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SFAN I&M Program Harbor Seal Monitoring

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Ecologist / Data Manager



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Outline

- Inventory and Monitoring Program
- Pinniped Monitoring Protocol
- Harbor Seal Field Methods
- Data Management
- Annual Data Work Flow
- Reporting



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- Harbor seal monitoring is a project of the San Francisco Area Network (SFAN) Inventory and Monitoring (I&M) Program
- SFAN is one of 32 national networks
- I&M program center Fort Collins, CO
- I&M Program a component of NPS Natural Resource Challenge, implemented in 1999



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Map of the 32 I&M ecoregional networks that include more than 270 park units with significant natural resources. The 32 networks share core funding and a professional staff to inventory park natural resources and conduct long-term monitoring of park ecosystems.



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I&M National Program

- Technical assistance: sampling design, statistical analyses, modeling, GIS, data management, website design
- Guidance documents: protocol production, data management, publications
- Tools: national databases, database templates, GIS applications
- Collaboration



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SFAN Monitoring Plan

- Completed in 2005. Includes network data management plan.
- Identified and ranked 63 biotic and abiotic vital signs.
- 18 vital signs prioritized for initial funding.
- Budget restrictions likely to reduce funded programs to 10 vital signs



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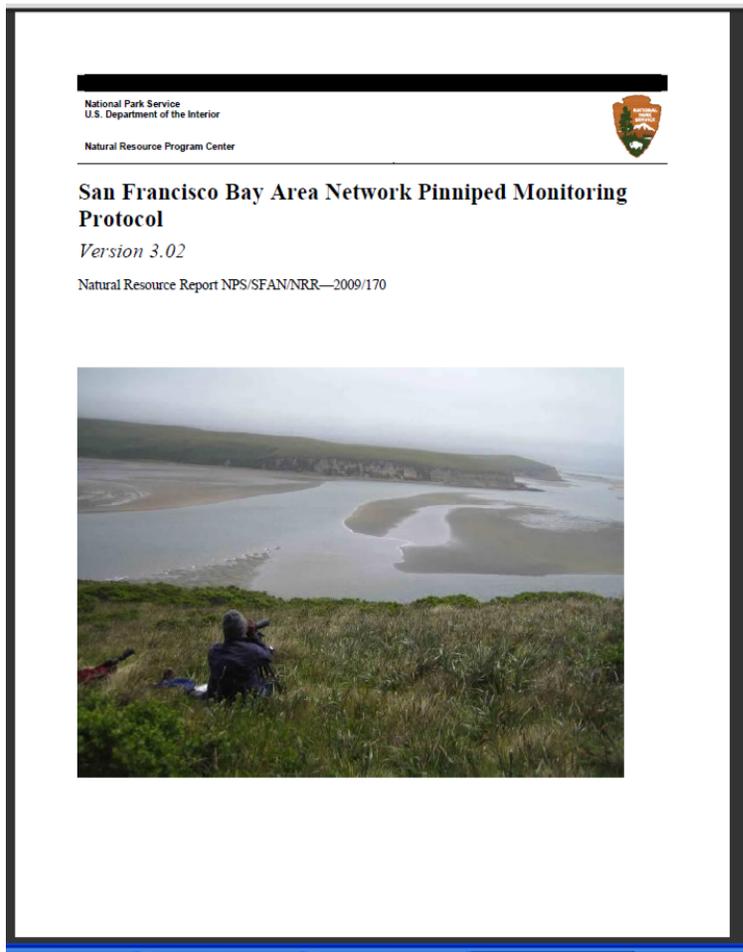
SFAN Vital Signs

- Air Quality
- Amphibs/Reptiles
- Invasive Plants
- Salmonids
- Landbirds
- Landscape Dynamics
- Raptors (PINN)
- Pinnipeds
- Stream Flow
- Water Quality
- Wetlands
- Western Snowy Plovers
- Northern Spotted Owls
- Rocky Intertidal
- Stream Flow



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Pinniped Monitoring Protocol

