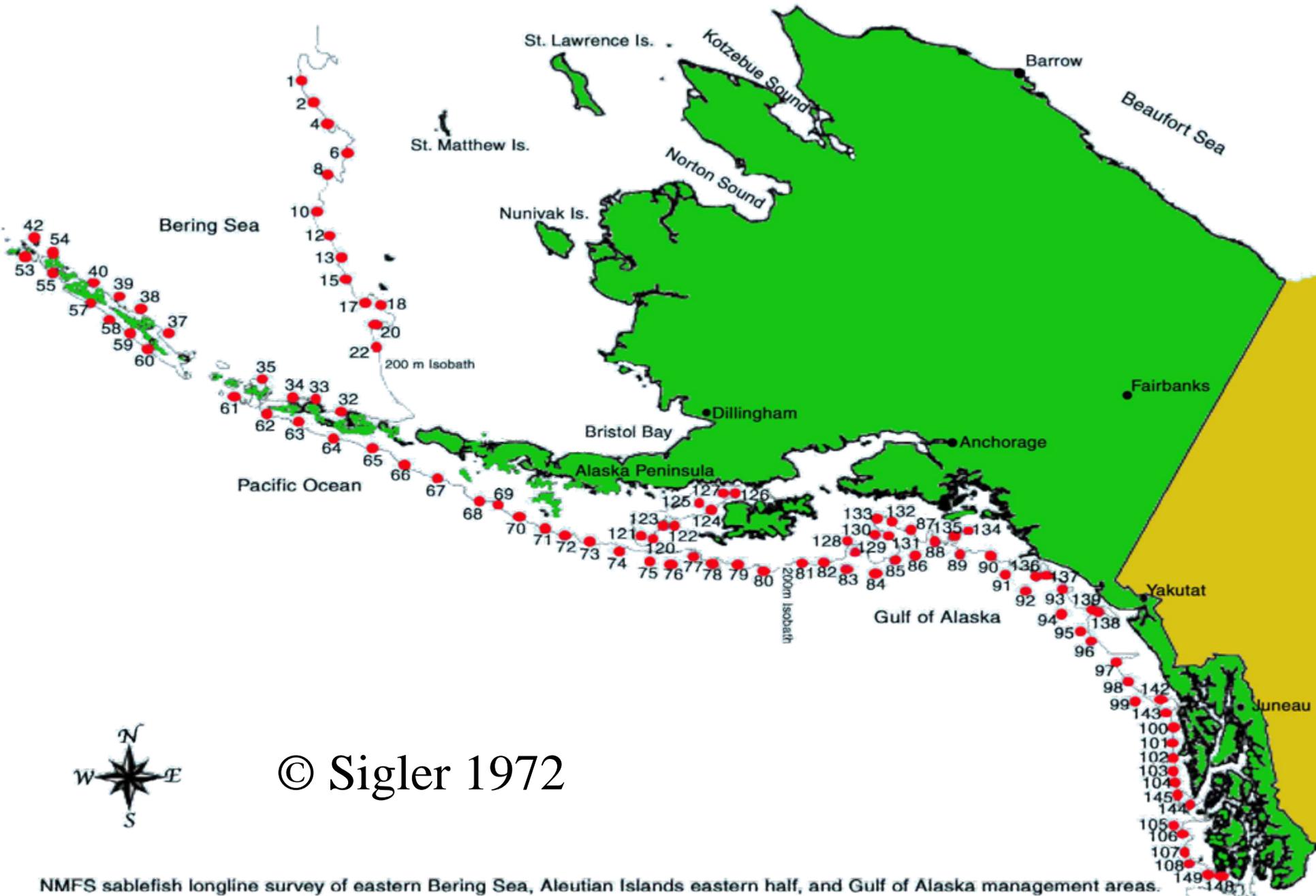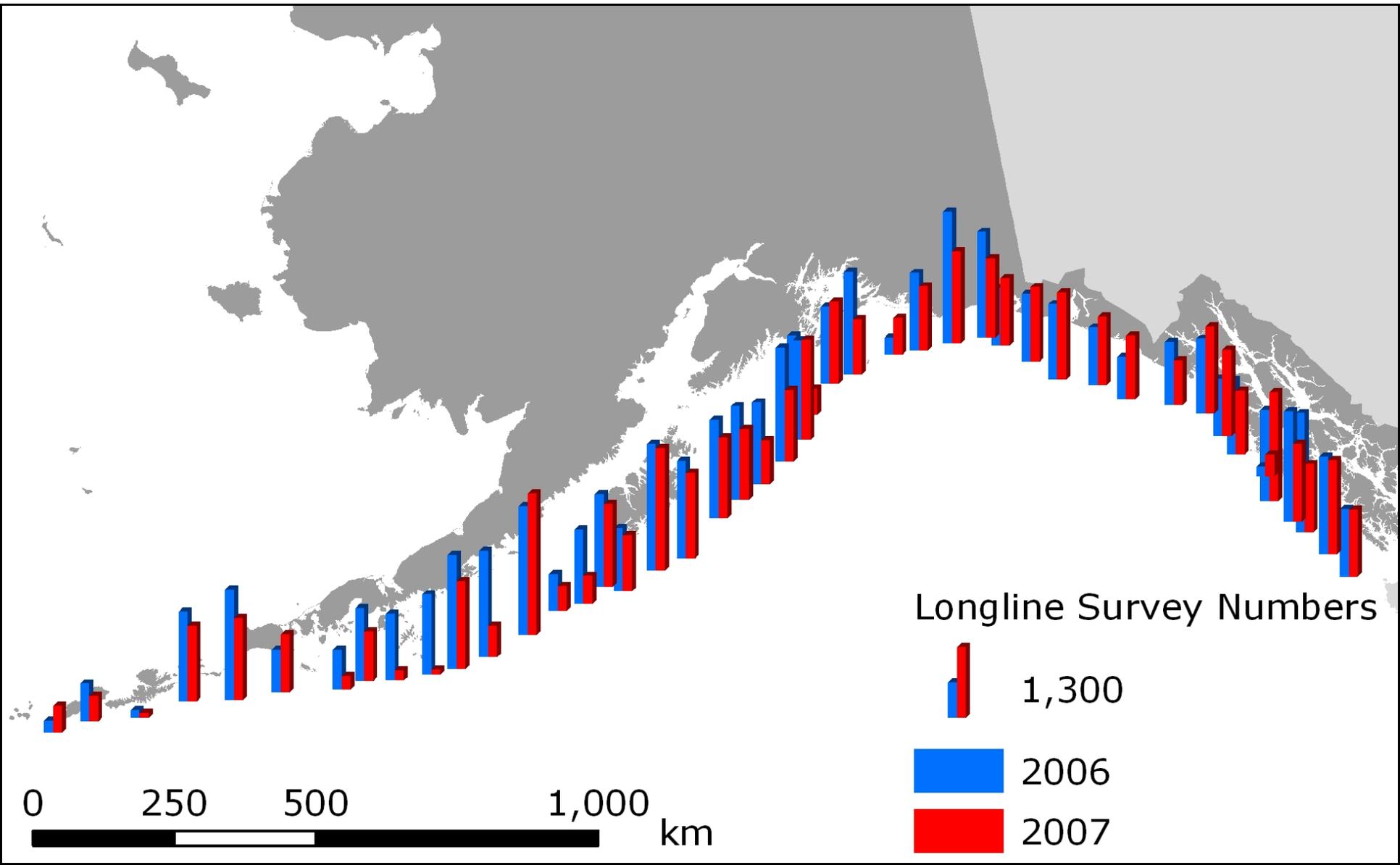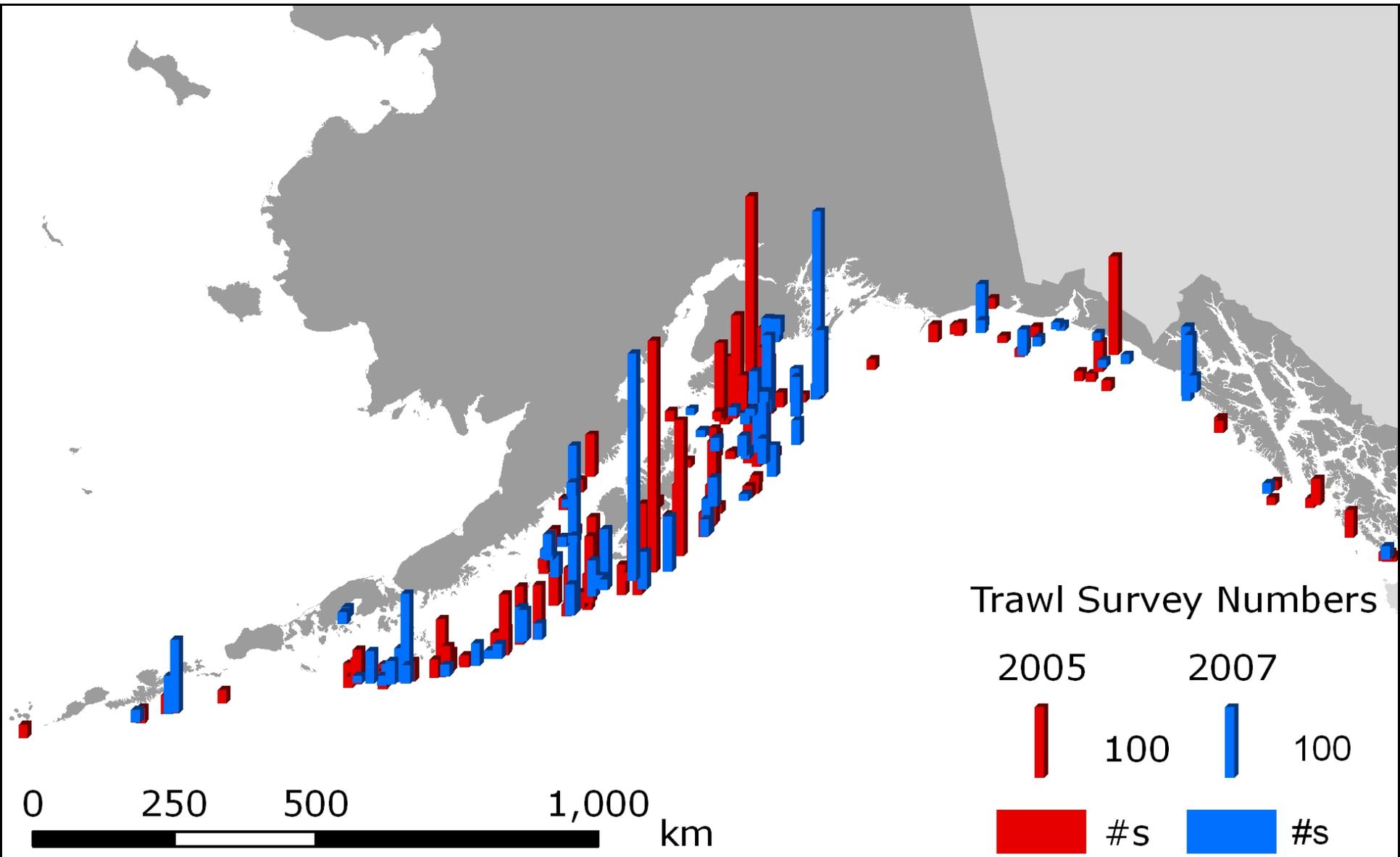
Sablefish surveys
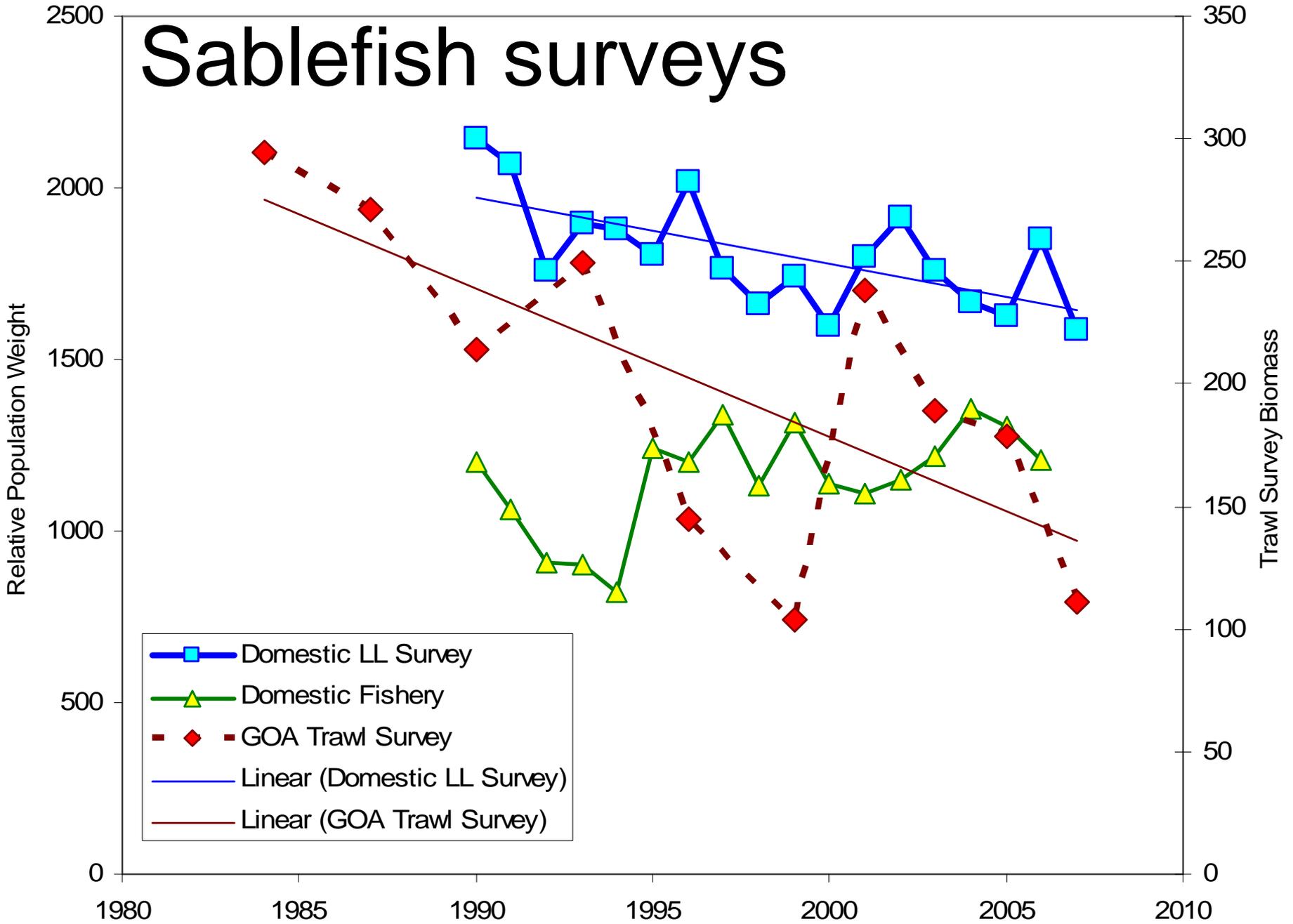
C3 - Alaska-wide Sablefish Stock Assessment, Dec 2007

