

*Louisiana Seafood Safety Response and  
Quality Certification Plan  
Post - Mississippi Canyon 252 Oil Spill*

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Quality Certification Plan  
Post - Mississippi Canyon 252 Oil Spill*

**APPROVED:**

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BP Representative:

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Date:

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Federal Representative:

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Date:

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State Representative:

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Date:

***Submitted to Area Command for Approval and Inclusion in  
Incident Operations***

## Contents

<b>Post - Mississippi Canyon 252 Oil Spill</b> .....	2
<b>Introduction and Overview</b> .....	5
<b>Part I. Seafood Safety Testing, Monitoring and Evaluation</b> .....	7
<i>Scope</i> .....	7
<i>Roles and Responsibilities</i> .....	7
<i>Data Collection and Analysis</i> .....	8
Chemicals of Concern (COC) .....	8
Test Methods .....	9
Sampling Locations .....	12
Sample Preparation.....	12
Target Species .....	13
<i>Data Evaluation</i> .....	14
<i>Protocols for fish consumption advisories</i> .....	15
<b>Part II. Louisiana Seafood Safety Public Education</b> .....	16
<i>Objective</i> .....	16
<i>Program Components</i> .....	16
Research and Development .....	16
Public Education Creative.....	16
Ad buys .....	16
Database Development and Management .....	17
Digital Marketing.....	17
Media Relations .....	17

Monitoring and evaluation ..... 17

*Stakeholders/Partners* ..... 17

*Key Action Steps/Timeline* ..... 18

**Part III. Louisiana Wild Seafood Certification Program**..... 19

*What is the Louisiana Certified Harvester Program?* ..... 19

*What is the Louisiana Certified Processor Program?*..... 19

*Best Handling Practices* ..... 19

*What is involved in the program?*..... 19

    “Certified Louisiana Seafood” Service Mark ..... 21

    What does this mean to a consumer? ..... 21

*Louisiana Seafood Safety Response Plan Advisory Panel*..... 21

**Appendices:**

*Appendix A: Preliminary Budget*..... 22

*Appendix B: Roles and Responsibilities* ..... 45

*Appendix C: State/Federal Seafood Program Contacts*..... 46

**Attachments:**

*Protocol for Issuing Public Health Advisories for Chemical Contaminants  
in Recreationally Caught Fish and Shellfish*

*Protocol for Interpretation and Use of Organoleptic and Analytical Chemistry Results for Re-Opening  
Oil-Impacted Areas Closed to Seafood Harvesting*

## Introduction and Overview

*The commercial seafood industry in Louisiana, with an economic impact of more than \$3 billion annually, is one of Louisiana's most reliable industries – harvesting from one of the most productive fishery resources in the world. The oil spill from the BP disaster in the Gulf of Mexico has threatened that industry and a way of life for thousands of Louisiana residents, and potentially threatened a food supply amounting to one-third of America's seafood production. The Louisiana Department of Health and Hospitals (DHH) and Louisiana Department of Wildlife and Fisheries (DWF) have closed coastal areas to commercial and recreational fishing and harvesting as a precautionary measure to minimize the risk of consumers purchasing product impacted by the spill. The efforts thus far have curtailed significant fishing and production, but have been effective at protecting the public. The long-term impact of the oil and chemicals used to mitigate the impact remains a concern. The State of Louisiana is committed to ensuring only safe seafood product is permitted to go to market, and that the product is only of the highest quality. Recognizing that anything less would be detrimental to our industry, Louisiana seeks to ensure the American public is confident in the safety and quality of Gulf Coast seafood.*

In order to achieve this objective, it becomes necessary for science to support our assertions of seafood safety. And, importantly, it is important for the regulatory functions in Louisiana to reflect this science in a transparent way. Finally, nothing will be more important than a robust mechanism for communicating to the public the safety of our product, the steps taken to ensure the safety of our product, and to certify that the product meets rigorous standards. To our knowledge, this will be the first such effort to certify the quality of seafood in America, and may become a standard for the nation to follow.

