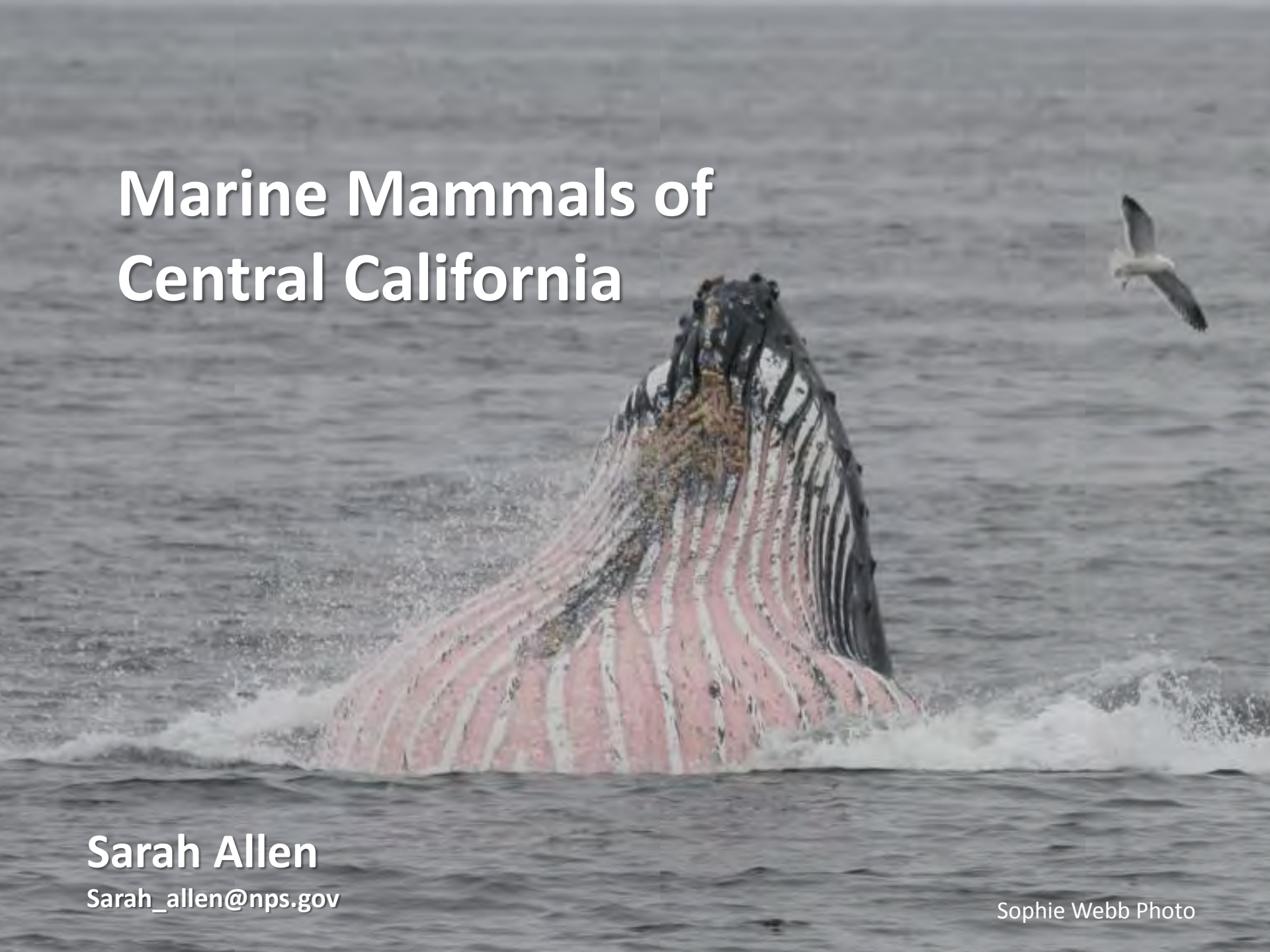
Marine Mammals of Central California



Sarah Allen
Sarah_allen@nps.gov

Sophie Webb Photo

Outline

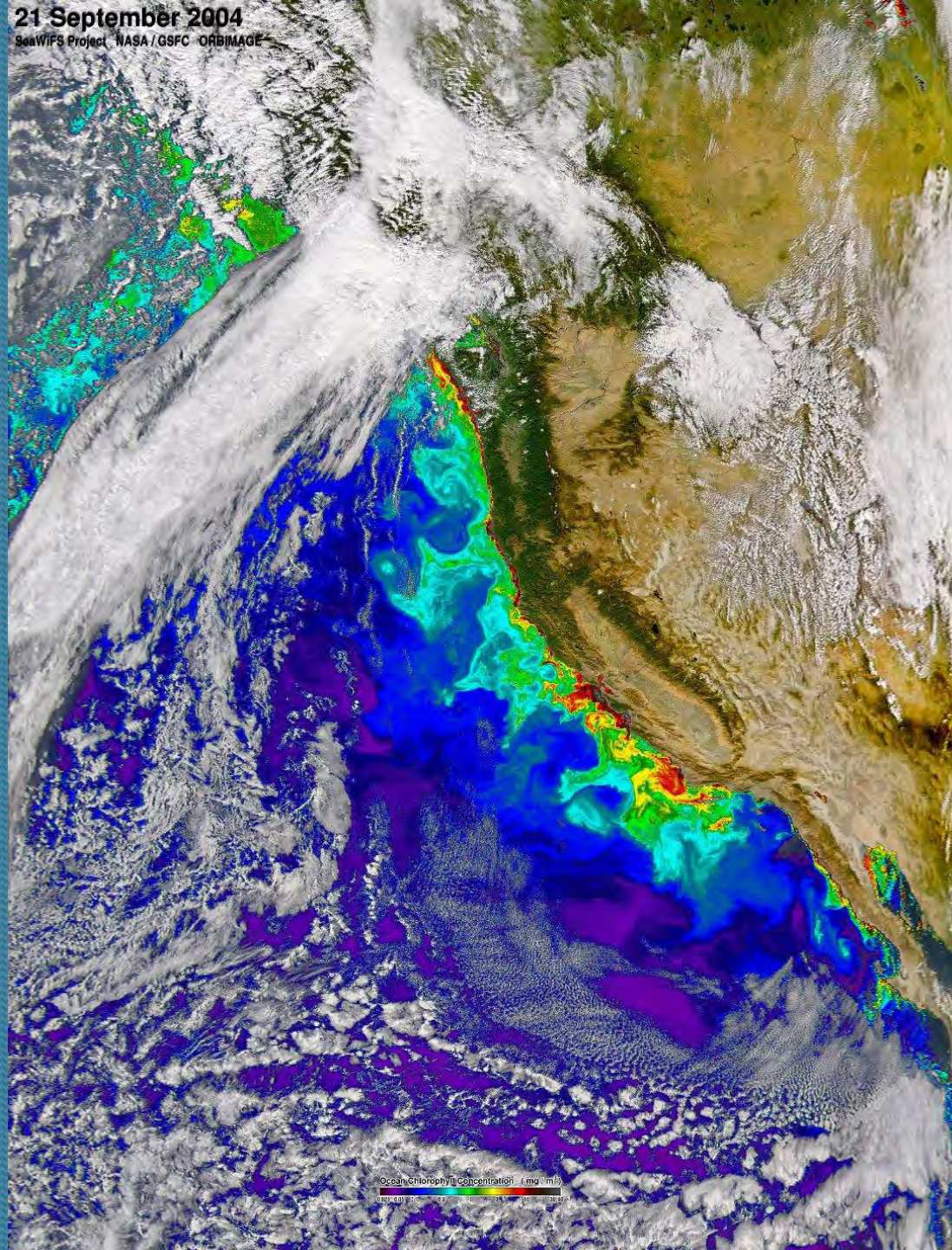
- What are marine mammals
- What species are here
- Pinnipeds

Galen Leeds

Pacific Coast
from Baja to BC
one of the most
productive
marine ecosystems
in the world

- California Current
- Coastal Upwelling

45 marine mammal
species



Ocean Ecosystems

- Bioregions
  - Latitude
  - Onshore-offshore

- Ocean ecosystems

  Food webs

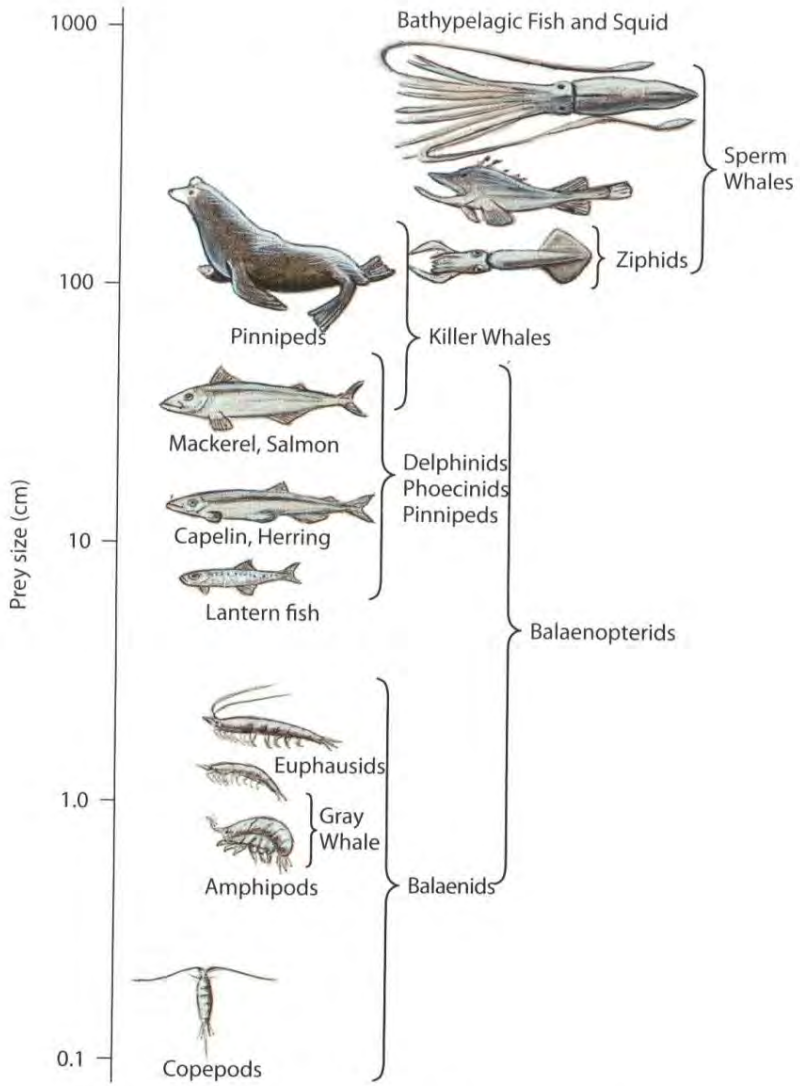
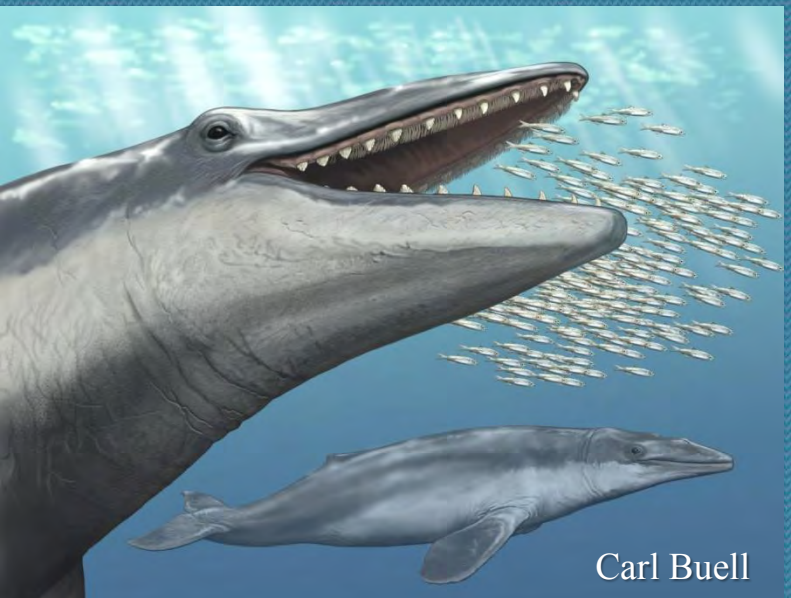


Figure 22. Marine food web and range of preferred prey sizes: Killer Whales, the apex predators, feed on other mammals; seals feed on fish; some baleen whales feed on the "fleas" of the sea, copepods (redrawn from Berta et al. 2006).