Catch (M.Tons) Lower bar =EBS Catch, Top bar = Aleutians Catch

NMFS Longline Survey Biomass, All Areas RPW = Relative Population Weight

Total Population Model Age 2 Recruits (Millions, Ave= 19 million)

Model 3 Biomass in Thousand M.Tons, Line = Age 4+ Exploitable Biomass, Diamond Dots = Female Spawning B
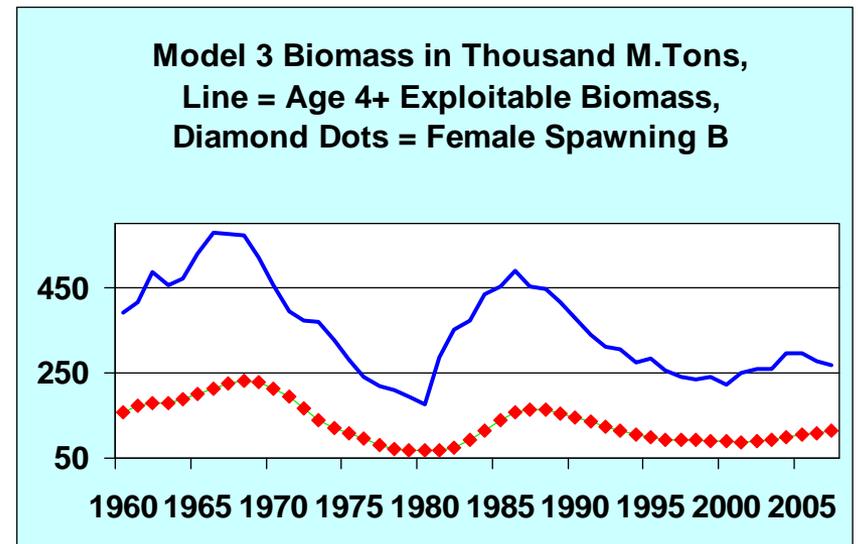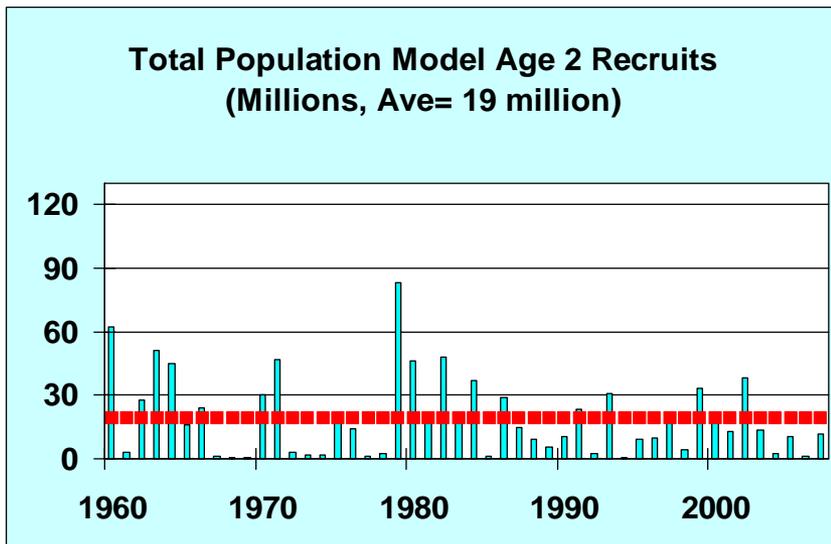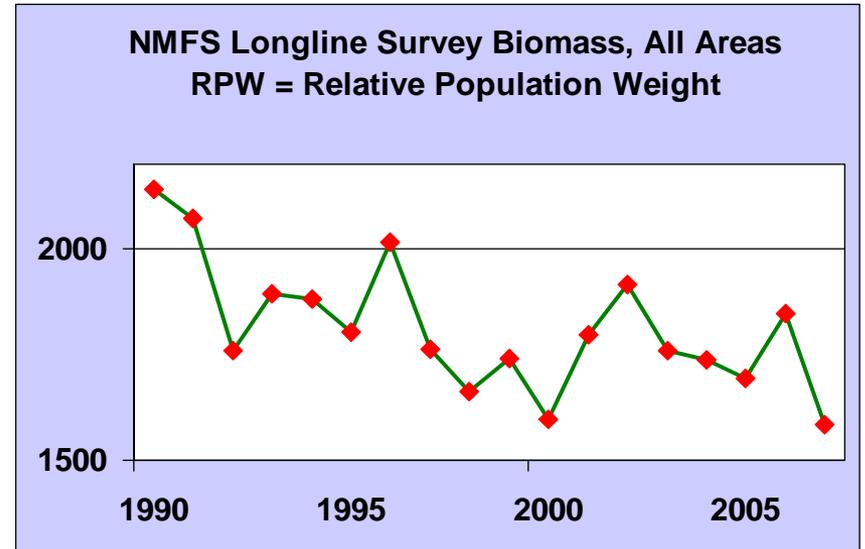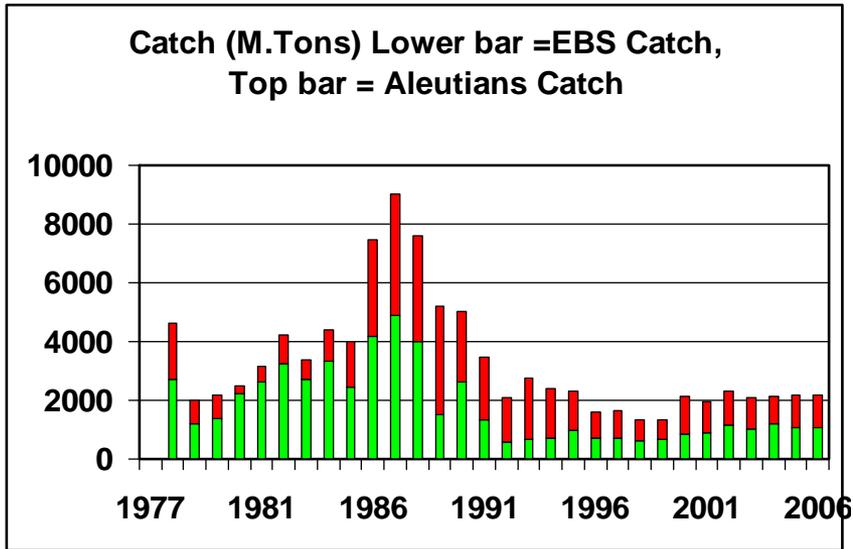
Sablefish Models

Model 1: 2006 model plus new data
Model 2: Model 1 plus new growth
Model 3: Model 2 plus priors on catchability

	Model 1	Model 2	**Model 3**
ABC	20.9	16.9	**18.0**

- Recommend model 3 based on:
  - Good fit to the data
  - Links catchabilities using external data
  - Constrains catchability from moving too much annually
  - Surveys down

Sablefish ABC Apportionment
(Same Procedure Used since 2000)

Area	ABC Percentage	2008 ABC (mt)	Change from 2007
Total		18,000	-10 %
Bering Sea	16%	2,860	- 4 %
Aleutians	14%	2,440	-13 %
Gulf of Alaska	71%	12,700	-11 %

Flatfish Complex
Overview of the Complex

1. Survey Biomass

-- High biomass, 18 % increase from 2006

-- Flatfish Biomass now 53% of total Groundfish Biomass

-- Flatfish Biomass now 1.8 times larger than that of pollock

-- Greenland Turbot, a deep water flatfish, remains down

-- Arrowtooth Flounder biomass rising rapidly, 20% of Flatfish B.

2. Models

-- Developed for most of the species

-- Modeled by split sexes, as appropriate

-- Catchability Coefficient is Adjusted for water temperature

3. TACs for all Flatfishes have been set substantially below maximum possible ABCs, even for Greenland Turbot

Yellowfin Sole Catch History

**Catch History and recent ABCs (red dots)
Units in 1,000 mt**
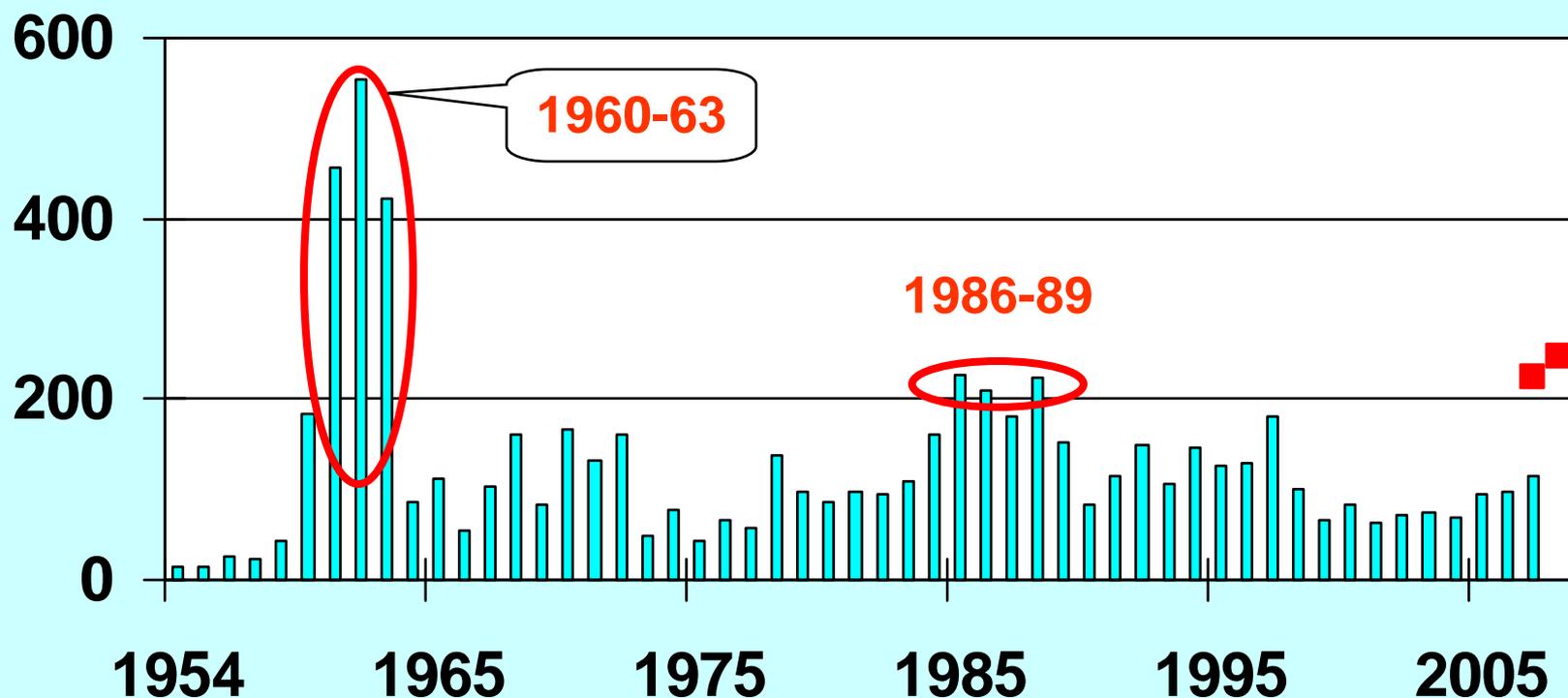
C4 - Yellowfin Sole Stock Assessment, Dec 2007