This plan has three components, and was prepared collaboratively by the Louisiana Departments of Health and Hospitals, Wildlife and Fisheries, Agriculture and Forestry, and Environmental Quality. Academic partners assisted in the plan as well. The Louisiana Seafood Safety Response and Quality Certification Plan is a high-level, broad and critical approach to continually and scientifically assert the quality of Louisiana's seafood. It is a *living document* that will evolve as more information and related science emerges. Once funded, Louisiana will work with numerous stakeholder groups to develop and put forth final operational details for implementation. Part I addresses the testing, proactive monitoring and evaluation processes necessary to ensure the safety of seafood. It draws heavily from the document *Managing Seafood Safety after an Oil Spill*, National Oceanic and Atmospheric Administration, NOAA's National Ocean Service Office of Response and Restoration and from the draft document *Protocol for Issuing Public Health Advisories for Chemical Contaminants in Recreationally Caught Fish and Shellfish* released for public comment by DHH in January 2010, and undergoing finalization by the State agencies involved with the preparation of this plan.

Part II details a long-term, robust communication strategy to communicate to the public the value and quality of Louisiana seafood. This strategy will be based on learning how consumers will react to the oil spill in terms of their purchase patterns, and will use this information to determine the best manner in which to communicate with the public information which will re-instill confidence in Louisiana seafood product. The communication portion of this plan was based in part on the experience in Alaska in rebuilding its seafood brand after the Exxon Valdez spill and, in part, on rebuilding Louisiana's brand as a tourist attraction after Hurricane Katrina.

Part III details the Louisiana Seafood Certification Program. The program allows for Louisiana seafood harvesters and processors to certify their products based on quality control and food safety standards. These standards will be designed based on the evidence to support a quality product.

Louisiana believes this effort must be sustained over time. The proposal is for a 20-year multi-agency initiative with a total cost of \$457 million. Considering the \$3 billion annual impact of this industry on Louisiana, we believe this is a fair and appropriate investment in revitalizing an industry that will clearly feel the effects of this spill for decades to come. Appendix A includes a preliminary budget and budget narrative.

## Part I. Seafood Safety Testing, Monitoring and Evaluation

### Scope

Samples collected for analyses under the purview of this plan are intended to represent commercially and recreationally harvested species that are landed in Louisiana for the purposes of human health risk assessment and fisheries closure/openings. Target species are listed later in this document and include commercially and recreationally popular Gulf of Mexico finfish and shellfish potentially exposed to the referenced MC252 oil spill incident. Additional species will be collected to identify potential sources of contamination of livestock food sources (i.e., Gulf menhaden). Species not included due to the unlikelihood of exposure to the spilled oil are crawfish, pond-raised catfish and generally all freshwater species, save for those that occur in coastal Louisiana.

Tests conducted for the purpose of verifying seafood safety will determine presence of petroleum and chemical dispersants in seafood tissues. Water will also be sampled from where seafood samples are collected to provide an indicator of exposure pathway that has lower detection limits than for tissue analyses. Tissue tests include chemical analyses and sensory analyses. The quantity of sensory analyses is limited by the number of trained personnel available to conduct these tests. However, this plan includes request for federal resources to not only conduct the testing, but also to train state personnel in this approach, thereby expanding the capacity to conduct this type of test over the entire affected portion of the state.

Capacity necessary to conduct chemical analyses by a single laboratory is estimated at approximately 200 samples per month. Capacity to collect samples by agency personnel or contract assistance can exceed this readily. Using an additional laboratory with similar capacity, or with expanded capacity at a single laboratory, this plan anticipates up to 400 samples per month initially to ensure coverage of the entire potentially affected area. The number of samples, the location of sample collection and the species selected for analyses may be adjusted as the project continues based on the degree and location of oiling impacts of the on-going MC 252 oil spill incident.

The geographic extent of this plan includes all coastal parishes, coastal waters that make up the State of Louisiana territorial seas and federal waters of the Gulf of Mexico that are potentially impacted by the subject oil spill incident.

The scope of this document does not include testing, monitoring and evaluation of impacts to aquatic resources, i.e., potential for reductions in the long-term quantity or viability of fishery stocks. Studies to quantify injury to natural resources and the services they provide to the public, including fish and shellfish, are subject of a Natural Resource Damage Assessment, which is currently on-going and is coordinated through the joint efforts of NOAA and the State of Louisiana. The Louisiana Department of Wildlife and Fisheries is also developing approaches to assess impacts to the commercial fisheries resource through a resource monitoring and assessment protocol.

