Marine Mammal Strandings

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What is a "stranding" U.S. Definition

- Any dead marine mammal on a beach or floating near-shore

- Any live cetacean on a beach or in water so shallow that it is unable to free itself and resume normal activity

- Any live pinniped which is unable or unwilling to leave the shore because of injury or poor health

Types of Stranding

- **Single**

  one animal
- **Mass (MSE)**

  $\geq$ 2, excluding mother/calf pair

- **Unusual mortality event (UME)**

  -unexpected

  -a significant die-off

  -demanding an immediate response.

Single Stranding

Live

Rehabilitation
Translocation
Euthanasia
No response

Sampling for diagnosis to guide treatment

Dead

Sampling
Carcass disposal

Mass Strandings

- Pelagic species/social cohesion
- Many theories

  Geraci & St. Aubin 1977, 1979

  - Geomagnetic pathway disrupted (*Klinowska 1985*)
  - Earthquakes (*Fraser 1933*)
  - Sound (sonar, blast injury) (*Frantzis 1998, Fernandez et al.2005, Danil et al 201*
  - Loss of auditory ability (*Ridgway and Dailey 1972*)
  - Parasitism of cranial nerve (*Morimitsu 1986*)

Not in Alaska, so far…

Unusual Mortality Events

- Malnutrition
  - El Nino
- Infectious disease
  - Morbillivirus
  - Leptospirosis
  - Influenza
- Biotoxins
  - Saxitoxin
  - Brevetoxin
  - Domoic acid
- Fisheries interactions
- Sonar
- Ship strikes

Aim of Stranding Network

- Provide a humane response for animal welfare
- Maximize specimen and data collection for
  - population assessment
  - natural history
  - ecology
  - health assessment
- Detection of management problem
  - fisheries by-catch
  - ship strike
  - sound

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History US Stranding Network

- 1972 Marine Mammal Protection Act (MMPA)
  - Regional networks, focus biology
- 1987 4 Humpback whales Cape Cod

- 1987/1988 645 *Tursiops truncatus*
- 1989 *Exon Valdez oil spill*
- 1992 Title IV MMPA
  - Health and Stranding Response Act

3 crises

U.S. Marine Mammal Health & Stranding Program Established 1992

1. **Facilitate the collection and dissemination of reference data on the health of marine mammals and health trends of marine mammals in the wild;**
2. **Correlate the health of marine mammals and marine mammal populations, in the wild, with available data on physical, chemical, and biological environmental parameters; and**
3. **Coordinate effective responses to unusual mortality events by establishing a process in the Department of Commerce.**

Components of a Marine Mammal Stranding Program

Surveillance

- Case investigations /stranding response
  - Broad screening allows detection of emerging diseases
- Sentinel species monitoring
  - Structured sampling design for epidemiological analyses

    (e.g. age classes, spatial and temporal distribution)

Emergency response

- Epidemics, HABs, Oil spills, Unknown

Research

- Retrospective and prospective studies
- Novel techniques and diagnostics

Permits - NOAA

- MMPA
  - Stranding Network member all one permit
- Stranding authorization (SA)
- Rehabilitation guidelines to protect wild animals and individual
  - Released animal must not threaten wild population
  - Released animal must have skills to survive
    - Facility
    - Operations

Stranding Agreements

- Authorizes MMPA species response
- ESA response occurs under NMFS National MMHSRP permit #932-1905
  - CI belugas, ringed seals, wDPS SSLs, most large whales
  - Outside the scope of the Stranding Agreement
  - All ESA response receives case by case authorization from NMFS