Catch History and recent ABCs (red dots)
Units in 1,000 mt
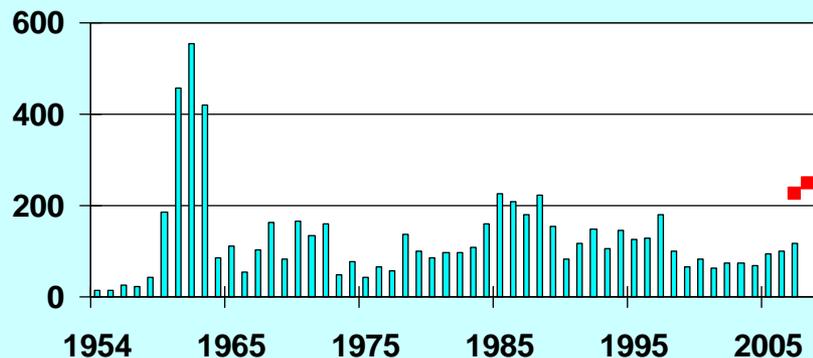
NMFS Bottom Trawl Survey Biomass
(Thousand M. Tons)
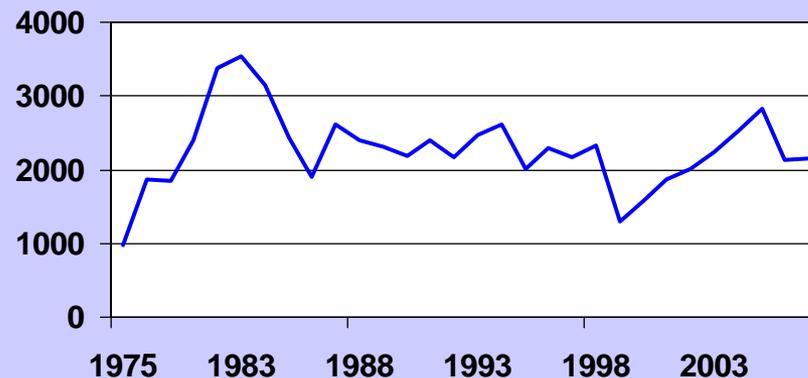
Age 5 Recruits in Billions, Ave= 1.6
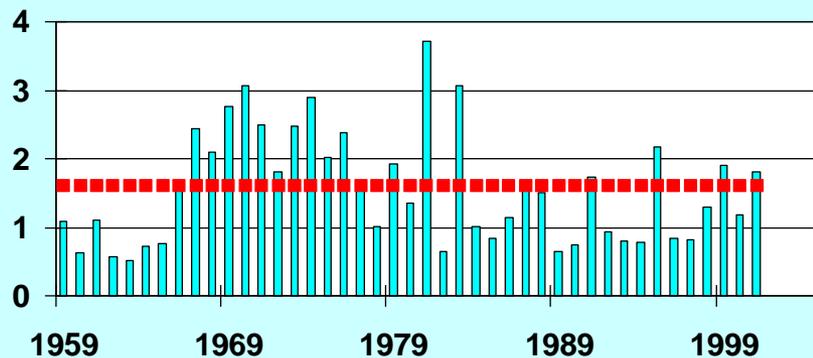
Table 4.15 Model Biomass in Thousand M.Tons, Line = Age 2+ Biomass, Red Diamond Dots = Female Spawning Biomass

female spawning biomass

Legend:
- FSB
- Bmsy
- B40

Y-axis: F S B (1,000 s t), values 0 to 900
X-axis: year, 1954 to 2006
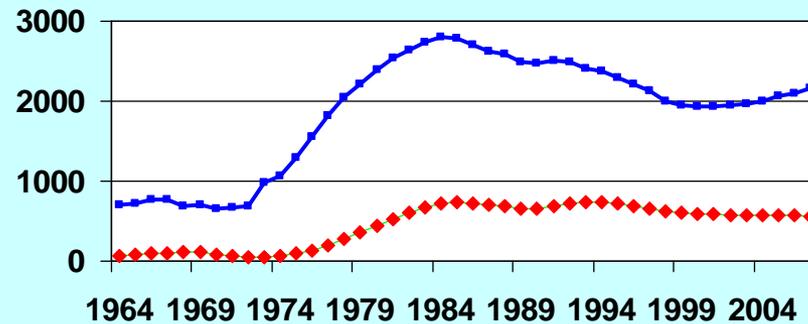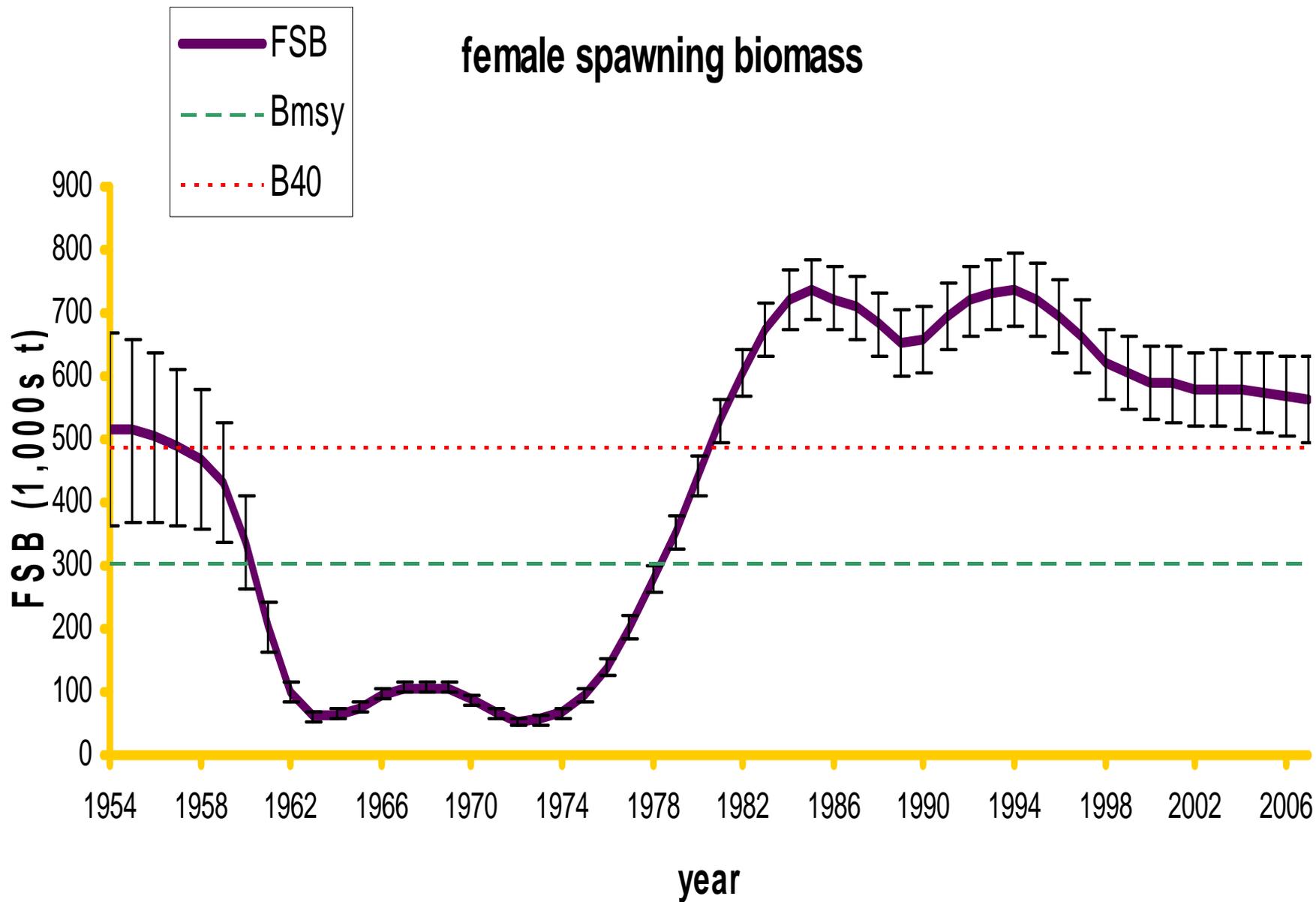
C5 - Greenland Turbot Stock Assessment, Dec 2007

Catch History and recent ABCs (red dots)
Units in 1,000 mt

NMFS EBS Survey Biomass in Thousands
of M.Tons, Line = Shelf, Diamond Dots =
Slope

Model EBS Age1 Recruits
(Millions, Ave= 10.5 Million)

Model Biomass in Thousand M.Tons, Line
= Age 1+ Biomass, Diamond Dots = Female
Spawning Biomass
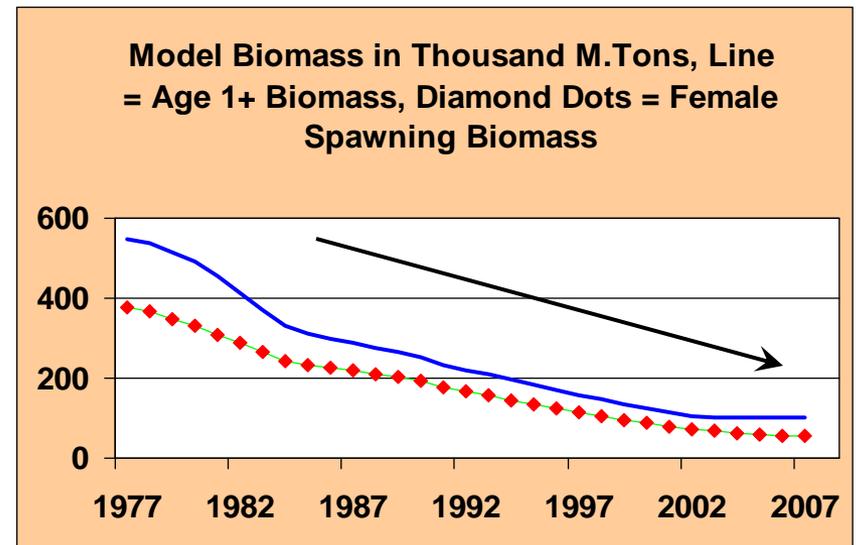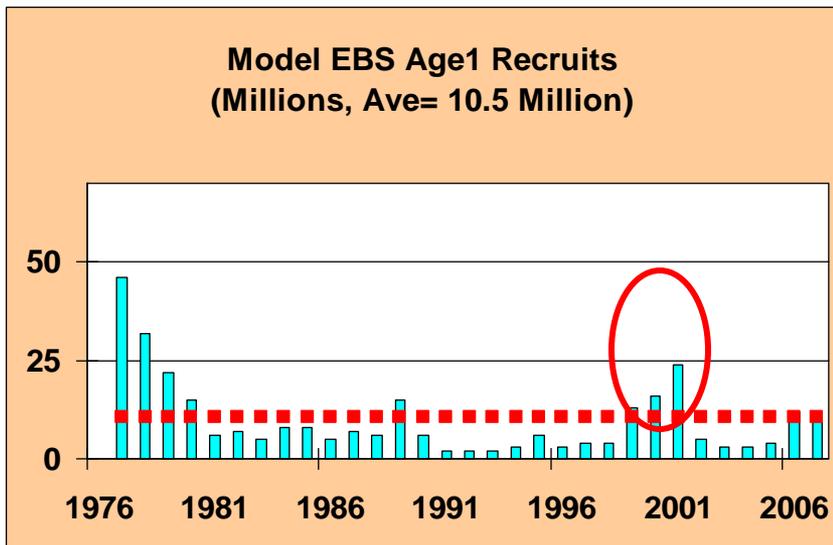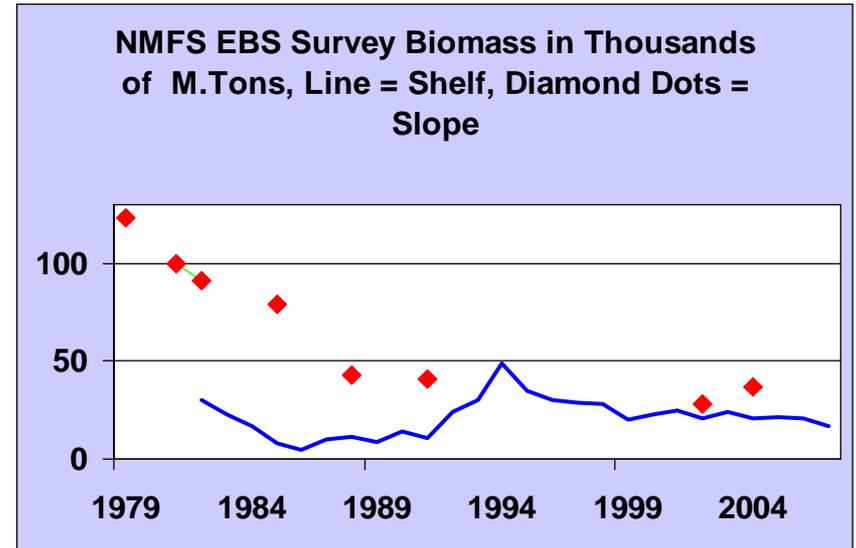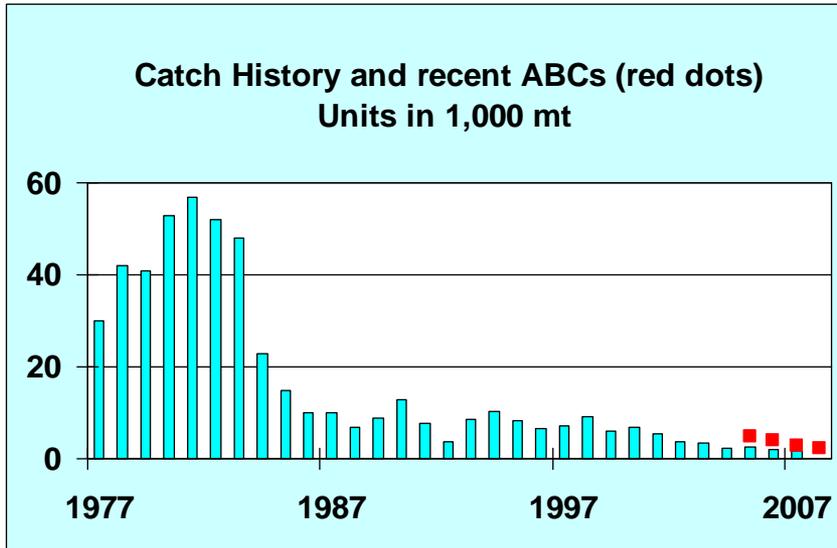
C6 - Arrowtooth Flounder Stock Assessment, Dec 2007

