Presentation Outline

- Overview of PIRO and federally managed fisheries and stocks/stock complexes;
- Relevance of stock assessment conducted (what stocks are assessed?);
- Quality of stock assessments (modeling approach, review process, and communication); and
- Considerations for improvements.
Pacific Islands Regional Office

- **Domestic Fisheries.** Oversee implementation of fishery ecosystem plans (FEP) developed by the Council, as authorized under the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

- **International Fisheries.** Provides policy advice and technical administrative support for international fisheries agreements in the western and central Pacific Ocean (WCPO).

- **Other Divisions/Programs:** Fisheries Observers, Habitat, Protected Resources, Monuments, Operations, Management Information & Technology
MSA Mandate (National Standard 1)

Prevent overfishing while achieving optimum yield

For each stock/stock complex, the FEP must include:

• An estimate of maximum sustainable yield (MSY);
• Status determination criteria that NMFS will use to determine when a stock or stock complex is subject to overfishing (MFMT or OFL), or overfished (MSST);
• Annual catch limits to prevent overfishing from occurring.

Ideally, MSY and MSY-based reference points above, should be estimated through a statistically-based stock assessment model.
Domestic Fisheries

Geographically-based Fishery Ecosystem Plans (FEP)

There are several hundred individual species identified in each FEP.
## Stocks & Stock Complexes by FEP (n=103)

<table>
<thead>
<tr>
<th>FEP Fishery</th>
<th>American Samoa</th>
<th>Guam</th>
<th>CNMI</th>
<th>Hawaii</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bottomfish</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(snappers, groupers, jacks and emperors; Hawaii seamount groundfish)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td><strong>Crustaceans</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(spiny and slipper lobsters, Kona crab and deepwater shrimp)</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td><strong>Precious Coral</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(black &amp; pink, gold, bamboo)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td><strong>Coral Reef</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(several hundred species grouped at the family level)</td>
<td>15</td>
<td>20</td>
<td>15</td>
<td>13</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>22</strong></td>
<td><strong>27</strong></td>
<td><strong>22</strong></td>
<td><strong>32</strong></td>
</tr>
</tbody>
</table>
Precious corals and certain species of crustaceans are not exploited in either local or EEZ waters around AS, GU and CNMI.

FEP Fisheries occur predominantly within local/state waters.
Major Domestic Stocks (FSSI)

Only 7 of 103 stock complexes are considered major

1. American Samoa Bottomfish Complex
2. Guam Bottomfish Complex
3. CNMI Bottomfish Complex
4. Main Hawaiian Island Deep 7 bottomfish complex
5. Hawaii bigeye scad*
6. Hawaii round scad*
7. Hawaii Hancock Seamount Groundfish*

* Indicates un-assessed stocks
International Fisheries

Pacific Pelagic
FEP

Pelagic Resources

Pacific bigeye tuna

N. Pacific swordfish

S. Pacific albacore
## Stocks in International Fisheries (n = 36)

<table>
<thead>
<tr>
<th>Species Group</th>
<th>Number of Stocks/Populations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tunas</td>
<td>12 (albacore, bigeye, yellowfin, skipjack, bluefin, other)</td>
</tr>
<tr>
<td>Billfishes</td>
<td>8 (black, blue, striped, swordfish, sailfish, spearfish)</td>
</tr>
<tr>
<td>Sharks</td>
<td>8 (thresher, mako, silky, blue,)</td>
</tr>
<tr>
<td>Other pelagic finfish</td>
<td>5 (opah, ono, moonfish, oilfish, pomfret)</td>
</tr>
<tr>
<td>Squid</td>
<td>3 (diamond back, purple back, neon)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>
## Major International Stocks (FSSI)

18 of 36 stocks are considered major

<table>
<thead>
<tr>
<th>Region</th>
<th>Stock</th>
<th>Stock</th>
<th>Stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>N. Pacific</td>
<td>Albacore</td>
<td>E. Pacific striped marlin</td>
<td>Pacific blue marlin</td>
</tr>
<tr>
<td>S. Pacific</td>
<td>Albacore</td>
<td>W. Pacific striped marlin</td>
<td>Pacific Kawakawa*</td>
</tr>
<tr>
<td>E. Pacific</td>
<td>yellowfin tuna</td>
<td>N. Pacific Blue shark</td>
<td>Pacific Opah*</td>
</tr>
<tr>
<td>W. Pacific</td>
<td>yellowfin tuna</td>
<td>N. Pacific swordfish</td>
<td>Pacific spearfish*</td>
</tr>
<tr>
<td>E. Pacific</td>
<td>skipjack tuna</td>
<td>Pacific bluefin tuna</td>
<td>Pacific ono*</td>
</tr>
<tr>
<td>W. Pacific</td>
<td>skipjack tuna</td>
<td>Pacific bigeye tuna</td>
<td>Pacific Mahimahi*</td>
</tr>
</tbody>
</table>

* Indicates un-assessed stocks
Relevance: Domestic Assessments

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Assessed</th>
<th>Un-Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Stocks</td>
<td>7</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Minor Stocks</td>
<td>96</td>
<td>0</td>
<td>96</td>
</tr>
</tbody>
</table>

- Of the 3 un-assessed major domestic stocks, two occur primarily in local state waters (HI scads), the other is not fished by U.S. fleets (seamount groundfish).
- Of the 96 un-assessed minor stocks, fishing occurs predominantly in local state waters where data collection is voluntary (except in Hawaii).
- Council is considering classifying most of these stocks as ecosystem component species, which relieves NMFS of requirements for stock assessments, MSY, ACL etc.
Relevance: International Assessments

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Assessed</th>
<th>Un-Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Major Stocks</strong></td>
<td>18</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td><strong>Minor Stocks</strong></td>
<td>18</td>
<td>0</td>
<td>18</td>
</tr>
</tbody>
</table>

• Completion of stock assessments for the 4 remaining major international stocks will require data from foreign fishing nations, which is currently not available, and not required to be reported to RFMOs.