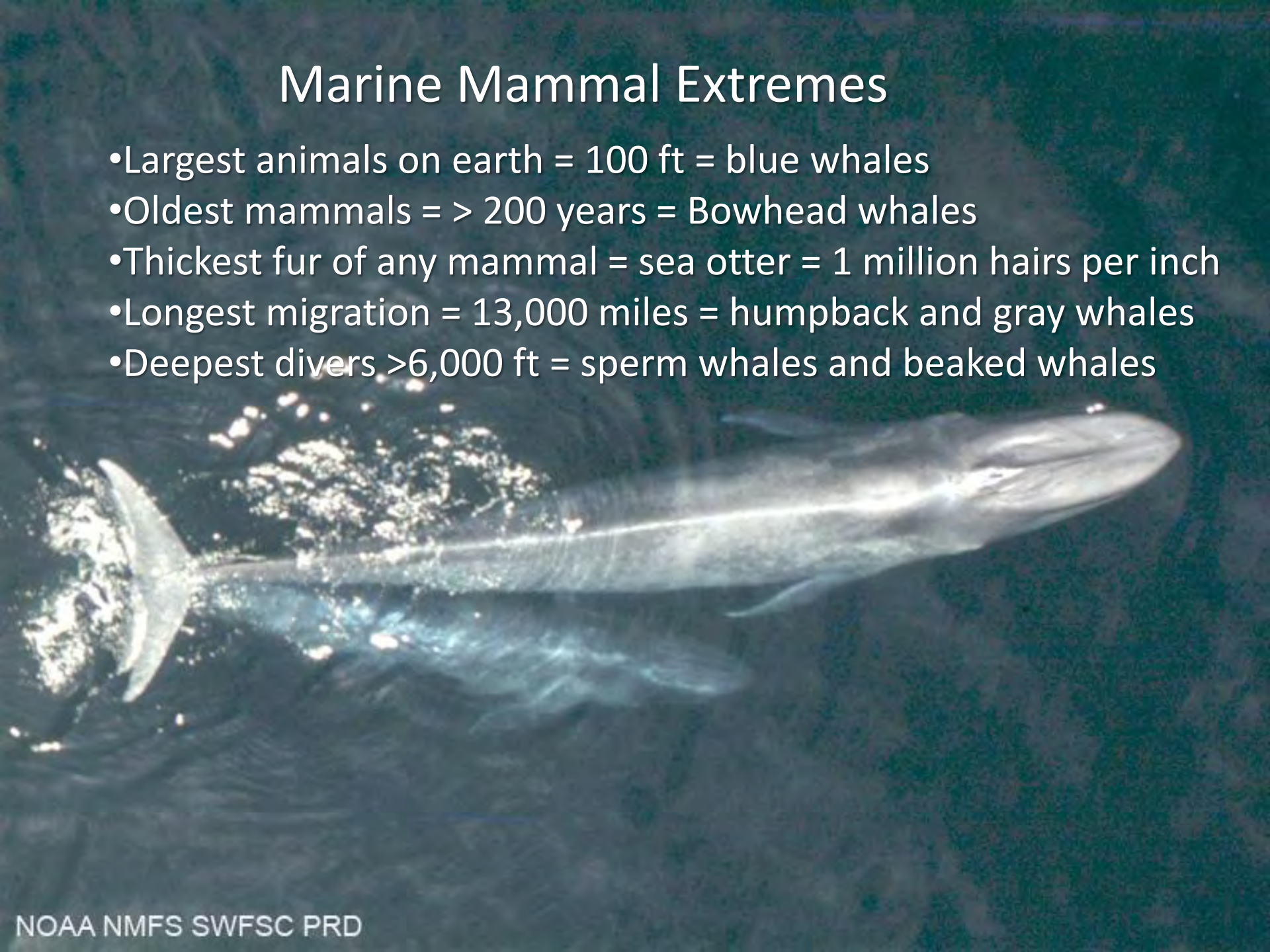
What is a marine mammal?

- Morphology
  - Specialized body forms
  - Modified appendages
  - Modified feeding forms
- Physiology
  - Breathing
  - Heat retention
  - Unique blubber
  - Counter current heat exchangers



Marine Mammal Extremes

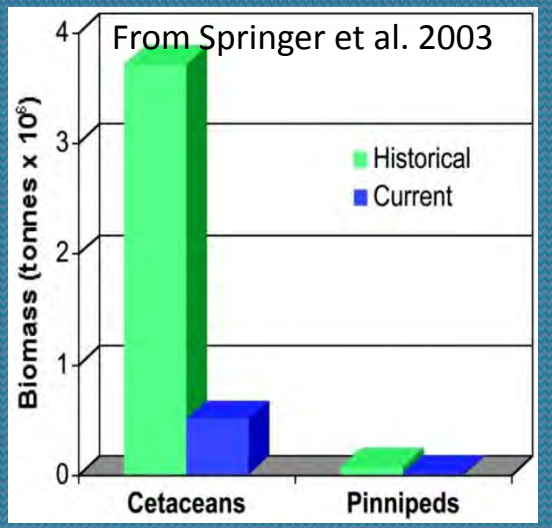
- Largest animals on earth = 100 ft = blue whales
- Oldest mammals = > 200 years = Bowhead whales
- Thickest fur of any mammal = sea otter = 1 million hairs per inch
- Longest migration = 13,000 miles = humpback and gray whales
- Deepest divers >6,000 ft = sperm whales and beaked whales

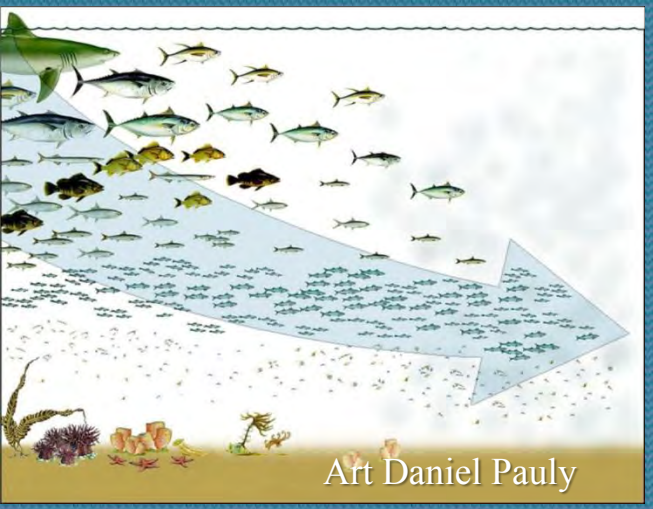


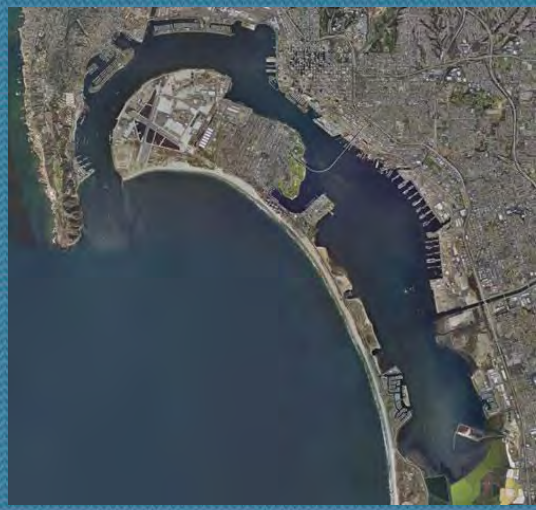
NOAA NMFS SWFSC PRD

Causes for decline

- Over exploitation for oil, fur, food etc.
- Fishing down the food chain
- Ship strikes and military sonar
- Pollutants (oil, plastics, pathogens)
- Fisheries interactions
- Habitat loss







Conservation of Marine Mammals

- Legislation such as Marine Mammal Protection Act
- Marine Protected Areas – Guadalupe Island
- Conservation Ethic - Scammon

Marine Mammal Protection Act (1972)

- MMPA established a moratorium on the taking of marine mammals in U.S. waters
- The term "take" is defined to mean "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture or kill any marine mammal."

Three taxonomic orders

Cetaceans

-Baleen whales-*Mysticeti*

-Toothed whales-*Odontoceti*

Carnivores

-Pinnipedia

seals and sea lions

-Mustelidae

sea and river otters

Sirenians

Absent

Baleen whales

- Baleen not teeth
- unique feeding
- symmetrical skull
- two blow holes
- forage on krill & fish
- Females larger than males

3 families – 8 species

- *Eschrichtiidae*
- *Balaenopteridae*
- *Balaenidae*

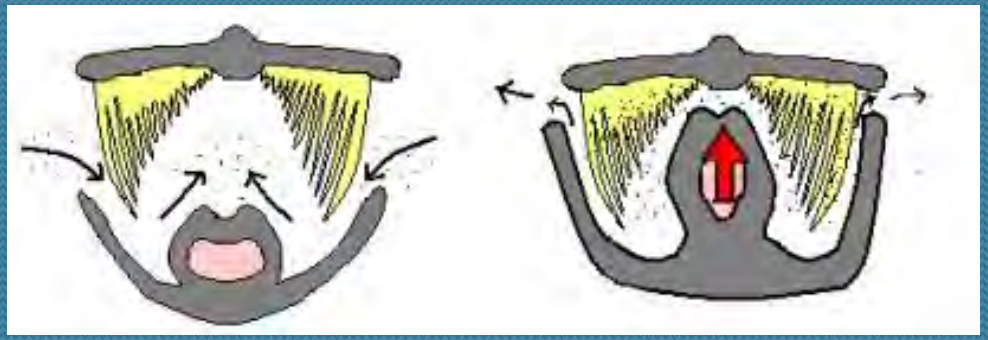
Gray whale

Humpback whale

North Pacific Right Whale

Sophie Webb

How baleen whales eat?