Catch (1,000 M.Tons)

NMFS EBS Survey Biomass in Thousands of M.Tons, Line = Shelf, Diamond Dots = Slope

Model Age 2 Recruits by Year Class (Millions, Ave= 400 Million)

**Model Biomass in Thousand M.Tons, Line = Age 1+ Biomass, Diamond Dots = Female Spawning Biomass**
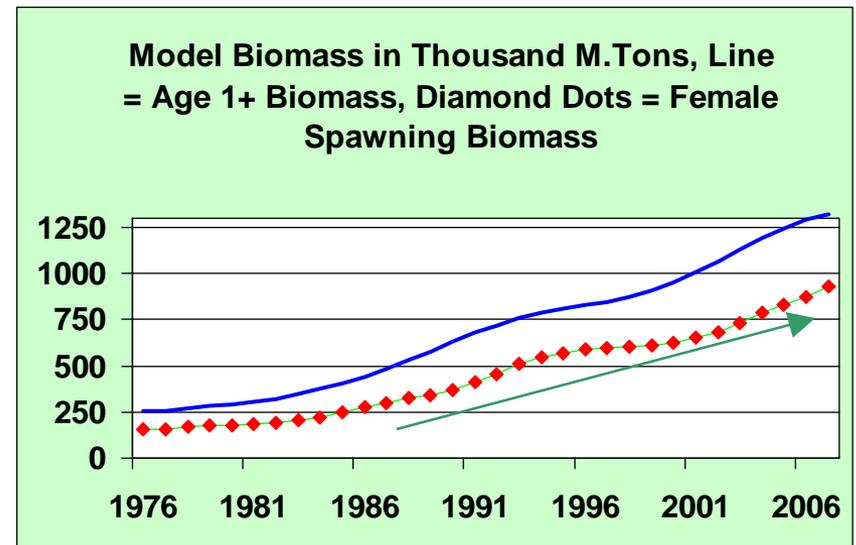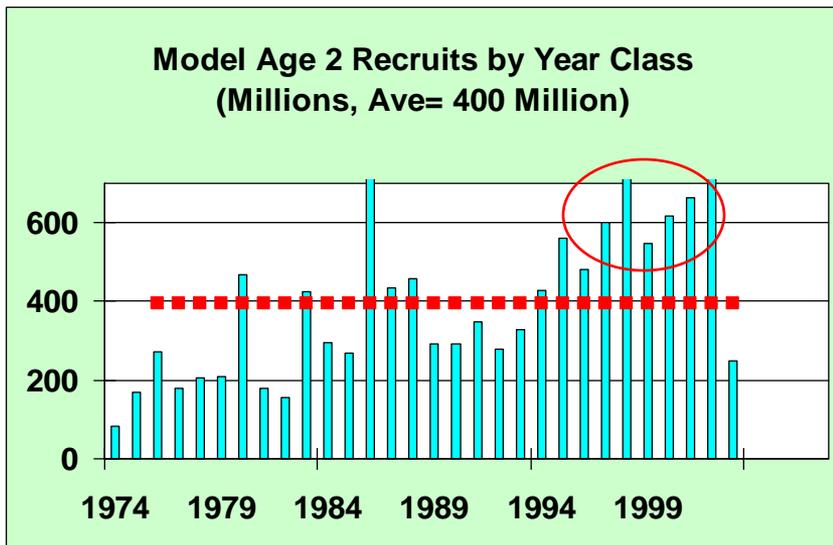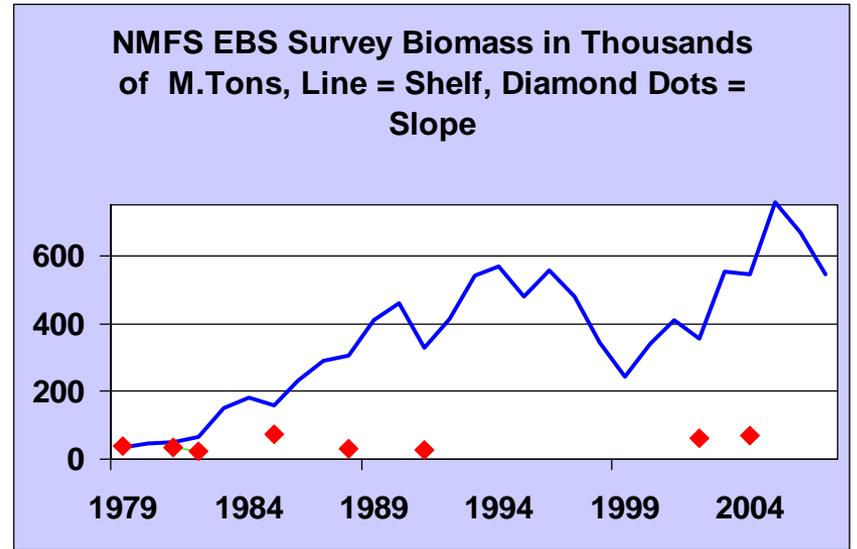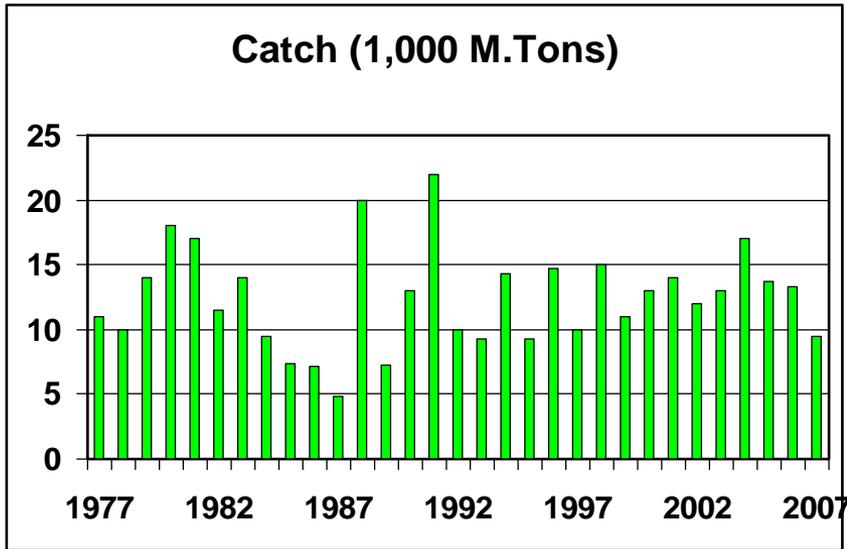
C7 – N. Rock Sole Stock Assessment, Dec 2007

Catch History and recent ABCs (red dots)
Units in 1,000 mt

NMFS EBS Survey Biomass
(Million M.Tons)

Model Age 4 Recruits
(Average = 1 Billion)

Model Biomass in Million M.Tons, Line = Age 2+ Biomass, Diamond Dots = Female Spawning Biomass
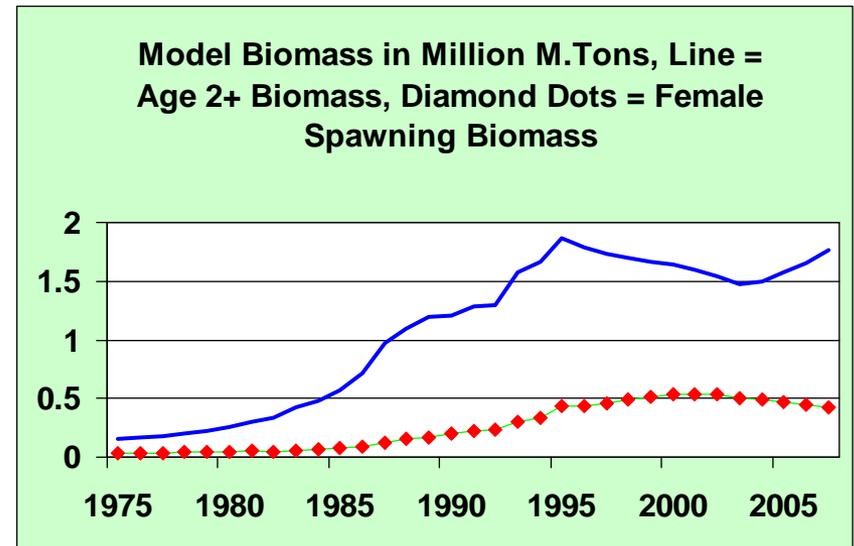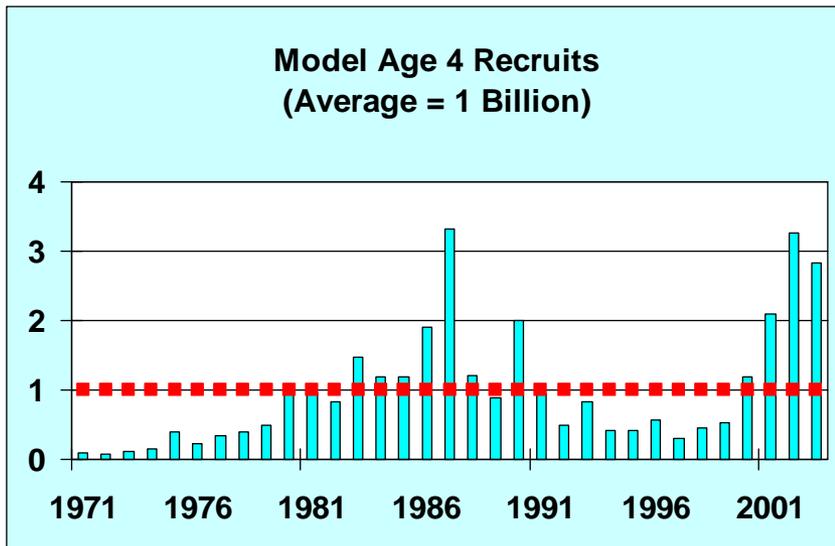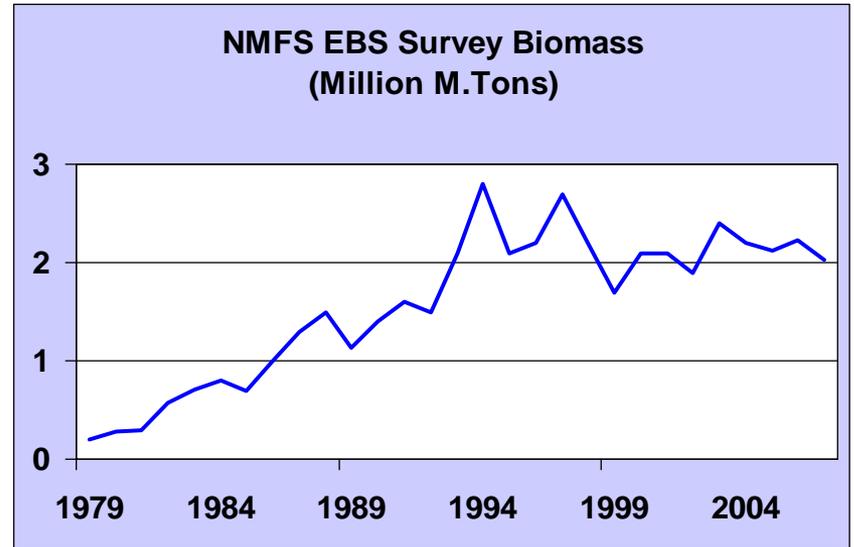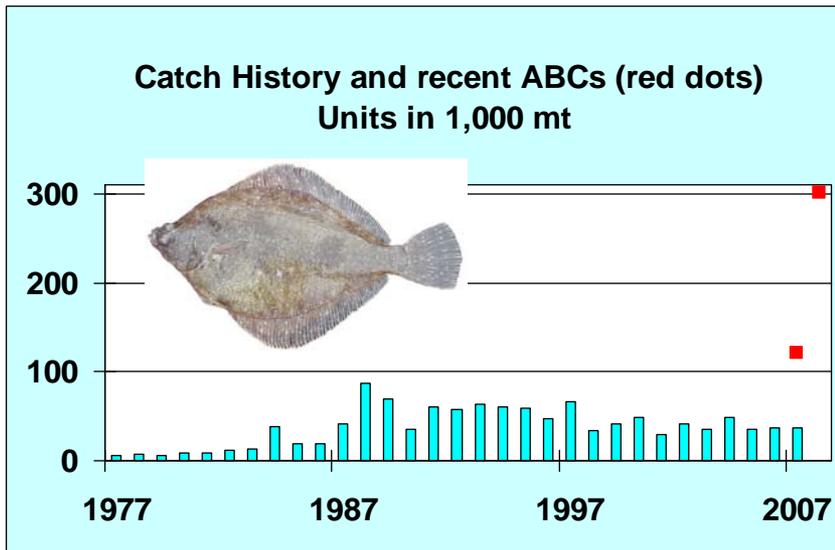
C8 - Flathead Sole Stock Assessment, Dec 2007