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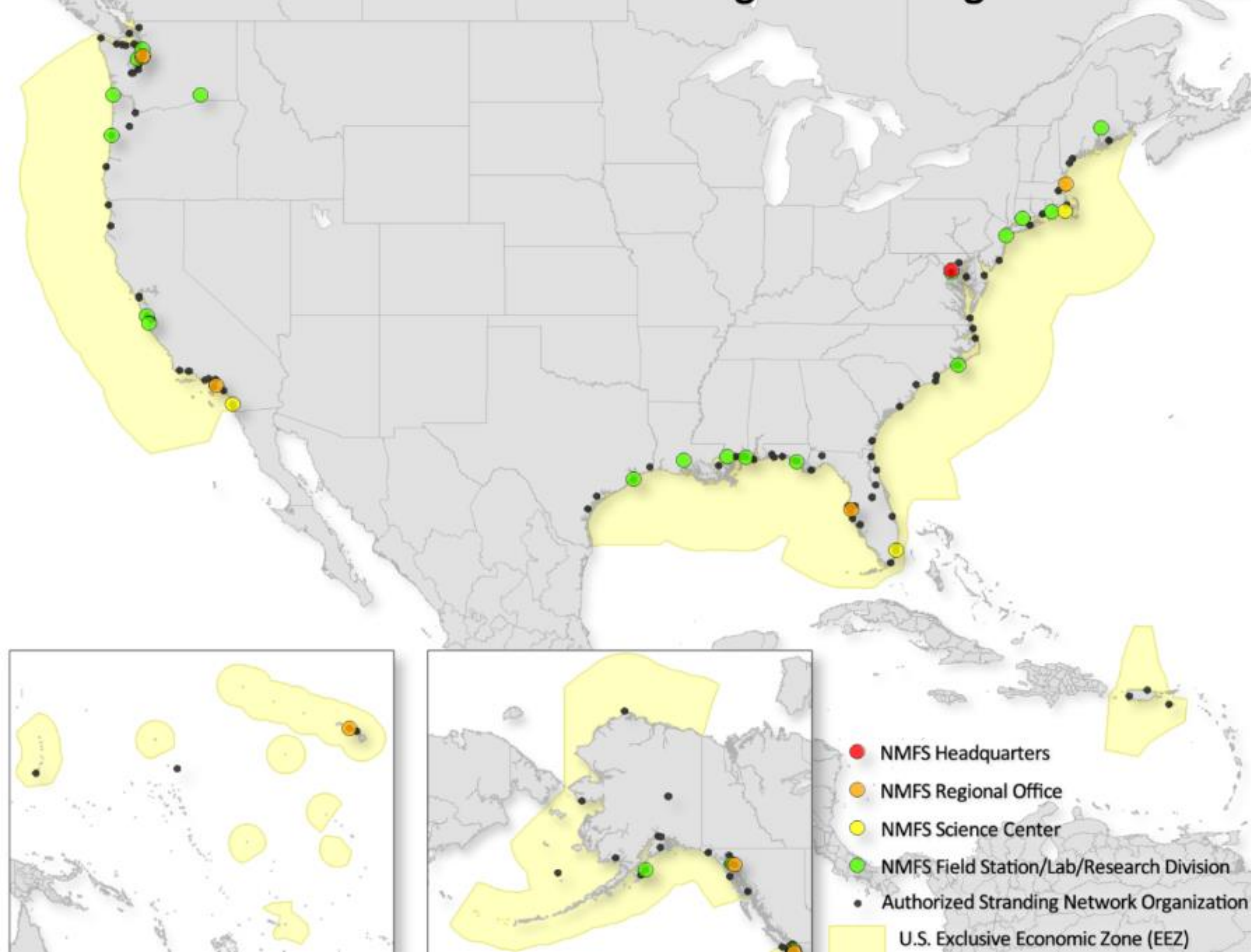
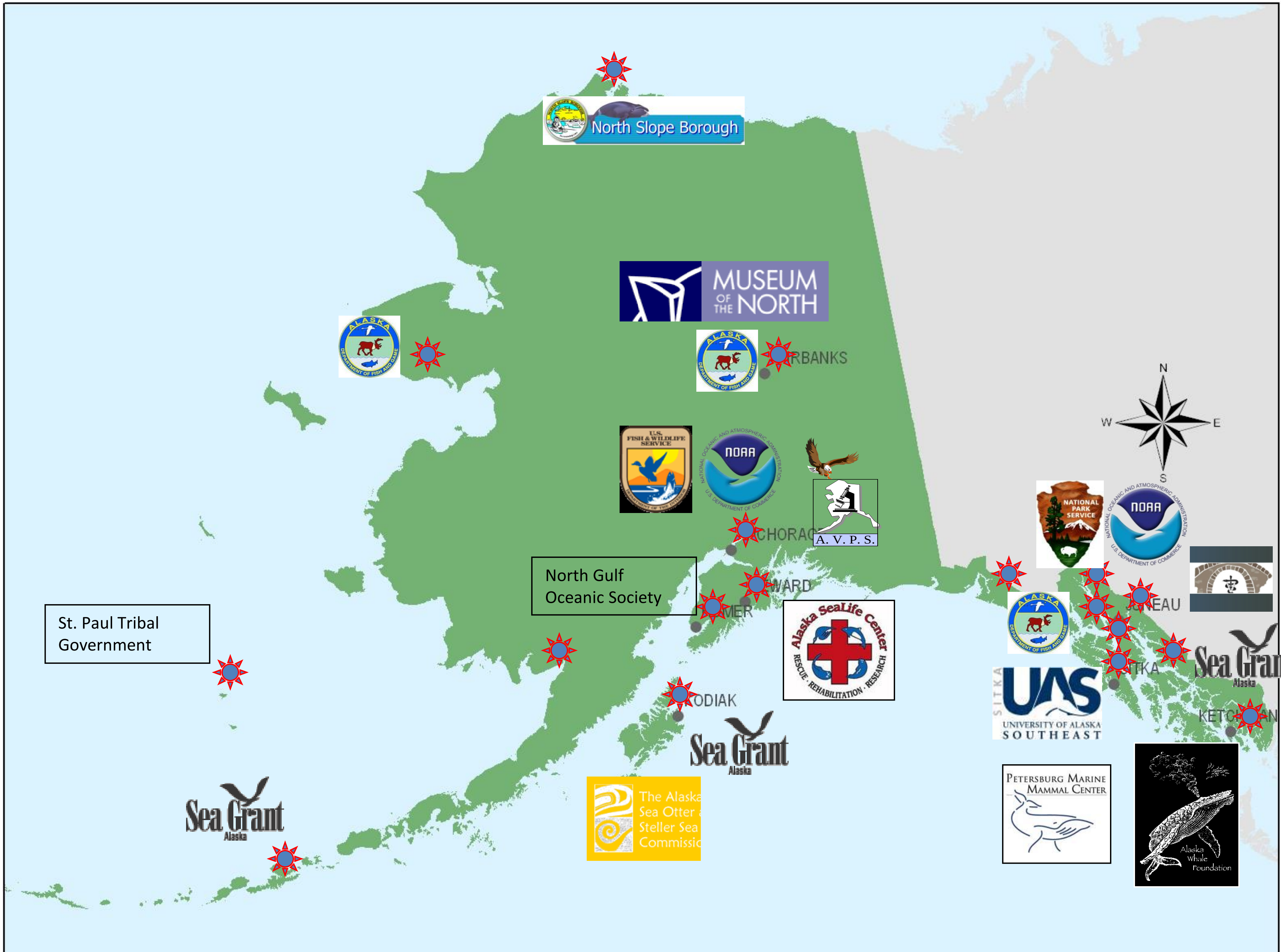
NMFS Offices and Authorized Stranding Network Organizations:




