25 species (and counting!) in the central & western Pacific
Primary Mandates

Marine Mammal Protection Act-
• **Stock Assessment Reports (Sec. 117):** mandates creation of SARs for each stock in U.S. waters
• **Taking of marine mammals incidental to commercial fishing operations (Sec. 118):** Take-reduction process

Endangered Species Act-
• **Listing of Species, Critical Habitat Designation, & Recovery (Section 4)**
Goals of the Cetacean Research Program

Assess the status of cetacean populations within the U.S. waters of the Pacific Islands Region
- Occurrence / Geographic range
- Stock structure
- Population size, trends, and productivity

Understand impacts of human-caused and natural threats to cetacean populations
- Fisheries
- Anthropogenic sound
- Environmental change

Provide science support for management teams & products
- Take-Reduction Teams
- ESA Status Reviews, Critical habitat evaluation, recovery science
- Biological Opinions
Hawaii
American Samoa
Palmyra & Kingman
Jarvis
Wake
Howland & Baker
Johnston
Guam
CNMI
Pacific Islands Region

1.8 M nmi² of ocean

Currently 25 species known to occur in the region, including migratory, pelagic, and insular “island-associated” populations

Many stocks are transboundary

121 cetacean “stocks”
A brief history of CRP

Before 2005:
Assessment research conducted primarily by SWFSC

2005:
- First PIFSC cetacean biologist began cooperative & independent projects
- SWFSC still responsible for assessment research

2009-2011:
- Federal PIFSC CRP Leader
- SWFSC & PIFSC collaborate on major assessment projects

Since 2012:
- Most assessment research in the Region led by PIFSC
- Growing and diverse list of Federal and non-Federal partners
CRP Funding since Inception

- Increase in 2010: FKW issues (BRT, TRT) and Hawaii EEZ survey
- Temp funds generally support surveys & FKW TRP research
- Navy funds since 2010 support Marianas surveys
- Most other competitive funds support acoustic technology or analysis
CRP Staffing
Not including temporary staff for field efforts

- Federal Program Leader in 2009, Quantitative Ecologist in 2011
- JIMAR staff primarily support NMFS-funded projects
- Contract staff generally support Navy-funded projects
Known & Potential Threats to Cetaceans in the PIR

- Bycatch in the Hawaii longline fisheries
- Hooking & entanglement in “near shore” fisheries
- Vessel strikes
- Military testing & training
- Bycatch in the American Samoa longline fishery
- Fishing by other nations
- Others: Ship noise, Prey competition, Run-off/pollutants, Geophysical research
Research Priorities

1. Conduct stock abundance research in Pacific Islands Region EEZs
   - Large-scale assessments are prioritized based on known impacts, time since last survey, ship-time allocation (both regional & available days), and funding
   - Local / smaller-scale surveys fill gaps as possible
   - Passive acoustic monitoring research and development augments standard assessment approaches

2. Evaluate stock structure using all available data and techniques

3. Characterize cetacean-fishery interactions, and conduct research to reduce or mitigate fishery impacts

4. Develop new approaches for assessing stocks where traditional approaches are infeasible
PIR Assessment Surveys

- CNMI
- Guam
- Wake
- Johnston
- Palmyra & Kingman
- Jarvis
- American Samoa
- Hawaii
- Howland & Baker

SwFSC surveys
PIFSC surveys
## Pacific Islands Region Cetacean Stocks

(summary of Species Table)

<table>
<thead>
<tr>
<th>EEZ</th>
<th>No. Stocks Known</th>
<th>Stocks with Current Abundance Estimate</th>
<th>Stocks with Human-caused Mortality Estimate</th>
<th># SARs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hawaii</td>
<td>38</td>
<td>26</td>
<td>18*</td>
<td>38</td>
</tr>
<tr>
<td>Guam &amp; CNMI</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Palmyra</td>
<td>18</td>
<td>0#</td>
<td>9*</td>
<td>1</td>
</tr>
<tr>
<td>Johnston</td>
<td>15</td>
<td>0#</td>
<td>9*</td>
<td>0</td>
</tr>
<tr>
<td>American Samoa</td>
<td>12</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Wake</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Howland/Baker</td>
<td>6</td>
<td>0</td>
<td>4*</td>
<td>0</td>
</tr>
<tr>
<td>Jarvis</td>
<td>1</td>
<td>0</td>
<td>1*</td>
<td>0</td>
</tr>
</tbody>
</table>