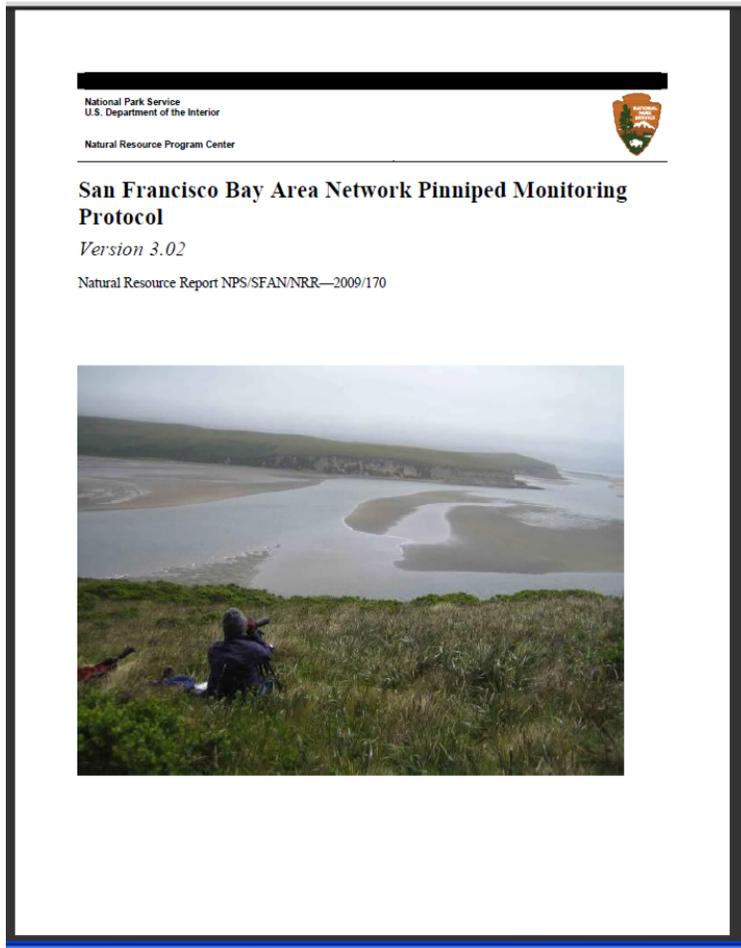


- Protocol approved December 2009.
- Harbor seals and northern elephant seals
- Open peer review 2004
- Dr. David Ainley, Dr. Jim Harvey



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Pinniped Monitoring Protocol



- 2008 blind peer review coordinated by NPS and University of Washington
- 2 anonymous reviewers, Dr. Jim Agee (UW), Dr. Penny Latham (NPS)
- No modifications required to data collection or analytical methods.
- Protocol approved December 2009.



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Pinniped Monitoring Protocol

- Monitoring Objectives
 1. Determine the long-term trends in population size and seasonal distribution of harbor seal populations at primary sites in the SFAN parks during the breeding and molt seasons.
 2. Determine long-term trends in reproductive success of harbor seals through annual estimates of pup production at PORE and GOGA.
 3. Determine the long-term trends in sources, frequency and level of effects of natural and anthropogenic disturbances on harbor seal haul out use and productivity.



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Pinniped Monitoring Protocol

- Power to Detect Trends

Adults: 90% power to detect 10% annual decline in the six major SFAN sites over 3 years.

Pups: 88% power to detect 10% annual decline in the six major SFAN sites over 4 years.

Drakes Estero: 80% power to detect 25% decline takes 21 years for adults and 15 years for pups



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Pinniped Monitoring Protocol

- Standard Operating Procedures
 - Field Methods
 - Data Management
 - Data Analysis and Reporting
 - Safety Procedures