### Roles and Responsibilities

The Louisiana Departments of Health and Hospitals (DHH), Environmental Quality (DEQ), Wildlife and Fisheries (DWF) and Agriculture and Forestry (DAF) are authorized to protect public health and the environment. These agencies will work collaboratively to develop, facilitate and organize the Seafood Safety Response so as to assure stewardship of the states' resources and protection of health and environment:

- *The mission of the Department of Health and Hospitals is to protect and promote health and to ensure access to medical, preventive and rehabilitative services for all citizens of the State of Louisiana. Currently the broad role of DHH in the Louisiana Seafood Safety Response and Quality Certification Plan is multifold. DHH carries*

*the primary responsibility, in partnership with DWF for oyster evaluation. DHH is responsible for testing, evaluation and interpretation of all types of seafood data as it relates to human health, as well as providing the overall scientific expertise in health evaluation.*

- The mission of the Department of Environmental Quality is to provide service to the people of Louisiana through comprehensive environmental protection in order to promote and protect health, safety and welfare while considering sound policies regarding employment and economic development. The broad role of DEQ in the Louisiana Seafood Safety Response and Quality Certification Plan is the assistance with the collection of shellfish and seafood, as well as providing the scientific expertise about the environmental contaminants of concern.*
- The mission of the Department of Wildlife and Fisheries is to manage, conserve and promote wise utilization of Louisiana's renewable fish and wildlife resources and their supporting habitats through replenishment, protection, enhancement, research, development and education for the social and economic benefit of current and future generations; to provide opportunities for knowledge of and use and enjoyment of these resources; and to promote a safe and healthy environment for the users of the resources. The broad role of DWF in the Louisiana Seafood Safety Response and Quality Certification Plan is the collection of most types of seafood, as well as providing expertise on specific animal types and contaminants of concern.*
- The mission of the Louisiana Department of Agriculture and Forestry's is to promote, protect and advance agriculture and forestry, and soil and water resources. Their vision is to be a unified and coordinated team that effectively responds to the challenges facing the agricultural and forestry industries, and which pursues each and every opportunity that might provide a benefit to the state and its citizens.*

### Data Collection and Analysis

#### Chemicals of Concern (COC)

The objective of conducting a comprehensive data collection effort is to provide adequate characterization of the contaminant concentrations in edible recreationally- and commercially-important species to support the risk assessment and advisory process. The list of target analytes identified for seafood sampling is based on known contaminants in crude oil and the dispersants being used to manage the spill. Crude oil consists of a mixture of petroleum hydrocarbons. The chemicals of concern in crude oil include:

- ▶ Volatile organic compounds (VOCs),
- ▶ Polycyclic aromatic hydrocarbons (PAHs), and
- ▶ Saturated long chain hydrocarbons (aliphatics).

Specific chemicals within each of these categories have been identified for evaluation based on the availability of toxicity information for these chemicals.<sup>1</sup>

The use of chemical dispersants, COREXIT 9527 and 9500, in response to this spill event has added complexity to determining seafood safety.<sup>2</sup> Dispersants are being used on oil through aerial application to the oil slick and also through sub-sea injection. To date, they are not being used near the Louisiana coast, even though the responsible party is authorized to apply dispersants aerially outside of Louisiana territorial

<sup>1</sup> The specific chemicals to be included in the initial target analyte list for crude oil include benzene, toluene, ethylbenzene, xylene chrysene, benz[a]anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo[a,h]anthracene, indeno[1,2,3,-cd]pyrene, naphthalene, benzo[a]pyrene, anthracene, fluoranthene, fluorene, pyrene, and aliphatic hydrocarbons within the C<sub>12</sub> to C<sub>36</sub> range.

<sup>2</sup> Components of these two dispersants include hydrotreated light petroleum distillates, propylene glycol, proprietary organic sulfonic acid salt, and 2-butoxyethanol (also known as ethylene glycol monobutyl ether).

seas. The dispersants are likely to be rapidly diluted in the Gulf waters, but due to the on-going nature of the event and the large volumes of oil and dispersants that will likely be used as the incident continues, concern is growing about the potential exposure of Gulf seafood to dispersants in the water column. These substances are reported to not accumulate in seafood and are reported to be readily biodegradable. The content of the dispersants will be disclosed to the state by the manufacturer, and appropriate testing will be conducted to quantify if any elements of the dispersant are detectable in the seafood supply.

