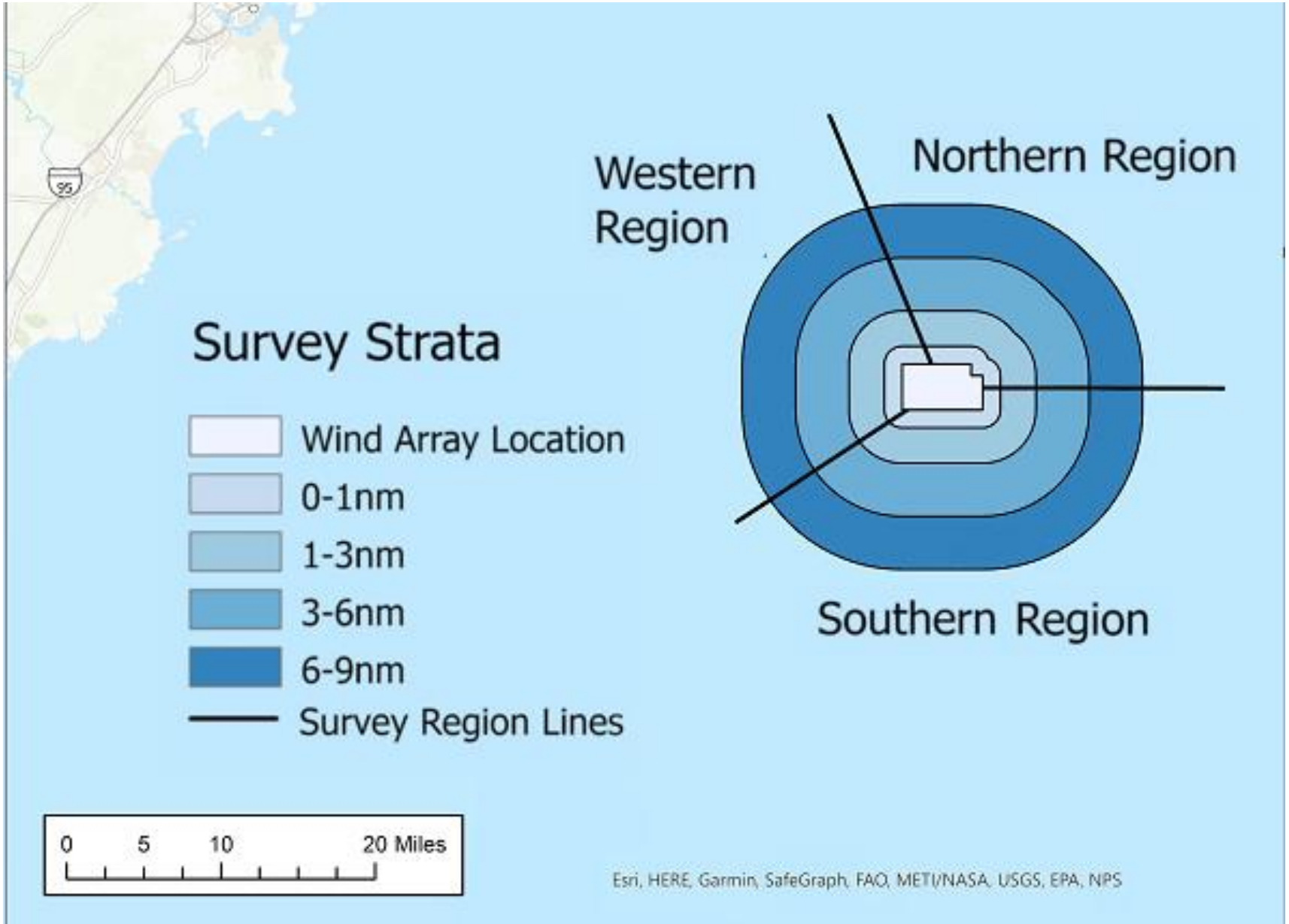
DMR Research Array Survey Plans

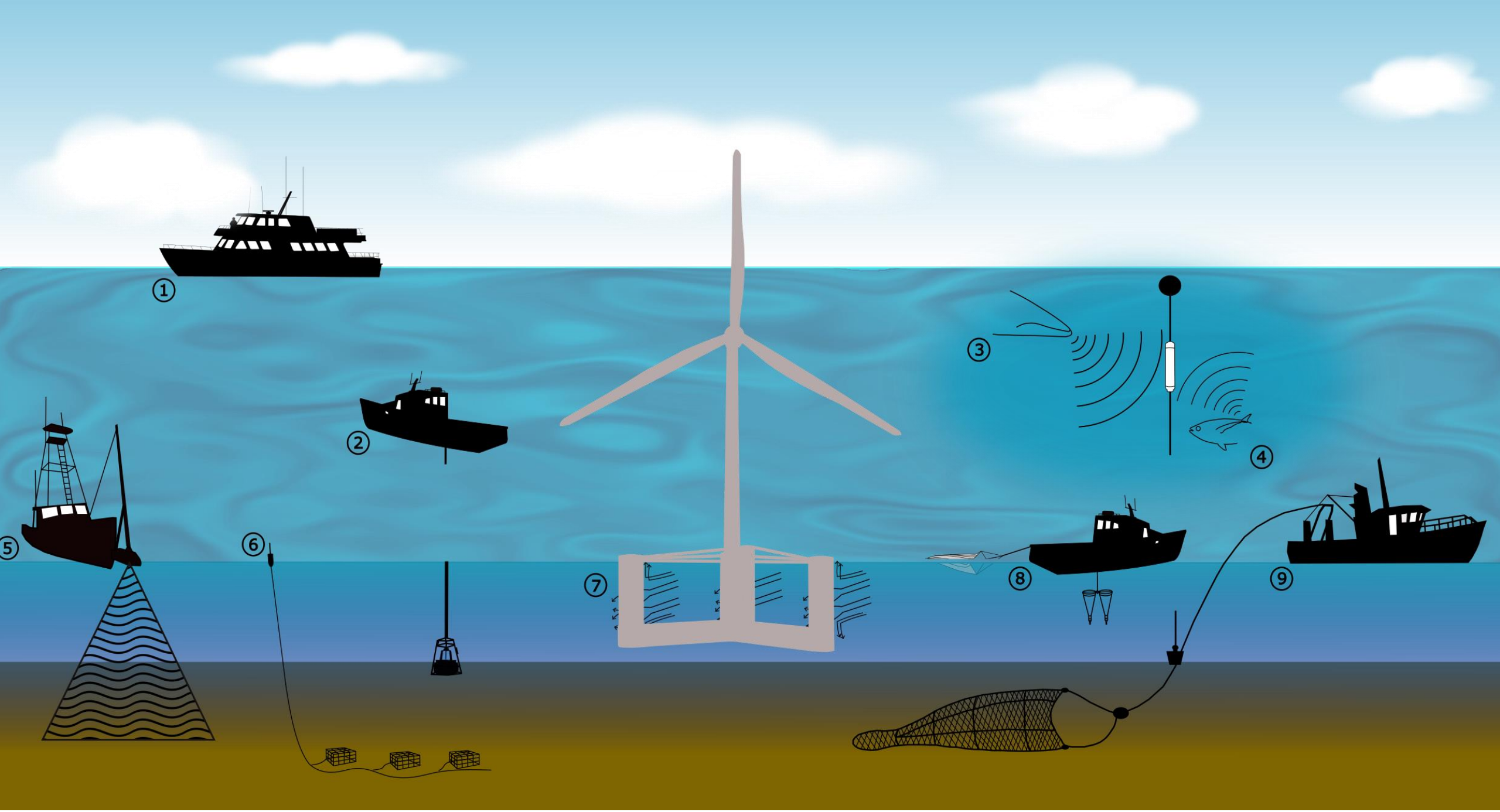
- **Trying to set up a framework for understanding impacts to the whole ecosystem**
  - **Setting up surveys to measure causal links**
- Align with developer survey plans where possible
- Work with industry vessels where possible
- Work with partner organizations where possible

DMR Research Array Survey Plans

- **Additive to permitting requirements, based on recommendations of Offshore Wind Roadmap Fisheries Working Group**
- **Similar work to other surveys being conducted in the Gulf of Maine already, with higher intensity**
- **Subject to same permitting and consultation requirements that any similar survey work would be**