Catch History and recent ABCs (red dots)
Units in 1,000 mt

NMFS EBS Survey Biomass
(Million M.Tons)

Model Age 3 Recruits
(Billions, Ave= 1 Biillion)

Model Biomass in Million M.Tons, Line = Age 3+ Biomass, Diamond Dots = Female Spawning Biomass
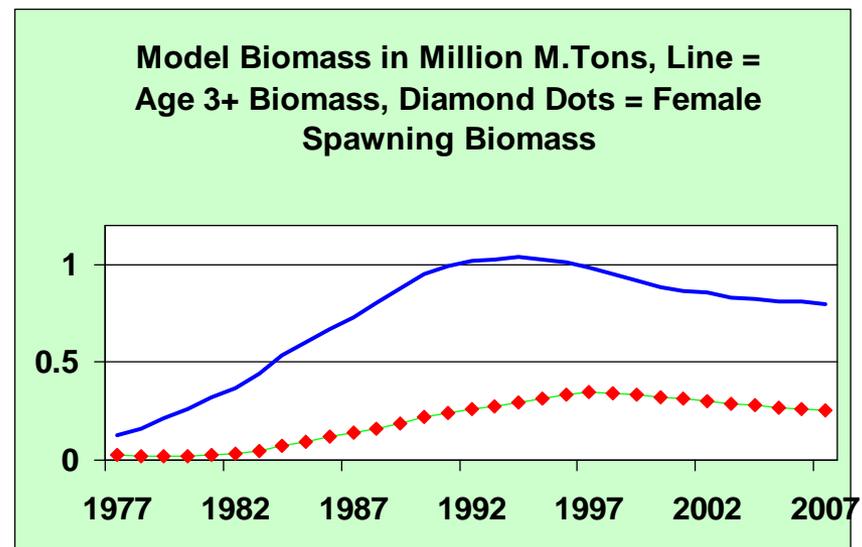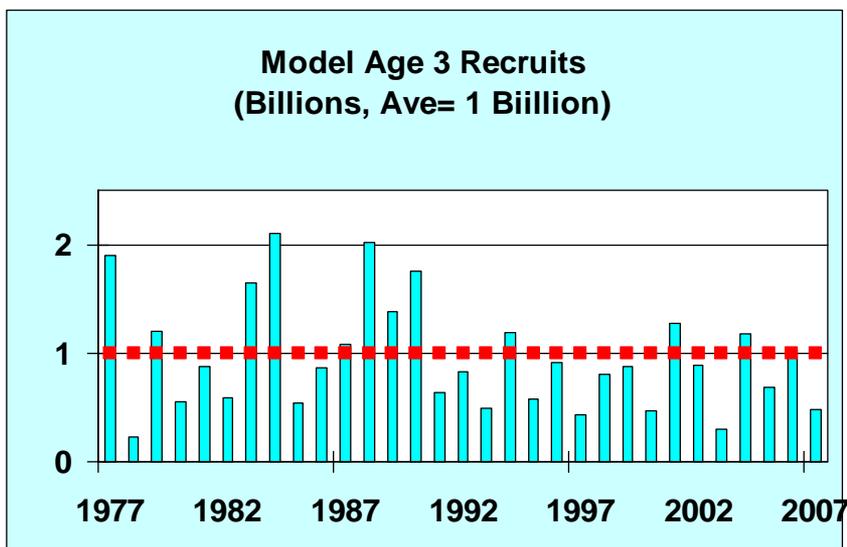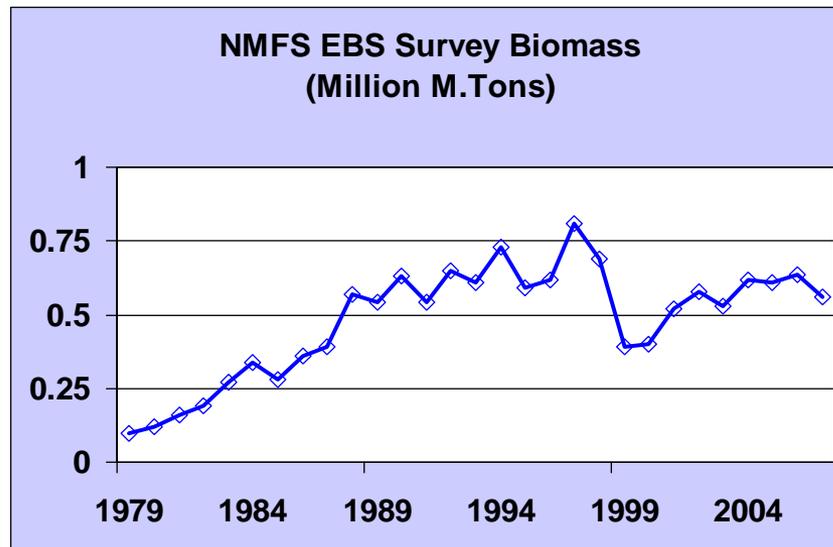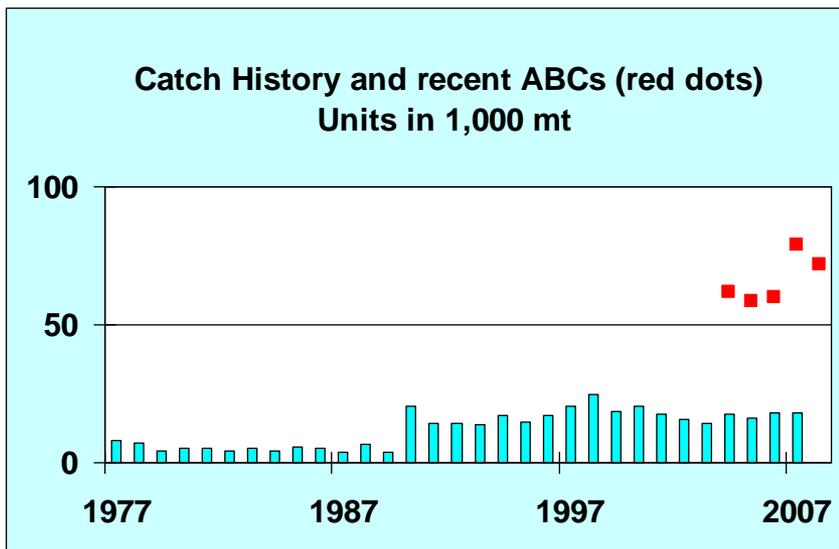
C9 - Alaska Plaice Stock Assessment, Dec 2007

Catch History and recent ABCs (red dots)
Units in 1,000 mt

NMFS EBS Survey Biomass
(Million M.Tons)

Model Age 3 Recruits
(Billions, Ave= 1.66 Billion)

Model Biomass in Million M.Tons, Line =
Age 3+ Biomass, Diamond Dots = Female
Spawning Biomass
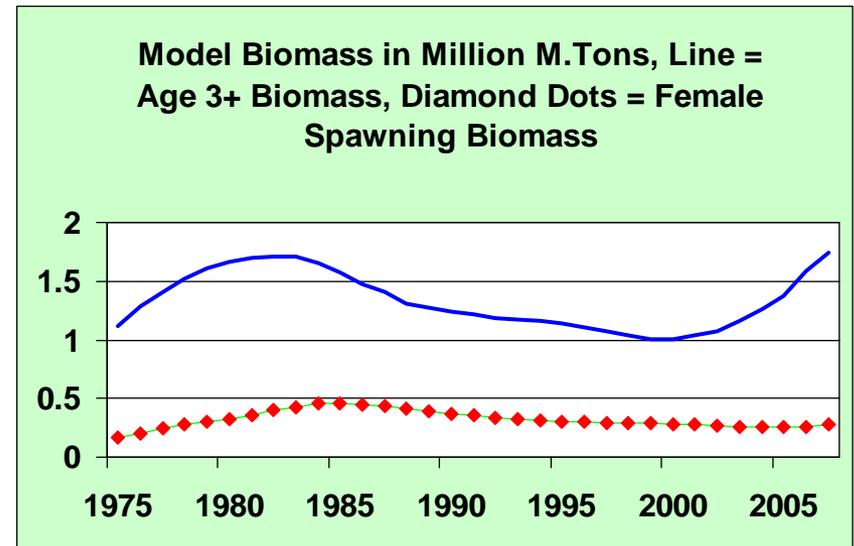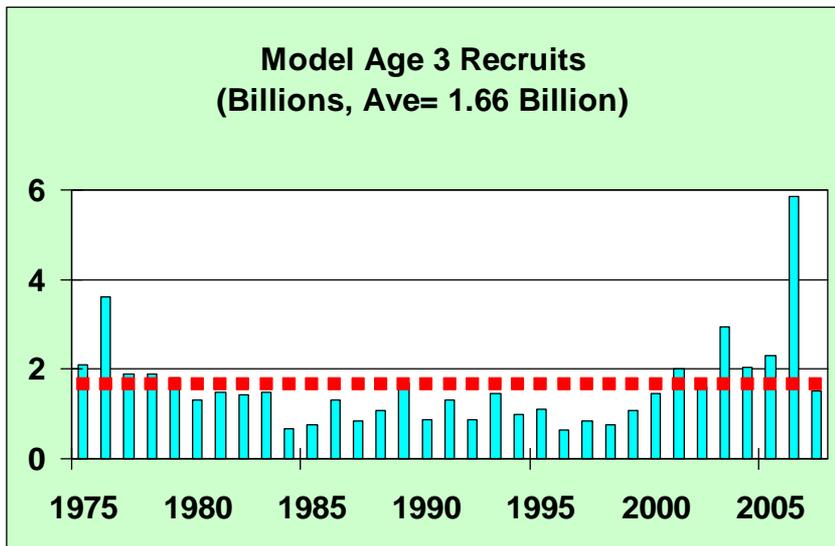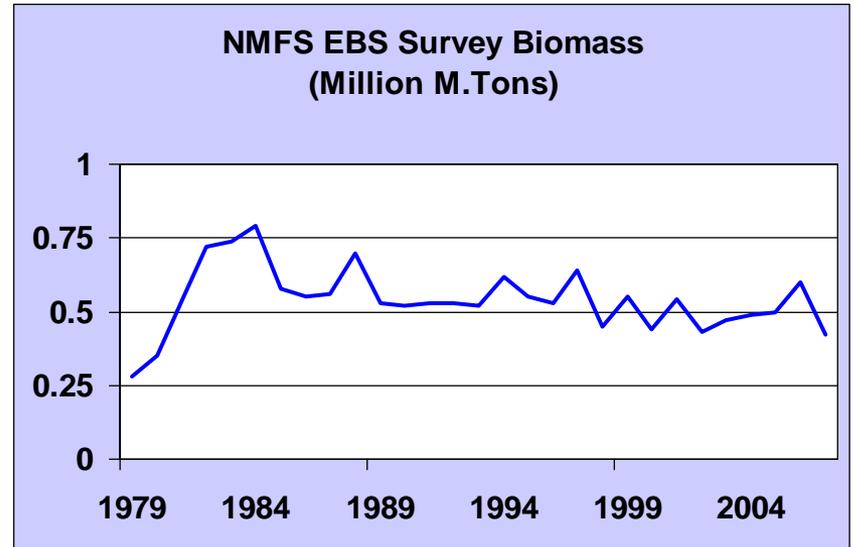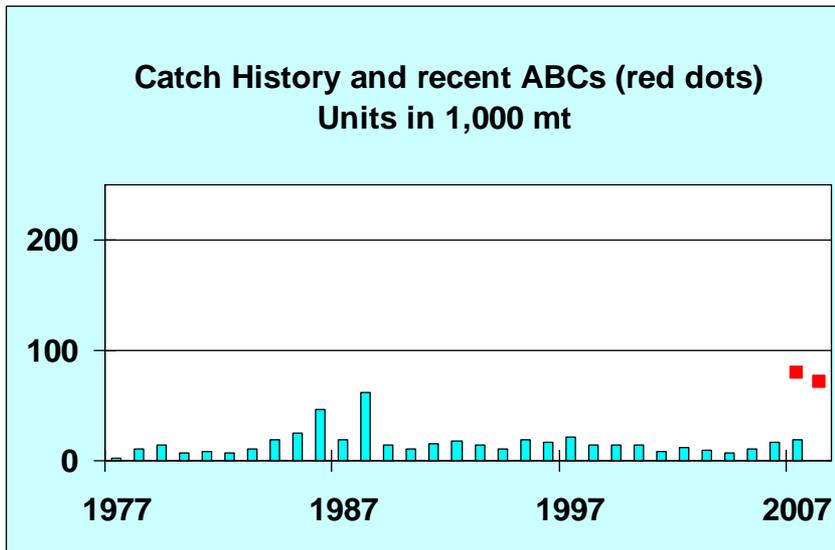
C10 - Other Flatfish Group Assessment, Dec 2007

