State of Louisiana

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SAMPLING PROTOCOL FOR PROJECTS IN PUBLIC OYSTER AREAS

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Effective Date: May 1, 2005
Effective date refers to surveys performed on or after May 1, 2005

Section 1

Required procedures relating to water bottom assessments for proposed projects located in public oyster areas (Public Oyster Seed Grounds, Public Oyster Seed Reservations, Public Oyster Tonging Areas, etc.) are listed below. Based on pertinent biological, hydrological, and geophysical data submitted to this Department concerning the project area, the Department may consider modification and/or waiver of survey and assessment requirements upon written request. Such data may consist of previous survey findings and assessments conducted within the past two years, scientific literature, or other published reports as deemed acceptable by the Department. For consideration of modification or waiver of survey/assessment requirements, data must accurately demonstrate that project activities will not adversely impact oyster resources and 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 type survey and oyster assessment shall be completed according to the procedures listed below:

A. Sampling of oyster grounds shall be for oyster density (via square meter samples), oyster presence/absence, oyster condition (reef condition/cultch type), water bottom type, water depth, bottom and top water temperature, bottom and top water salinity, and observations of oyster reef community components (i.e. presence and abundance of reef-associated species such as predators, biofouling organisms, etc.). Sampling methods, procedures, and gear-type used shall be stated.

B. Information and data from sampling shall be tabulated, analyzed and presented in tables, charts, and in a written format along with scale maps indicating the oyster reefs and water bottom types in relation to the proposed activities, including location of samples sites, number and size (5mm increments) of both live and dead oysters, along with frequency, distribution, mortality, total sacks per acre, and photographs of all oyster samples.

C. Summaries of data collected and methods to be used to avoid and/or minimize impacts to oyster reefs shall be included.

D. Poling areas are as follows, although the Louisiana Department of Wildlife and Fisheries reserves the right to require poling of additional area, if needed. In general, samples and

poling transects shall be designed to cover the entire Oyster Seed Grounds within a 1,500 feet radius of the proposed pipeline routes greater than 6 inches in diameter and well sites that require dredging activity, and within a 500 feet radius of proposed routes for pipelines with a diameter of 6 inches or less and well sites that require no dredging activity. In addition, an area 250 feet on each side of the centerline of any proposed access routes (occurring in water depths < 12ft) shall be poled to denote water bottom types and oyster coverage. If dredging is required to access a well site, the public grounds within a 1,500 feet radius from bucket and confined hydraulic dredging will be poled. The area of the public seed grounds within a 2,640 feet radius of unconfined hydraulic dredging (i.e. prop-washing) shall be poled. Poling shall also be required on the public seed grounds within a 500 foot radius of all other structures (pilings, docks, tank battery platforms, etc.). A side-scan sonar survey may be substituted, upon written request to the Department, for the poling requirements. Please refer to *Section 2 – LDWF Side-Scan Sonar Survey Protocol* for additional information.

E. Access routes to pipeline routes or well sites are to be identified on scale maps along with water depths and water bottom types for the route. Draft specifications of all vessels to be used in the proposed activity shall be included.

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

G. A diver will collect required square-meter samples. A minimum of three replicate square-meter samples is required where reefs and/or exposed shell exists. 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. Replicate dredge samples (3 minute tow each) shall be taken on each water bottom type to indicate presence/absence of oyster resources on Type I and Type II bottoms (see I.3 below – first column).

H. At least one member of the oyster-sampling team must hold a valid oyster scientific collecting permit issued from this agency 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.

I. Water Bottom Type Determination and Oyster Sample Collection:

1. The use of oyster tongs and/or dredges is not authorized for quantitative oyster production data collection, although may be used for qualitative data collection. As indicated in part G above, dredges shall be used for presence/absence data collection. Poling of the water bottom using transects may be undertaken to determine bottom type and identify reefs or other shellfish resources such as cultch deposits.
2. Transect beginning and ending locations, plus oyster sample locations, shall be determined by coordinates using a sub-meter Differential Global Positioning System (DGPS) or with a GPS-WAAS (Wide Area Augmentation System) with comparable accuracy. Transects shall be no greater than 200 feet apart with poling stations at no more than 50 foot intervals. Additional poling shall be performed to determine the extent of reef areas. For instance, if reef was located at poling station # 5 on transect A and not at station #5 on transect B, then additional poling shall be performed between those two transects to more accurately determine the extent of the reef.