North Slope Borough
MUSEUM OF THE NORTH
ALASKA
DEPARTMENT OF FISH AND GAME
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U.S. FISH & WILDLIFE SERVICE
DEPARTMENT OF THE INTERIOR
NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE
A. V. P. S.
CHORAG
NATIONAL PARK SERVICE
North Gulf
Oceanic Society
WARD
MER
EAU
St. Paul Tribal
Government
Alaska SeaLife Center
RESCUE · REHABILITATION · RESEARCH
TKA
Sea Grant
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KETC
AN
The Alaska
Sea Otter
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Petersburg Marine
Mammal Center
Alaska
Whale
Foundation

109(h) Responders

- Alaska Department of Fish & Game
- NMFS Enforcement
- NMFS AK Fisheries Science Center and Regional Office
- US Fish and Wildlife Service
- National Park Service
- Tribal Governments
- U.S. Coast Guard
- City officials (harbormasters, etc.)

Stranding Agreement (SA) Holders—
16 Active Members

- Alaska SeaLife Center
- Alaska Whale Foundation
- Glacier Bay NP&P
- UAS Sitka
- Aleut Community of St. Paul
- UAF Museum of the North
- North Slope Borough
- Chichigof Conservation Council
- UAF Marine Advisory Program Ketchikan/AK Sea Grant
- UAF Marine Advisory Program Kodiak/AK Sea Grant
- UAA - Alaska Veterinary Pathology Services
- Bridge Veterinary Services
- Petersburg Marine Mammal Center
- Alaska Consortium of Zooarchaeologists