Catch (MetricTons)

Legend: Remain, Butter, Rex, Starry

NMFS Trawl Survey Biomass
(Thousand M.Tons, Line = EBS, Diamond Dots = Aleutians)
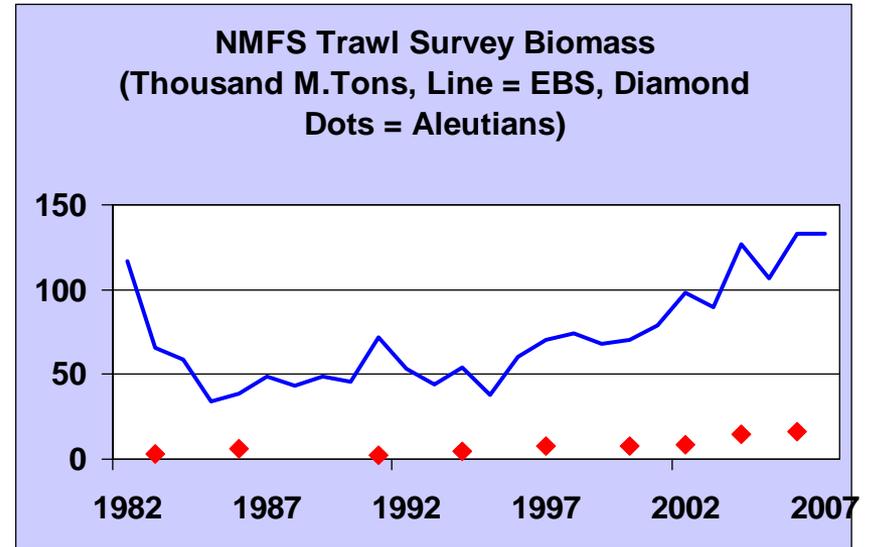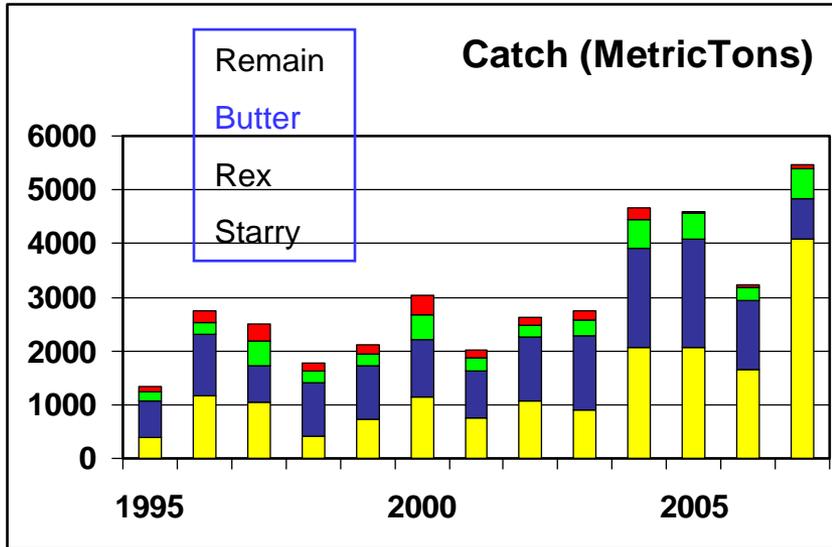
Model Biomass and Recruitment Estimations are not Available

Assessment based on Tier 5 NMFS Survey Biomass – Increasing Trend

Assessment Features

1. **Species Composition**
-- 16 species from EBS, 5 species from Aleutians,
-- Starry flounder = 74 % of Biomass
-- Rex & Butter Sole = 25%

Rockfish Assessments

1. **Major Updates of Rockfish Assessment are on 2 year cycle to coincide with Aleutian Islands surveys.**

2. Estimates for 2008 are based upon last years analysis and re-running projection models with new 2007 catch data

    -- No changes except for POP, which dropped ABC by 200 mt\

3. **Analyzes for POP and Northern Rockfish groups are based on Age Structured Models and their ABCs are calculated under Tier 3.**

4. **ABCs for all other rockfish groups are dependent directly on survey biomass under Tier 5 calculations, where ABC = 0.75M x Biomass**

C11 - Pacific Ocean Perch Stock Assessment, Dec 2006

Catch (1,000 M.Tons)
Bottom bar = Aleutians, Top bar = EBS

Survey Biomass
(Aleutian Islands Region)

Age 3 Recruits in Millions, Ave= 82

**Model Biomass in Thousand M.Tons, Line = Age 3+ Biomass, Diamond Dots = Female Spawning Biomass**
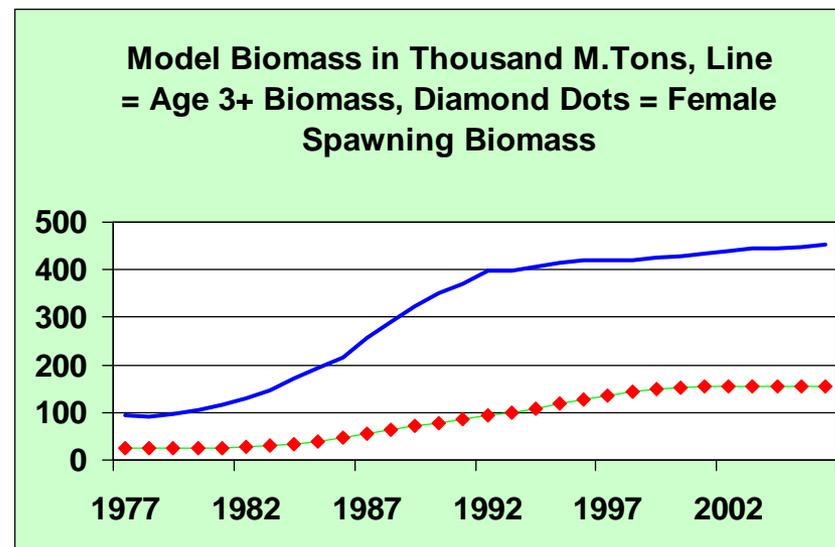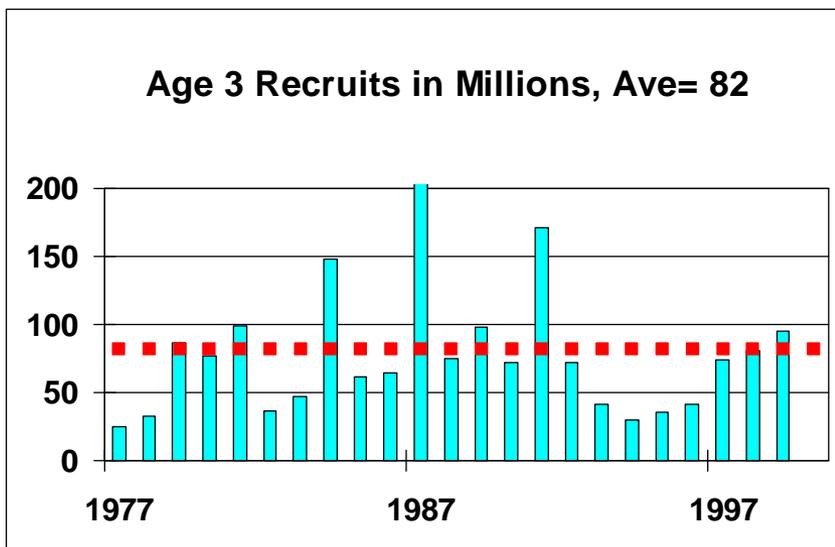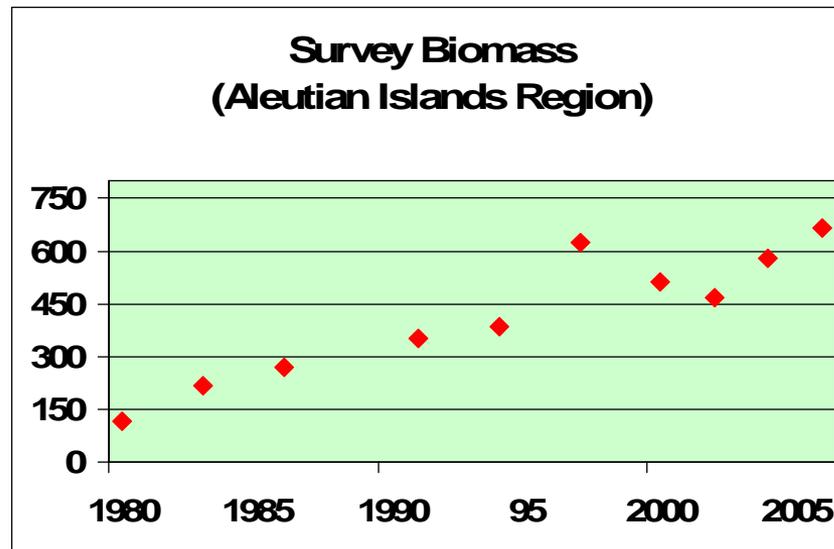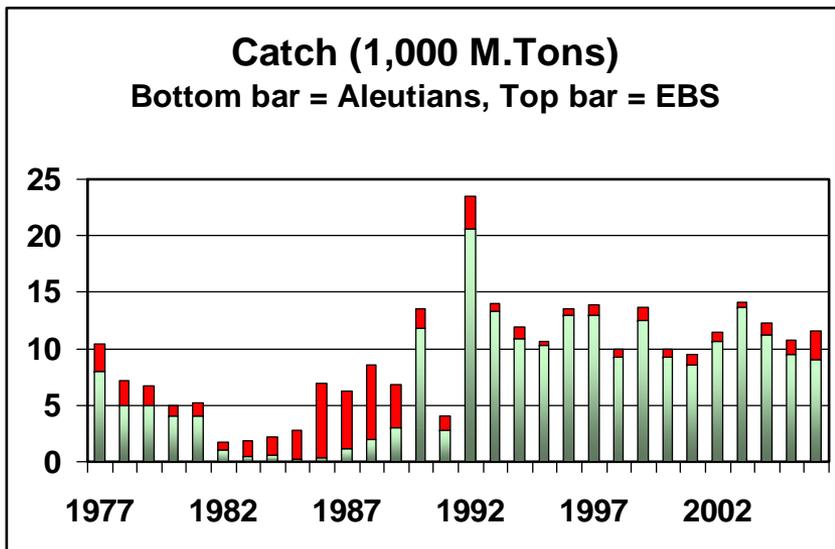
C12 - Northern Rockfish Stock Assessment (Dec 2006)

Catch (MetricTons)
Bottom bar = Aleutians, Top bar = EBS

Survey Biomass (BSAI)