• Completion of stock assessments for the 18 remaining un-assessed minor stocks, will require the same as un-assessed major stocks.
Stock Status Report to Congress

- NMFS must annually report stock status determination for all FEP stocks and stock complexes.
- NMFS relies on stock assessments to make these determinations.
- Status of majority of Pacific Islands stocks and stock complexes is “unknown.”
- Ecosystem Component
Quality: Domestic Assessments

Stock Assessment of the Main Hawaiian Islands
Deep 7 Bottomfish Complex Through 2010

Jon Brodziak, Dean Courtney, Lyon Wagatsuma, Joseph O’Malley,
Hui-Hua Lee, William Walsh, Allen Andrews, Robert Humphries,
and Gerard DiNardo

Pacific Islands Fisheries Science Center
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Stock Assessment Update of the
Status of the Bottomfish Resources of American Samoa,
the Commonwealth of the Northern Mariana Islands,
and Guam, 2012

Jon Brodziak, Joseph O’Malley, Benjamin Richards,
and Gerard DiNardo

October 2012

Administrative Report H-12-04
WPSAR Review Process

- **Tier 1**: Center for Independent Experts
  - New methodologies
  - International stock assessments

- **Tier 2**: WPSAR Expert Panel
  - New methodologies
  - Routine assessment updates
  - Coordinated by PIFSC/PIRO/Council

- Bottomfish stock assessments reviewed under Tier 2.
Stock assessment projection results showing the total commercial catches of Deep 7 bottomfish in fishing years 2012 and 2013 that would produce probabilities of overfishing of 0 – 99% under the Baseline Catch Scenario II and Baseline CPUE Scenario I

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>197,000</td>
<td>0.10</td>
<td>0.09</td>
</tr>
<tr>
<td>255,000</td>
<td>0.20</td>
<td>0.19</td>
</tr>
<tr>
<td>299,000</td>
<td>0.30</td>
<td>0.29</td>
</tr>
<tr>
<td>341,000</td>
<td>0.40</td>
<td>0.39</td>
</tr>
<tr>
<td><strong>383,000</strong></td>
<td><strong>0.50</strong></td>
<td><strong>0.50</strong></td>
</tr>
<tr>
<td>429,000</td>
<td>0.60</td>
<td>0.60</td>
</tr>
<tr>
<td>481,000</td>
<td>0.70</td>
<td>0.71</td>
</tr>
<tr>
<td>549,000</td>
<td>0.80</td>
<td>0.81</td>
</tr>
<tr>
<td>665,000</td>
<td>0.90</td>
<td>0.91</td>
</tr>
<tr>
<td>1,001,000</td>
<td>0.99</td>
<td>0.99</td>
</tr>
</tbody>
</table>
MHI Deep 7 Stock Assessment Model Projection

OFL = 383,000 lb = ABC_{MAX}

ABC (P_{40.8%}) = 346,000 lb

ACL = ABC = 346,000 lb

ACT = 325,000 lb (-6% of ACL)
Quality: International Assessments

- Conducted by RFMOs and their respective science providers, with PIFSC scientist participation.
- RFMOs have not identified a reference points for MSST, so the default used is $B_{MSY}$.
- However, under the Pelagic FEP, MSST is $c \cdot B_{MSY}$, where $c = 1.0 - M$, or 0.5, whichever is greater.
To illustrate:
- For species with $M$ of 0.2, MSST is $0.8 \, B_{MSY}$
- For a species with $M \geq 0.5$, the MSST is $0.5 \, B_{MSY}$. 
Summary

- PIFSC conducts stock assessments for the major federal fisheries tracked in the FSSI.
- For minor domestic stocks, which are harvested predominantly in state waters, lack of mandatory permit and reporting by local jurisdictions is a challenge to conducting assessments.
- PIFSC and Council are exploring other ad hoc methods to determine MSY and stock status for these.
- For both major and minor international stocks, lack of data from all foreign fishing nations continues to be a challenge.
Suggestions for Improvements

Coordination of the completion month of domestic assessment updates and any new assessments to allow for:

- Independent peer review process (if necessary);
- SSC to assess scientific uncertainty when setting ABC and for Council to set ACL;
- PIRO to complete necessary environmental impact analyses (e.g., EA) on ACL recommendation;
- PIRO to initiate rulemaking (proposed and final rules) prior to the start of the fishing year.
Example Timeline

- **2/2015**: PIFSC completes new assessment
- **4/2015**: Conduct CIE/WPSAR review
- **5/2015**: Council initiate P* analysis
- **6/2015**: SSC recommends ABC based on P*
- **6/2015**: Council recommends ACL
- **7/2015**: PIRO prepare EA
- **10/2015**: PIRO release EA and publish ACL proposed rule for public review and comment
- **12/2015**: PIRO publish ACL final rule
- **1/2016**: Start of fishing year
QUESTIONS?