Before-After-Gradient Design

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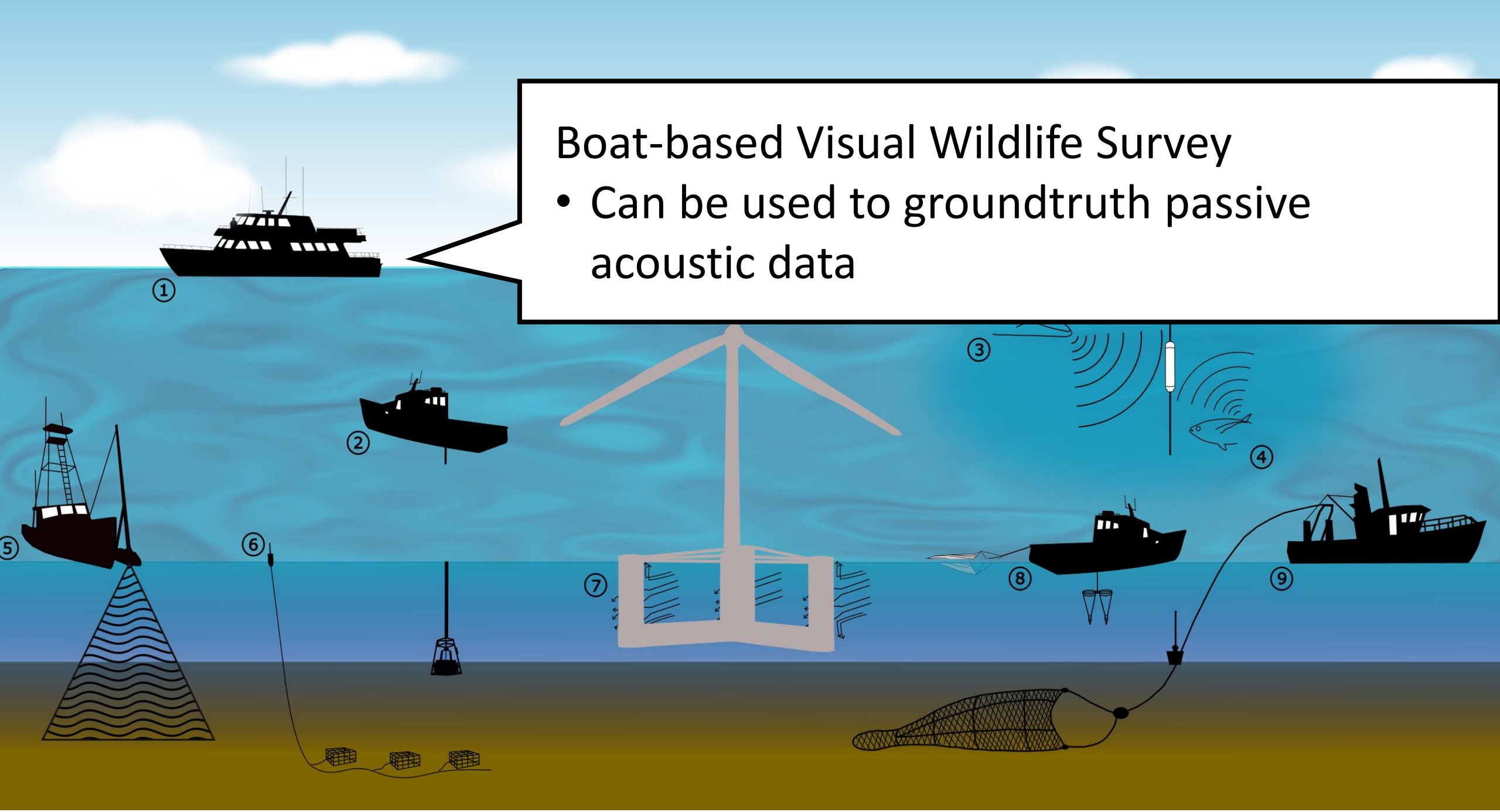
Boat-based Visual Wildlife Survey