# Model-based abundance available, but methodology not yet accepted by Scientific Review Group (SRG) for use in SARs

* Minimum estimates, or none observed in longline fishery
## Line-Transect Survey Requirements

Average (2010-2015) # of NOAA R/V days-at-sea for dedicated PIR cetacean science: 32

<table>
<thead>
<tr>
<th>EEZ</th>
<th>Area (nmi²)</th>
<th>Days-At-Sea (60 nmi² grid)</th>
<th>Transit from Oahu (round trip)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hawaii</td>
<td>721,541</td>
<td>232</td>
<td>-</td>
</tr>
<tr>
<td>Guam/CNMI</td>
<td>343,257</td>
<td>94</td>
<td>25</td>
</tr>
<tr>
<td>Palmyra</td>
<td>103,001</td>
<td>35</td>
<td>6</td>
</tr>
<tr>
<td>Johnston</td>
<td>129,122</td>
<td>43</td>
<td>4</td>
</tr>
<tr>
<td>American Samoa</td>
<td>128,098</td>
<td>40</td>
<td>21</td>
</tr>
<tr>
<td>Wake</td>
<td>137,072</td>
<td>36</td>
<td>15</td>
</tr>
<tr>
<td>Howland &amp; Baker</td>
<td>118,087</td>
<td>41</td>
<td>12</td>
</tr>
<tr>
<td>Jarvis</td>
<td>95,289</td>
<td>29</td>
<td>9</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1,775,467</strong></td>
<td><strong>550</strong></td>
<td><strong>92</strong></td>
</tr>
</tbody>
</table>
The task exceeds our capability & resources, so how do we proceed?

1. Keep going...
   - As funds allow, we will keep chipping away
   - Work with partners to conduct research for which we don’t have expertise or capability
   - Focus on regions of greatest need

2. Modify our strategy and expand our toolset...
   - Develop alternative survey designs & analysis approaches
   - Acoustic monitoring for occurrence
   - Accept that some EEZs are low priority for assessment
CRP works with many valued partners

**Funding**
- U.S. Navy Pacific Fleet
- NMFS Office of Science & Technology
- NOAA Ocean Acoustics Program
- NMFS Bycatch Reduction Engineering Program
- NMFS Stock Assessment

**Logistic Support**
- HI Humpback Whale National Marine Sanctuary
- PIFSC Science Operations
- CNMI Division of Land & Natural Resources

**Provide Data / Analysis Products**
- PIR Marine Mammal Response Network
- PIFSC FMRD, EOD

**Collaborate on Research**
- NMFS PIRO Observer Program
- Cascadia Research Collective *
- NMFS Science Center Passive Acoustic Programs
- SWFSC Genetics* & EEZ Assessments Programs
- NWFSC Contaminants Lab
- Hawaii Longline Association*

**Improvement Working Group**
- NMFS Advanced Sampling Technology Working Group
- Pacific Islands Regional Office
- Marine Mammal Commission

* Partial funding provided by or through PIFSC CRP
Outline of Today’s Talks

• Cetacean assessment in the PIR
  – CRPs approach to stock assessment, including challenges and innovations

• Passive acoustic contributions to stock assessment
  – New acoustic technologies and techniques to enhance stock assessment

• CRP data management
  – Data collection, processing, archiving, and stewardship for past, incoming, and future datasets
Outline of Today’s Talks

• Assessment Case study: False killer whales
  – Significant time and resources go toward false killer whale assessment due to high rates of interaction with the Hawaii-based longline fishery

• Work in the Territories: Mariana Archipelago
  – Goals, study design, early results, and plans for future work in this relatively unstudied region

• CRP Summary & Wrap-Up