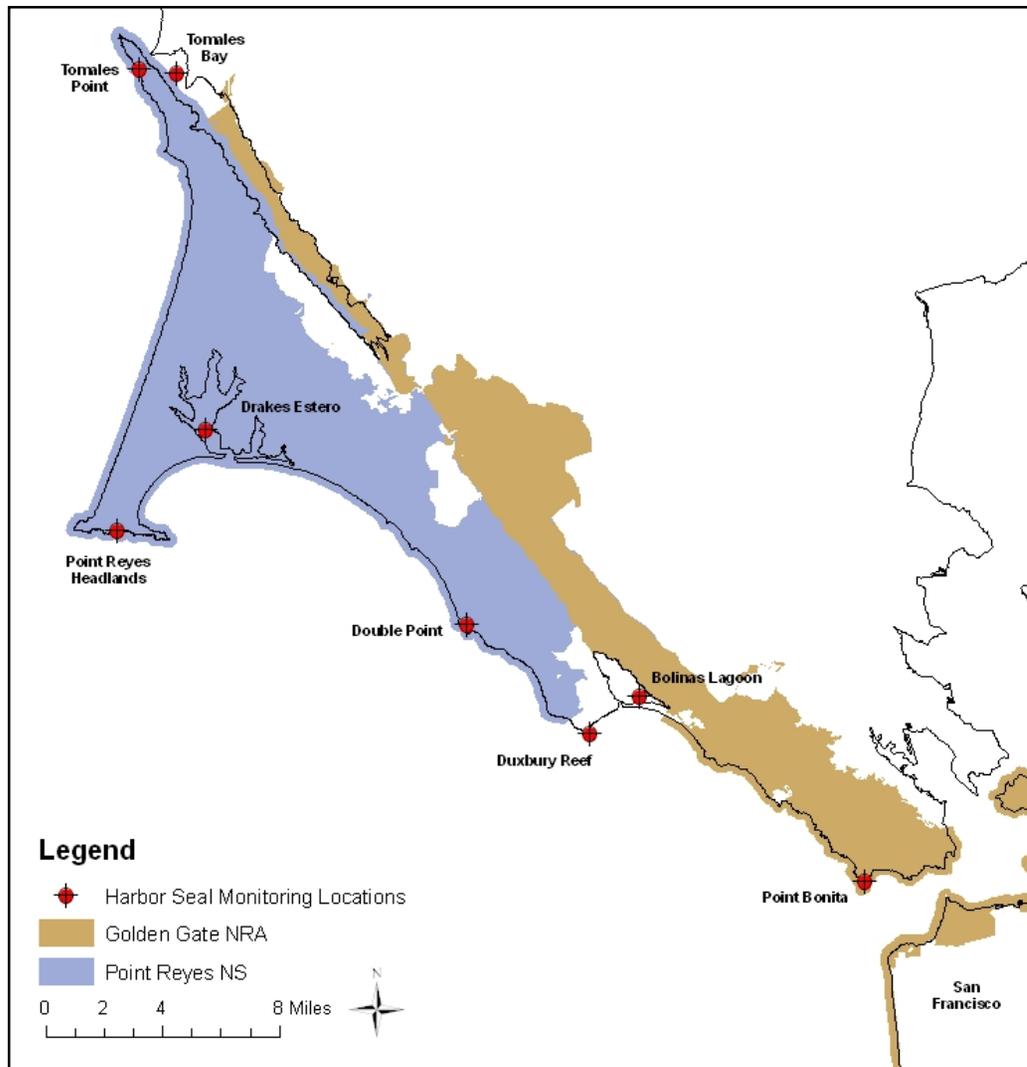
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Field Methods

- Volunteers and NPS wildlife biotech
- 2009: 49 volunteers, 450 hours of monitoring March-July
- Eight monitoring locations.
- Breeding season: March 1 – May 31
- Molt Season: June 1 – July 31



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Field Methods

- Data collected by trained volunteers and staff from fixed observation points.
- Two classroom sessions.
- One field session.
- Pup identification.
- Mentoring program.
- Quality certification.





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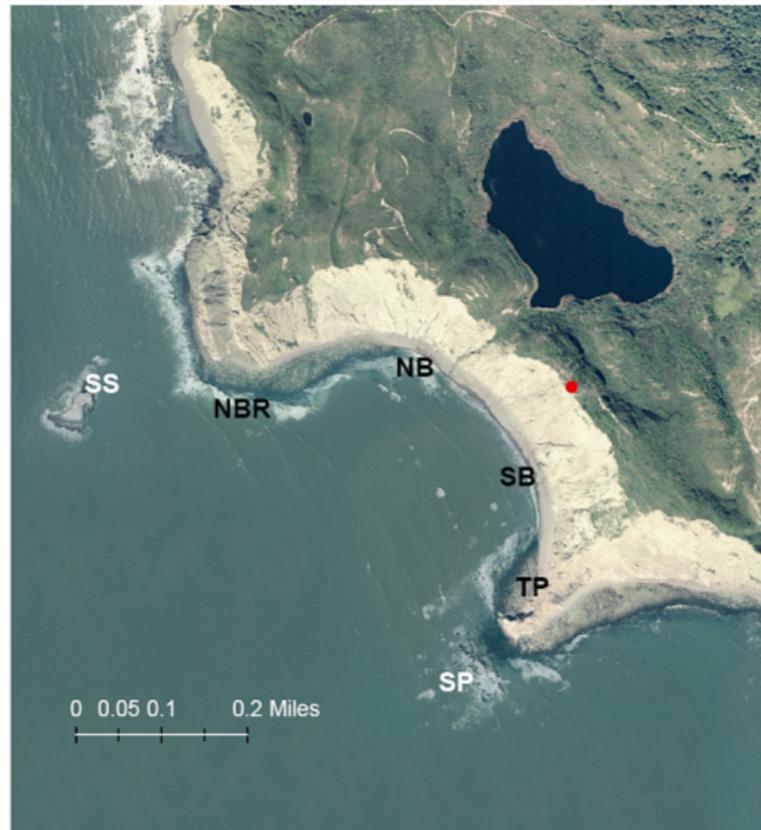
Field Methods