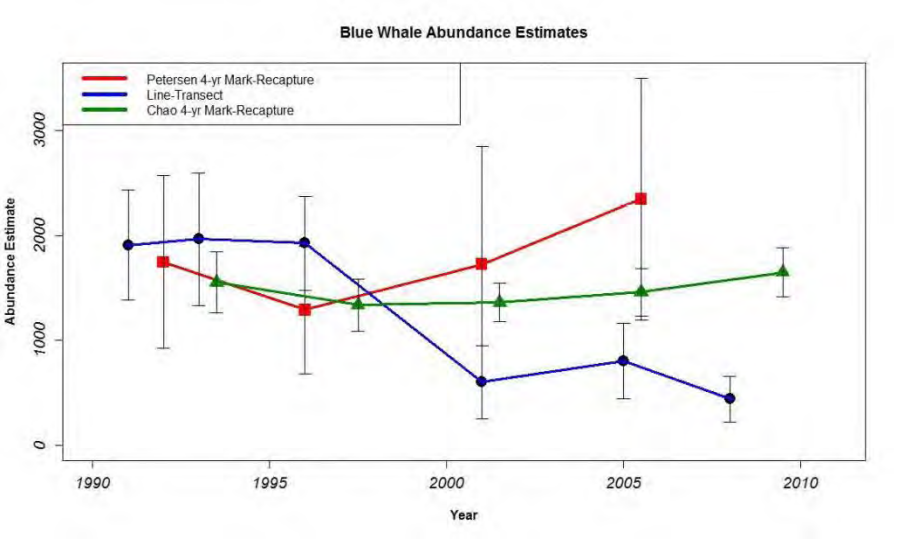


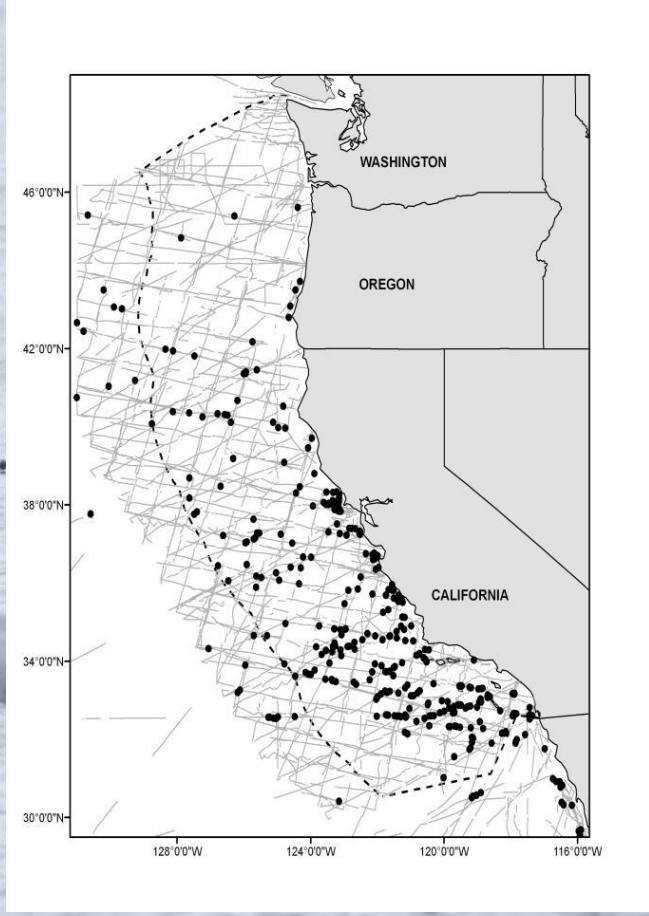
Blue Whale *Balaenoptera musculus*

- Largest animal on earth
- Calf is >20 ft
- Baleen 3ft
- Feed on fish and krill

© Sophie Webb

Blue Whale *Balaenoptera musculus*





Population estimate for eastern Pacific from NOAA in 2013 is <u>1,647</u>

© Sophie Webb

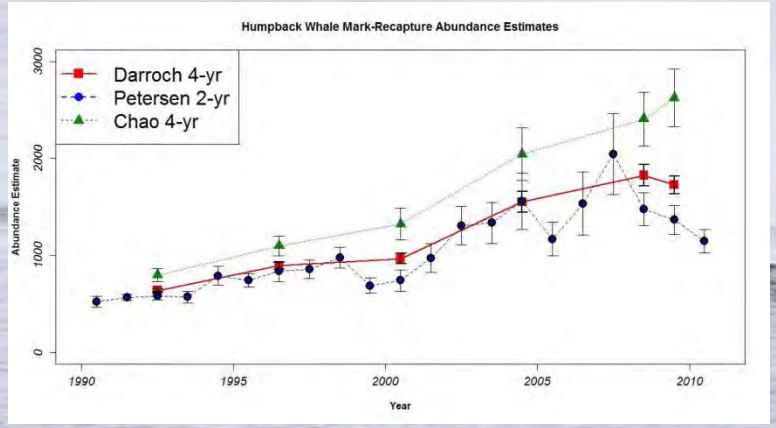
Humpback Whale - *Megaptera novaeangliae*

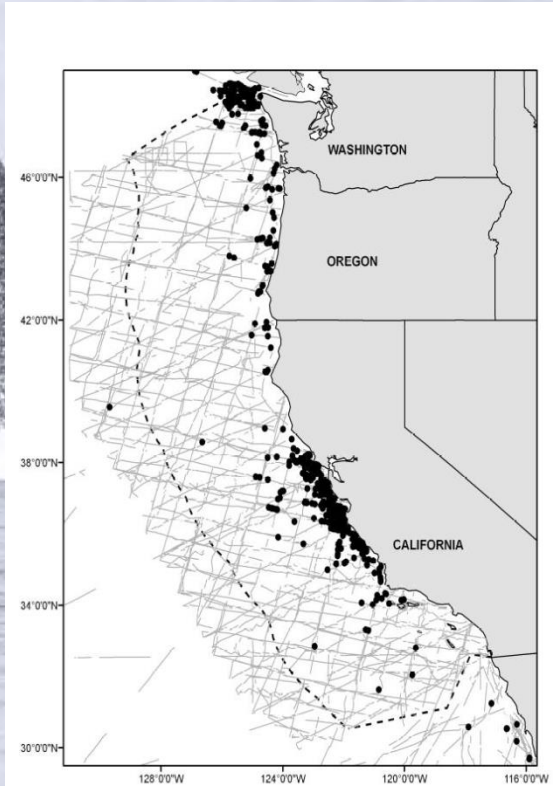
- Humpback- distinct arching back
- Large wing-like flippers
- Ballerinas of the sea
- Longest single migration of any animal
- True singing whales – last ½ hr and repeated for days

© Sophie Webb

Humpback Whale

Population estimate for eastern Pacific from NOAA in 2013 is <u>1,918</u>





Gray Whale *Eschrichtius robustus*

- One of longest migrations
- Shortest baleen
- No dorsal fin
- Friendly whales
- Ecological engineer

Photo Chris Johnson

Gray Whale

Population estimate for eastern Pacific from NOAA in 2013

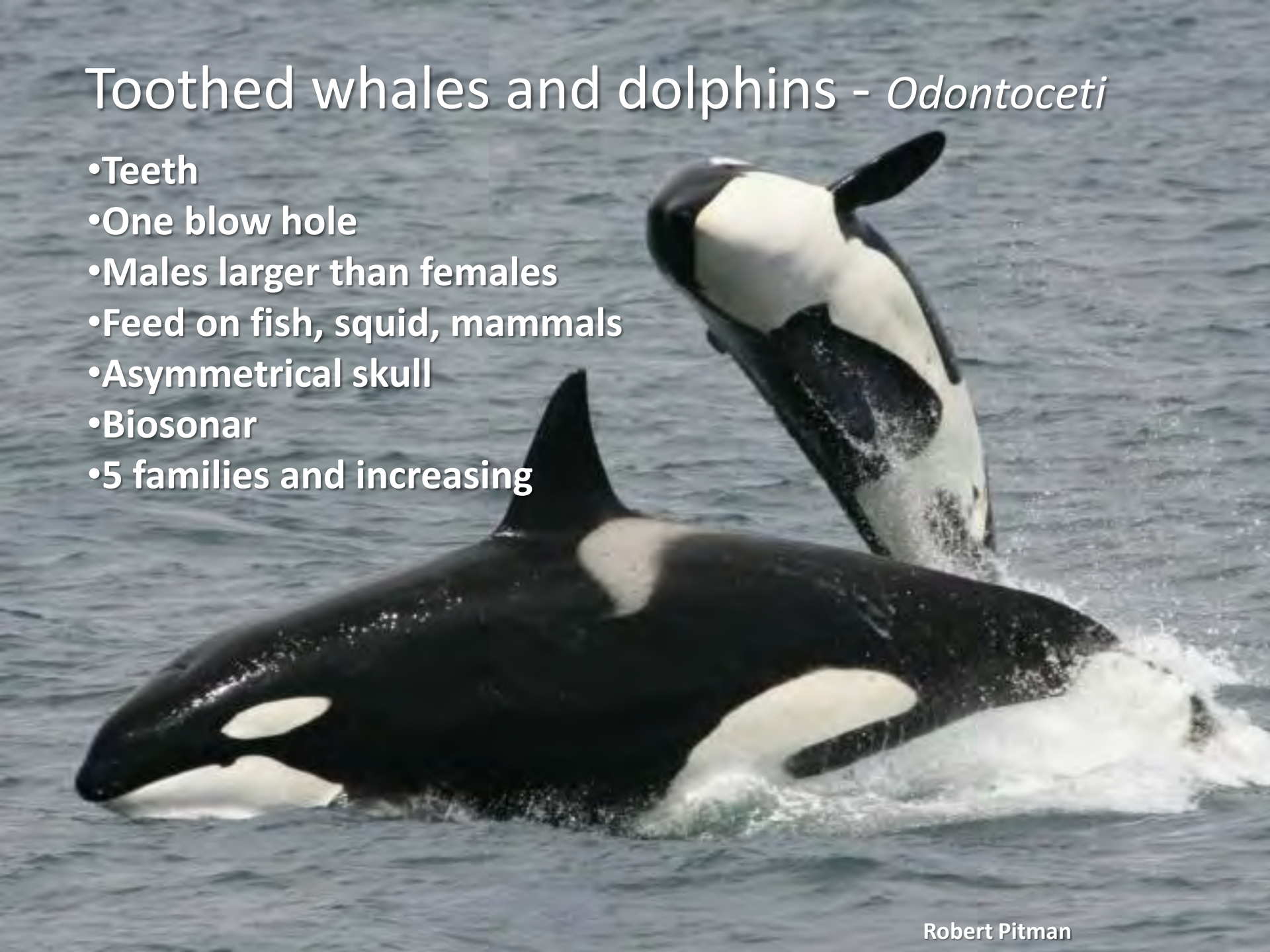
19,126

© Sophie Webb

Minke Whale – *Balenoptera acutorostrata*
•Smallest of baleen whales
•Chevron markings on back & flipper
•Year round presence in some areas

Toothed whales and dolphins - *Odontoceti*

- Teeth
- One blow hole
- Males larger than females
- Feed on fish, squid, mammals
- Asymmetrical skull
- Biosonar
- 5 families and increasing



