Sampling Protocol for Projects in Public Oyster Areas

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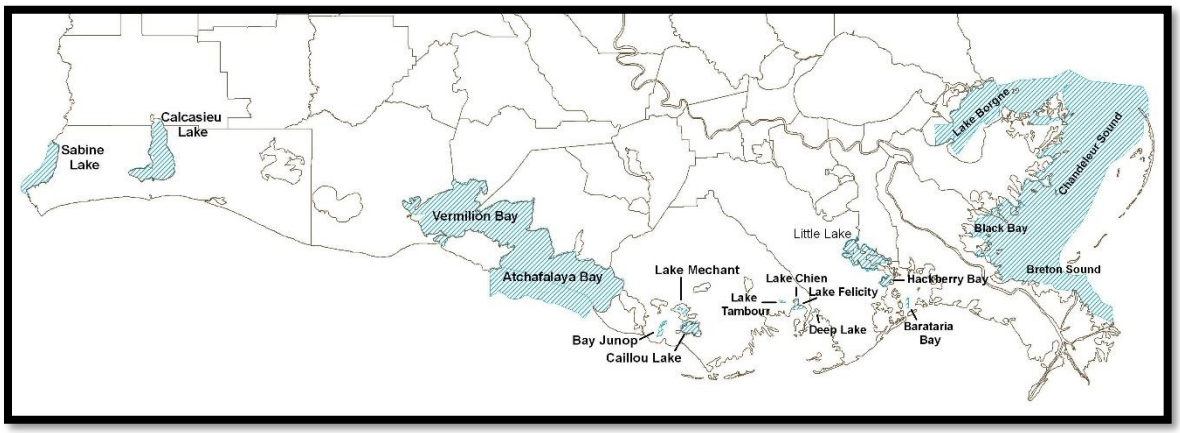

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Introduction

Projects located within or traversing Louisiana's public oyster areas (Public Oyster Seed Grounds, Public Oyster Seed Reservations, Calcasieu and Sabine Lakes) are subject to review by the Louisiana Department of Wildlife and Fisheries (LDWF). With some exceptions, LDWF requires a water bottom survey and oyster assessment to be submitted for evaluation. The two officially recognized water bottom survey techniques are Side-Scan Sonar and multibeam.

Poling-only surveys may be allowed by LDWF, but only if requested in writing and only for specific locations. Failure to secure prior approval from LDWF for poling-only surveys may result in rejection of the assessment.

For all projects, LDWF may consider modification and/or waiver of survey and assessment requirements upon written request, based on pertinent biological, hydrological, and geophysical data of the project area submitted to LDWF. Such data may consist of previous surveys and assessments conducted within one mile of the proposed project and within the past twelve months, scientific literature, or other published reports as deemed acceptable by LDWF. For consideration of modification or waiver of survey/assessment requirements, data must accurately demonstrate that project activities will not adversely impact oyster resources or oyster habitat. A survey modification/waiver does not release the applicant from compensation requirements. If the data submitted do not support the request or adequate data are not presented, a water bottom survey and oyster assessment shall be completed according to the procedures stated within this document.

Water Bottom Survey Coverage

Surveys shall be designed to cover 100% of the public oyster areas as described below. However, LDWF reserves the right to require expanding the survey area(s) if needed to determine the extent of reef complexes or to modify proposed access or pipeline routes.

1. Pipelines that are 6 inches or greater in diameter and/or well sites that require dredging activity.
    A. Survey area must cover at least a 1,500-foot radius around the centerline of proposed pipeline(s).
2. Pipelines with a diameter of less than 6 inches and/or well sites that require no dredging activity.
    A. Survey area must cover at least a 500-foot radius around the centerline of proposed pipeline(s).
3. If multiple pipelines are being installed in a single trench, the diameters of the lines should be added together and surveyed according to the

guidelines above (example: two 3" lines would require a 1,500-foot radius survey).

4. All other independent structures, including but not limited to pilings, docks, booster pumps, heater platforms, and tank battery platforms that require no dredging activity.
   A. Survey area must cover at least a 500-foot radius around the center of all work areas and/or structures.
5. Access routes not requiring dredging
   A. Survey area must cover at least a 250-foot radius around the centerline of the proposed access route(s) (only the portions of which occur within the oyster seed areas and in water depths equal to or less than 10 feet).
   B. Waivers of the assessment requirement for access routes not requiring dredging may be granted if specific criteria are met. Please refer to *Exceptions.*
6. Access routes requiring confined dredging
   A. Survey area must cover at least a 1,500-foot radius around the centerline of the proposed access route(s).
7. Access routes requiring unconfined hydraulic dredging (e.g., propwashing)
   A. Survey area must cover at least a 2,640-foot radius of the proposed access route(s).
8. Poling of the water bottom using transects may be undertaken to ground-truth Side-Scan Sonar or multibeam survey data, confirm bottom categories, and further identify reefs or other shellfish resources such as cultch deposits.

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Water Bottom Classification

The purpose of the water bottom survey is to determine the presence and extent of water bottoms by Type and Category within the study area (Table 1).