- 1-2 surveys per week. Minimum of two during peak season (Apr 15 – May 15).
- Medium (2.5 ft) to low (-1.0 ft) tide.
- Two hours, with counts occurring every half-hour.
- Each subsite is surveyed separately, comprising a grand total for the site.



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Double Point



● Observation Point



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Field Methods

Census Data

- Adults / Immatures
- Pups (March 1 – May 31 only)
- Dead pups
- Red-pelaged seals
- Shark-bite seals
- Time / Subsite

Disturbance Data

- Time / Subsite
- Source Category
- Specific Source
- Source number
- Response
- Flush numbers



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Data Management

- Relational MS Access database
- Harbor seal and elephant seal monitoring data
- Data entry, QA/QC, data summaries.
- Complete user-interface
- Custom queries built for data summaries and QA/QC



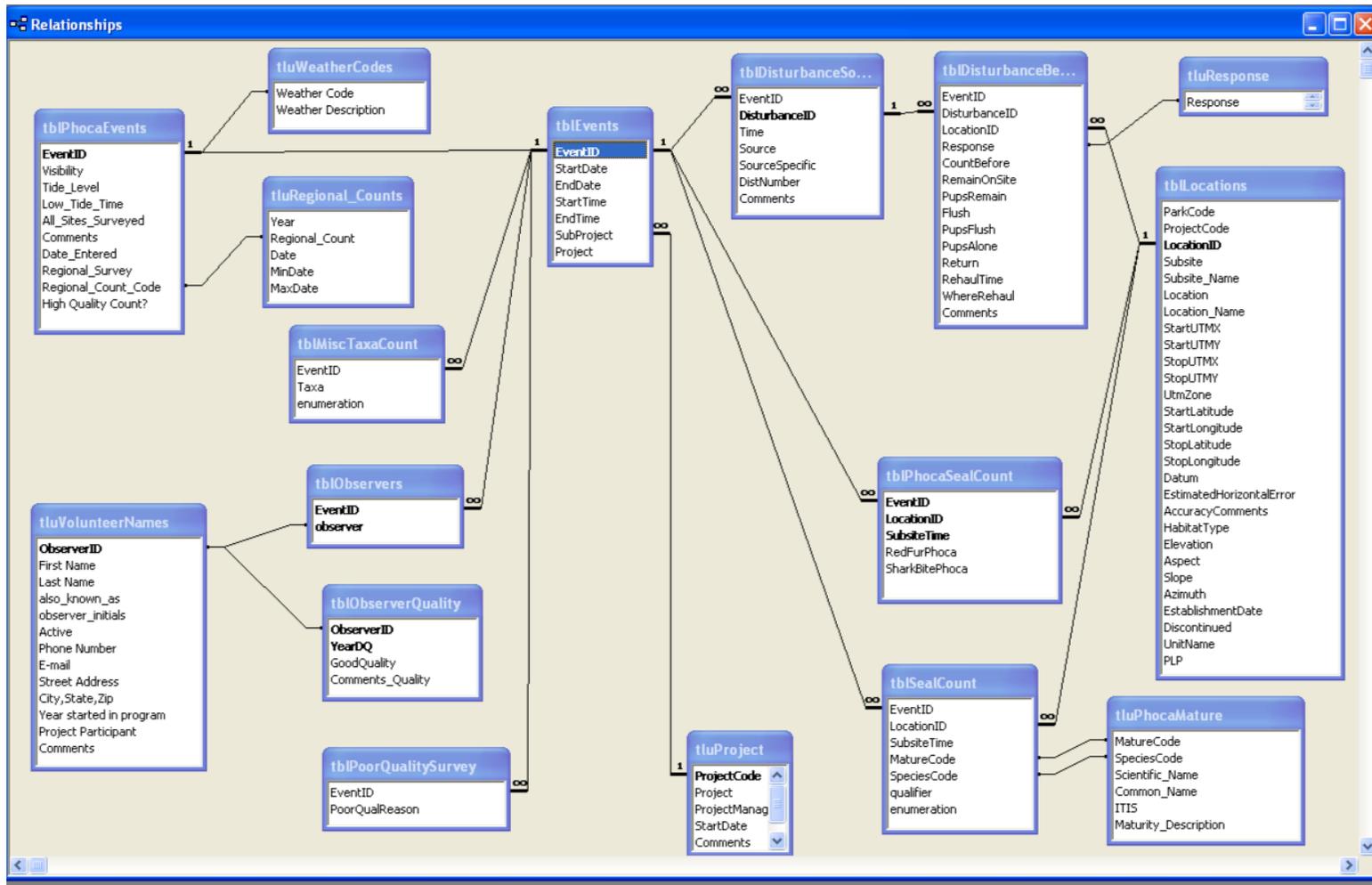
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Data Management