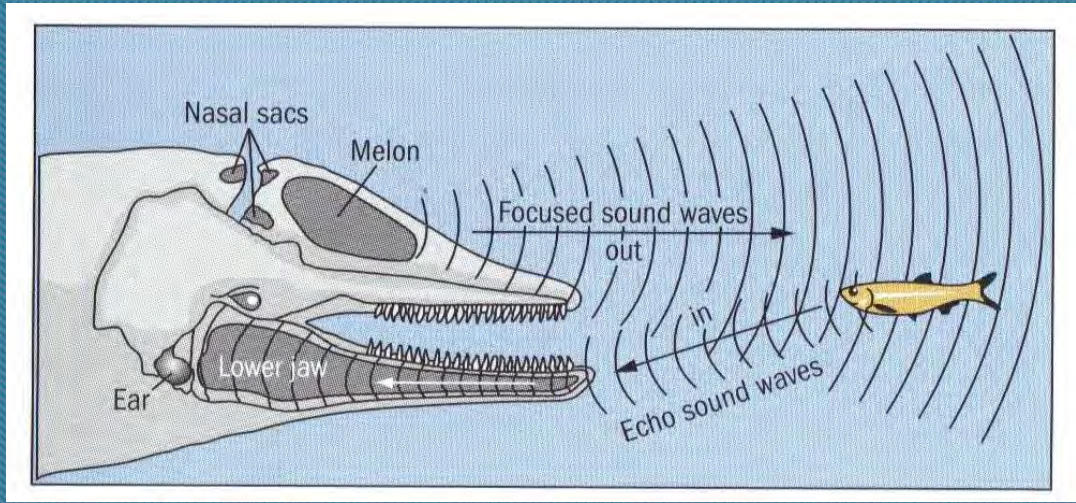
Robert Pitman

Toothed whales

Biosonar

Identify objects

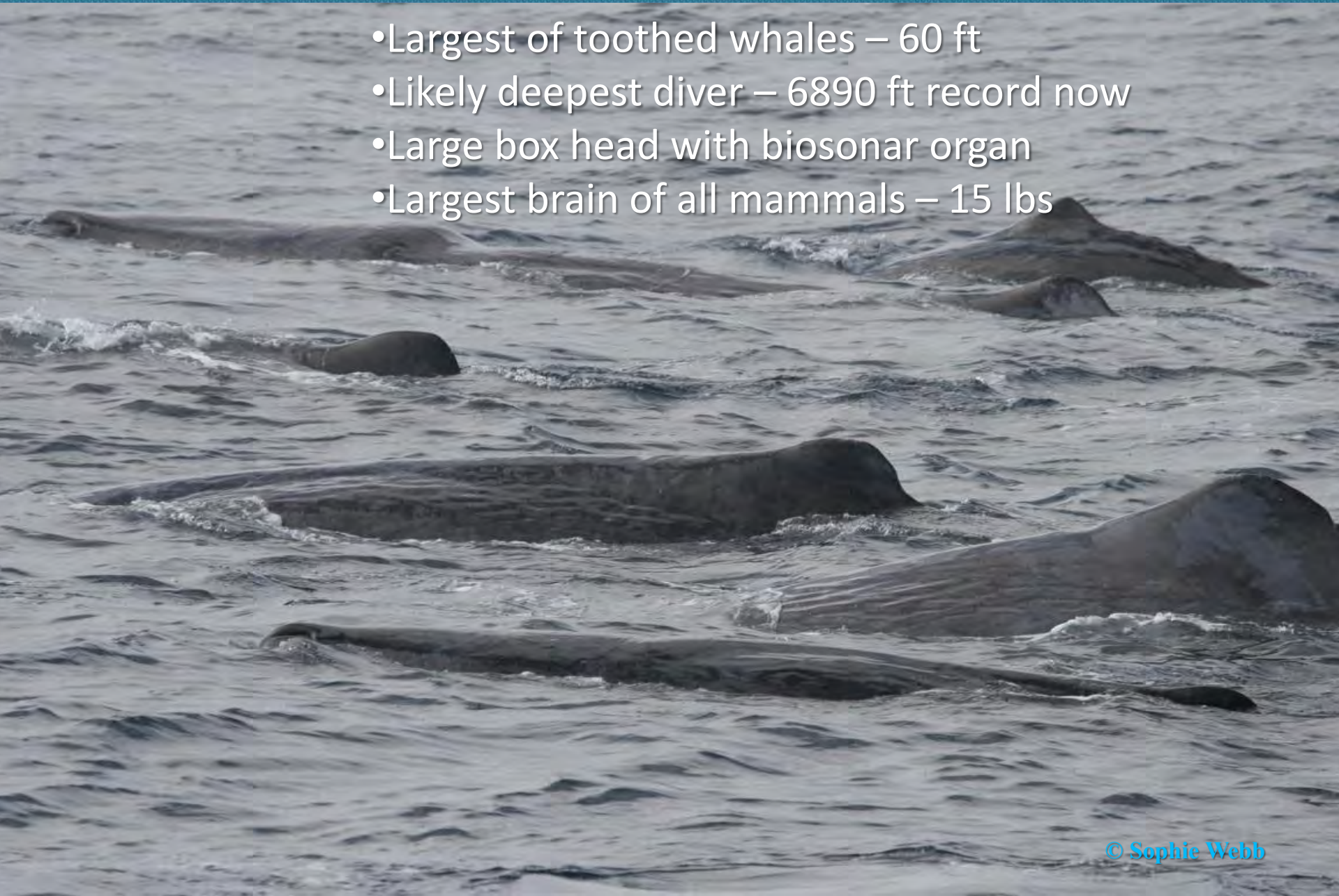
360 ft – 10 miles



Sperm whales

© Sophie Webb

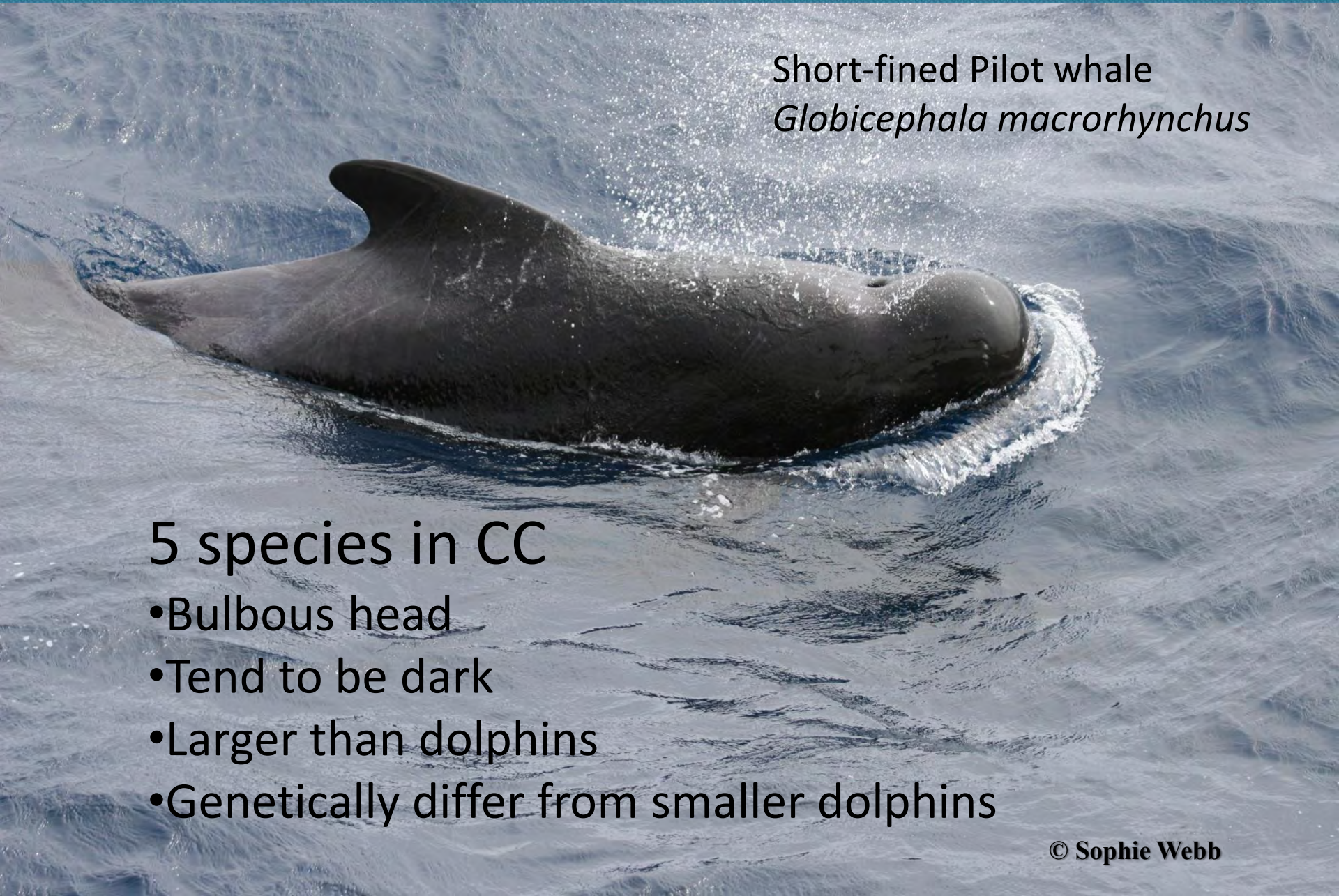
Sperm Whale - *Physeter macrocephalus*



- Largest of toothed whales – 60 ft
- Likely deepest diver – 6890 ft record now
- Large box head with biosonar organ
- Largest brain of all mammals – 15 lbs

© Sophie Webb

Blackfish within Delphinidae Family



Short-fined Pilot whale
Globicephala macrorhynchus

5 species in CC

- Bulbous head
- Tend to be dark
- Larger than dolphins
- Genetically differ from smaller dolphins

© Sophie Webb

Killer Whales
3 Ecotypes

Southern
Resident
Fish eater

Transient
Mammal eater

Offshore
Fish eater

© Sophie Webb

- Strong sexual dimorphism
- Ecolocate prey – detect to size of a bean
- Age – female >70; male – 60
- Highly social
- Pods have distinct dialects
- Cooperative feeding

Average length

- Male – 32 ft
- Female – 28 ft
- Calf – 8 ft

© Sophie Webb

Killer Whale offshore ecotype

Killer Whale offshore Ecotype washed ashore at Point Reyes in 2011

Now a specimen at CAS

Pacific White-sided dolphin

Short-beaked common dolphin

Long-beaked common dolphin

Northern right whale dolphin

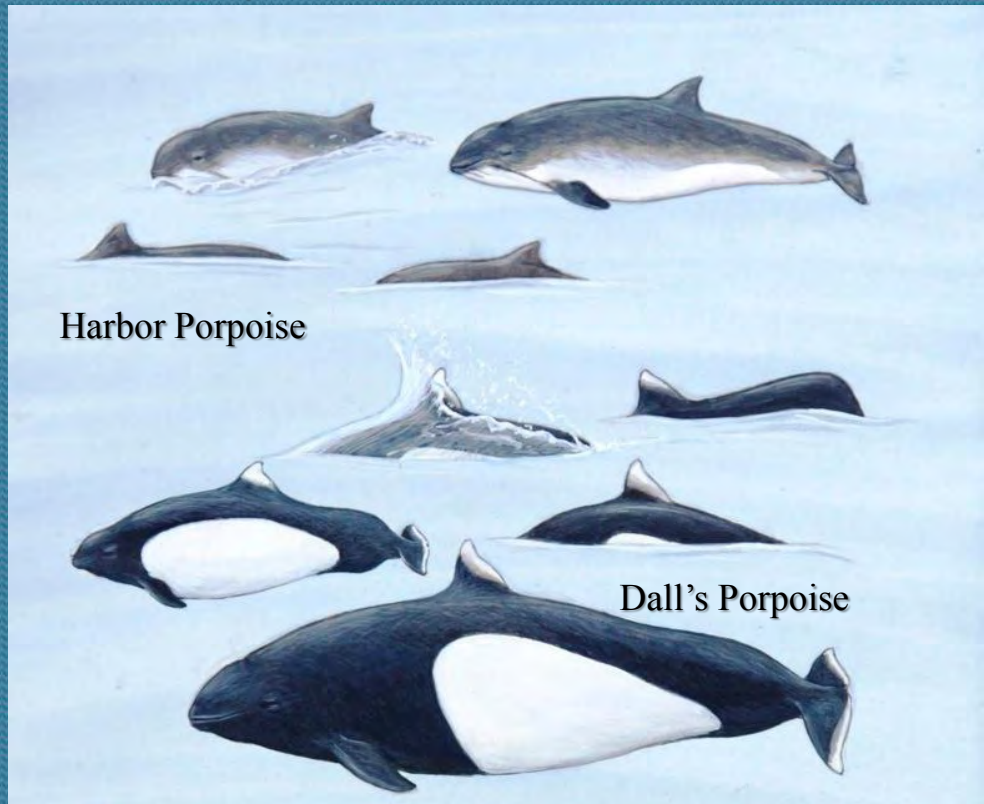
Small cetaceans

Dolphins – *Delphinidae* – 15 species

- Beak
- Conical teeth

Porpoises – *Phocoenidae* – 2 species

- Round head
- Spade teeth



Harbor Porpoise

Dall's Porpoise

Bottlenose Dolphin *Tursiops truncatus*

- Biosonar organ-detect a pin 300 ft
- Signature whistle for individual
- Range expanding north

© Sophie Webb

Bottlenose Dolphin *Tursiops truncatus*

Population size estimated by NOAA is *323*
Range extended to Sonoma County

Pacific White-sided Dolphin

Lagenorhynchus obliquidens

- Mostly ocean dolphin
- Bow rider
- Join groups of thousands of mixed species

© Sophie Webb

Dall's Porpoise – *Phocoenoides dalli*

- Endemic to North Pacific
- Fastest – 35 mph
- Bow ride exuberantly
- Schooling fish and squid

Harbor Porpoise

Phocoena phocoena

- Smallest cetacean in CC
- Does not bow ride
- Coastal
- Northern hemisphere
- Eats schooling fish and squid

Pygmy sperm whale – unusual species

Kogia breviceps

Fissipeds

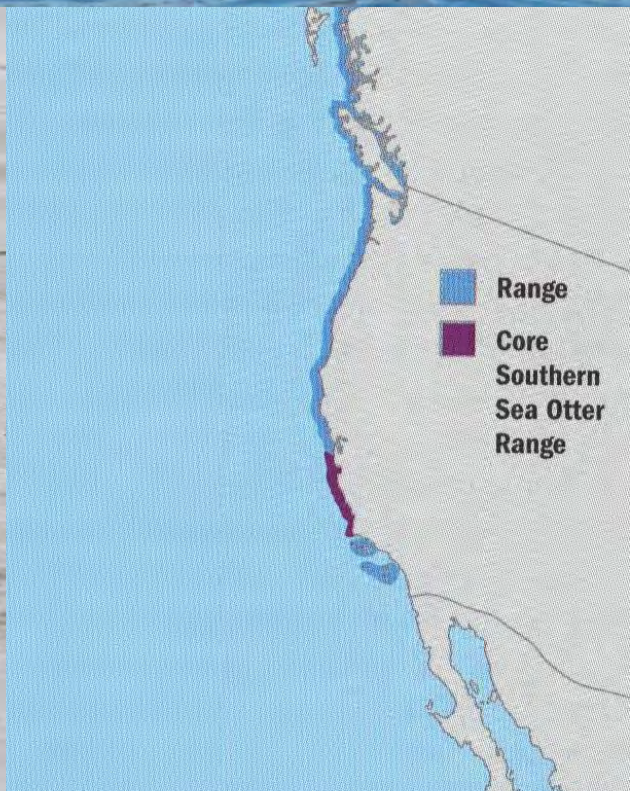
Sea Otters
River Otters

Sea Otter - NPS Photo

River Otters – Galen Leeds

Sea Otter – *Enhydra lutris*

- Thickest fur -1 million hairs/in
- Smallest marine mammal
- Almost entirely pelagic
- Single pup annually in water
- Eat mostly shellfish



Pinnipeds

Order Carnivora – sub-order Pinnipedia

= wing-footed

<u>ALL pinnipeds give birth and nurse on land</u>

Much variation of species based on:

- Morphology
  - Specialized body forms
  - Modified appendages
  - Modified teeth
- Physiology
  - Heat retention (fur/blubber)
  - Length of nursing period
  - Molt on land or at sea

Photo NOAA

Photo Richard Allen

Photos Paul Nicklin

What is a Pinniped?