3. Water bottom types shall be identified and divided into the following categories (middle column below):

Water Bottom Type	***Categories***	***Brief Description***
Type I	Soft Mud	Soft, slushy mud – would not support small pieces of cultch material
Type II	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
Type III	Exposed Shell	Single or scattered shells, or hard substrates such as clam shells, limestone, concrete aggregate, etc.
	Reef	Thick shell

Each water bottom type shall be mapped with a continuous line indicating the geographic extent or boundary. A table shall be provided that indicates the amount of acres of each water bottom type that will be impacted by the proposed project. A scale map showing the proposed project and impacted water bottom types shall be provided.

4. Recently dead (as determined by the amount of fouling organisms present since death) oysters shall be recorded as "box" if both valves remain intact and single valves. Two valves that can be paired will be counted as one dead "box." The number of 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

5. The number of marketable or "sack" 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 marketable oysters by dividing the number of seed oysters by 360 and by utilizing a conversion factor of 1.68 (Melancon 1990). For instance, 1000 seed oysters ÷ 360 = 2.78 sacks of seed oysters. 2.78 sacks of seed oysters X 1.68 = 4.67 sacks of marketable oysters. Therefore, 1000 seed oysters grow into 4.67 sacks of marketable 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.
6. Mortality rates for 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 in item I.5 above takes into account the mortality rate of seed oysters as they grow to market size.
7. Oyster shell-length data shall be measured and recorded in 5 mm increments or groups. The starting group of 5 mm range of 0-4 mm shall be assigned "0". The next range of 5-9 mm shall be "1" and so on to the largest group size occurring in the sample.

J. Record by species the total number of invertebrate predators (i.e. snails, crabs, etc) in each sample.

K. Record by species the estimated total number of fouling organisms (hooked mussels, bryozoan colonies, slipper shells, boring clams, etc.) that may affect future spat sets in each sample.
L. A digital copy of the assessment with all maps, charts, tables, and text is requested in an ArcView (minimum: ArcView 3.2) or compatible format.

Section 2 – LDWF Side Scan Survey Protocol

As per industry request, side-scan sonar (SSS) with sub-bottom profiling may be used in place of the poling requirement (Section 1, Item D) for water bottom assessment projects on Louisiana Department of Wildlife and Fisheries' Public Oyster Seed Grounds, upon written request. However, all other elements of Section 1 shall be adhered to. In some cases SSS may be required. For SSS surveys of seed grounds, the following protocol is required:

A. SSS frequency (kHz) shall be determined by the water bottom survey consultant to effectively delineate the extent of reefs and cultched water bottoms.
B. SSS transects shall be developed in order to ensure 100 percent coverage of the target area.
C. Shot [event or reference] points shall be spaced to adequately define the track line but shall be no greater than 300 feet apart.
D. Boat speed during SSS and sub-bottom transect runs shall be determined based on the level of resolution needed to accomplish survey goals but shall be no greater than 4.5 knots.
E. All SSS transects and shot points shall be geo-referenced with a sub-meter Differential Global Positioning System (DGPS) or similar GPS-WAAS instrument of comparable accuracy.
F. Raw data from SSS must be in a digital collection format.
G. 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 types.
H. Copies of daily field logs must be supplied noting start and end time of each line, direction of travel, beginning and ending shot point numbers, and environmental conditions.
I. Processed data must be presented in a negative mosaic format (reefs/cultch show up as dark shades) drawing and digital data which show the following geo-referenced layers:

    1. Track lines and shot points
    2. Water depth via contour lines
    3. Ground truthing locations/data (poling, square-meter sampling, etc.)
    4. Background imagery (DOQQs, navigational charts, etc.)
    5. Proposed access channel location
    6. Other information as deemed pertinent by the water bottom survey consultant.

J. Bathymetric survey is required using a high-frequency, survey-grade fathometer with digital recording capability.
K. All navigation or land survey shall be reported in the projection of Louisiana State Plane Coordinates with NAD 1983 datum in feet.
L. Processed digital data shall be provided in ArcView 3.2 or compatible format so that it can be viewed on computer by Departmental personnel.
M. A frequency modulated "CHIRP" unit shall be used to perform sub-bottom profile analysis in order to assist in confirmation of the SSS imagery.