• Can be used to groundtruth passive acoustic data
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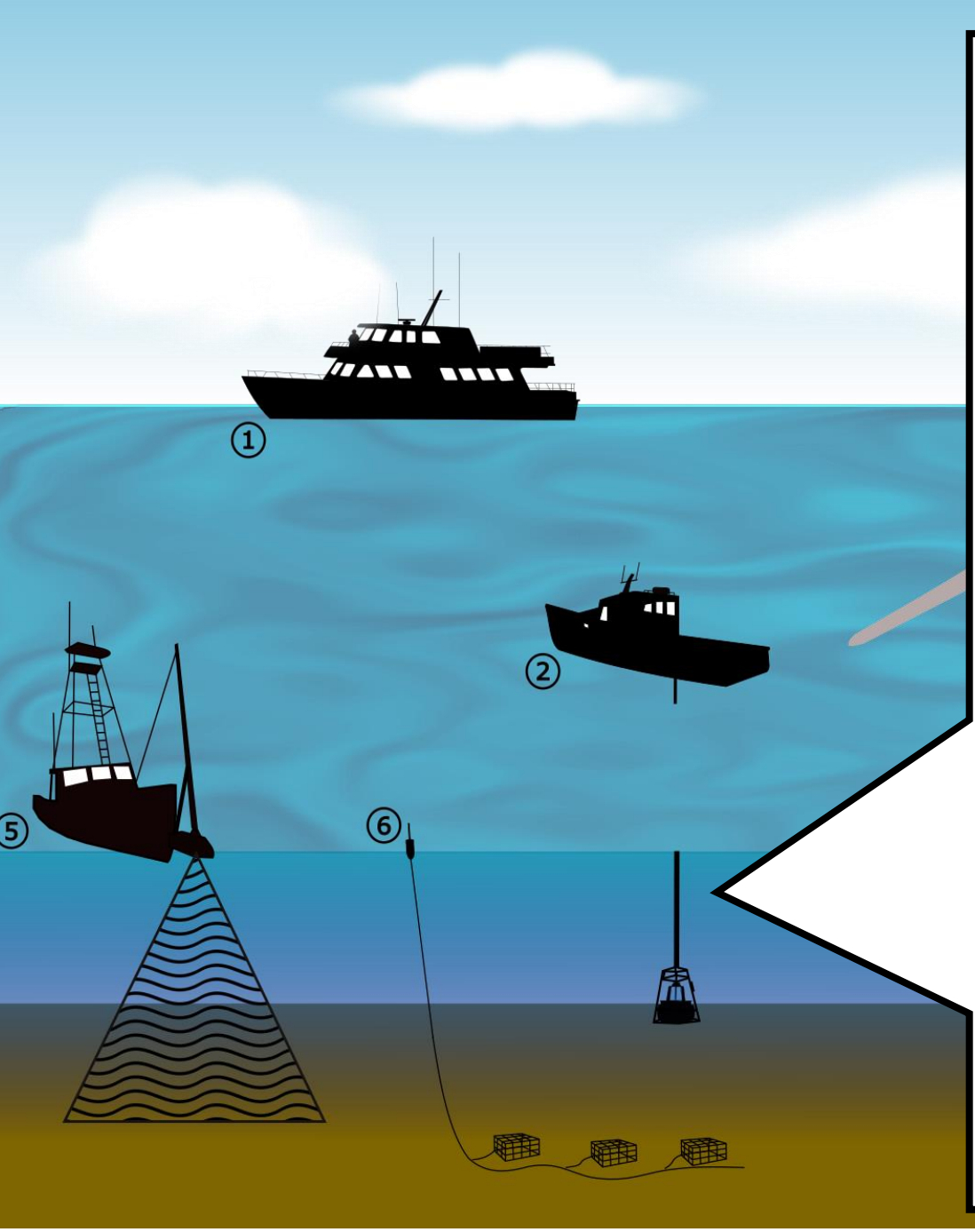
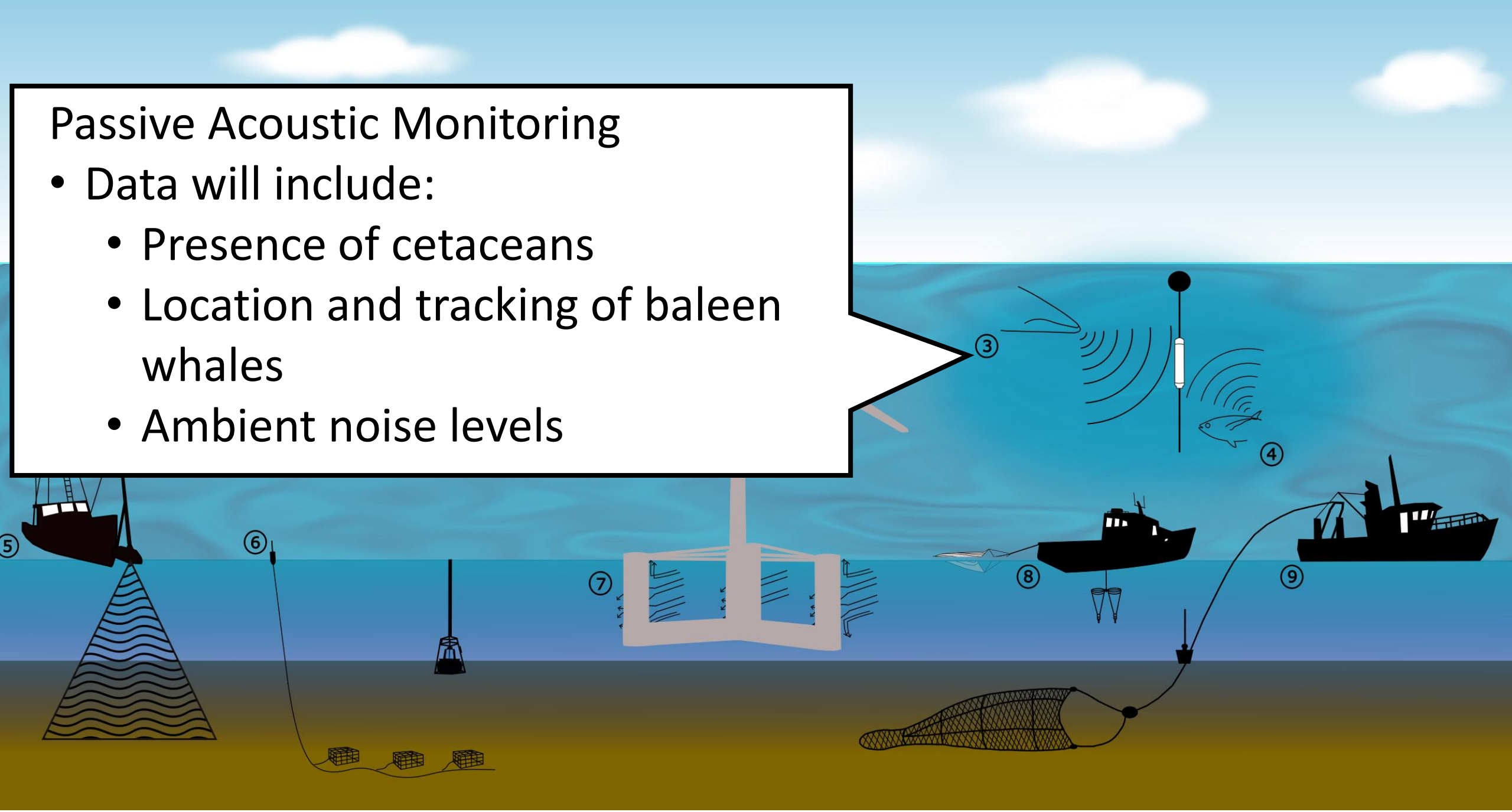