Order Carnivora – sub-order Pinnipedia

= wing-footed

<u>ALL pinnipeds give birth and nurse on land</u>

Much variation of species based on:

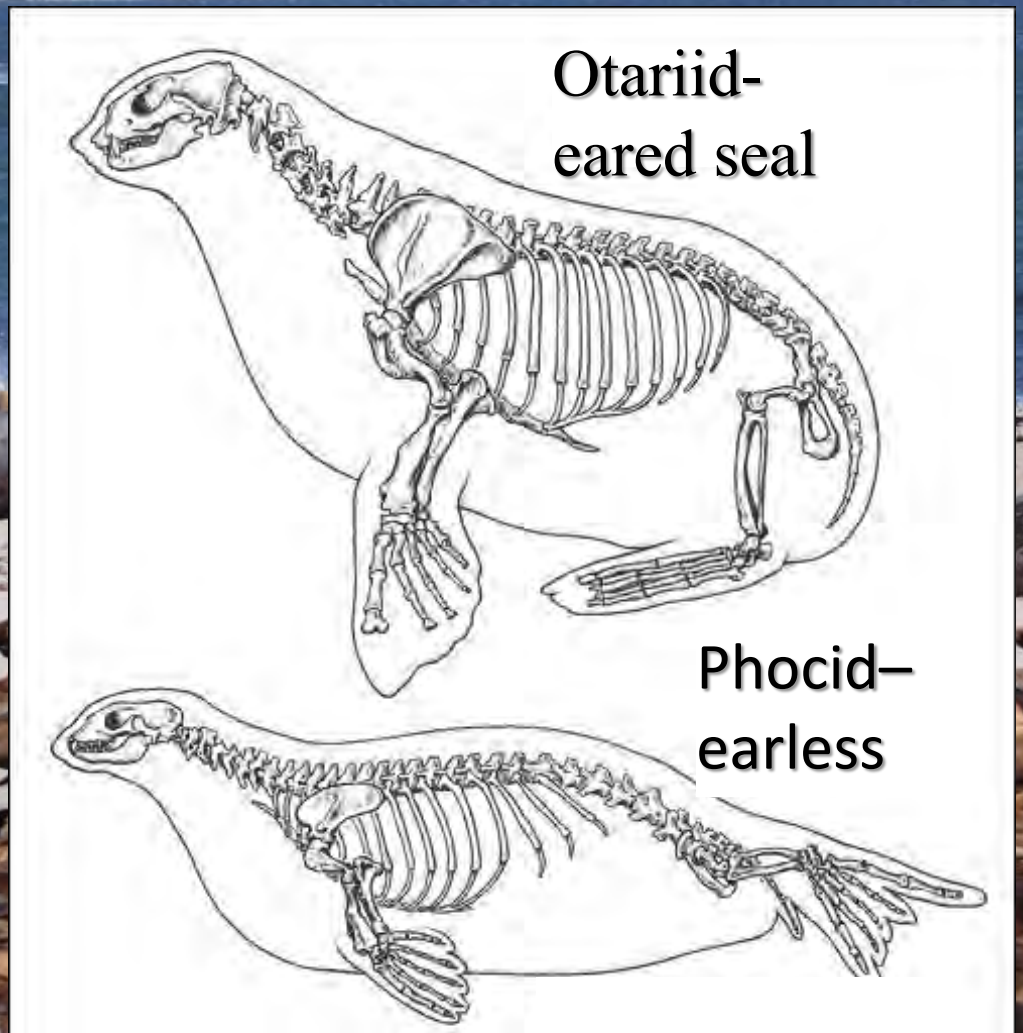
- Morphology
  - Specialized body forms
  - Modified appendages
  - Modified teeth
- Physiology
  - Heat retention (fur/blubber)
  - Length of nursing period
  - Molt on land or at sea

Photo NOAA

Photo Pat Morris

Photo Richard Allen

Pinnipeds- carnivores



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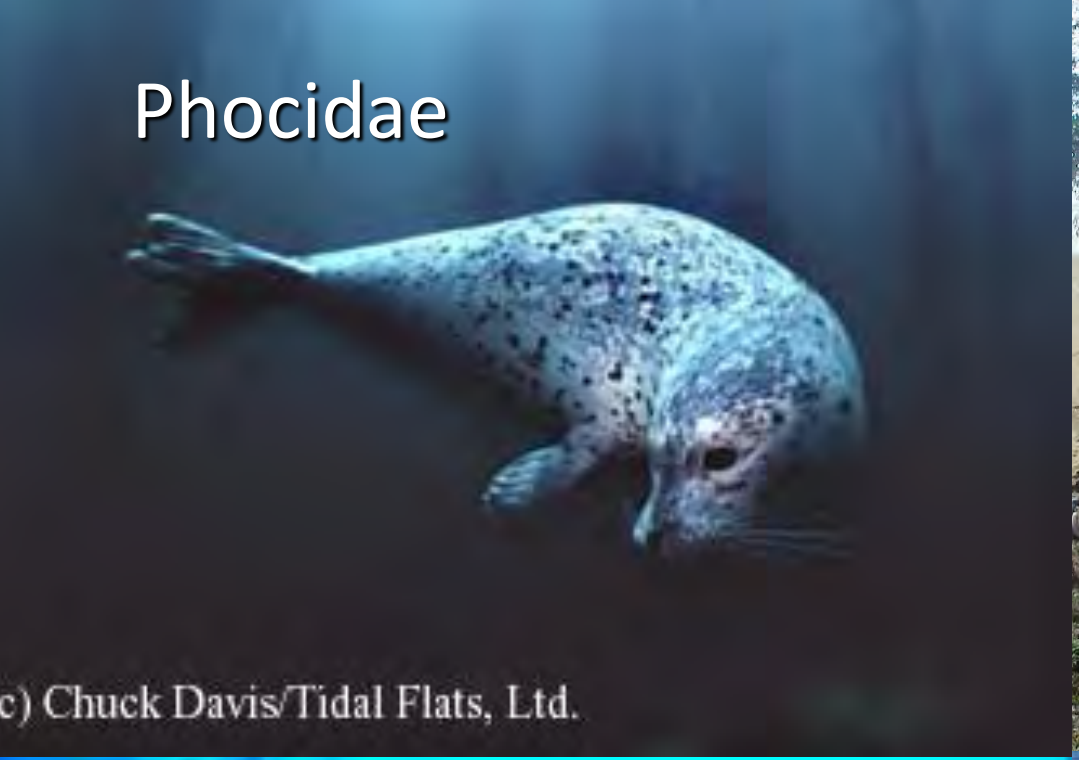
Dual life – marine and terrestrial

Phocidae



Otariidae

Sea lions and fur seals - Otaridae

Guadalupe Fur Seal

California Sea Lion

Northern Fur Seal

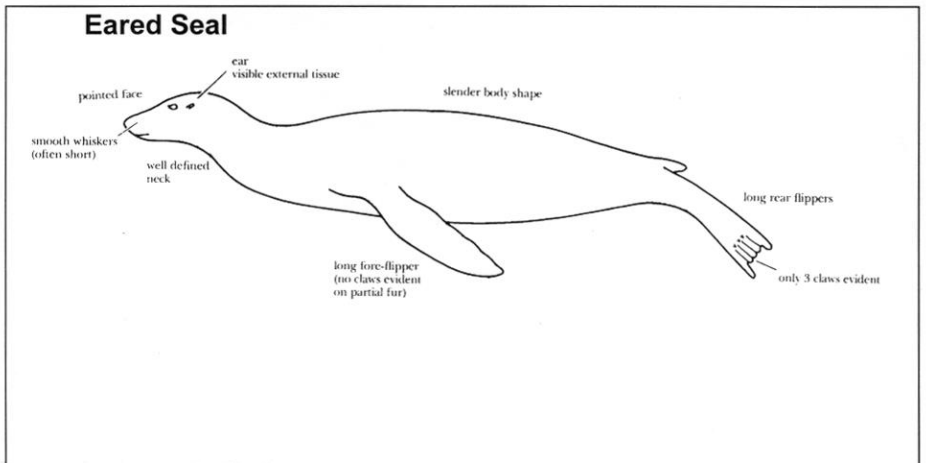
Steller Sea Lion

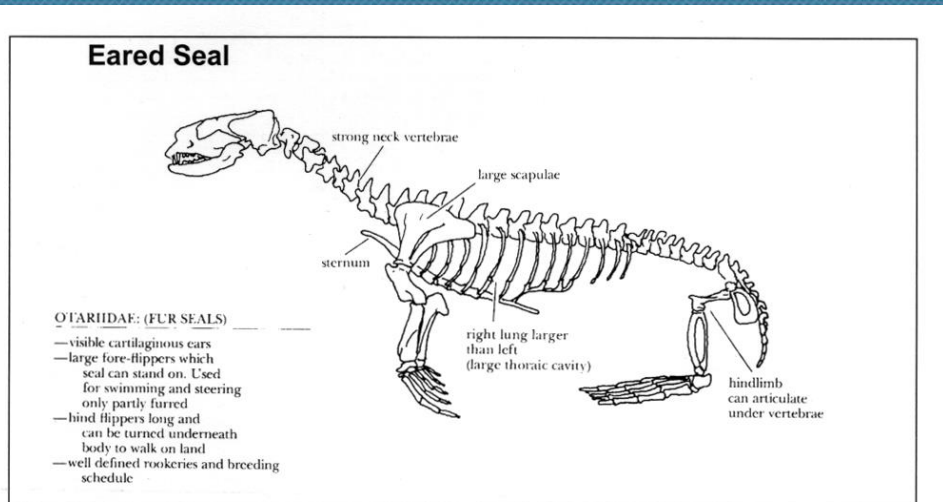
© Sophie Webb

Otariidae

California Sea Lion
Steller Sea lion
Fur seals

- External ear flap
- Articulated hips
- Long front & rear flipper
- Sexual dimorphism





Northern Fur Seal (*Callorhinus ursinus*)

Behavior

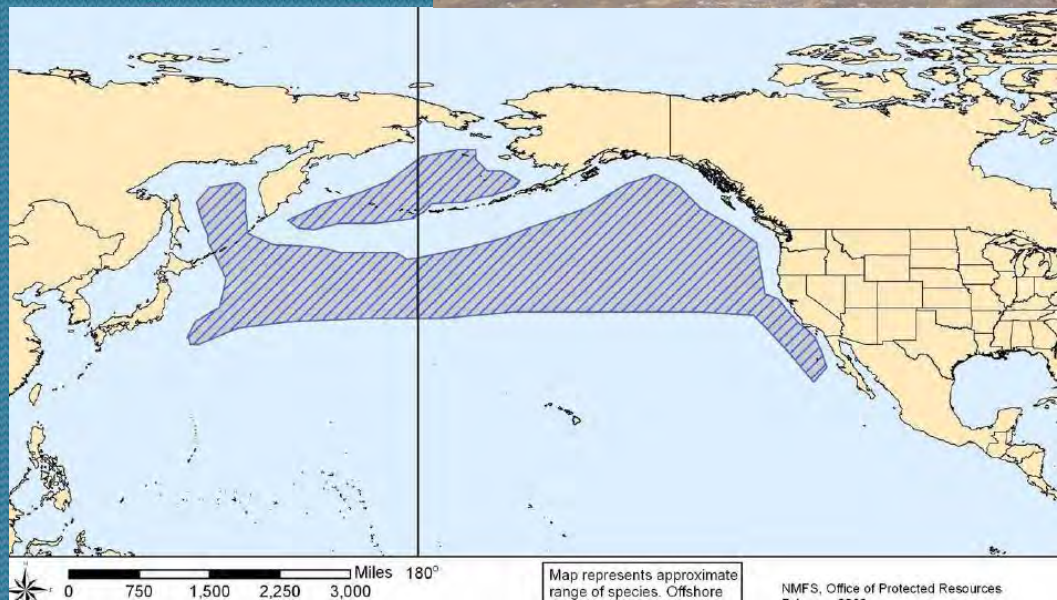
- Gregarious on land
- Solitary at sea or small groups

Breed

- May-June
- Channel Islands, Farallon Islands, Alaska

Size

- Sexual dimorphic
- male @800 lbs
- female@ 250 lb



Northern Fur Seal (*Callorhinus ursinus*)

Northern Fur Seal colony Farallon Island
600 pups 2014

© Sophie Webb

Guadalupe Fur Seal (*Arctocephalus townsendi*)

Behavior

- Small groups on land – breed in caves
- Solitary at sea or small groups

Population

- Increasing - 2,000

Breeding

- Guadalupe Island

Size

- Sexual dimorphic- male @375 lbs female@ 110 lbs

Photo:Robert Pitman

Photo:Scot Andesen

Photo from the web; fur seals on Guadalupe Is.