New 2014: Sitka Sound Science Center

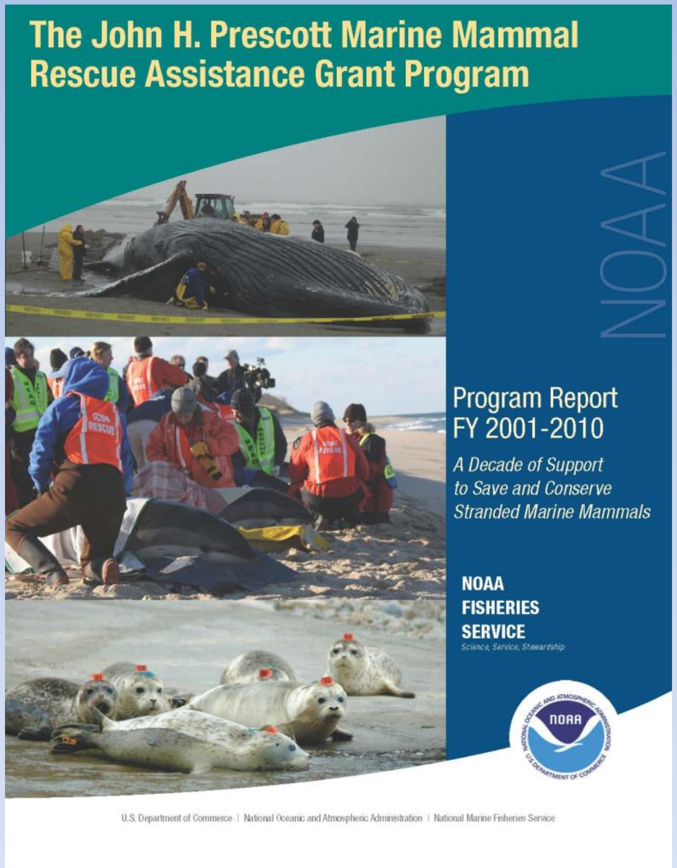
New 2015: UAS Juneau

Roles & Responsibilities

Vary Regionally

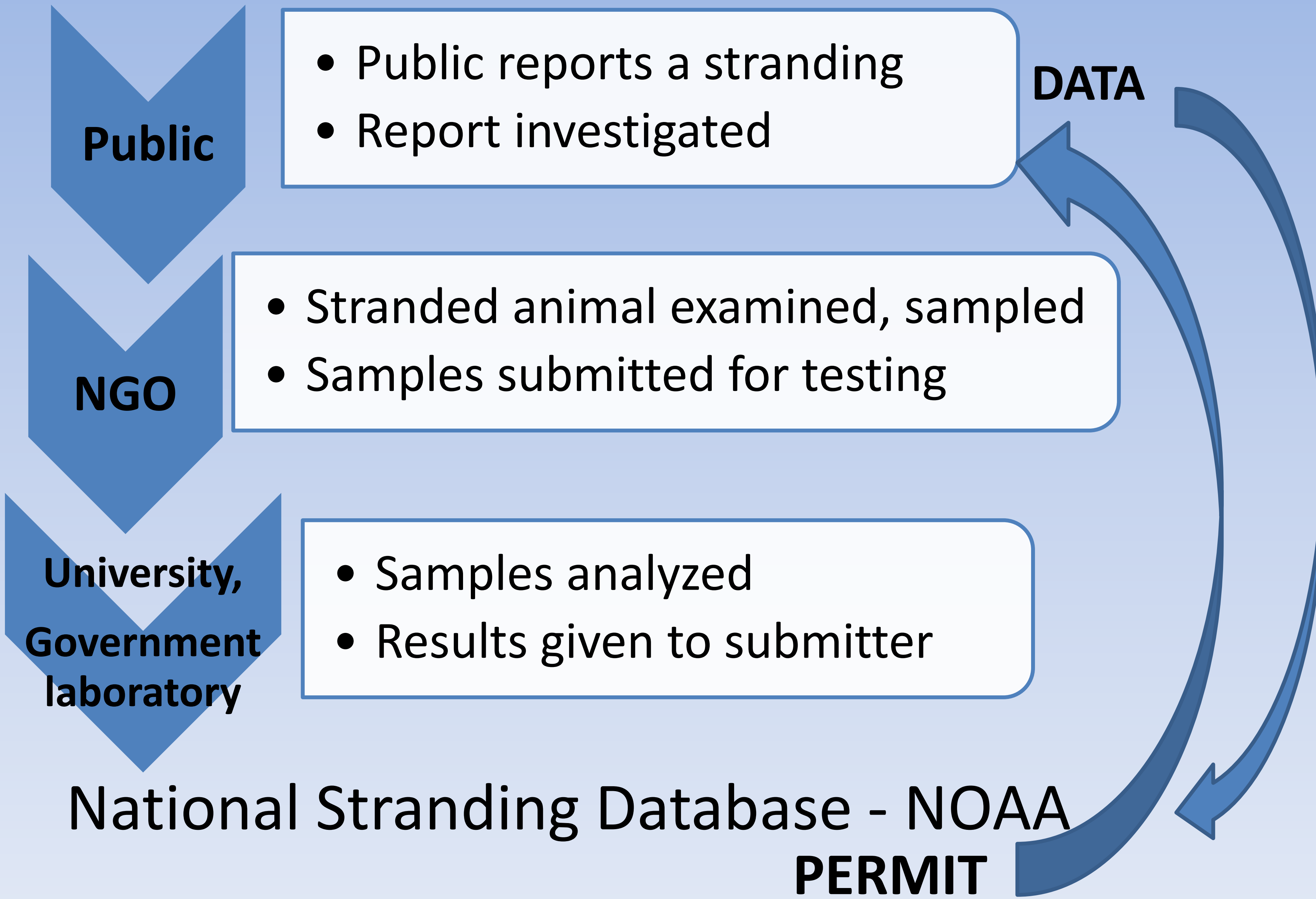
- NOAA
  - Legalize, permits, coordination
  - National database on numbers, species, location
  - Some diagnostics (marine biotoxins)
- State/county/city government
  - Human safety
  - Environmental quality – carcass disposal
- NGO
  - Stranding response
- Academia
  - Diagnostics
  - Research into causes, taxonomy, ecology
- Aquaria
  - Stranding response
  - Public outreach

