Dolphin tales: studying the who, when, and where of habitat use
Overview

• Toothed whale 101

• Habitat Use: Who, When, Where

• Technology for studying habitat use

• Applications
Dentition
Distribution
Habitat
National Marine Sanctuary System

- Olympic Coast
- Greater Farallones
- Cordell Bank
- Monterey Bay
- Papahānaumokuākea
- Hawaiian Islands Humpback Whale
- Channel Islands
- American Samoa (U.S.)
- Thunder Bay
- Stellwagen Bank
- Monitor
- Gray's Reef
- Florida Keys
- Flower Garden Banks

Scale varies in this perspective. Adapted from National Geographic Maps.
Social Structure
Communication

Whistles  Echolocation clicks  Burst pulses


Vaughn-Hirshorn et al. (2012) JASA
Bottlenose dolphins – open social network

Connor et al. 1999

www.britz.com
Signature whistles
Killer whales – matrilineal society

Shared calls

Filatova et al 2013 Behavioural Processes
Foraging strategies
Habitat Use: Who, When, & Where
Toothed whales play key roles in ecosystems.
Toothed whales are vulnerable to human activity
Dolphins are hard to study!
Habitat Use: Who, When, & Where
Digital acoustic recording tags (DTAGs)

- Sensors:
  - Pressure (depth)
  - 3-D movement
Tagging spotted dolphins

Silva et al. 2016 JASA
DTAG data

Whistle  Echolocation clicks  Breath
DTAG data
Habitat Use: Who, When, & Where
Passive acoustic monitoring

- Surveys 24/7
- Long-time scales
- Poor weather
- Less expensive
- Autonomous underwater vehicles

hydrophone
Ocean gliders are tools for habitat studies

DMON
Digital monitoring device

CTD
Conductivity, temperature, depth

Iridium satellite/GPS
Glider deployments
Stellwagen Bank National Marine Sanctuary

Map data – Mike Thompson (NOAA/SBNMS)

Stellwagen Basin

Cape Cod Bay
Spatial distribution

Map data – Mike Thompson (NOAA/SBNMS)
Temporal distribution

% Files with detections

11/2  11/16  11/30  12/14  12/28  1/11  1/25  2/8  2/22

69%  95%  31%
Acoustic identification of species

Atlantic white-sided dolphins

*Lagenorhynchus acutus*

Common dolphins

*Delphinus delphis*

broken glider whistles

sinusoidal glider whistles

0 2 0 2 0 2 0 2 0 2 0 2 0 2

0 2 0 2 0 2 0 2 0 2 0 2 0 2

0 2 0 2 0 2 0 2 0 2 0 2 0 2

0 2 0 2 0 2 0 2 0 2 0 2 0 2
Applications

http://www.listenforwhales.org

Parks et al. 2011
Summary

• Dolphin species are abundant and highly diverse.

• Habitat use studies are important for understanding and managing ecosystems and mitigating human activities.

• Technology is increasing our ability to study dolphins and their habitat use.
More Information

• NOAA Dolphins and Porpoises Species Cards  
  https://www.fisheries.noaa.gov/dolphins-porpoises

• Discovery of sound in the sea (DOSITS)  
  https://dosits.org/

• Watkins Marine Mammal Sound Database  
  http://cis.whoi.edu/science/B/whalesounds/index.cfm

• Orcasound  
  http://www.orcasound.net/

• Robots 4 Whales  
  http://dcs.whoi.edu/
Educational Resources

- NOAA Alaska Fisheries Science Center Elementary Killer Whale Curriculum
  - [https://www.afsc.noaa.gov/education/Activities/springer_curriculum.htm](https://www.afsc.noaa.gov/education/Activities/springer_curriculum.htm)

- NOAA Fisheries Killer Whale activities

- NOAA Fisheries - Killer Whale Fin matching activity

- Channel Islands National Marine Sanctuary Marine Mammal Sightings Database
  - [http://www.cisanctuary.org/mammals/](http://www.cisanctuary.org/mammals/)

- Sarasota Dolphin Research Program
  - [http://www.sarasotadolphin.org/educational-programming/school-curricula/](http://www.sarasotadolphin.org/educational-programming/school-curricula/)