- Database modeled after national database template
- Spatial component of data built-into database
- Table relationships completely defined
- Definitions for all tables and fields



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Data Management

- Metadata records compliant with FGDC standards as required under Executive Order 12906
- Metadata records accompany all FOIA requests
- Metadata records maintained online at NPS Data Store public website



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NR/GIS Metadata: Formal Metadata View - Windows Internet Explorer

http://science.nature.nps.gov/nrdata/metadata.cfm?ID=40523

File Edit View Favorites Tools Help

Google Search

NR/GIS Metadata: Formal Metadata View

NPS Data Store

National Park Service
U.S. Department of the Interior

Application Home >> Login

Search Results Online Data View Dataset Catalog View Formal Metadata View

SFAN Pinniped Database

Search

Select Search Type: All Records

and NPS Unit: All NPS Units

Category: All Area Categories

or Subject: All Subjects

Word Search: Keyword Title Abstract

Search

Advanced Search

Help

Instructions About News Data Server More Info Data Store FAQs Data Standards FAQs Metadata Standards NPS Metadata Profile

Links

Metadata Tools & Editor GIS/Metadata Tools NPS GIS Clearinghouse (search by map) NPSFocus NPS I&M Program

Metadata:

- NPS_Information
- Identification_Information
- Data_Quality_Information
- Entity_and_Attribute_Information
- Distribution_Information
- Metadata_Reference_Information

NPS_Information:
NPS Metadata Master ID: 40523
NPS Metadata Purpose: NPS, DataCat
NPS Unit and Type: SFAN (Network)

Data Store Information:
Data Category: Wildlife

Dataset Catalog Information:
Subject:Mammals
Priority:Medium
Data_Type:ANADIG
Data_At_Park:Yes
File_Location:At originator SFAN network

Dataset_Extent:
Extent_Description:
Coverage: IN & OUT , LOCATION: Pacific Ocean and San Francisco Bay Beaches in Marin and San Francisco Counties.
Bounding Rectangle is the default rectangle for SFAN network.

UTM Bounding Coordinates:
UTM_West:
UTM_East:
UTM_North:
UTM_South:
UTM_Zone: 17
UTM_Datum: Other

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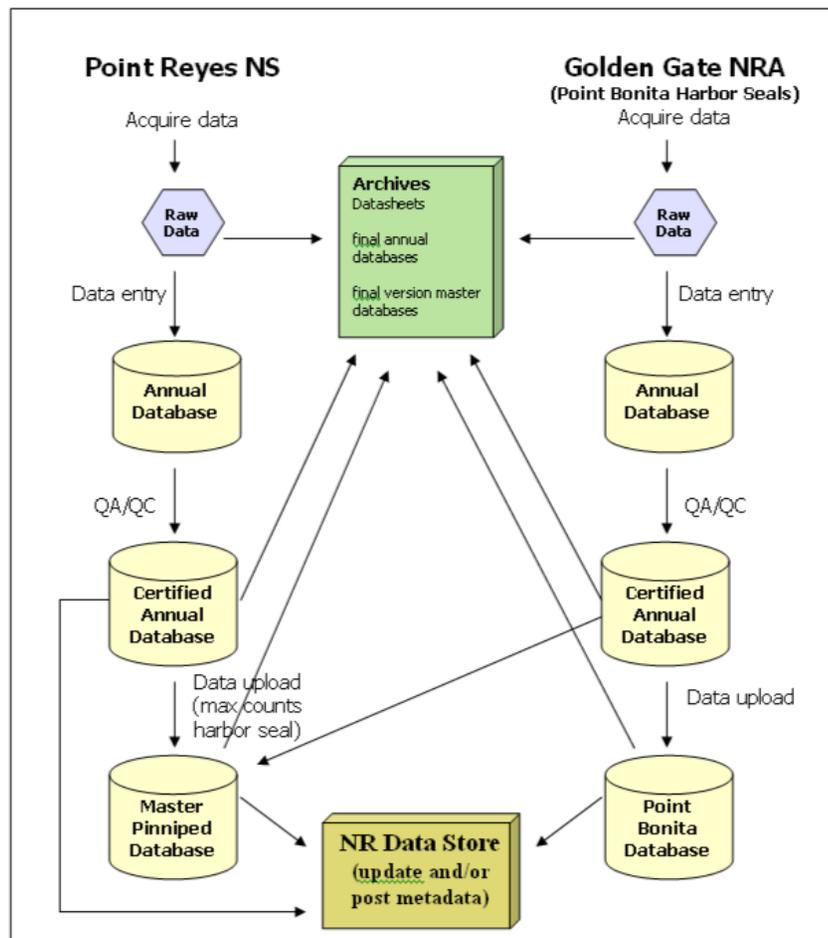
Local intranet 100%