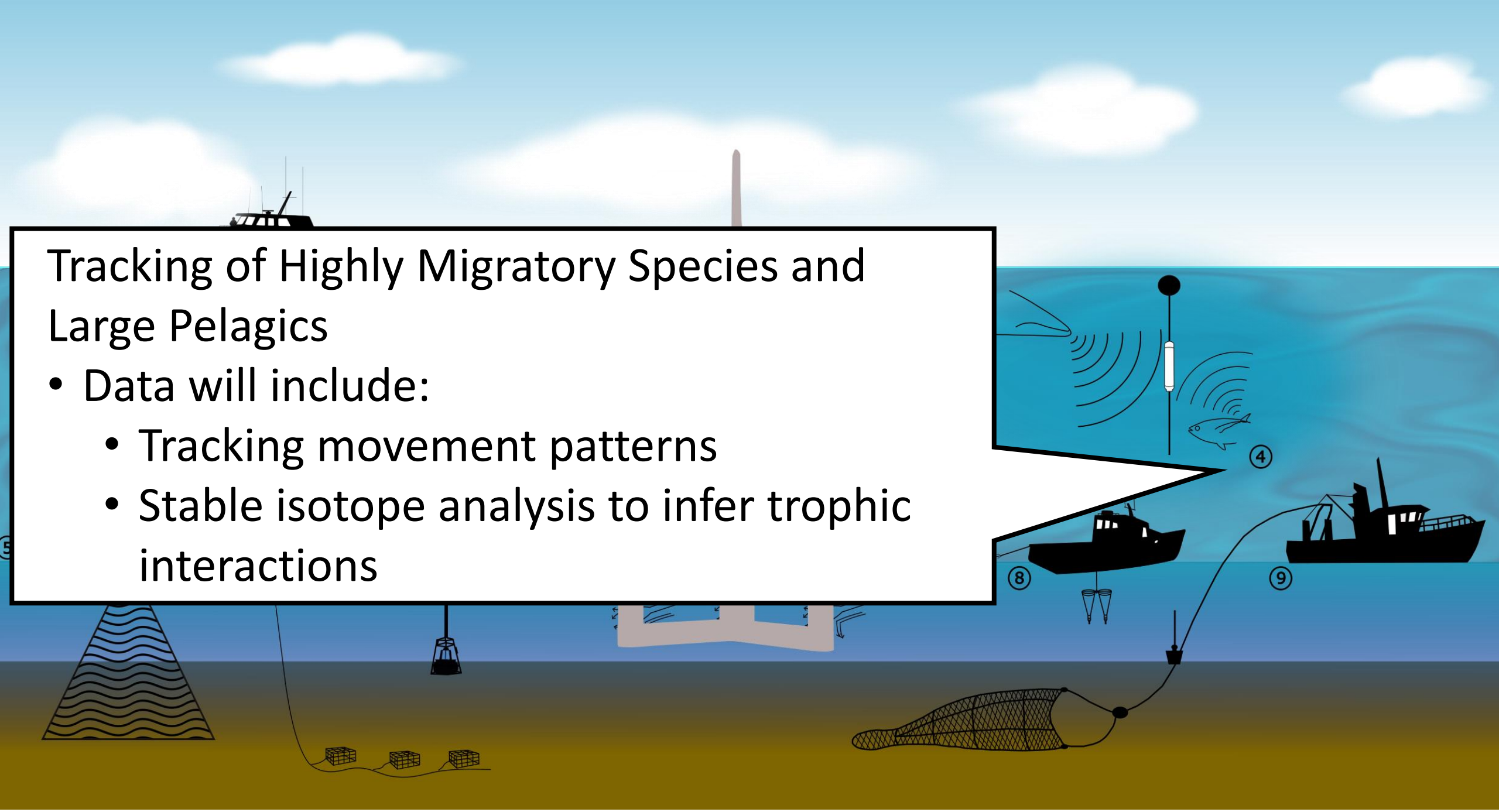
Seafloor Habitat Characterization and Benthic Sampling