Table 1. Water bottom types and categories.

Water Bottom Type	***Water Bottom Category***	***Brief Description***
1	Soft Mud	Soft, slushy mud – would not support small pieces of cultch material
2	Moderately Firm Mud	Bottom that would support small pieces of cultch material
	Firm Mud or Sand	Compact muddy or sandy substrate
	Buried Shells	Shells buried under sediment
3A	Exposed Shell or Reef without Live Oysters	A single oyster shell, or scattered or clustered oyster shells, or hard substrates such as clam shells, limestone, concrete aggregate, etc.
3B	Exposed Shell or Reef with Live Oysters	A single oyster shell, or scattered or clustered oyster shells, or hard substrates such as clam shells, limestone, concrete aggregate, etc.

Water Bottom Survey – Side-Scan Sonar and Multibeam

Side-Scan Sonar is the preferred water bottom survey method for projects occurring in the public oyster areas. In some cases, multibeam surveys may be required for proposed activities in Tier 1 or sensitive Tier 2 areas (See https://www.sonris.com). In these cases, specific survey protocols and deliverables, in addition to those listed below, will be determined in consultation with the contractor. All Side-Scan Sonar surveys of the public oyster areas must meet the following minimum requirements:

1. Transects shall be developed in order to ensure 100 percent coverage of the study area.
2. All Side-Scan Sonar transects shall be geo-referenced with a sub-meter Differential Global Positioning System (DGPS) or similar GPS-WAAS (Wide Area Augmentation System) instrument of comparable accuracy.

3. Survey resolution will be determined by the water bottom survey consultant and must be fine enough to accurately delineate reef (or cultched bottom) from other bottom categories.
4. Side-Scan Sonar frequency (kHz) shall be determined by the water bottom survey consultant to effectively delineate the extent of all oyster reefs and cultched (Type 3) water bottoms.
5. Survey vessel speed during Side-Scan Sonar and sub-bottom transect runs shall be determined based on the level of resolution needed to accomplish survey goals.
6. Raw data from Side-Scan Sonar must be in a digital collection format.
7. A bathymetric survey is required using a high-frequency, survey-grade fathometer with digital recording capability. Water depth readings shall be reported in 6-inch intervals and adjusted to Mean Low Water (MLW).
8. All water depth data are to be calibrated to the nearest functioning United States Coast and Geodetic (USGS) or National Oceanic & Atmospheric Administration (NOAA) tide-gauging station and stated in relation to that gauge and Mean Low Water.
9. Survey data shall be reported in the projection of Louisiana State Plane Coordinates with NAD 1983 datum in feet.
10. Ground-truthing transects shall be of sufficient spacing to ensure an accurate interpretation of the survey data.
11. Poling of the water bottom using transects may be undertaken to ground-truth Side-Scan Sonar or multibeam survey data, confirm bottom categories, and further identify reefs or other shellfish resources such as cultch deposits.
12. Sub-bottom profile data is not required; however, the data may still be collected and submitted if needed to further identify the extent of bottom categories.

Water Bottom Survey – Poling-Only (SUBJECT TO PRIOR APPROVAL)

At the discretion of LDWF, poling-only surveys may be accepted in place of Side-Scan Sonar or multibeam if a written request is submitted and approval is granted.

If approval to conduct a poling-only survey is granted by LDWF, transects shall be developed in order to ensure 100 percent coverage of the study area. All transect beginning and ending locations, plus oyster sample locations, shall be determined by coordinates using a sub-meter DGPS or with a GPS-WAAS with comparable accuracy. Transects shall be no greater than 20 feet apart, with poling stations at no more than 10-foot intervals. Additional poling is required to determine the full extent of scattered shell and reef areas. For instance, if shell was located at poling station #5 on transect A, but not at station #5 on transect B, then additional poling shall be performed between those two transects and the surrounding poling points to more

accurately determine the extent of the shell area and to determine if it is scattered shell or a consolidated reef area.

All water depth data are to be calibrated to the nearest functioning USGS or NOAA tide-gauging station and stated in relation to that gauge and mean low water (MLW).

Survey data shall be reported in the projection of Louisiana State Plane Coordinates NAD 1983 datum in feet.

Oyster Assessment

Oyster assessments shall be for:

1. Oyster presence/absence
2. Oyster density, if applicable
3. Oyster condition (reef condition/cultch type), if applicable
4. Water temperature (top and bottom)
5. Salinity (top and bottom)
6. Observations of oyster reef community components (e.g., presence and abundance of reef-associated species such as predators, biofouling organisms), if applicable

Sampling methods, procedures, and gear type used shall be stated in the deliverables.

At least one member of the oyster-sampling team must hold a valid oyster scientific collecting permit issued by LDWF prior to taking oyster samples. The person to whom the permit is issued must be present at the time of the sampling activity and the permit must be on board during sampling activities. All pertinent conditions of the sampling permit must be followed.

Three-minute tow dredge sampling should be used on Type 2 water bottoms to determine the presence/absence of oyster resources. Dredge sampling is not required for Type I water bottoms.