start Dave Press - ... Gmail - Inbox ... NR/GIS Meta... Outline of MM... Harbor seal 2... SFAN_Pinnipe... CD_Contents ... MMC_Press_I... December200... 15:48



Data Work Flow

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Data Work Flow

- Annual Database – August to July of next year; all raw data entered
- Count data ranked as high vs. poor quality data.
- All data sheets error-checked against digital records
- 10% of data records randomly selected for additional error-checking by Data Manager
- Series of queries designed to check data for “logic” errors



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Data Work Flow

- Merge annual dataset with master database.
- Harbor seal count data condensed to maximum count per survey.
- Disturbance data transferred as is.
- Archive data sets.
- Update database log - tracks significant database updates and data edits



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Data Reporting

- Annual monitoring report completed as soon as possible.
- Provides general overview of monitoring year. No subsite data.
- Maximum counts by location, comparisons with other monitoring years, disturbance counts by source, disturbance rates.
- Summaries based on maximum total count per location for breeding and molting seasons.
- Poor quality count data excluded from summaries
- Disturbance data not filtered for quality.



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Data Reporting: Poor Quality Counts



- observer quality
- visibility
- other weather conditions (ie. wind, glare)
- incomplete survey



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Data Reporting: Disturbance Data

- Only “actual” disturbances included – head alert, flush, flush into water responses
- Disturbance data not filtered for quality based on observer experience, weather, tide, etc.



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Photos courtesy of J. Thompson



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Data Reporting

- Annual report peer-review internal and external
- Reports approved by NPS Key Official
- Report posted to SFAN I&M website following approval



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NPS: Nature & Science » Networks: San Francisco Bay Area Network » Pinnipeds - Windows Internet Explorer

http://science.nature.nps.gov/im/units/sfan/vital_signs/pinnipeds/HarborSeals.cfm

File Edit View Favorites Tools Help

Google Search Input Search Here Search

NPS: Nature & Science » Networks: San Francisco Bay Area Network » Vital Signs » Harbor Seals

National Park Service Inventory & Monitoring Program

National Park Service
U.S. Department of the Interior

Nature & Science NPS

Input Search Here Search

Advanced Search
Search A to Z

Nature & Science

Inventory & Monitoring

Network Home :

- About Us
- Inventories
- Monitoring
- Reports & Publications
- Network Contacts
- Data Liability Statement
- SFAN Intranet (NPS only)

Vital Signs

- Air Quality
- Amphibians and Reptiles
- Butterflies - T & E
- Fish
- Landbirds
- Landscape Dynamics
- Pinnipeds
- Plants - Communities
- Plants - Invasives
- Plants - Rare
- Raptors
- Riparian Habitat
- Snowy Plover, Western
- Spotted Owl, Northern
- Stream Flow
- Water Quality
- Weather and Climate
- Wetland Habitat

Parks: Nature & Science

National Park Service Networks

NPS » Nature & Science » I & M » Networks » San Francisco Bay Area » Vital Signs » Harbor Seals

San Francisco Bay Area Network Harbor Seals



Harbor seals (*Phoca vitulina richardii*) are the dominant and only year round resident pinniped in the San Francisco Bay Area, California. Within the San Francisco Bay Area, the population at Point Reyes represents the largest concentration of harbor seals in the State of California, other than the Channel Islands. Much of the Point Reyes coastal zone remains fairly pristine and provides excellent marine and terrestrial habitat for seals to rest, molt, feed, and breed where human encroachment is minimal. Long-term monitoring studies of harbor seals have been conducted at selected colonies for 30 years, and are currently conducted at 7 locations along the Point Reyes seashore and at Point Bonita in the Golden Gate National Recreation Area.

