Studying Wild Dolphins

Studying dolphins in their **natural homes**  can help scientists to learn a lot about how they **live**, how they **talk**  to each other and how we can help to **protect** them. But, studying dolphins in the wild can be **hard** because many dolphins live **way out in the middle of the ocean**  where it is hard for humans to go.

To study dolphins out in the **ocean**, scientists often spend a long time living on big **research ships**.  These ships can spend **weeks**  away from land so that scientists can **go** to where the dolphins are. Scientists use **big binoculars**  to find dolphins at sea and once they find dolphins, they can study them by **watching what they do** and taking **videos**  and **photographs**  of them. But, watching dolphins can be **difficult** because dolphins spend a lot of time **out of sight**  **under water**,  they can be **hard to get close to**, and it is very hard to see dolphins in **bad weather**  and when it is **dark** out. 

How do we study animals that are hard to see??

Luckily, many dolphins are very **noisy**  – they use sound to **talk**  to each other and they also make sounds that **bounce off things**  around them. They listen to those **echoes**  and that way they can **hear** what is close by. This is called **echolocation** and is the next best thing to **seeing**  **when there is no light**. Because dolphins use **sound**  so much, scientists can use underwater microphones  called **hydrophones** to **listen**  to dolphins and **learn** from them that way.

Scientists use a lot of different kinds of hydrophones. Some hydrophones are on *short cables* and can be held over the side of a boat.  These are called **dipping hydrophones**.

Some hydrophones are on very long cables and are *pulled behind a boat*  so that scientists can listen as they *travel*. These are called **towed hydrophones**.

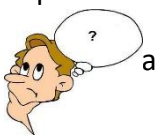
Towed and dipping hydrophones are both attached to a *computer*  on the boat and scientists *record* 

the sounds onto that computer.

Some hydrophones and recorders *sit on the bottom of the ocean*  and make recordings for  *days, months or even years!* Scientists have to go and *pick up* these hydrophones and recorders again so they can *listen to and look at* the recordings **(see the 'Looking at Sound' Dolphin Speak video and study guide to learn more about that)**. These are called **autonomous recorders**.

Some hydrophones *float*  in the ocean and send sounds to a recorder on land or a ship using *radio waves*.  These are called **sonobuoys.**

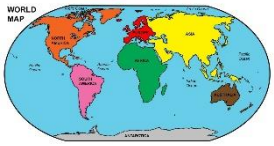
Some hydrophones sit on the *seafloor* are connected to a recorder on *land* by a *long cable*.  These are called **cabled hydrophones** and sometimes you can listen to them *live online!*  The **Station ALOHA cabled observatory (ACO)** is on the seafloor north of  *Oahu, Hawaii*. It has a cabled hydrophone that you can *listen*  to online at: *http://aco-ssds.soest.hawaii.edu/audio1.html*.

When deciding what kind of hydrophone and recorder to use, a scientist needs to ask a lot of **questions**. They think  about questions like….

- what kinds of sounds do I want to record?
- where in the ocean do I want to record? 
- how long  do I want to record for?
- what questions do I want to study by making these recordings?
- how much money  do I have to spend?

Scientists can study a lot of different **questions** using acoustic recordings. 

They can study questions like….

- what do different kinds of dolphins sound like?
- what do dolphins sound like in different parts of the ocean? 
- how far  do sounds produced by dolphins travel?
- how do dolphins communicate and what are they talking about?
- do dolphins do different things at different times of the day or different times of the year? 
- how many dolphins are there in one part of the ocean? 
- do dolphins react to sounds that humans put into the ocean?
- can YOU  think of some other questions that scientists could study using acoustic recordings?

Some things for you to think about…

- What are some questions that *you would like to ask* about dolphins? *How* do you think you could study those questions?
- Do you think you would like to *live on a ship* for weeks or months?  What do you think *you would like* about it? What *wouldn't you like*?

Here are some cool websites that talk about doing research on dolphins at sea…

- All about a *research cruise around the Hawaiian Islands* run by the National Oceanographic and Atmospheric Association (*NOAA*):  https://www.pifsc.noaa.gov/hiceas/storymap/index.html
- Some *questions from students like you*  about studying dolphins at sea and *answers from scientists*: https://www.fisheries.noaa.gov/pacific-islands/question-week-dolphins-and-whales-high-seas
- A *blog* all about a *research expedition to Antarctica* led by the *Woods Hole Oceanographic Institution*: http://goship2016-i08s.blogspot.com/ 
- All about the *marine mammal acoustics program* at the *Southwest Fisheries Science Center*, California (and *links to sounds*  recorded from marine mammals!): https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=148&id=1244
- How sound is used to estimate *marine mammal abundance* (how many marine mammals there are in an area): https://dosits.org/people-and-sound/investigate-marine-animals/how-is-sound-used-to-estimate-marine-mammal-abundance/ 

- How sound is used to study **marine mammal distribution** (where marine mammals are found): https://dosits.org/people-and-sound/investigate-marine-animals/how-is-sound-used-to-study-marine-mammal-distribution/

- **The right whale listening network** – radio-linked hydrophones that detect sounds made from right whales and let ships know when right whales are nearby. This helps to **prevent right whales from being hit by ships!** http://www.listenforwhales.org/Page.aspx?pid=430

Here are some more hydrophones you can listen to live online:

- **OrcaSound** - Killer whales in the Salish Sea: http://listen.orcasound.net/Home.aspx
- **OrcaLive** - Killer whales off of British Columbia, Canada: http://www.orca-live.net/community/index.html

- **The Jupiter Foundation** – live humpback whales off of Hawaii when they are there in the winter and recordings of humpback whales: http://jupiterfoundation.org/

- **Monterey Bay Aquarium Research Institute** - Cabled hydrophone in deep water off Monterey Bay: https://www.mbari.org/hydrophone-stream-release/
- **Listening to the Deep Ocean (LIDO)** Links to deep ocean hydrophones all over the world: http://listentothedeep.com/acoustics/index.html

! REMEMBER: these live links **only broadcast**  **marine mammal sounds** when these animals **are around the hydrophones**. 

A lot of the time there will be **no marine mammals to be heard.** You may need to be **patient** to detect one.