How is it funded?



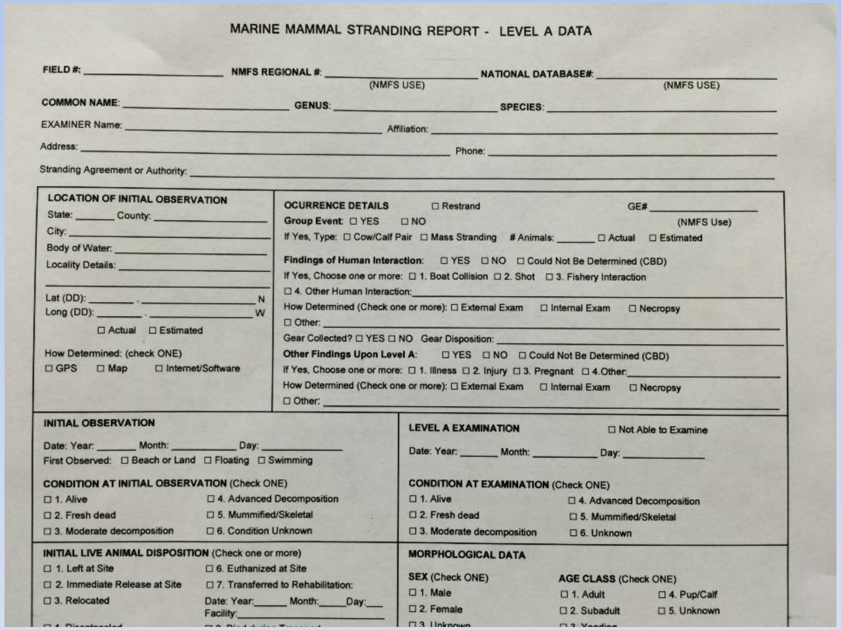
- John H. Prescott Marine Mammal Rescue Assistance Grant Program
  - **51 eligible proposals received** for FY2015
    - 2014 = 35
    - 2013 = 12
    - 2012 = 39
- Other grants; donations

How is stranding data used?


Public
Public reports a stranding
Report investigated
DATA
NGO
Stranded animal examined, sampled
Samples submitted for testing
University,
Government
laboratory
Samples analyzed
Results given to submitter
National Stranding Database - NOAA
PERMIT

Data / sample Management

- Level A (NOAA federal government)
  - Species, age class, sex, location of stranding,
  - Human interaction
- Population status (NOAA)
  - Number in stock
  - Genetics
  - Human interactions
- Disease diagnostics (Stranding responder, academia)
- Sample archiving (Museums, academia, responders, NOAA, NIST)



MARINE MAMMAL STRANDING REPORT - LEVEL A DATA

FIELD #: ______ NMFS REGIONAL #: ______ (NMFS USE) NATIONAL DATABASE#: ______ (NMFS USE)

COMMON NAME: ______ GENUS: ______ SPECIES: ______

EXAMINER Name: ______ Affiliation: ______

Address: ______ Phone: ______

Stranding Agreement or Authority: ______

LOCATION OF INITIAL OBSERVATION

State: ______ County: ______

City: ______

Body of Water: ______

Locality Details: ______

Lat (DD): ______ . ______ N

Long (DD): ______ . ______ W

☐ Actual ☐ Estimated

How Determined: (check ONE)

☐ GPS ☐ Map ☐ Internet/Software

OCURRENCE DETAILS ☐ Restrand GE# ______ (NMFS Use)

Group Event: ☐ YES ☐ NO

If Yes, Type: ☐ Cow/Calf Pair ☐ Mass Stranding # Animals: ______ ☐ Actual ☐ Estimated

Findings of Human Interaction: ☐ YES ☐ NO ☐ Could Not Be Determined (CBD)

If Yes, Choose one or more: ☐ 1. Boat Collision ☐ 2. Shot ☐ 3. Fishery Interaction

