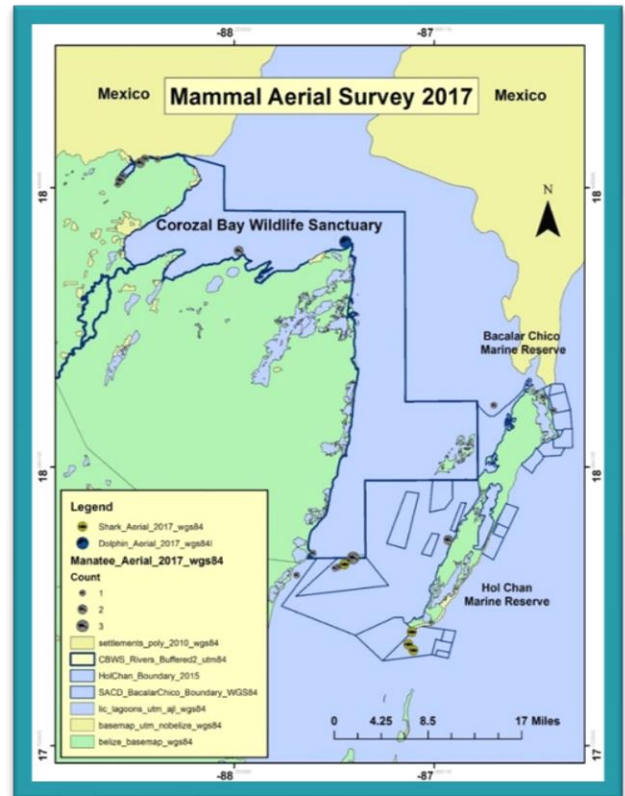


Methodology for Manatee Monitoring

Aerial Surveys:

Conducted once a season if possible (with 3 replicated each). If not possible, conduct at least once a year.

1. Each survey follows a pre-planned route.
2. The survey flight should be at 150 m above the sea level, 400 m parallel from the coastline, and traveling at 180 km/h.
3. Each observer scans a 400m wide transects.
4. The survey team consists of two observers (one on each side of the plane), and two recorders, working as two teams.
5. Each recorder has a GPS and a clipboard/paper to record the observations of the observer.
6. As a manatee is spotted, the observer reports the sighting to the recorder, who marks the point on the GPS and notes the waypoint number and sighting information.
7. The data is entered and saved into an Excel file, and the points are mapped using ARCGIS.



Resting Holes:

1. Reduce the engine power 1.6 km from the hole, and idle until near enough to turn off engine.
2. Ensure that the boat is stopped at least 50 m from the hole and lay anchor.
3. The date, name of recorders, weather conditions, are recorded.
4. When an observer sees a manatee, this should then be confirmed by another member of the team and the data should be recorded.
5. The observation should last 30 minutes.
6. If no manatee is observed, go with the boat to the resting hole and collect water parameters with the YSI (salinity, temperature, dissolved oxygen and pH) at 1 m water intervals.
7. If a manatee is observed, DO NOT enter the hole to obtain further information.



Opportunistic Sighting:

1. If an opportunistic sighting should take place during a patrol or a research and monitoring trip, stop the boat and observe its behavior.
2. Record the following info: recorder, GPS coordinates, weather conditions, number of individuals, size, condition, and behavior. Also note if there are any visible scars.
3. Data collected is save in the SMART and is analized using ARCGIS.



Drone Monitoring:

Drone surveys are conducted to monitor manatees at identified resting holes in CBWS. This survey is conducted seasonally where feasible. Each survey should include Resting Holes 1, 2, 3, and 4 depending on weather conditions.

1. Reduce engine power 1.6 km from the hole, and idle until 500m from hole. Turn off engine and anchor the vessel.
2. The drone operator should program the drone to fly the set route over the resting hole, and then hover for at least 10 minutes at an altitude of 50 meter above the resting hole. There may be a need to change or vary this height during the survey.
3. A recorder should be present with a clipboard, pen/pencil and paper to take notes.
4. An observer should always follow the drone with binoculars once it's on flight and keep updated the pilot on the actual position of the drone.
5. If a manatee is seen during the survey by the pilot, the pilot should observe the manatee and describe to the recorder. If the manatee leaves the resting hole, the pilot should follow the manatee at a height of no less than 15 meters to observe the direction and behaviour.
6. Review footage within a week of the survey to check for manatees and record the number of manatees sighted, behaviour and the age if possible (adult, juvenile, or calf).