### Test Methods

Sensory analysis is used to screen for organoleptic effects in seafood that may be associated with oil contamination. These tests are used to determine if seafood has an off-odor or off-flavor. The sensory tests are conducted using highly trained seafood inspectors. The FDA and NOAA's National Marine Fisheries Service are currently the only known resources for personnel experienced in this type of testing. The State will request federal resources to assist with this task and with training of state personnel to expand the capacity of this type of testing in the state.

Chemical analyses will be conducted to quantify COC presence in sampled media. The laboratory analysis of water and seafood for chemical contaminants will be performed by commercial environmental analytical laboratories according to applicable state and federal quality assurance procedures to ensure the accuracy, precision and reliability of the data generated. Data generated from seafood samples will be used to support decisions on fishery closures and openings and whether fish consumption advisories are warranted. Data generated from water samples, which have inherently lower detection than similar analyses on tissue, will be used to identify whether seafood is being exposed to low levels which were not at that time detectable in tissue samples. This information will guide adjustments to tissue sampling efforts; that is, whether additional tissue samples from the area are warranted.

Laboratory results should be reported with any information necessary to ensure the validity of the sample. Supporting documentation should include, when available, analyte name, waterbody name, sampling location (monitoring station identification or latitude / longitude coordinates), sampling date, sample collection procedures, sample preservation and processing procedures, analytical methods used for quantitation of target contaminants, method detection and quantitation limits, percent lipid composition, species name, composite sample identification (ID) number, sample size for each composite sample, fish length (average individual lengths for each fish in a composite), estimated age, sample weight, tissue cut type analyzed, indication of the presence or absence of contaminant detection (yes / no), QA / QC results (i.e., blank results, spiked samples results, split sample results, equipment calibration results, internal QA /QC check results, etc.), a detailed description of recordkeeping and documentation procedures for maintaining laboratory log books and reporting forms, significant figures, units of reporting, routine procedures to assess the accuracy and completeness of records and a detailed description of the database variables and layout for transparent oversight.

In order to obtain data that are suitable for risk assessment and the consumption advisory process, it is imperative that the reporting limits (RL) in tissue are within the analytical capabilities of the analytical method and laboratory techniques employed and below levels that represent health concerns. EPA guidance recommends that the reporting limit (RL) for tissue analysis be at least five times lower than the screening level for a given target analyte.

On May 11, 2010, the U.S. Food and Drug Administration released the document "Protocol for Interpretation and Use of Organoleptic and Analytical Chemistry Results for Re-Opening Oil-Impacted Areas Closed to Seafood Harvesting". This protocol seeks to protect consumers from adulterated and

unsafe seafood, while minimizing undue economic burden on the recreational and commercial fishing industries. The protocol includes both secondary and follow-up chemical analysis of affected seafood, but could be adapted to consider all types of seafood, whether visibly affected or not. This protocol will help guide the standards, tests and methods for seafood testing. It is included as attachment.

Central Analytical Lab (CAL), located in Metairie, Louisiana has been preliminarily identified to provide testing of seafood and water samples in the short term. CAL will use the most sensitive analytical methods currently available to ensure that the data are appropriate for the intended use. The method selected for the analysis of aliphatic hydrocarbon is a CAL in-house GC/MS method developed in Europe and CAL has agreed to provide a description of this method to the State agencies. **The State of Louisiana DHH public health laboratory will approve and validate the testing methods for each contaminant.**

CAL will perform all compositing and homogenization of tissue at its premises in Metairie. Samples collected for testing by this laboratory may be brought to CAL directly once the funds for testing have been approved. It is estimated that CAL can perform analysis on average of 10 samples per day. Additional samples submitted to the CAL may affect the ability to provide the standard 7 day turnaround time for data reporting. The need for securing additional laboratory resources is possible, depending upon the frequency of detection and the apparent quantity of COCs found in submitted samples. This plan anticipates 350-450 samples per month submitted for analyses. Other commercial analytical laboratories may be used for sample analysis if dictated by the volume of samples requiring analysis or the need for special analytical services not provided by CAL.