- Multibeam mapping surveys to compile images of bottom habitat of entire area
- Benthic grab sampling data will include:
  - Water column profiles
  - Average seafloor values for temperature, pH, chlorophyll, dissolved oxygen, and salinity
  - Surficial sediment information
  - Seafloor video
  - Benthic species identification

Passive Acoustic Monitoring

- Data will include:
  - Presence of cetaceans
  - Location and tracking of baleen whales
  - Ambient noise levels



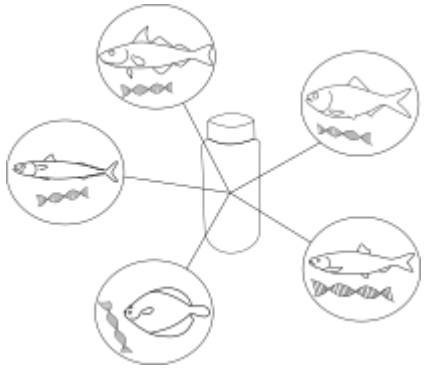


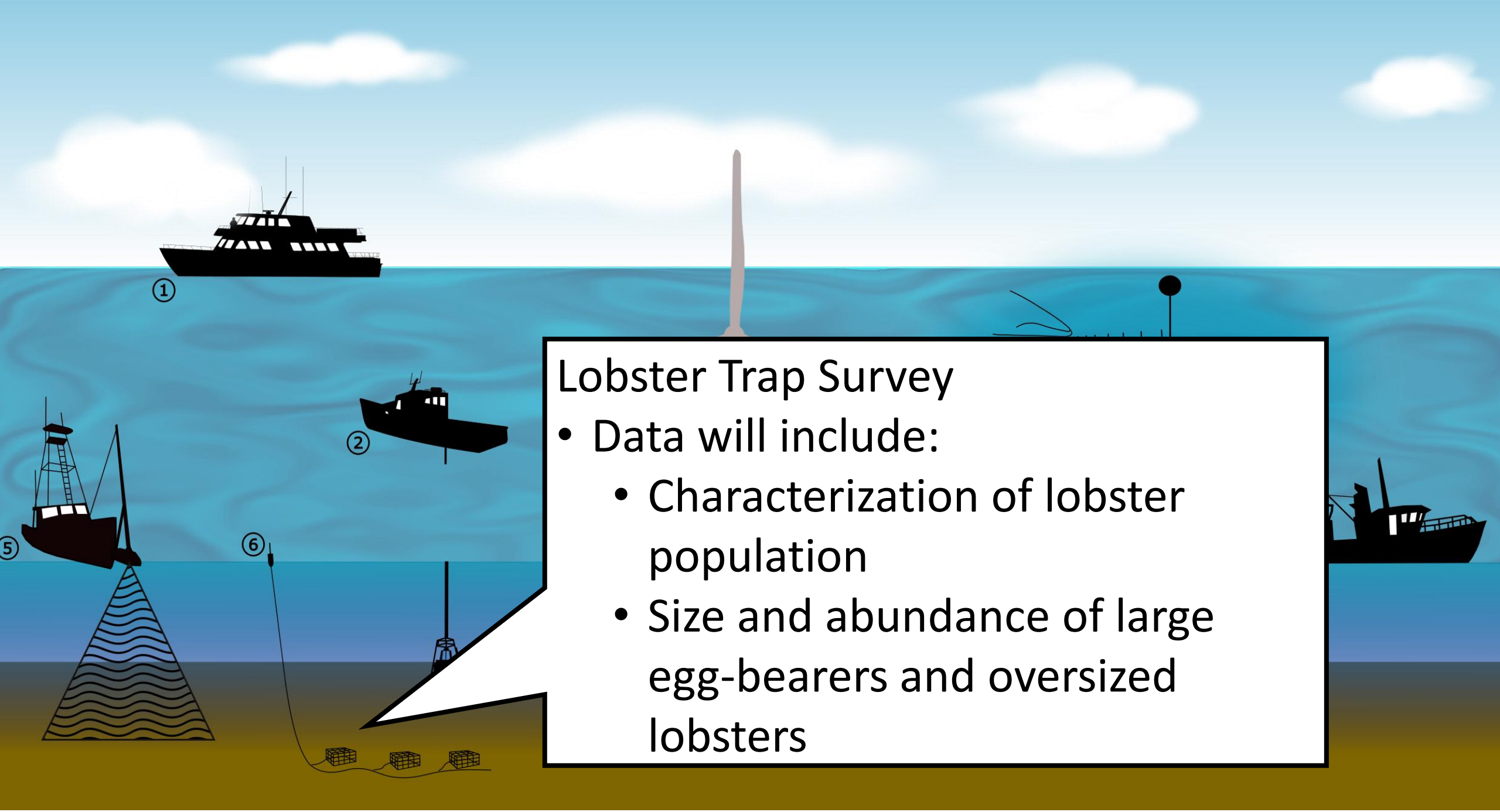
Tracking of Highly Migratory Species and Large Pelagics

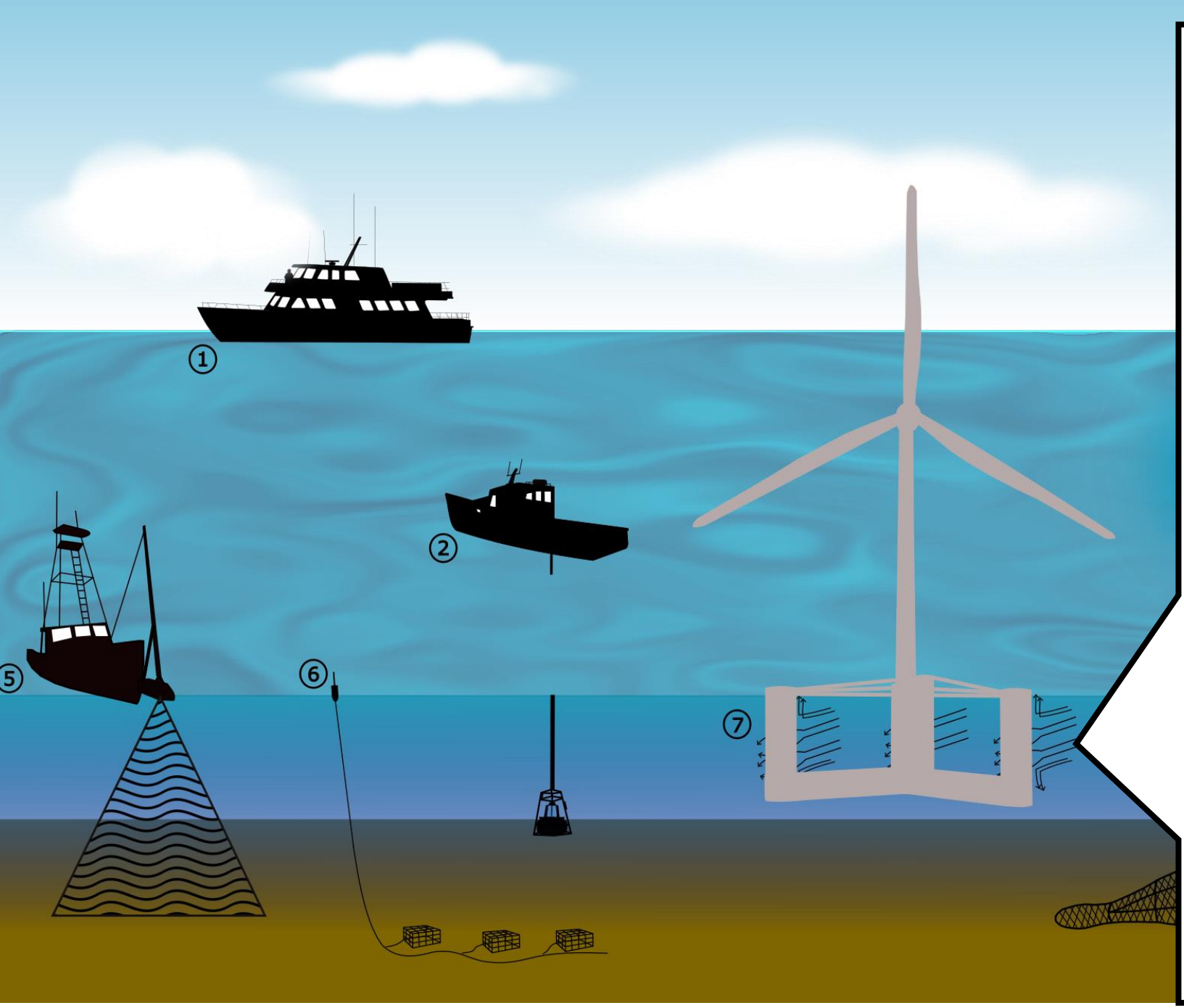
- Data will include:
  - Tracking movement patterns
  - Stable isotope analysis to infer trophic interactions