California Sea Lions (*Zalophus californianus*)

Behavior

- Gregarious
- Barking
- Swim with front flippers
- Eat mostly schooling fish

Breed

- May-June
- Channel Islands, Año Nuevo, Farallon Islands

Size

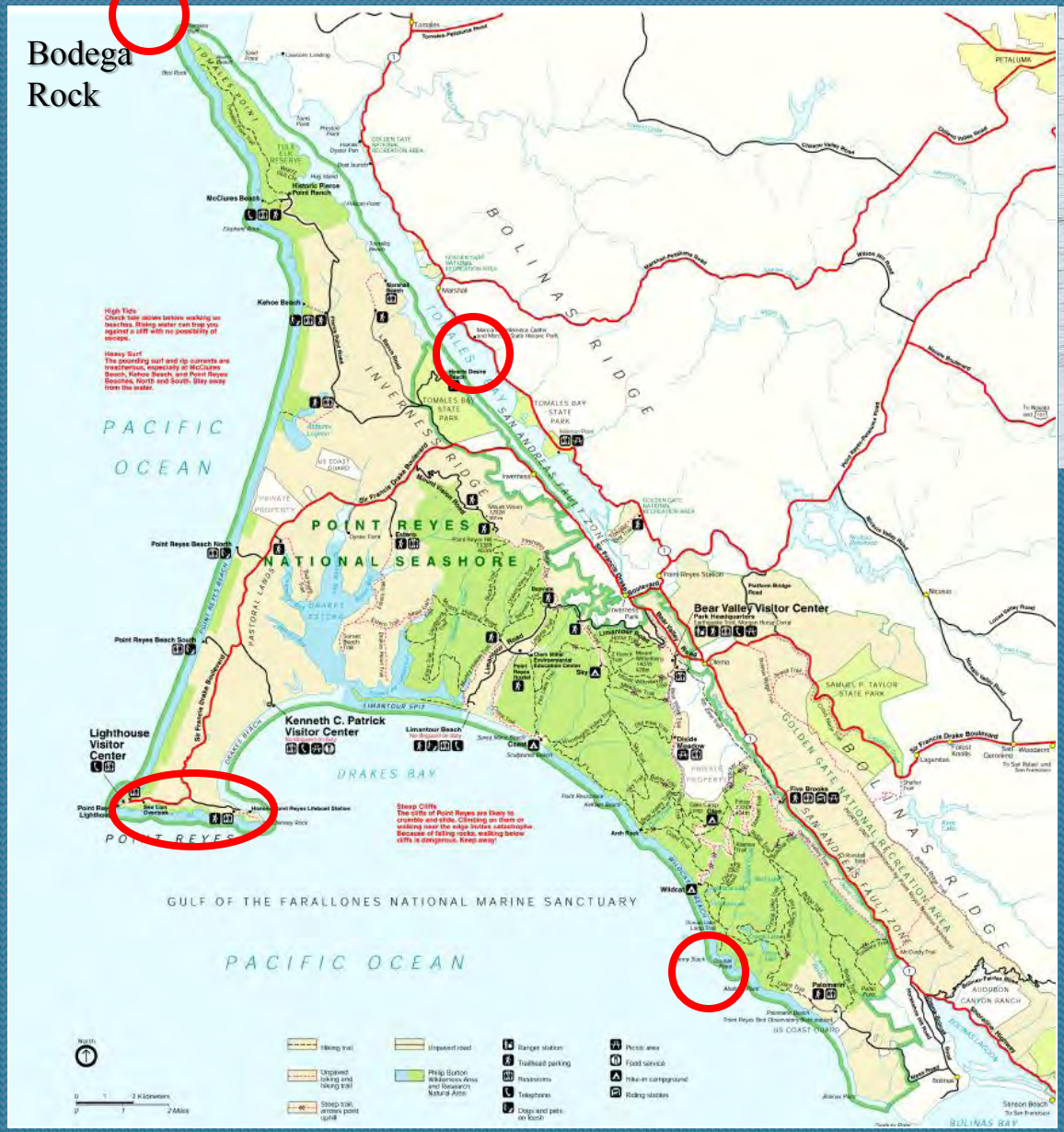
- Sexual dimorphic
- male @800 lbs
- female@ 250 lb

Males haul out in region in

fall-spring

NOAA NMFS SWFSC PRD

California Sea Lions – haul out sites

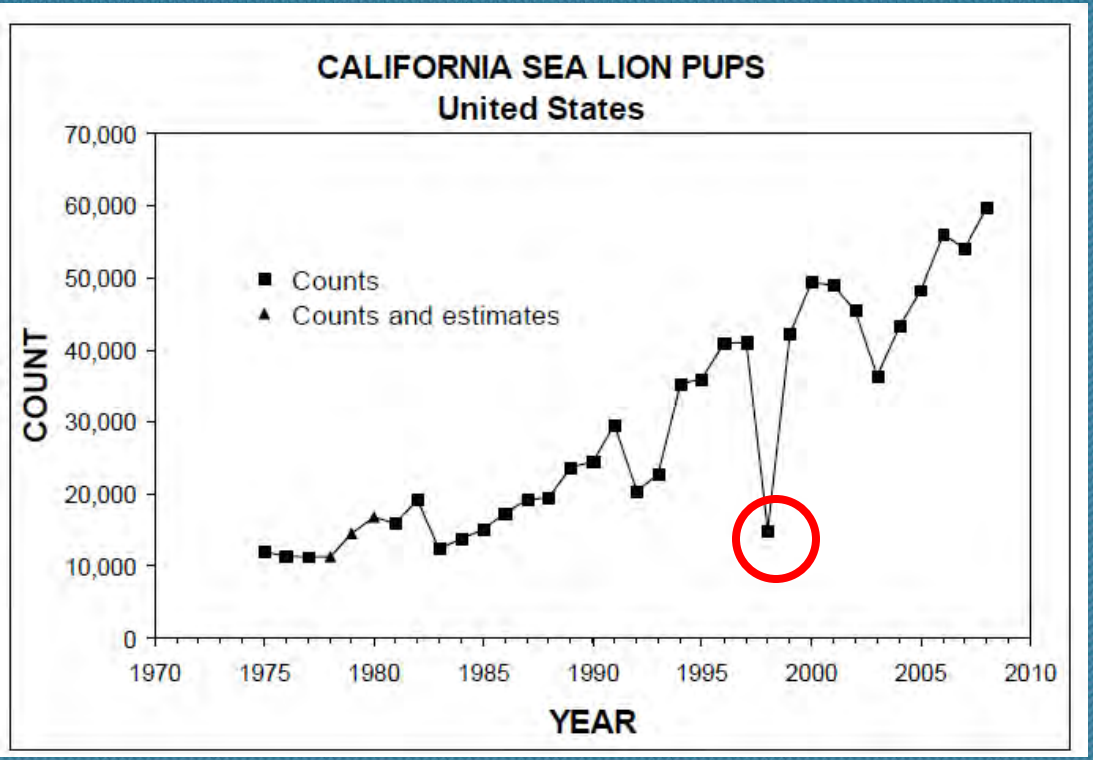


Picture from the web

= Seal Lion Sites

California Sea Lions

General Population Status and Trends



Population:

- *Growing at 5.4 %*
- *~ 153,337 - 296,750 in 2013*

NMFS Stock Assessment

Steller Sea Lion

Steller Sea Lions (*Eumetopias jubatus*)

Behavior

- Males roar like lion
- Mostly, non-migratory
- Haul out on rocky areas such as Bodega Rock, PRH
- Year round but low numbers

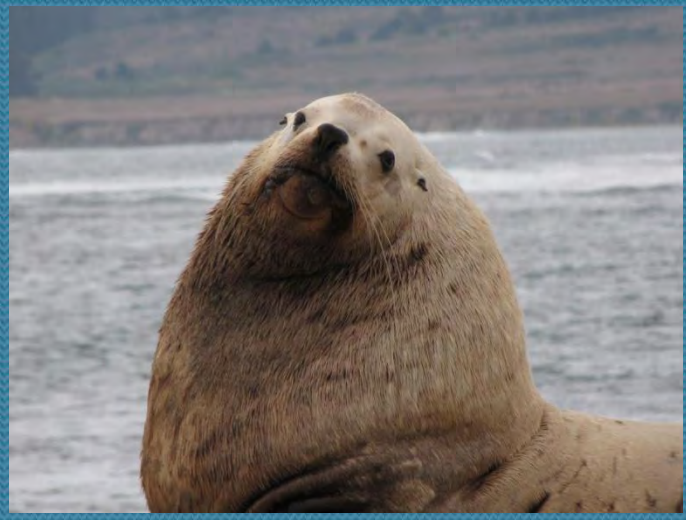
Breed

- May-June
- Farallon Islands, Año Nuevo & Fort Ross

Size

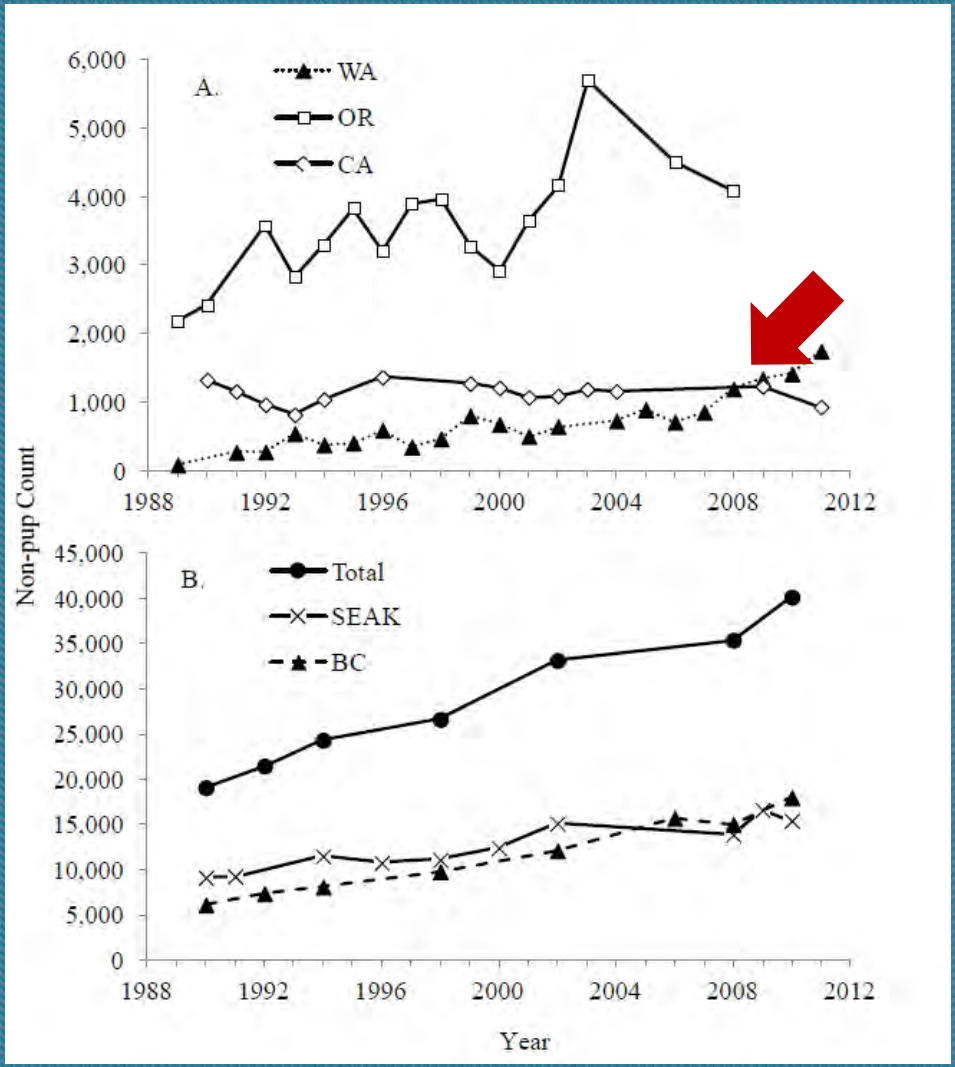
- Sexual dimorphism
- male-1500 lbs
- female-700 lbs

Steller Sea Lions



= Steller sea lion Sites

Steller Sea Lions



General Population Status and Trends

Population:

- *Declining – >50% in California*
- *Threatened*
- *~34,485-57,966 -2013 (US Stock)*
- *2,781 in California*