N. A report summary of software used in collecting and processing the SSS data shall be submitted.
O. All instrument offsets are to be referenced to the navigation DGPS instrument's antenna location. This adjustment is required in process data. A drawing of the overall boat layout and collecting units with dimensions shall be provided in hard copy to provide a visual representation of instrument offsets.
P. Deliverables to the Department of Wildlife and Fisheries are:
    1. All digital geo-referenced mosaic data by layers
    2. Sub-bottom profiler data
    3. Hard copy drawings of processed data
    4. Summary report

Section 3 – Additional Information

These public records will be maintained by the Louisiana Department of Wildlife and Fisheries in accordance with applicable public records laws.

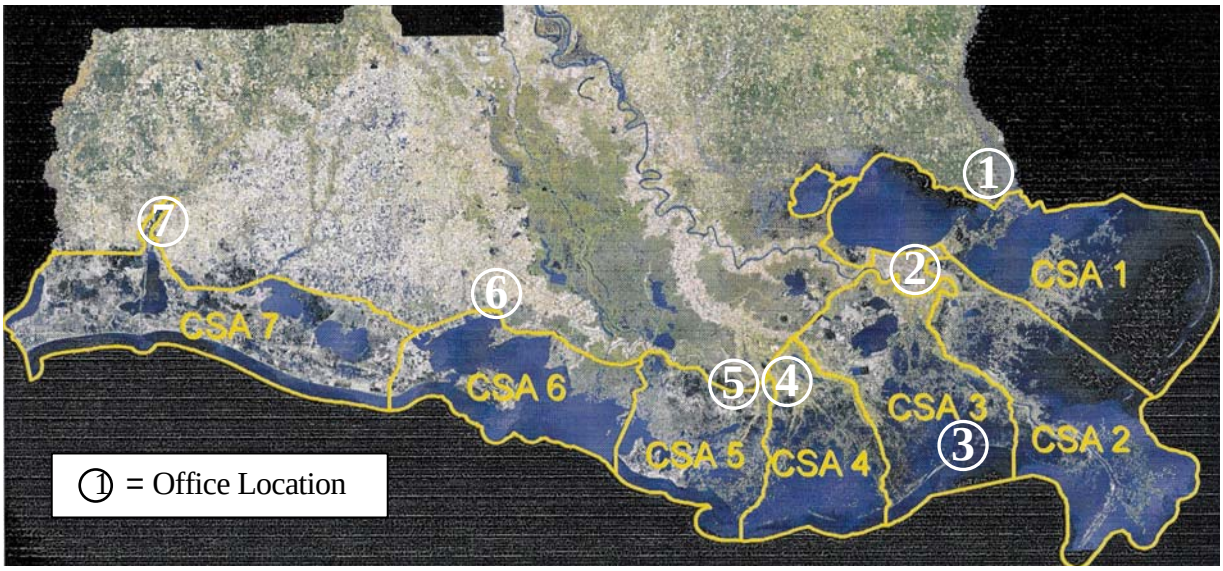
This agency reserves the right to identify and require new and/or improved methods and techniques for such sampling and reporting as developments occur in this field.

One complete copy of each assessment and water bottom survey is to be sent to both Patrick Banks in our Baton Rouge office and the area Marine Fisheries' Biologist Manager to be identified (please see below).

Written requests for waiver or modification of the assessment protocols should be forwarded to Patrick Banks in Baton Rouge along with appropriate documentation to justify the waiver or modification.

Contact Christy Lavergne at (225) 765-2370 or by email at clavergne@wlf.louisiana.gov if you have questions or require additional information about the above protocols.

LDWF Marine Fisheries' Coastal Study Areas (CSAs)



CSA	*Biologist Manager*	*Address*	*Phone Number*	*FAX Number*
1	Brian Lezina	52282 Hwy. 90 Slidell, LA 70461	(985) 646-6441	(985) 646-6481
2	Keith Ibos	1600 Canal Street Room 324 New Orleans, LA 70112	(504) 568-5671	(504) 568-2048
3	Jason Adriance	P.O. Box 37 Grand Isle, LA 70358	(985) 787-2163	(985) 787-4517
4	Vince Guillory	P.O. Box 189 Bourg, LA 70343	(985) 594-4130	(985) 594-7317
5	Martin Bourgeois	P.O. Box 189 Bourg, LA 70343	(985) 594-7621	(985) 594-7317
6	Paul Cook	2415 Darnall Road New Iberia, LA 70560	(337) 373-0032	(337) 373-0032
7	Michael Harbison	1213 N. Lakeshore Drive Lake Charles, LA 70601	(337) 491-2573	(337) 491-2009