Field Surveys

- Surveys are conducted weekly at 12 sites during the breeding season (March - June) of each year.
- Bi-monthly surveys are conducted for all pinnipeds year-round.

For more information on becoming a volunteer, contact the [Harbor Seal Coordinator](#).

Project Updates 2009

- Harbor Seal Update and Summary Graphs - 8/3/2009
- Harbor Seal Update and Summary Graphs - 7/8/2009

Annual Reports

- Annual Report 2008
- Annual Report 2007
- Annual Report 2006

Local intranet 100%



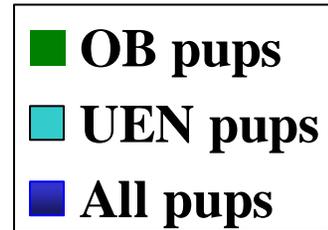
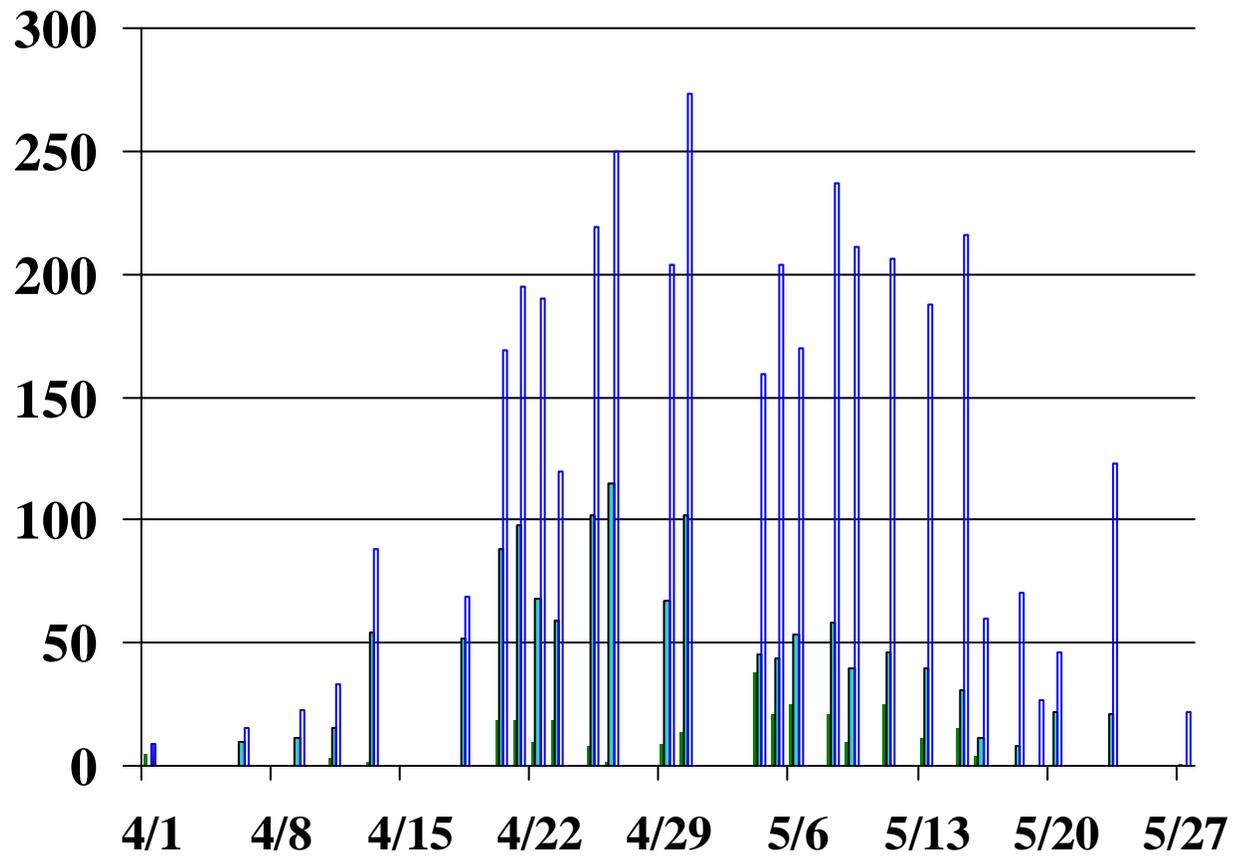
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80% decline at OB in 2007