Active Acoustic Survey

- Data will include:
  - Pelagic fish schools
  - Demersal fish biomass
  - Invertebrate biomass
  - Depth of the biological maximum
  - Size-spectral analysis of pelagic community
  - Water samples for eDNA to groundtruth acoustic signals




Lobster Trap Survey
• Data will include:
• Characterization of lobster population
• Size and abundance of large egg-bearers and oversized lobsters

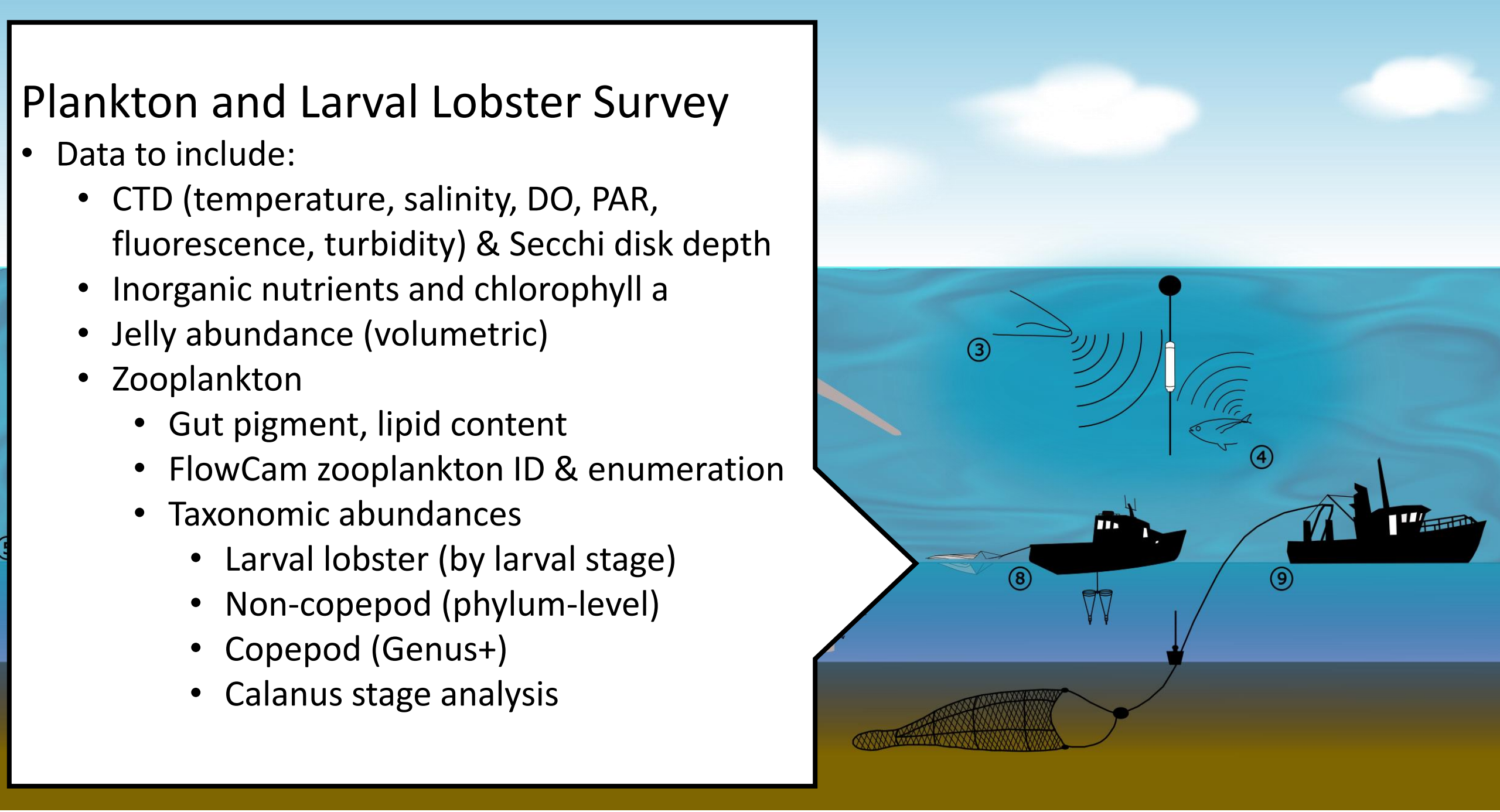


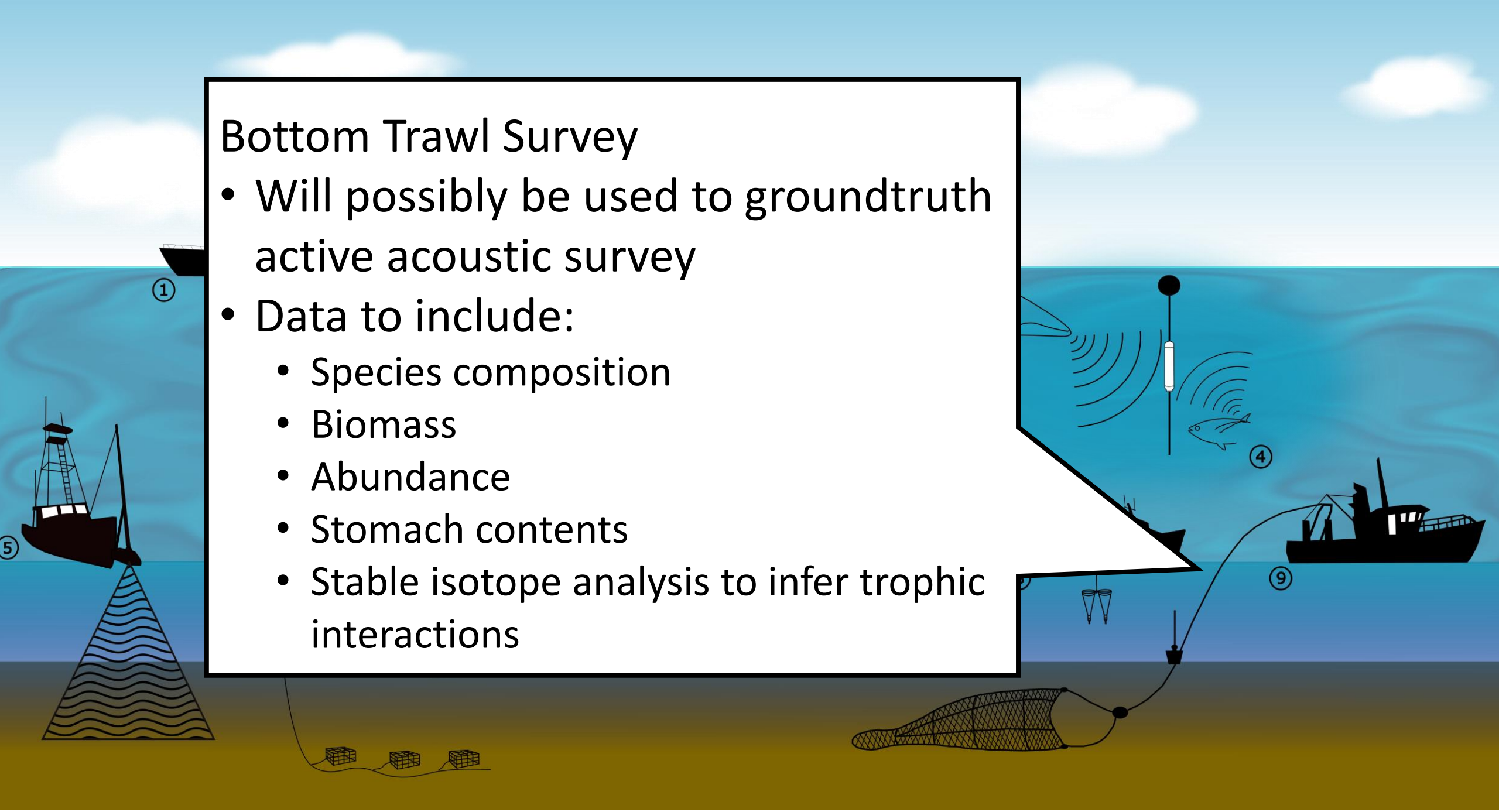
Oceanographic Surveys

- Continuous data collected by shore-based radar stations to include:
  - Surface water velocity
  - Winds
- Continuous data collected by underwater gliders to include:
  - Physical oceanographic, biogeochemical, and biological data
  - Temperature
  - Salinity
  - Velocity
  - Chlorophyll concentration
  - Suspended particulate concentration

Plankton and Larval Lobster Survey

- Data to include:
  - CTD (temperature, salinity, DO, PAR, fluorescence, turbidity) & Secchi disk depth
  - Inorganic nutrients and chlorophyll a
  - Jelly abundance (volumetric)
  - Zooplankton
    - Gut pigment, lipid content
    - FlowCam zooplankton ID & enumeration
    - Taxonomic abundances
      - Larval lobster (by larval stage)
      - Non-copepod (phylum-level)
      - Copepod (Genus+)
      - Calanus stage analysis





Bottom Trawl Survey

- Will possibly be used to groundtruth active acoustic survey
- Data to include:
  - Species composition
  - Biomass
  - Abundance
  - Stomach contents
  - Stable isotope analysis to infer trophic interactions

Ecosystem Modeling

- Will create a framework for modeling connections between resources and conditions to measure any changes that may arise from the construction and/or operation of wind turbines

Participatory Mapping and Local Historical Knowledge Interviews

- Will gather information on how fishers have used the area proposed for the research array over generations and how they relate to ocean spaces