☐ 4. Other Human Interaction: ______

How Determined (Check one or more): ☐ External Exam ☐ Internal Exam ☐ Necropsy

☐ Other: ______

Gear Collected? ☐ YES ☐ NO Gear Disposition: ______

Other Findings Upon Level A: ☐ YES ☐ NO ☐ Could Not Be Determined (CBD)

If Yes, Choose one or more: ☐ 1. Illness ☐ 2. Injury ☐ 3. Pregnant ☐ 4.Other: ______

How Determined (Check one or more): ☐ External Exam ☐ Internal Exam ☐ Necropsy

☐ Other: ______

INITIAL OBSERVATION

Date: Year: ______ Month: ______ Day: ______

First Observed: ☐ Beach or Land ☐ Floating ☐ Swimming

CONDITION AT INITIAL OBSERVATION (Check ONE)

☐ 1. Alive ☐ 4. Advanced Decomposition

☐ 2. Fresh dead ☐ 5. Mummified/Skeletal

☐ 3. Moderate decomposition ☐ 6. Condition Unknown

LEVEL A EXAMINATION ☐ Not Able to Examine

Date: Year: ______ Month: ______ Day: ______

CONDITION AT EXAMINATION (Check ONE)

☐ 1. Alive ☐ 4. Advanced Decomposition

☐ 2. Fresh dead ☐ 5. Mummified/Skeletal

☐ 3. Moderate decomposition ☐ 6. Unknown

INITIAL LIVE ANIMAL DISPOSITION (Check one or more)

☐ 1. Left at Site ☐ 6. Euthanized at Site

☐ 2. Immediate Release at Site ☐ 7. Transferred to Rehabilitation:

☐ 3. Relocated Date: Year: ______ Month: ______ Day: ______ Facility: ______

MORPHOLOGICAL DATA

SEX (Check ONE)

☐ 1. Male

☐ 2. Female

AGE CLASS (Check ONE)

☐ 1. Adult ☐ 4. Pup/Calf

☐ 2. Subadult ☐ 5. Unknown

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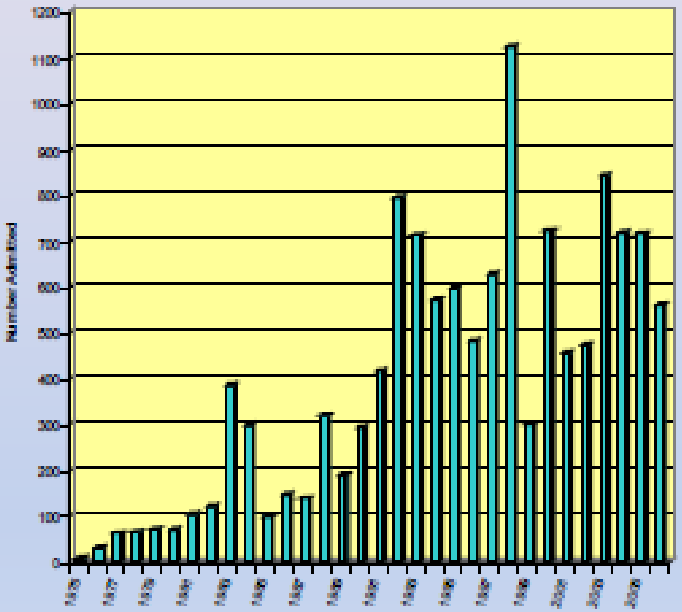
Ethan Zimmer, Lazy Otter/ NOAA MMHSRP (permit#932-1905-1)