California Sea Lion

Steller Sea Lion

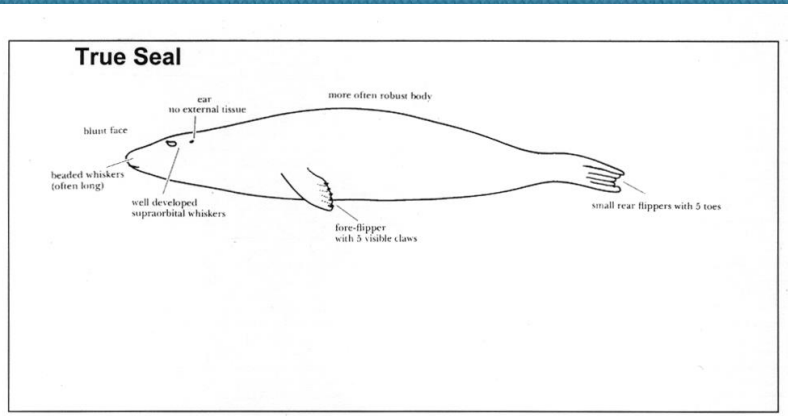
© Sophie Webb

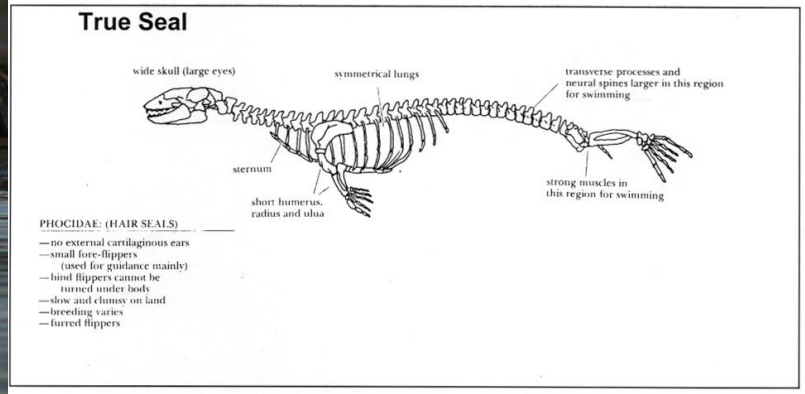
Phocidae

Northern Elephant seal (*Mirounga angustirostris*)

Harbor Seal (*Phoca vitulina*)

- **No external ear flap**
- **No articulated hips**
- **Short front flipper**





Phocidae

Harbor Seal

Northern Elephant Seal

Pacific Harbor Seals (*Phoca vitulina*)

Behavior

- Year round resident, individuals migrate
- Rest onshore almost every day
- Mostly eat small schooling fish

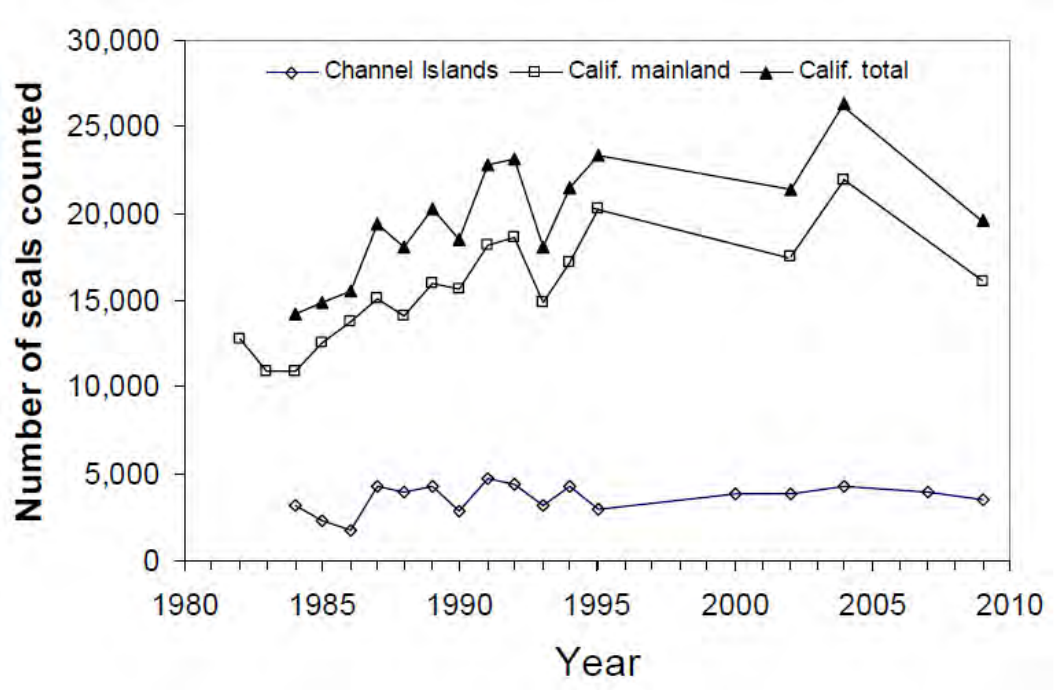
Breeding

- March-June
- @ 20% California mainland population breeds in Marin Co.

Size

- Little sexual dimorphism
- Adults 200-300 lbs

Harbor Seals



General Population Status and Trends

Population in 2011:

- *Stable*
- *30,196 + in CA*
- *@6,000 at Point Reyes*

Northern Elephant Seal *(Mirounga angustirostris)*

Behavior

- Longest migration (males - up to 14,000 miles total)
- Deep dives (males - over 5,000 ft)
- Eat bottom fish and pelagic squid
- Fast for up to 3 months during breeding season

Breed

- Winter Dec-March
- Farallon Islands, Año Nuevo & Point Reyes

Size extreme sexual dimorphism

- male-5,000 lbs
- female-900 lbs

Northern Elephant Seals Monitored at Point Reyes

Population:

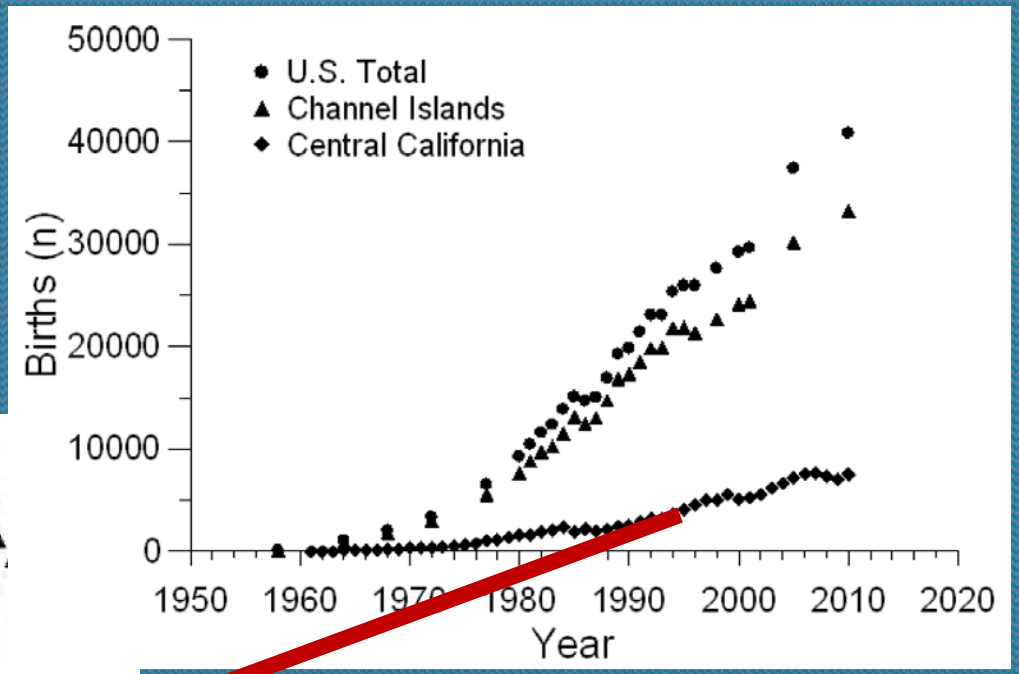
- Growing at 8.3%
- ~3,500 at Point Reyes

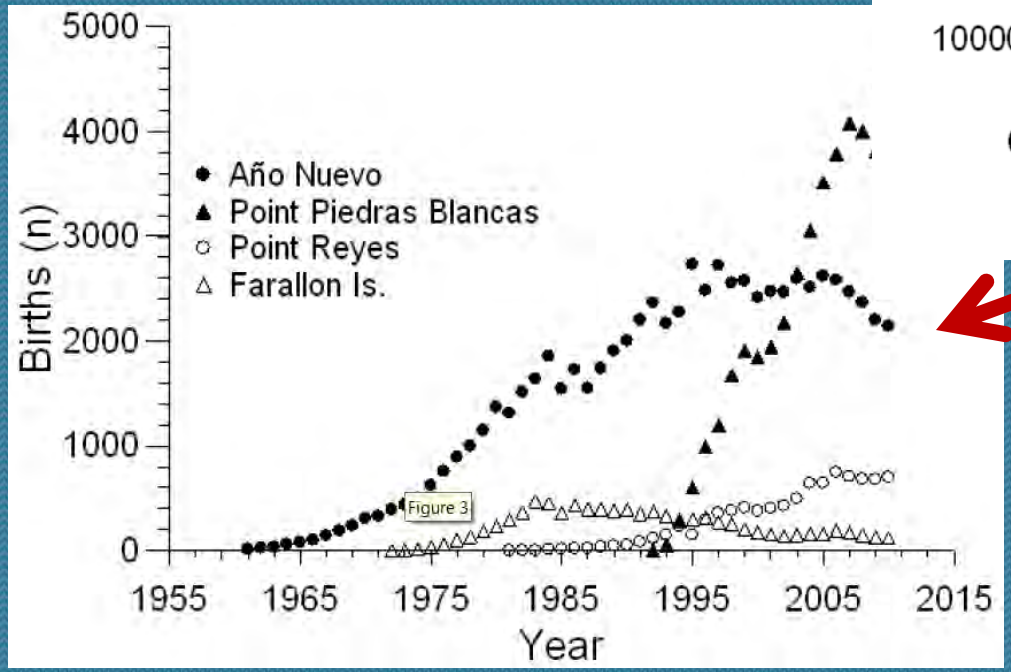
= Elephant Seal Breeding Sites

Elephant Seals – Population Recovery

Total population estimate 210,000 to 239,000

Growth rate per year 3.8% since 1988

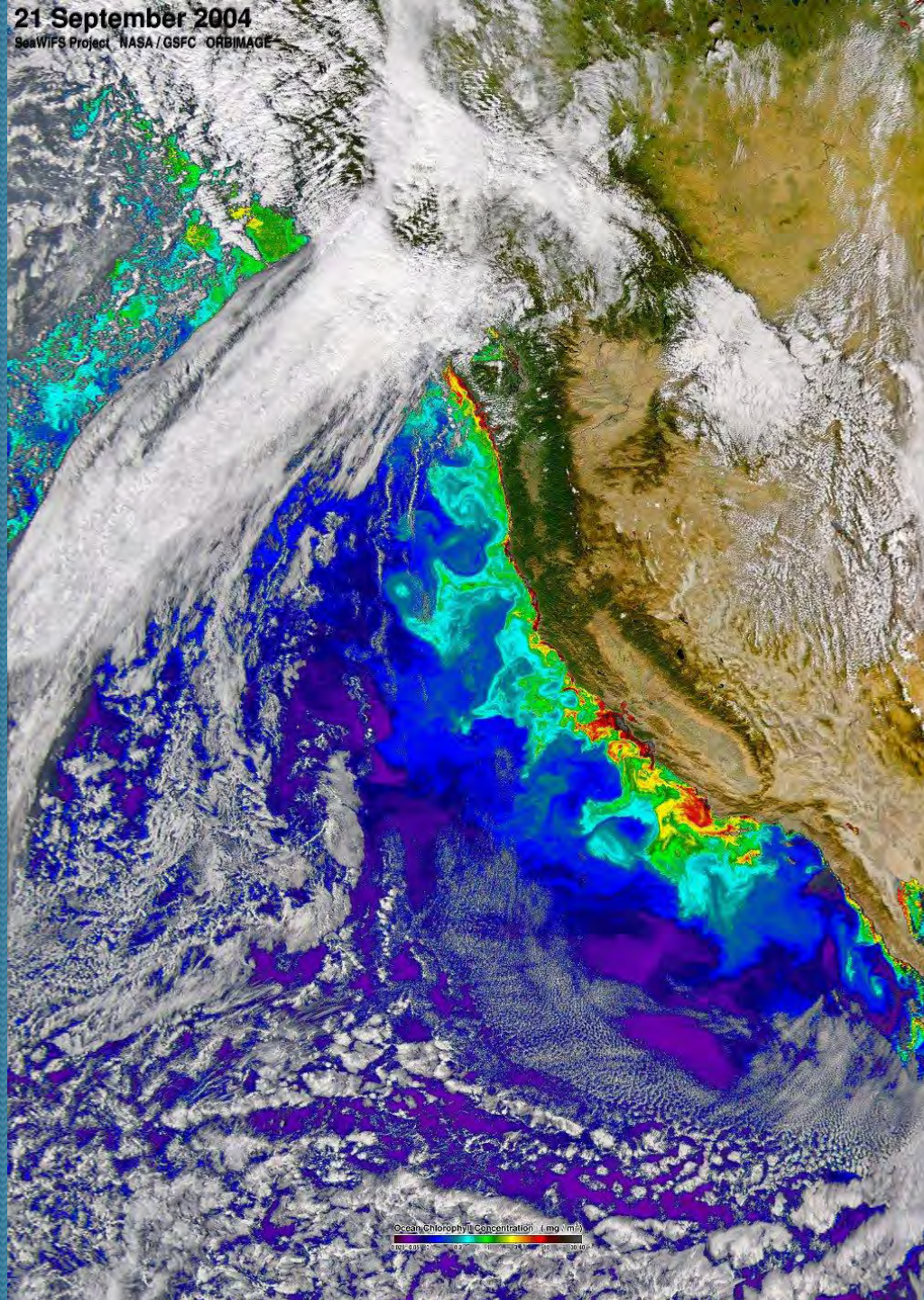




From Lowry et al. 2013

California Current

Ecosystem with
great diversity
of Marine Mammals and
Point Reyes is in the
center of the Current