Age 3 Recruits in Millions, Ave= 33.5

Model Biomass in Thousand M.Tons, Line = Age 3+ Biomass, Diamond Dots = Female Spawning Biomass
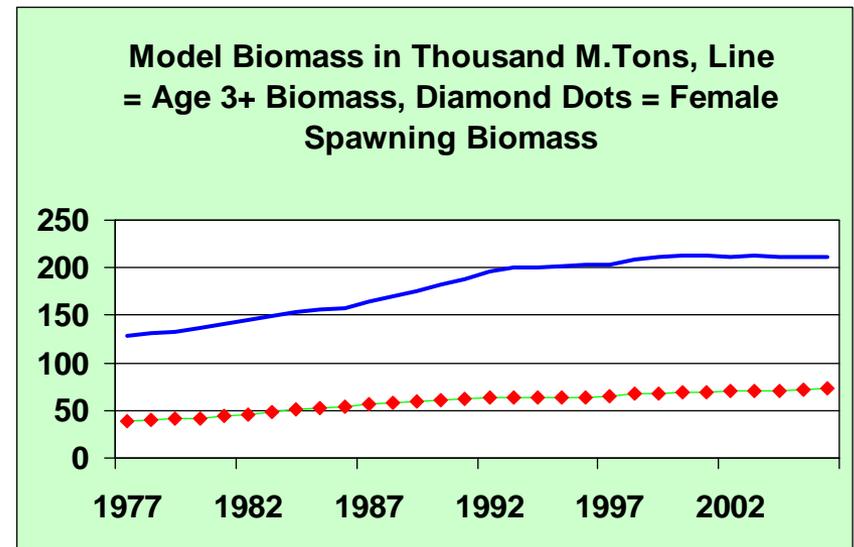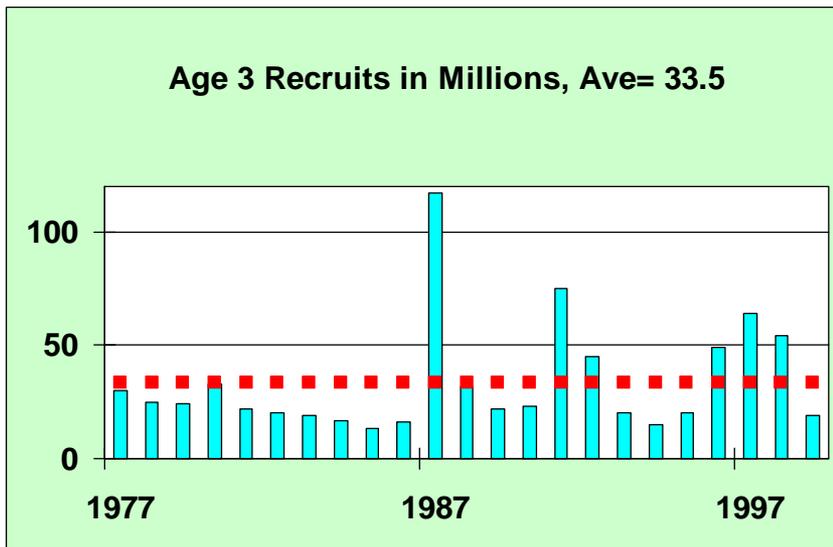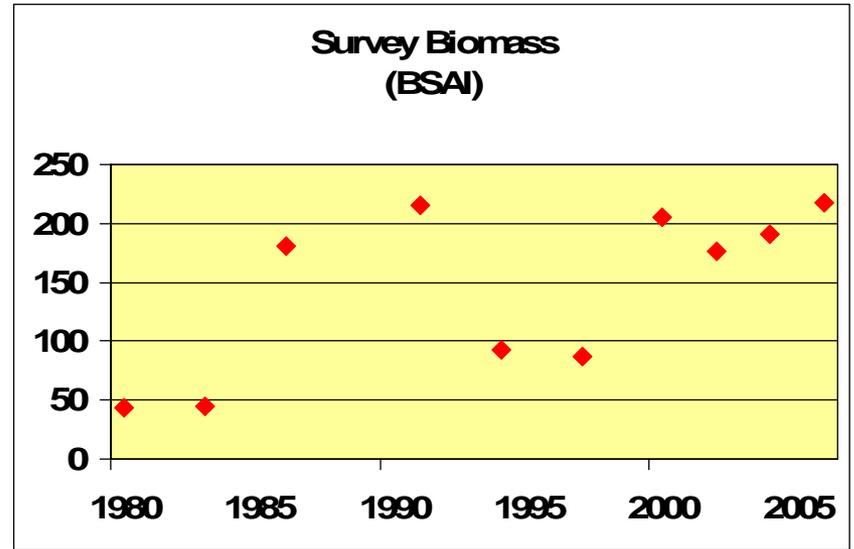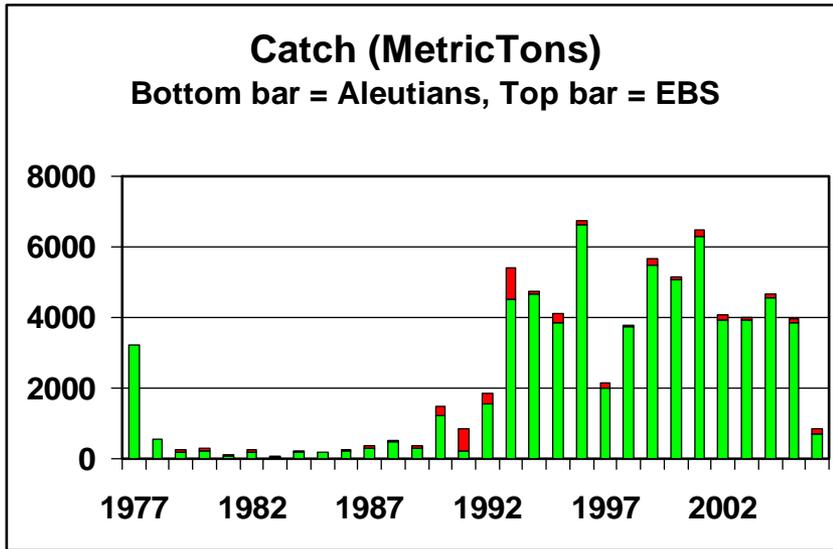
C13 - Shortraker & Rougheye Assessments, Dec 2006

Catch (MetricTons)
Bottom bar = Rougheye, Top bar = Shortraker

NMFS Trawl Survey Biomass
(Thousand M.Tons, Round Dots = EBS,
Diamond Dots = Aleutians)

Recruits Estimation
(Not Available)

Model Biomass in Thousand M.Tons, Line
= Shortraker, Diamond Dots = Rougheye
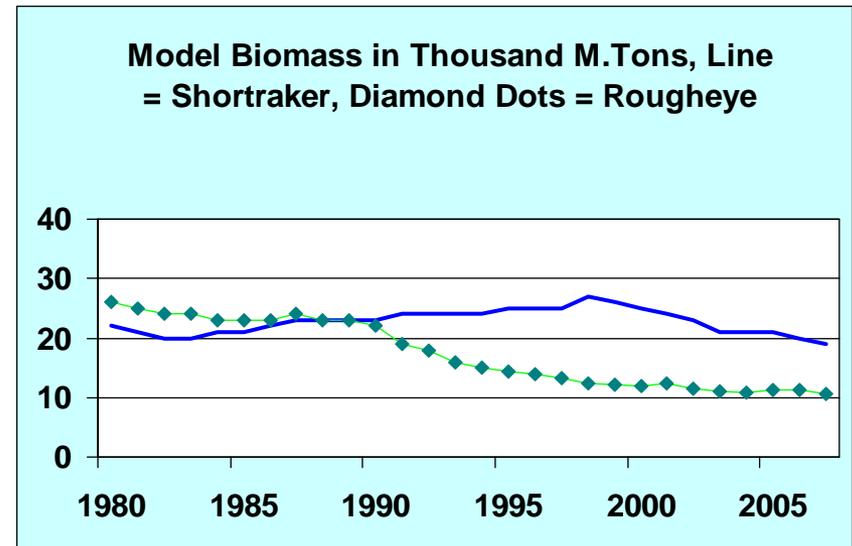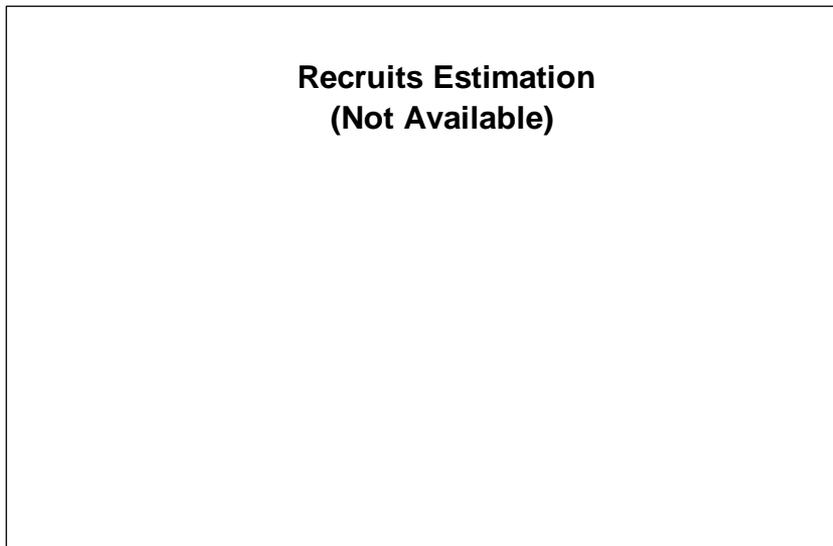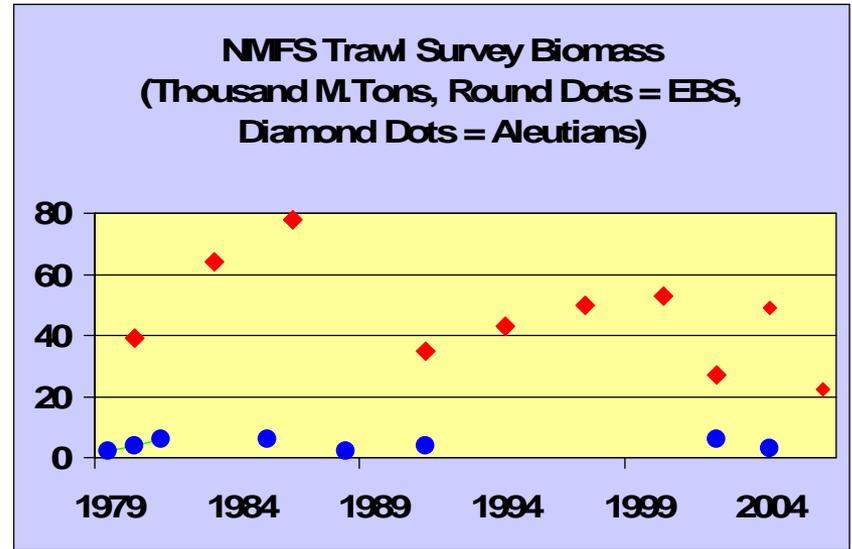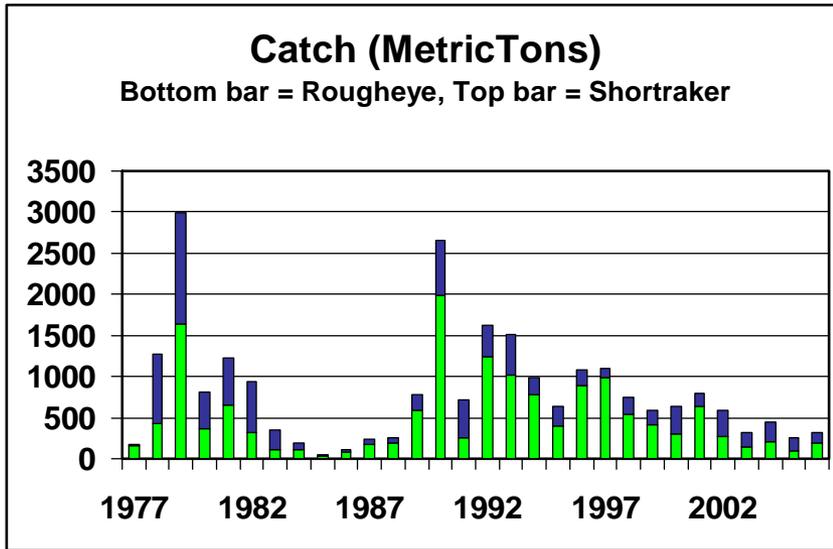
C14: Other Rockfish Complex

- **Complex includes eight species**
  - **Shortspine thornyhead, dusky rockfish dominant**
- **Straightforward update from last year, except**
  - **Past assessments, M = 0.07 for all species**
  - **This assessment**
    - **M = 0.03 for shortspine thornyhead (GOA value)**
    - **M = 0.09 (dusky rockfish value) for all other species**
- **ABC Calculation based on Tier 5**

C15. Atka Mackerel Assessment
## Notable Features

1. Update of last year's assessment

2. No survey in 2007

3. Recruitment of all 4 most recent year classes (2002-2005) are below average

4. ABC is apportioned by 3 Aleutian Areas; Eastern (32 %), Central (40 %), and Western (28 %)

C15 - Atka Mackerel Stock Assessment, Dec 2007


Catch (Thousand M.Tons)

NMFS Survey Biomass in Aleutians (Thousand M.Tons)

Model Age 1 Recruits (Millions, Ave= 500 Million)