Type 3 water bottoms shall be assessed using square-meter dive sampling. Dredging is not allowed on Type 3 water bottoms. A minimum of three replicate square-meter samples is required. Sub-sampling may be utilized, but no sample size smaller than 1/3 square meter is allowed. For example, three 1/3 square meter sub-samples may be substituted for each square meter sample required.

Oyster shell-length data shall be measured and recorded in 5 mm increments or Work Groups. Work Group 0 includes oysters measuring 0-4 mm. Work Group 2 includes oysters measuring 5-9 mm and so on, up to the largest group size occurring in the sample.

The number of Sack (market-size) oysters that measure 75 mm and above shall be converted to sacks by dividing by 180. The number of Seed oysters that measure 25-74 mm shall be converted to sacks of future Sack oysters by dividing the number of seed oysters by 360 and by utilizing a conversion factor of 1.68 (Melancon 1990). For instance, 1,000 seed oysters ÷ 360 = 2.78 sacks of seed oysters, 2.78 sacks of seed oysters X 1.68 = 4.67 sacks of Sack oysters. Therefore, 1,000 seed oysters are expected to grow into 4.67 sacks of Sack oysters. The number of Spat oysters that measure 0-24 mm shall be converted to seed oysters by assuming a 90% mortality rate from spat to seed size.

Recently dead (as determined by the amount of fouling organisms present) oysters shall be recorded as a "box" or a "valve." If both valves remain intact (i.e., connected) or can be paired, they are to be counted as a "box." Valves that cannot be paired are to be counted as a "valve." The number of recently dead oysters will be determined by adding the number of single valves and the number of boxes. Percent mortality shall be calculated as below:

#Recent Dead ÷ (#Recent Dead + #Live) X 100 = Percent Mortality

Mortality rates for the current and future production of Sack oysters shall be determined by using the actual mortality data generated from square-meter samples. If recently dead spat data is not determined, assume a first-year mortality rate of 90% for spat oysters. The conversion factor of 1.68 takes into account the mortality rate of Seed oysters as they grow to Sack size.

Information and data from sampling shall be tabulated, analyzed and presented in tables, charts, etc. along with scale maps indicating the oyster reefs and water bottom categories in relation to the proposed activities, including location of sample sites, number and size (5 mm increments) of both live and recently dead oysters, along with frequency, distribution, mortality, total sacks per acre, and photographs of all oyster samples (even if no oysters were present). All sample photographs shall include an identifying placard listing the date, location, sample number, and project name.

Exceptions

At the request of industry, LDWF developed approved access routes through the public oyster areas that may not require a water bottom survey or an oyster assessment, provided specific criteria are met. Criteria include:

1. Water depths must be 10 feet or greater at mean low water (MLW), regardless of Productive/Unproductive status (See https://www.sonris.com).
2. All vessels utilizing the routes must have at least 2 feet of clearance between the lowermost part of the vessel and the water bottom at the time

of movement.

3. The specified route has been used within the last 6 months or is located in an area of the public oyster areas currently classified as unproductive.
4. No activities (dredging, propwashing, pipelines, etc.) are proposed along the routes. If an activity is proposed within or through the routes, an assessment or a request for a waiver must be submitted to LDWF.

More information on approved access routes will be provided upon request.

Deliverables

1. A PDF copy of the assessment with all maps, charts, tables, and text, including but not limited to:
   A. A scale map showing the proposed project and displaying all impacted water bottom categories and locations of all sample sites.
   B. Water bottom categories mapped with a continuous line indicating the geographic extent or boundary of each category present.
   C. Scale map of all access routes traversing the public oyster areas, including water depths and water bottom categories for the route.
   D. A table indicating the number of whole and/or partial acres of each water bottom category that occur within the study area, as well as the number of whole and/or partial acres of each water bottom category that occur within the footprint of the project.
   E. Photographs of all oyster samples (even if no oysters were present). All sample photographs shall include an identifying placard listing the sample collection date and location, sample number, and project name.
   F. If available, draft specifications of all vessels to be used.

2. Shapefiles in an ArcMap 10.0 or later compatible format. KMZ files are not adequate unless specifically requested and previously approved. Digital data shall include at a minimum:
   A. Processed geo-referenced Side-Scan Sonar and multibeam raster mosaics (geotiffs) presented in a negative mosaic format (reefs/cultch show up as dark shades).
   B. Shapefiles for all access routes and project features, including pipelines, well locations, dredging and spoil placement areas.
   C. Survey boundary polygon with all individual water bottom type polygons, sample locations, and bathymetry contour lines.
   D. All bathymetry contour lines and/or points reported in 6-inch intervals and adjusted to MLW with beginning and ending times of collection.
   E. The gauge used to calibrate bathymetric data must be identified by name and ID number.

F. All poling points and transect lines, if applicable.

These deliverables are public record and will be maintained by LDWF per applicable public records laws.

Contact

Questions, concerns, data submission, etc., associated with this protocol should be addressed to:

LDWF
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