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

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

Legend
VESSEL
- Arcturus
- Aldebaran
- Northwest Explorer
- Sea Storm
- Gladiator

Northwest Explorer
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

Larger Temp Variations

1.63 deg C in 2007
Sea Bottom Temperature Profiles from Surveys, 2004-2007

- **2004**: Warmer
- **2005**: Colder
- **2006**: Colder
- **2007**: Colder

*Notes:*
- 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%
- Pollock-EBS: 26%
- Pacific Cod: 7%
- Pollock-Bogoslof: 2%
- Pollock-Al: 1%
- 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)
Nov 2007 Assessment
BSAI Rockfish Complex Biomass
Yr 2007 Total = 731,400 MT
(No Sig. Update, minor or no change)

- Northern: 29%
- Shortraker: 3%
- Others: 5%
- 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)

<table>
<thead>
<tr>
<th>Stock</th>
<th>Biomass (mt)</th>
<th>ABC (mt)</th>
<th>ABC Change from 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pollock, EBS</td>
<td>4,360,000</td>
<td>1,000,000</td>
<td>Down 23%</td>
</tr>
<tr>
<td>Pollock, AI</td>
<td>197,000</td>
<td>28,200</td>
<td>Down 37%</td>
</tr>
<tr>
<td>Pollock, Bogoslof</td>
<td>292,000</td>
<td>7,970(SSC)</td>
<td>Up 53 %</td>
</tr>
</tbody>
</table>
## Summary (Cod and Sablefish)
*(From Table 5, Team Summary Appendix A)*

<table>
<thead>
<tr>
<th>Stock</th>
<th>Biomass (mt)</th>
<th>ABC (mt)</th>
<th>ABC Change From 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pacific Cod, BSAI</td>
<td>1,080,000</td>
<td>150,000</td>
<td>Down 15%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(SSC=176,000)</td>
<td></td>
</tr>
<tr>
<td>Sablefish, EBS</td>
<td>41,000</td>
<td>2,860</td>
<td>Down 4%</td>
</tr>
<tr>
<td>Sablefish, AI</td>
<td>34,000</td>
<td>2,440</td>
<td>Down 13%</td>
</tr>
</tbody>
</table>
### Summary (Flatfishes)
(From Table 5, Team Summary Appendix A)

<table>
<thead>
<tr>
<th>Stock</th>
<th>Biomass (mt)</th>
<th>ABC (mt)</th>
<th>ABC Change from 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>YellFn. Sole</td>
<td>2,200,000</td>
<td>248,000</td>
<td>Up 10 %</td>
</tr>
<tr>
<td>Grn. Turbot</td>
<td>104,100</td>
<td>2,540</td>
<td>Up 4 %</td>
</tr>
<tr>
<td>Arrow. Fl.</td>
<td>1,280,000</td>
<td>244,000</td>
<td>Up 54 %</td>
</tr>
<tr>
<td>N.RockSole</td>
<td>1,880,000</td>
<td>301,000</td>
<td>Up 52 %</td>
</tr>
<tr>
<td>Flathead S</td>
<td>820,000</td>
<td>71,700</td>
<td>Down 9 %</td>
</tr>
<tr>
<td>Alaska Plaice</td>
<td>1,850,000</td>
<td>194,000</td>
<td>Up 2 %</td>
</tr>
<tr>
<td>Other Flats</td>
<td>150,000</td>
<td>21,600</td>
<td>Up 1 %</td>
</tr>
</tbody>
</table>
## Summary (Rockfishes)
(From Table 5, Team Summary Appendix A)

<table>
<thead>
<tr>
<th>Stock</th>
<th>Biomass (mt)</th>
<th>ABC (mt)</th>
<th>ABC Change From 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>POP, BSAI</td>
<td>453,000</td>
<td>21,700</td>
<td>Up 1 %</td>
</tr>
<tr>
<td>Northern R</td>
<td>212,000</td>
<td>8,190</td>
<td>No Update</td>
</tr>
<tr>
<td>ShortRaker</td>
<td>18,900</td>
<td>424</td>
<td>No Update</td>
</tr>
<tr>
<td>Rougheye</td>
<td>10,800</td>
<td>202</td>
<td>No Update</td>
</tr>
<tr>
<td>Other Rock</td>
<td>36,700</td>
<td>999</td>
<td>No Update</td>
</tr>
</tbody>
</table>
### Summary (Atka Mackerel & Other Species)

(From Table 5, Team Summary Appendix A)

<table>
<thead>
<tr>
<th>Stock</th>
<th>Biomass (mt)</th>
<th>ABC (mt)</th>
<th>ABC Change From 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atka Mackerel</td>
<td>323,000</td>
<td>60,700</td>
<td>Down 18 %</td>
</tr>
<tr>
<td>Squid</td>
<td>NA</td>
<td>1,970</td>
<td>No Change</td>
</tr>
<tr>
<td>Other Species</td>
<td>725,600</td>
<td>71,800</td>
<td>Down 0.1%</td>
</tr>
</tbody>
</table>
Status of Stocks Relative to Overfishing Levels
Bering Sea and Aleutian Islands Region

Dec 2006 Summary: No Stock was Overfished nor Approaching Overfishing
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 Fishery Patterns……A versus B seasons, 2007

[Maps showing fishery patterns for different seasons: 01/20 - 05/31, 2007 and 06/01 - 12/31, 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)
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.
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.
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
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 Age 1 Recruits in Billions
Average Recruitment 1964-2007 = 22.5
Feature #4: Arguments in support of ABC = Tier 1b max. permissible ABC