Model Biomass in Million M.Tons, Line = Age 3+ Biomass, Diamond Dots = Female Spawning Biomass
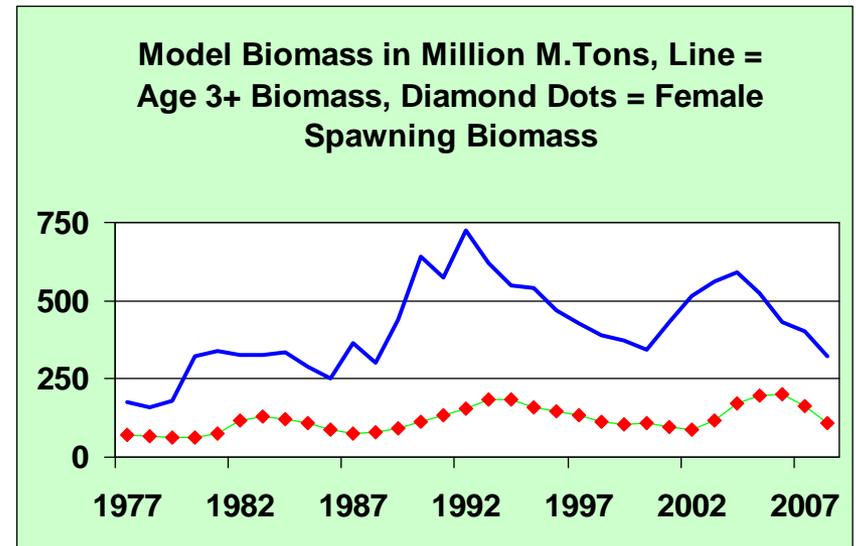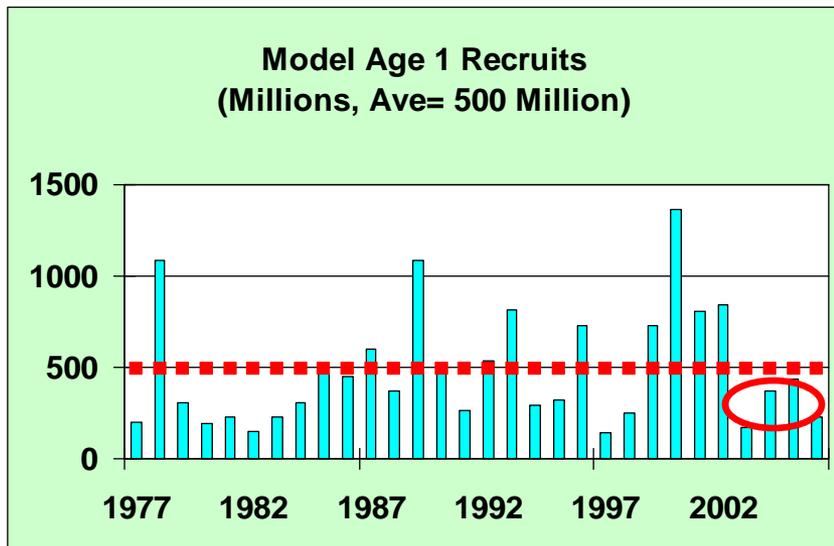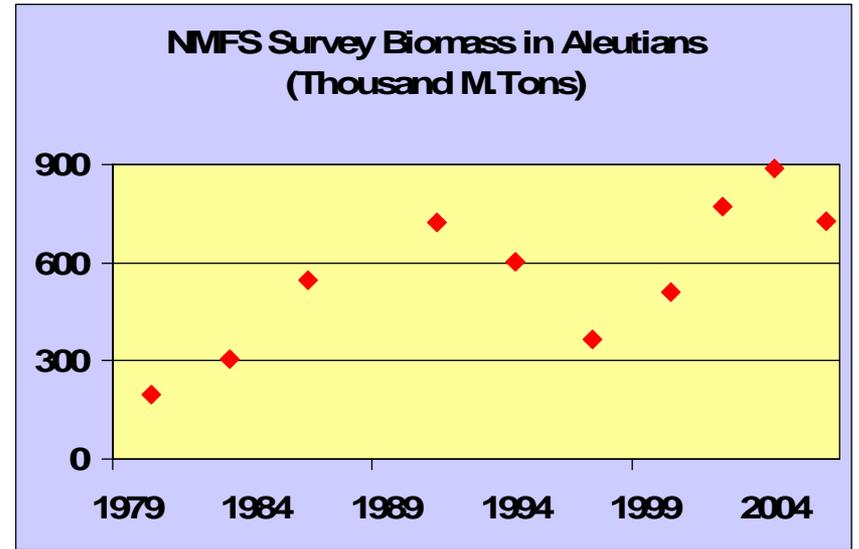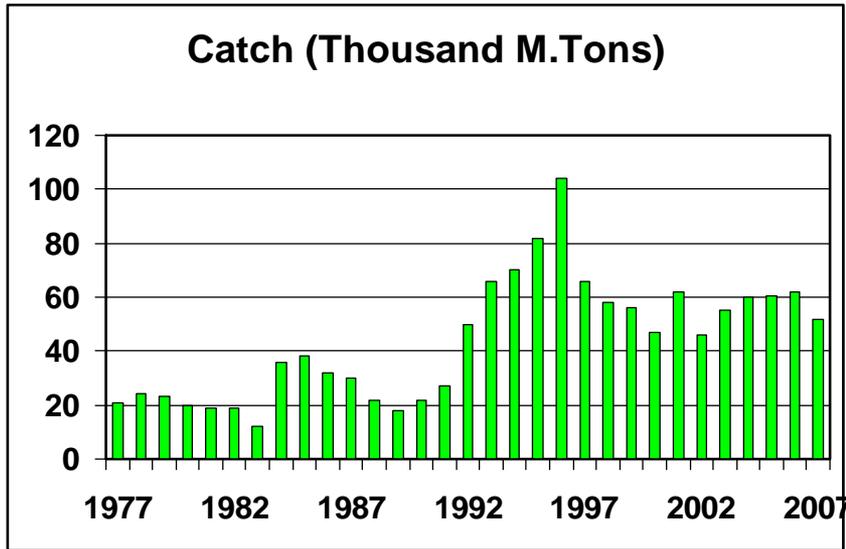
C16-20. Squid and Other Species Resources, Dec 2007 Assessments

2%
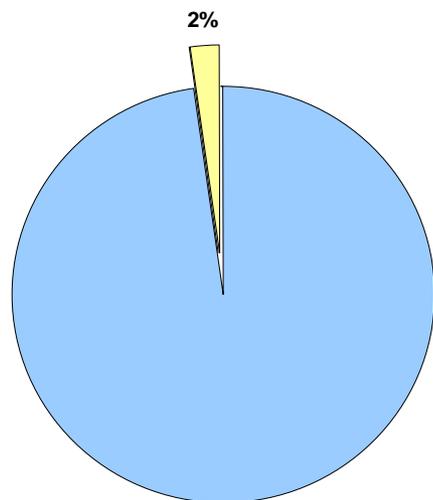
Average Groundfish Catch = 1.9 + mmt

Squid = 1,300mt

Skate & Others = 44,200 mt

Combined = 2.4 %

Squid Catch (MetricTons)
Bottom=EBS, Top=Aleutians
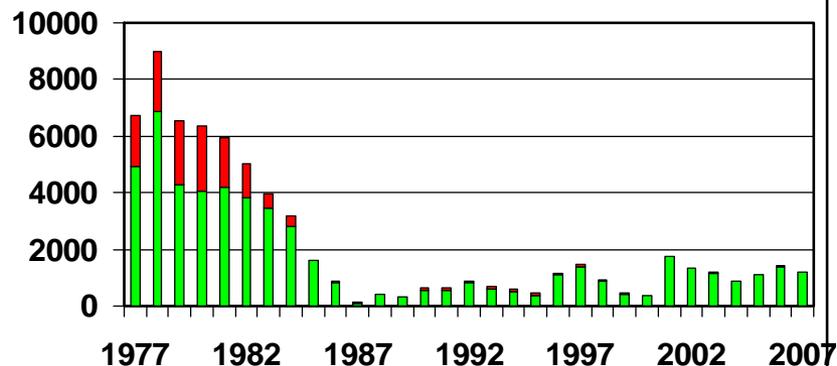
Skate and Other Species Catch (MetricTons)
Bottom=Skates, Top=Remainder Species
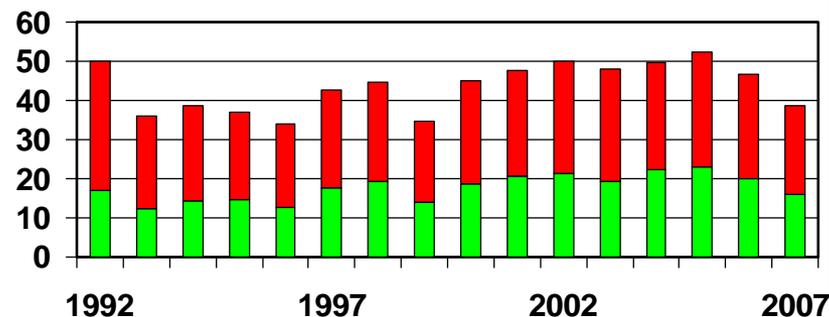
C16-20. Squid and other species Assessment
Notable Features

1   Squid ABC is calculated under Tier 6

average catch from 1977-1995, ABC = 1,970 mt

2.   Other species: author recommends managing by major taxonomic groups under Tier 5

Species	Biomass (mt)	ABC (mt)
Sharks	18,100	463
Skates	574,800	31,300 (Tier 5 by SSC)
Sculpins	229,000	39,800
Octopus	n.a.	243
Total	734,000	68,800

3. Plan Team and Authors recommend management by Break-out Species groups

Adjustments to ABCs
- due to Special Ecosystems Concerns

1. The Team did not make specific adjustments to ABCs for ecosystem concerns

2. General Concerns about ecosystem considerations have already been built into the Analyses

3. Ecosystems evaluations have been more extensive each year

BSAI Groundfish Complex
Yr 1999 to Yr 2008

Legend:
- 2000
- 2001
- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008

Categories: Biomass, ABC
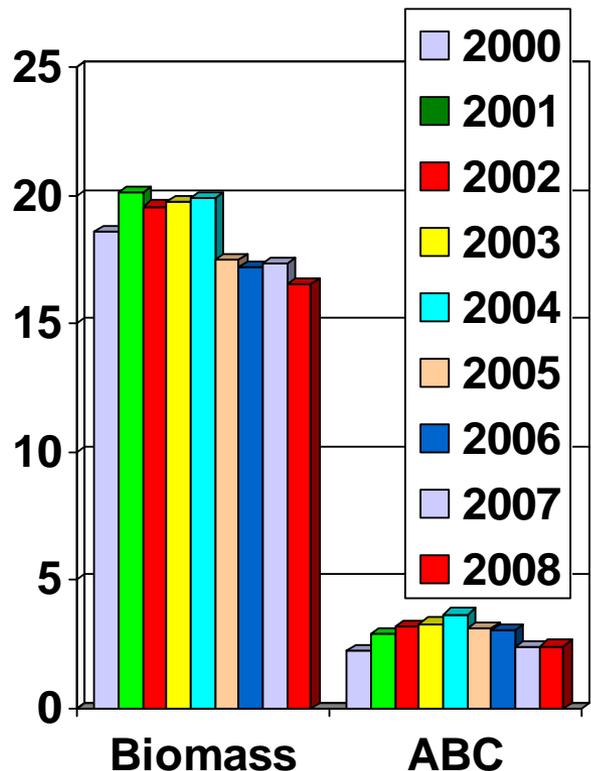
Exploitable Biomass

- 16.568 mmt for Yr 2008
- Declining fast for Roundfishes and Increasing fast for Flatfishes

- **ABC for 2007**

  - PT = 2.440 mmt
  - SSC = 2.xxx mmt
  - Both estimates are still higher than the OY cap of 2 mmt

Summary Assessment in December 2007
(Applicable for 2008 Fishery)
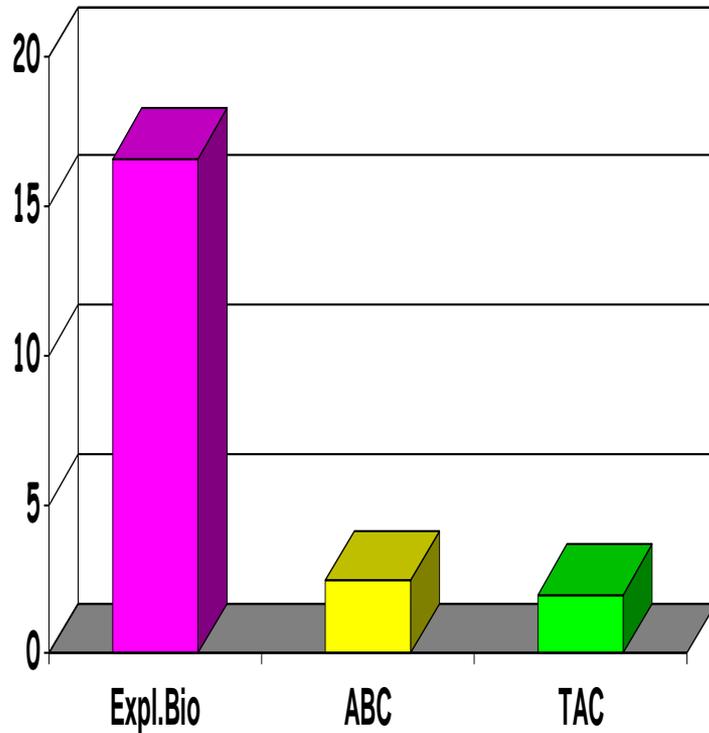
- Exploitable Biomass = 16.568 mmt
- ABC = 2.40,285 mt
- **Max TAC = 2 million mt**

- **Is any Stock being overfished or approaching overfishing Situation ? – No and No for all the Stocks below Tier 5 Analyses**

- **Cannot determine situations for Tier 5 and Tier 6 stocks**

SSC vs Plan Team Estimates, Dec 2007

Stock	SSC ABC (mt)	PT ABC (mt)	Reasons for Change
Pacific Cod	176,000	150,000	Recruitment Level
Skate	37,600	31,300	Tier 3 by PT Tier 5 by SSC

< End of Presentation >