The FDA requested that DHH freeze splits of the tissue samples collected until they have their methods validated and ready to perform analysis on the GC/MS. The FDA is reviewing previously performed methods for PAH detection and will provide those methods for central distribution at a later date. Through this sampling effort, the FDA will be provided representative samples of the tissue samples submitted to CAL by the state in accordance with their requests.

If warranted, specialty forensic analyses such as petroleum hydrocarbon fingerprinting may be used to determine if detected petroleum constituents are from the MC252 incident or another source.

The State of Louisiana plans to expand the current DHH laboratory in the next year. The cost projections for getting a seafood testing laboratory up and running are included in the budget template. We used 400 samples per month on an ongoing basis as the expected sample volume to create overall projections for equipment, staff and supplies. Note that there are no cost projections for VOC analysis in seafood as the FDA has not settled on definitive methods for this testing. These costs will need to be added when the method and equipment is approved. Sample costs are based upon volume, a 20-year timeframe and one-time, up-front costs for automated equipment.

It is important to have an immediate laboratory analysis mechanism so that testing can begin on both baseline samples and seafood moving forward. However, there is also a need for the State to control the data and its interpretation, so moving forward we need to expand the State's capacity to do this testing directly. Also, with human health at stake, this data should be owned and interpreted by DHH.

As a backup laboratory, we have also partnered with the LSU Agricultural Center (LSUAC). Although not able to do the testing currently, then could come up to speed, and are close collaborators with the State on this project. We have a representative of LSUAC on this advisory panel. DHH is also sharing the testing methods and requirements for seafood analysis as they come available with LSUAC, should there be a need for a "backup" laboratory.

The initial target analytes/chemicals of concern along with the analytical method and screening levels are listed in Table 1. It is anticipated that the target analyte list, and thus the list of chemicals of potential concern, will be refined as more information becomes available on the presence of chemicals (associated with oil or the dispersants used) in water and seafood during the sampling and evaluation process. The analytical methods listed in Table 1 are subject to change based on the availability of analytical methods for the target analytes, the adequacy of method reporting limits or other method limitations that may be associated with the analysis of tissue and water samples. Note that due to dilution and rapid degradation in the water, it is likely that dispersant target analytes will be present in media of concern at levels below analytical quantitation limits.

Table 1

Target Analyte	Analytical Method	Screening Level	
		Tissue* (mg/kg)	Water** (ug/l)
<u>PAHs</u>	SW846 Method 8270 or Method 8310 or equivalent		
chrysene		75	9.1
benz[a]anthracene benzo(b) fluoranthene		0.75	0.09
fluoranthene		0.75	0.09
benzo(k)fluoranthene		7.5	0.9
dibenzo[a,h]anthracene		0.075	0.2
indeno[1,2,3,-cd]pyrene		0.75	0.09
naphthalene		47	6.2
benzo[a]pyrene		0.075	0.2
anthracene		700	1800
fluoranthene		93	1500
fluorene		93	240
pyrene		70	180
<u>VOCs</u>	EPA Method 601 (water) Method __TBD_ (tissue)		
Benzene		9.3	5
Ethylbenzene		233	700
Toluene		187	1000
Xylene	467	10,000	
Petroleum Aliphatics C <sub>12</sub> to C <sub>36</sub>	***	233	1400
2-Butoxyethanol	EPA Method 8015B	233	18,000
Propylene glycol	EPA Method 8015B	46,660	730,000
Organic sulfonic acid salt	NA	NA	NA

\*Draft Tissue Screening Levels based on the assumptions and methods presented in the draft *Protocol for Issuing Public Health Advisories for Chemical Contaminants in Recreationally Caught Fish and Shellfish* (January 2010). Note: CAL has indicated that the method detection limit for PAHs ranges from 5 to 10 ug/kg.

\*\*Safe Drinking Water Act Maximum Contaminant Level or equivalent risk-based value obtained from EPA Regional Screening Level Table or LDEQ RECAP.

\*\*\*In-house GC/MS method developed in Europe; method detection limit is 10 mg/kg.

NA – not available; information on specific organic sulfonic acid salt constituents present in the dispersants is not available.