- Sheltered Wilderness, public testimony
- 80% estimate of decline in use of OB in 2007 compared to 2004 was based on best professional judgment from previous years of study
- Peak pup count date at DE in 2007 was similar to other years but at OB it was later
- Count of April 23 used although actual peak later discovered to be May 4
- Actual decline at OB from 2004-2007 based on May 4 peak was 53% for pups, 65% for pups and 56% overall.



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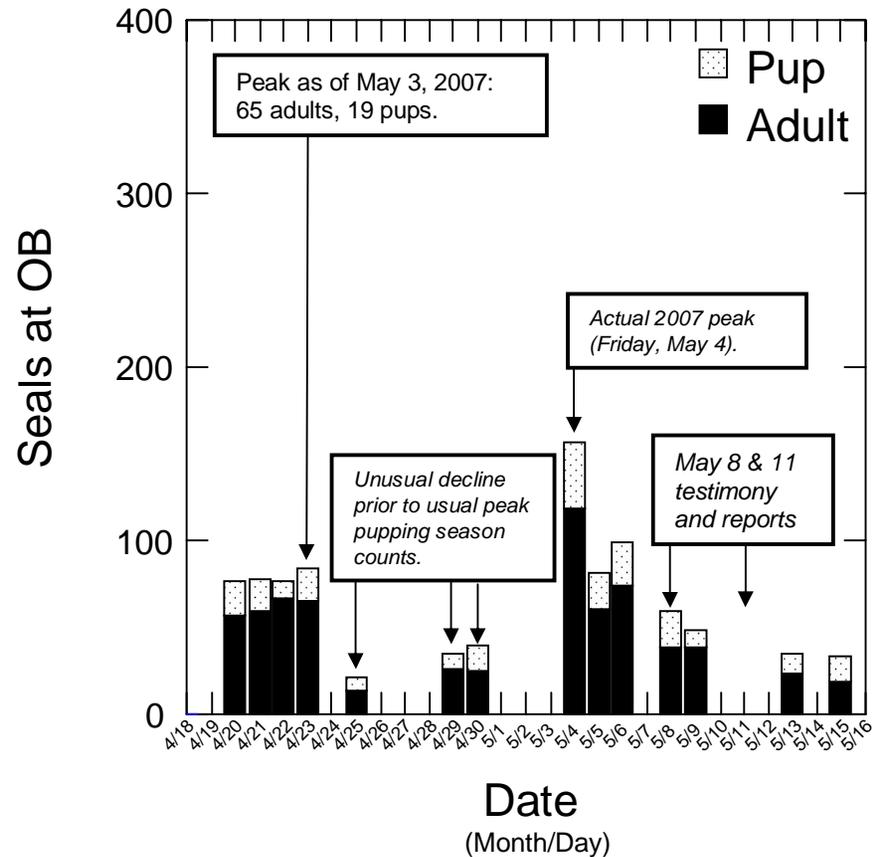


Figure 1. Harbor seal counts at Drakes Estero subsite OB in 2007. NPS used data available through May 3 to prepare May 8 and 11 testimony and reports. This is why the 80% decline was presented.



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DBOC Disturbance Data

- Only DBOC may operate motorboats in Drakes Estero
- Harbor seal use sandbars at higher tides



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Sandbar OB on falling tide. 3 hours and 35 min prior to low tide of 0.89 ft (Golden Gate).



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Sandbar OB on falling tide. 2 hours and 45 min prior to low tide of 1.68 ft (Golden Gate).



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DBOC Disturbance Data

- Only DBOC may operate motorboats in Drakes Estero
- Harbor seal use sandbars at higher tides
- Observer quality not related to disturbance data
- Sound travels
- Multiple subsites grouped under one disturbance source/time



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Photo courtesy of R. Campbell



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DBOC Disturbance Data

- Only DBOC may operate motorboats in Drakes Estero
- Harbor seal use sandbars at higher tides
- Observer quality not related to disturbance data
- Sound travels
- Multiple subsites grouped under one disturbance source/time
- Data edits, additions
- Program organization, transition from PORE to I&M