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 = 1.17 mmt; 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

Spawning Exploitation Rate

26% 20%
Projections of FSB to 2012

Female Spawning Biomass (thousands of t)

- B40%
- Bmsy
- Fmsy
- F40%
- Biomass with Catch=1.0 mmt
- Biomass with Catch=1.2 mmt

1 mmt

1.2 mmt
Recent FSB Exploitation Rates

Spawnin...
**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

**Model Biomass 1964-2009**
  - Line=Age 3+ Biomass, Diamonds Dots = Female Spawning Biomass

**EBS Pollock Age 1 Recruits in Billions**
- Average Recruitment 1964-2007 = 22.5
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.
<table>
<thead>
<tr>
<th>Year</th>
<th>Pollock Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>175,000</td>
</tr>
<tr>
<td>2004</td>
<td>130,000</td>
</tr>
<tr>
<td>2006</td>
<td>95,000</td>
</tr>
</tbody>
</table>
C1a - Aleutian Islands Pollock Assessment, Dec 2007

**Catch (1,000 M.Tons)**

**NMFS Survey Biomass in NRA Areas**

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

**Age 2 Recruits in Millions**

Average Recruitment 1990-06 = 54.5
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
   \[ \text{ABC (Plan Team)} = 7,970 \text{ mt} \]
2007 Pacific Cod Fisheries, Jan-May

Trawl

Longline

Pot
2007 Pacific Cod Fisheries, June-Aug

- Trawl
- Longline
- 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
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

Graph showing biomass trends from 1976 to 2008. The graph includes lines for age 3+, female spawning, and survey data. The biomass peaks are indicated for each year.
Important Recruitment Features

2001-2005 Year classes were below average
2006 Year Class may be the 2nd strongest of 30 Year History
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 sablefish longline survey of eastern Bering Sea, Aleutian Islands eastern half, and Gulf of Alaska management areas.

© Sigler 1972
GOA Trawl survey
C3 - Alaska-wide Sablefish Stock Assessment, Dec 2007

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

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

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

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

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABC</td>
<td>20.9</td>
<td>16.9</td>
<td>18.0</td>
</tr>
</tbody>
</table>

• 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

(Non-Procedural Procedure Used since 2000)

<table>
<thead>
<tr>
<th>Area</th>
<th>ABC Percentage</th>
<th>2008 ABC (mt)</th>
<th>Change from 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td>18,000</td>
<td>-10 %</td>
</tr>
<tr>
<td>Bering Sea</td>
<td>16%</td>
<td>2,860</td>
<td>-4 %</td>
</tr>
<tr>
<td>Aleutians</td>
<td>14%</td>
<td>2,440</td>
<td>-13 %</td>
</tr>
<tr>
<td>Gulf of Alaska</td>
<td>71%</td>
<td>12,700</td>
<td>-11 %</td>
</tr>
</tbody>
</table>
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


1960-63
1986-89
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

FSB
Bmsy
B40

Year

FSB (1,000s t)

C6 - Arrowtooth Flounder Stock Assessment, Dec 2007

Catch (1,000 M.Tons)

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

NMFS EBS Survey Biomass in Thousands of M.Tons, Line = Shelf, Diamond Dots = Slope
C7 – N. Rock Sole Stock Assessment, Dec 2007

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

Model Age 4 Recruits
(Average = 1 Billion)

NMFS EBS Survey Biomass
(Million M.Tons)

Model Biomass in Million M.Tons, Line = Age 2+ Biomass, Diamond Dots = Female Spawning Biomass

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

Model Age 4 Recruits
(Average = 1 Billion)

NMFS EBS Survey Biomass
(Million M.Tons)

Model Biomass in Million M.Tons, Line = Age 2+ Biomass, Diamond Dots = Female Spawning Biomass
Model Biomass and Recruitment Estimations are not Available

Assessment based on Tier 5 NMFS Survey Biomass – Increasing Trend

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

C10 - Other Flatfish Group Assessment, Dec 2007
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)

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

Catch (Metric Tons)
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 %)
C16-20. Squid and Other Species Resources, Dec 2007 Assessments

Average Groundfish Catch = 1.9 + mmt
Squid = 1,300mt
Skate & Others = 44,200 mt
Combined = 2.4 %
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

<table>
<thead>
<tr>
<th>Species</th>
<th>Biomass (mt)</th>
<th>ABC (mt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharks</td>
<td>18,100</td>
<td>463</td>
</tr>
<tr>
<td>Skates</td>
<td>574,800</td>
<td>31,300 (Tier 5 by SSC)</td>
</tr>
<tr>
<td>Sculpins</td>
<td>229,000</td>
<td>39,800</td>
</tr>
<tr>
<td>Octopus</td>
<td>n.a.</td>
<td>243</td>
</tr>
<tr>
<td>Total</td>
<td>734,000</td>
<td>68,800</td>
</tr>
</tbody>
</table>

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
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

<table>
<thead>
<tr>
<th>Stock</th>
<th>SSC ABC (mt)</th>
<th>PT ABC (mt)</th>
<th>Reasons for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pacific Cod</td>
<td>176,000</td>
<td>150,000</td>
<td>Recruitment Level</td>
</tr>
<tr>
<td>Skate</td>
<td>37,600</td>
<td>31,300</td>
<td>Tier 3 by PT Tier 5 by SSC</td>
</tr>
</tbody>
</table>
< End of Presentation >