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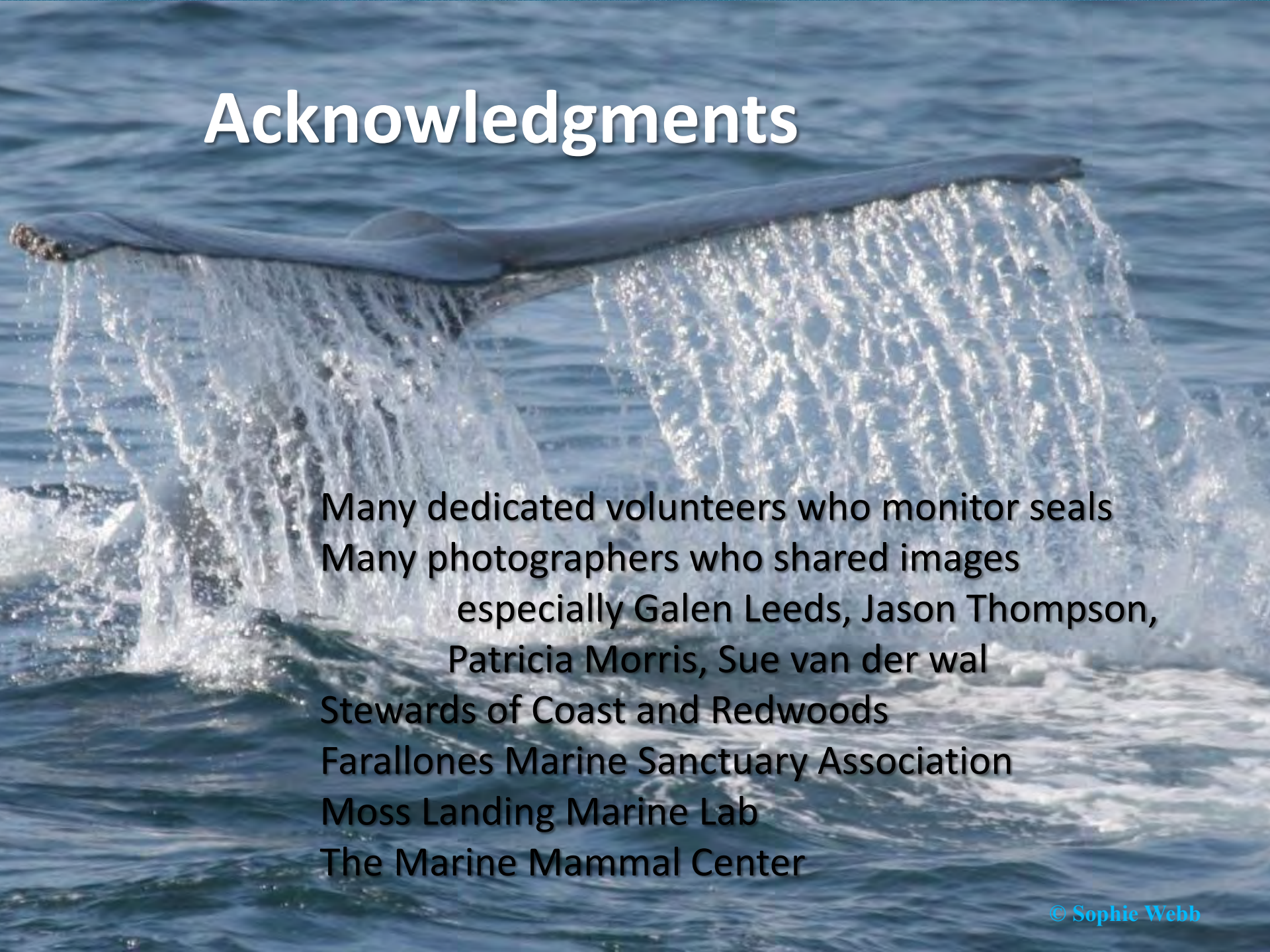


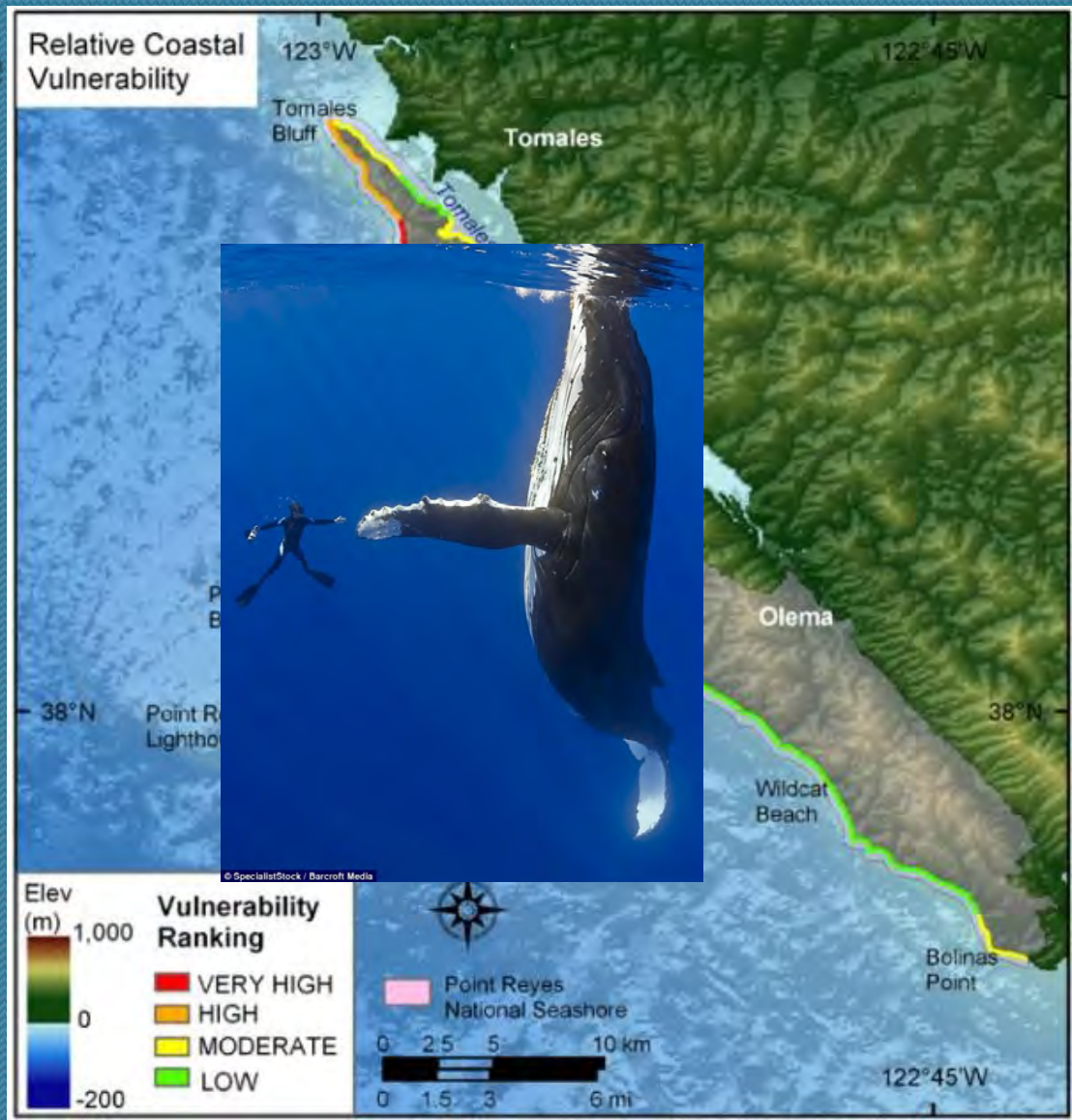
Many dedicated volunteers who monitor seals
Many photographers who shared images
especially Galen Leeds, Jason Thompson,
Patricia Morris, Sue van der wal
Stewards of Coast and Redwoods
Farallones Marine Sanctuary Association
Moss Landing Marine Lab
The Marine Mammal Center

© Sophie Webb

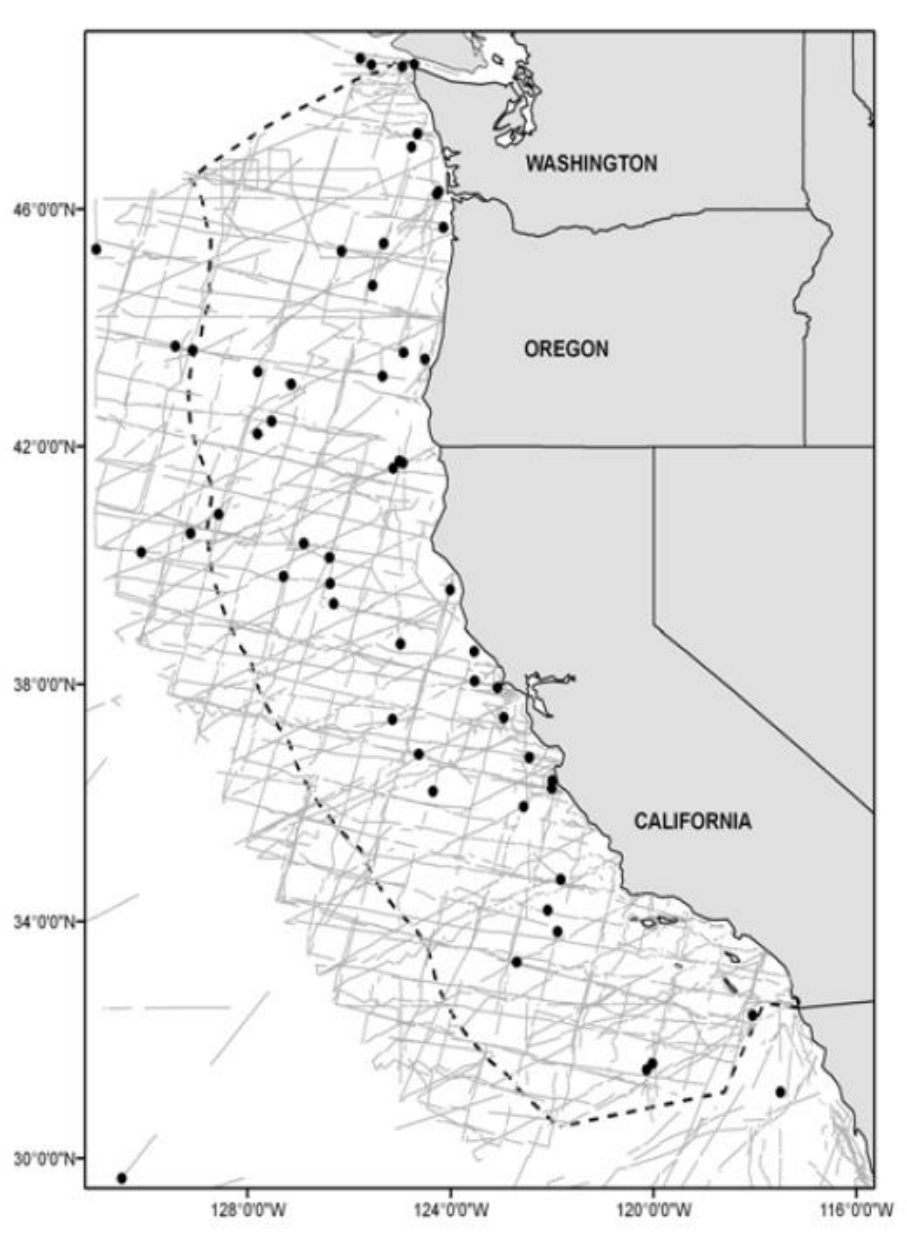
Climate disruption – predicted to….

- Higher sea level
- Higher air temperature
- More rain

http://coastalmap.marine.usgs.gov/



Offshore Ecotype



Population estimate
~240
Unknown
NOAA Listed as Depleted

From NOAA website

Beaked Whales

- Medium sized whales
- Deepest divers of all marine mammals
- Few teeth if any -suction feeders
- Eat mostly squid – teutophagous
- Particularly vulnerable to military sonar

DJ McSweeny