Marine Mammal Health MAP

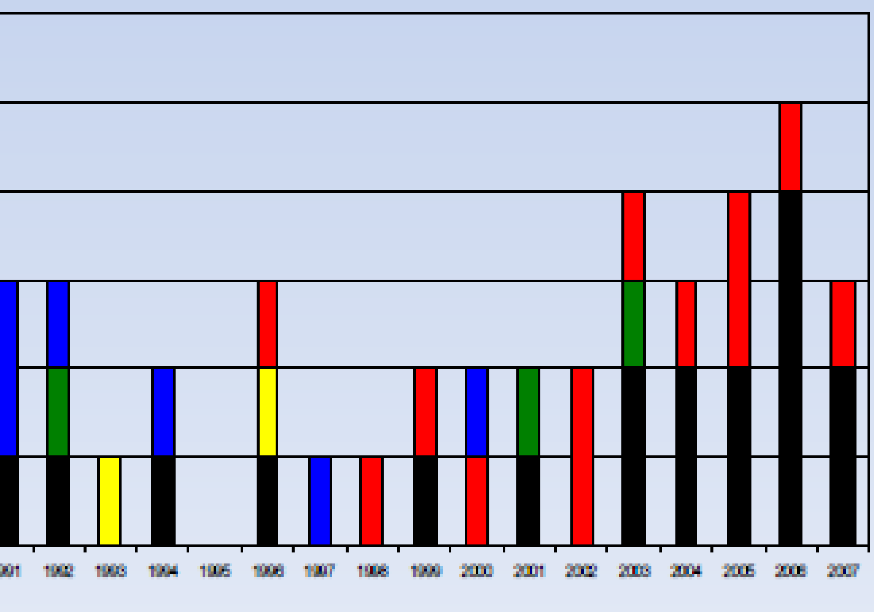
- Provide a **consistent platform** for collecting, collating, and visualizing marine mammal health data
- Enhance **visual identification of "hot spots"** of marine mammal disease, detection of health changes, emerging disease, & effects of mitigation
  - e.g. effects of ship speed rules on ship strikes to whales
- **Enable management decisions** and evaluations through a dynamic, user-friendly tool
- **Aid emergency management responses** to natural and anthropogenic emergencies (e.g. oil spills) by assessing changes in marine mammal health before, during and following the event
- **Enhance communication and collaboration** amongst marine mammal health and environmental scientists across multiple disciplines
- **Forecast challenges to marine mammal health** via oceanographic signals by integrating ocean and marine mammal health data

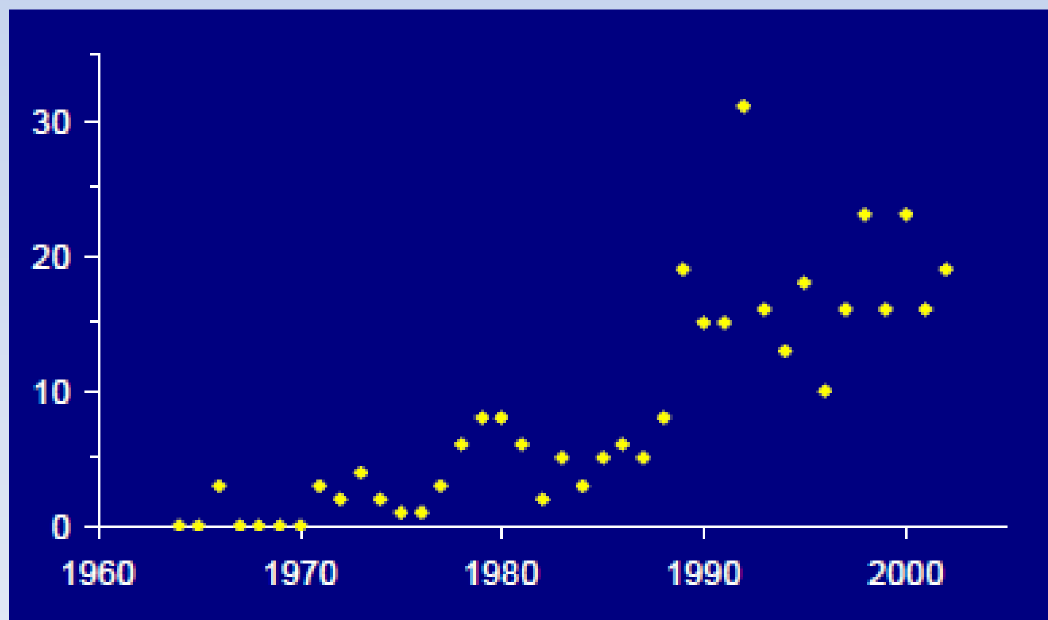
Are There Changes in Marine Mammal Health ?



Increases in:

- Individual strandings,
- Unusual Mortality Events
- Papers on marine mammal diseases





