Elephant Seal Population Studies: Current Research at Piedras Blancas

Vertebrate Integrative Physiology Lab
Cal Poly San Luis Obispo
Why study Piedras Blancas seals?

• Largest mainland rookery
• Central location
• Previous data not published
• Comparison to other rookeries
Current research objectives

1. Mark, tag, and weigh weanlings
2. Establish a known population
3. Contribute to the national database
4. Develop student-led studies
What can we learn?

1. Timing of arrivals/departures by age class
2. Harem sizes at different beaches
3. Weaning dates and weights
How does this help?

- Understanding beach use and timing
- Validating age classifications
- Breeding dynamics
- Animal movements within and between rookeries
- Help CA State Parks to plan for protection
Methods

1. Marking
2. Resights
3. Flipper tags
4. “Weaner” weighing
Marking
Resights

- Marks are easy to see
- Match animals to flipper tags
- Docents contribute to data
- Understand animal movement
Flipper tags

Green: 2469 Año Nuevo
Pink: M942 Pt. Reyes/Farallon Islands
White: 051 Point Piedras Blancas
Violet: 632 Cape San Martin/Gorda
Red: 199 San Nicolas Island
Yellow: 3194 San Miguel Island
Orange: 24176 Marine Mammal Center

Vandenberg AFB is Blue
“Weaner” weighing

- Sex and weight
- Morphometrics
- Second flipper tag
## Pilot years

<table>
<thead>
<tr>
<th>Procedure</th>
<th>2018 Breeding Season</th>
<th>2019 Breeding Season</th>
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</thead>
<tbody>
<tr>
<td>Marking</td>
<td>167 animals</td>
<td>225 animals</td>
</tr>
<tr>
<td>Flipper tags</td>
<td>270 weanlings</td>
<td>230 weanlings @ PB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25 weanlings @ VAFB</td>
</tr>
<tr>
<td>Weaner weighing</td>
<td>50 weanlings</td>
<td>50 weanlings</td>
</tr>
<tr>
<td>Surveys</td>
<td>Weekly</td>
<td>Weekly + harem counts</td>
</tr>
</tbody>
</table>

**Future years:** Authorized for >3,500 marks/tags, up to 500 weanling weights
Male weanlings significantly heavier than females.

Preliminary results

Sexual dimorphism evident at weaning?

P = 0.0221
Preliminary results

Weanlings weigh significantly more at La Tortuga.

Weanlings larger at sheltered beach.
Preliminary results

- **Harem sizes**

<table>
<thead>
<tr>
<th></th>
<th>Dead Center</th>
<th>La Tortuga</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></td>
<td>32 ♀</td>
<td>33 ♀</td>
</tr>
<tr>
<td><strong>Max</strong></td>
<td>114 ♀</td>
<td>130 ♀</td>
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</table>

Similar harem sizes at different beaches.
Future work

- Increased effort
- Cal Poly database
- Drone surveys
Team Ellie at Cal Poly

* Principal Investigator: Dr. Heather E.M. Liwanag

Cameron Cooper
M.S. Candidate
Pinniped vibrissal system

Melissa Voisinet
M.S. Candidate
Elephant seal proteomics

Emma Weitzner
M.S. Candidate
Weddell seal dive development

Gabriel Santos
Undergraduate
Efficacy of UAVs for surveys

* 20 undergraduate volunteers in 2018 and 2019!
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- Brian Hatfield (USGS)

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CA State Parks permit
Cal Poly IACUC #1711
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- Phil Arnold
- Tim Postiff
- Tim Bridwell
- Keith Mueller
- Brandt Kehoe

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CA State Parks permit
Cal Poly IACUC #1711
Questions?
Comparison among rookeries

Weanling mass not influenced by research *per se*.
Northern elephant seal rookeries

Pt. Reyes Farallon Isl.

Ano Nuevo

Gorda

Piedras Blancas

Vandenberg AFB

San Miguel Isl.

Santa Rosa Isl.

Santa Cruz Isl.

Santa Barbara Isl.

San Nicholas Isl.

Coronados Isl.

Guadalupe Isl.

San Benito Isl.

Cedros Isl.

www.elephantseal.org