Multiple Stressors in A Changing World

Ocean utilization

- Noise, sonar
- Shipping
- Fishing
- Alternative Energy +

Coastal development

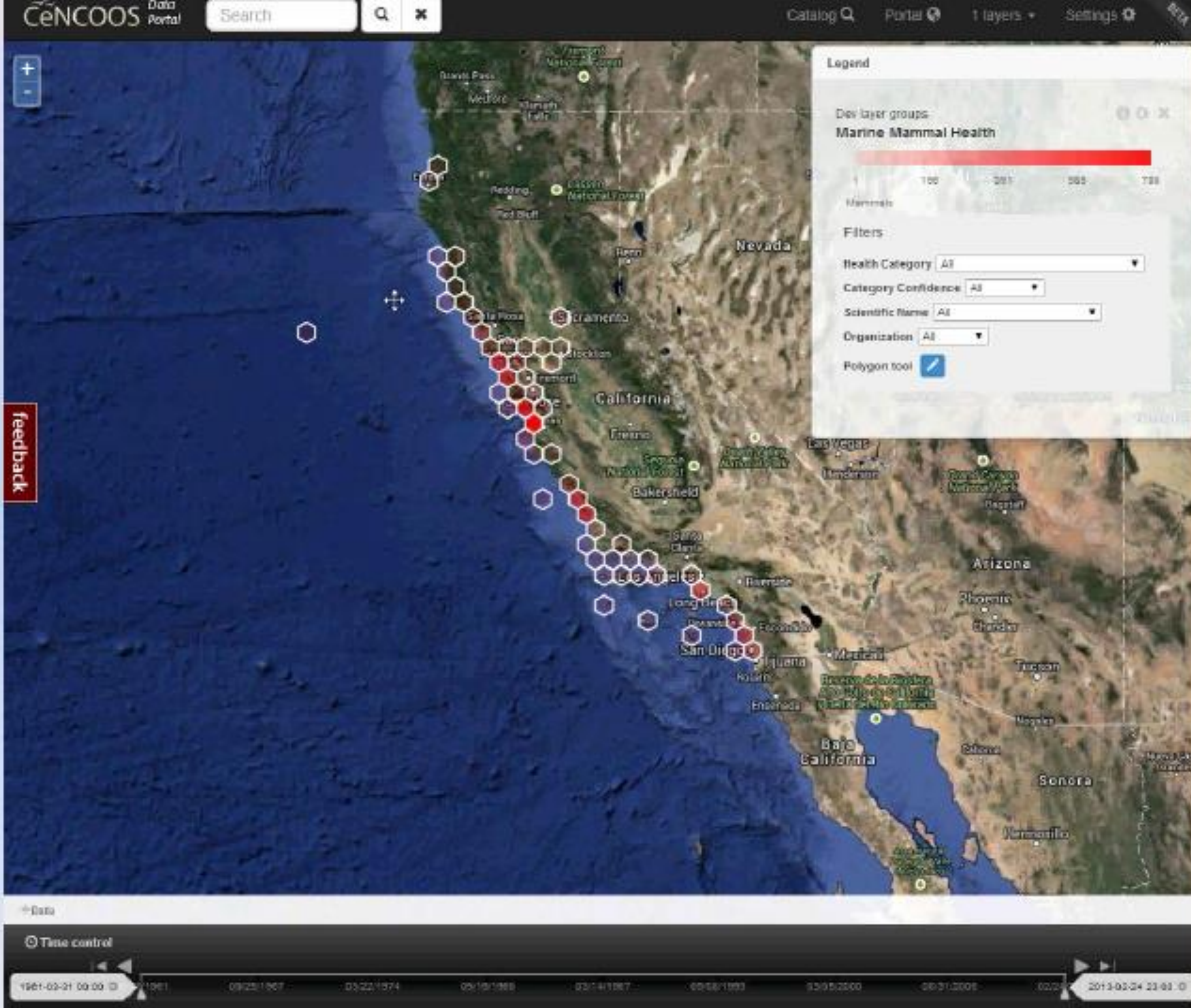
- Habitat loss
- Harmful algal blooms
- Contaminants
- Infectious diseases +

Climate change

- Increased water temperature
- Sea ice loss
- Sea level rise
- Acidification
- Extreme events
- Population effects
- Ecosystem effects

Sources of Health Information

- Stranding networks
- Entanglement response
- Live animal surveillance
- By-caught or incidentally killed or taken
- Subsistence harvest monitoring


CeNCOOS Data Portal
Search
Catalog
Portal
1 layers
Settings
Legend
Dev layer groups
Marine Mammal Health
Filters
Health Category All
Category Confidence All
Scientific Name All
Organization All
Polygon tool
feedback
Nevada
California
Arizona
Sonora
Baja California
Redding
Red Bluff
Reno
Fresno
Bakersfield
Las Vegas
Henderson
Stockton
Riverside
Tijuana
Mexicali
Phoenix
Ensenada
Data
Time control

USFWS 50 CFR 18.23 Tony Fishbauch

Subsistence Permit number: 17350-00 NSB

- Marine mammals as sentinels of the changing world
- Also can be sentinels of diseases and of particular interest, are also zoonotic diseases. Especially important for our native communities.

Media, Communications, Concerns

- People care about marine mammals
- Disease conditions exist in marine mammals that could occur in humans sharing the coastal environment, diet
- Coordinate information
- Develop talking points for network

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Bottom line – important in many way but also fun…

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