### Sampling Locations

Baseline sampling should be representative of fish and shellfish of coastal Louisiana areas that are not impacted by oil from the MC252 incident. Testing of seafood over time from both impacted and non-impacted areas will serve as the basis for fisheries opening/closing decisions. The scope of this testing effort includes all of coastal Louisiana and the Gulf of Mexico. Sample efforts in particular areas may be modified depending on the degree of likelihood that impacts from oil will occur or have occurred.

- ▶ *Field collection:* Wild fish and shellfish, representing commercially- and recreationally-popular species, will be collected using random site selection from coastal Louisiana. Representation should be of areas that can be managed for closures if that becomes necessary. Area designations associated with the Louisiana Molluscan Shellfish Program (Areas 1-30) are appropriate for this purpose. Area designations for management of opening/closure decisions for shrimp will follow existing DWF Shrimp Management Zones (1, 2, and 3). Area designations for other species (finfish and Blue crab) will follow the seven DWF coastal study areas.
- ▶ Initial sampling per area should target 3 samples of each species encountered per month per area, as available, with adjustments in the number of samples taken to represent an area if the data show significant variability or if additional data is needed to support opening/closure decisions. Water samples will also be collected to help identify exposure pathways. The number of samples used to represent a specific area should be sufficient to provide for confident informed decisions.
- ▶ *Seafood processing facilities:* NOAA and/or FDA personnel trained in sensory testing may monitor seafood processing facilities to test commercial seafood products destined for market. As boats arrive at the facilities, the inspector may test batches to identify any contaminated fish or shellfish before they are mixed with non-contaminated products. The frequency and selection of these visits will be at the discretion of trained personnel and their supervision. Site visits will be unannounced. Information from site visits will be documented and managed for reference by the Marketing Team.
- ▶ *Public boat launches:* This location will be used to monitor fish caught by recreational fishers. This will also be a way to obtain information on the likelihood of oil impact in that area. Testing will include sensory testing only, unless the fisher volunteers some of the catch for laboratory analyses. If samples are volunteered, a description of location of the catch will be requested.

### Sample Preparation

The advisory development process in Louisiana is based on analyses of edible tissues. Typically, this means muscle tissue fillets without skin, bones or organs. For species where organs are also considered edible (e.g., crab), the organs should be analyzed separately.

Fish tissue samples submitted for analyses (other than VOC) may represent individual specimens or a composite of individuals. Composite sample analyses provide an estimate of the average contaminant concentration across a group of individual fish within a species and provide data on more fish. However, if size of the fish allows, analyses of individual fish samples may be performed which provide more detailed information of the presence of a given contaminant within that species population. Composite samples are generated by removing targeted tissue from several fish of the same species and same size ( $\pm 15\%$  by length) and placing the tissue in a single sample container as per approved protocols.

Samples submitted for VOC analysis must be submitted whole and individually. Laboratory personnel must extract a portion of the tissue for sample while minimizing exposure of the cut tissue surfaces to

air. Analyses should begin immediately upon rendering of the sample. Samples for VOC must not be mixed with samples for other compounds.

A good quality control practice is to periodically provide for a duplicate sample of a submitted composite (5-20% of all samples). Duplicate analyses for VOC samples may be obtained from the same individual as the original sample if the individual is of sufficient size. For other compounds, the duplicate may be generated by using the target tissue from the opposite side of the fish (i.e., right-side fillet for composite sample and left-side for duplicate composite sample). Duplicates for these analyses may also be produced by laying the rendered fillets from each individual in an alternating orientation of head to tail, then tail to head, etc. and cutting the stack of fillets to split the tissue sample. This method can be used when sufficient tissue is available so as not to require tissue removal from the opposite side of the individual fish. The amount of tissue provided for a given sample should be approximately 200 grams (wet weight), but this will vary with the laboratory and analyses. Analytical results for duplicate tissue samples can be expected to vary naturally and can provide an understanding of natural variability of contaminants in tissue useful for decision making. Duplicate results that exceed 100% relative percent difference may result in rejection of that data for use in decision making.

Samples should be collected, preserved, processed and analyzed according to scientifically valid, standardized procedures. The integrity and security of samples and data should be maintained at all times. Record keeping and documentation procedures should be adequate to ensure traceability of all samples and data from initial sample collection through final reporting and archiving, and to ensure the verifiability and defensibility of reported results.

### Target Species

Fish and shellfish subject to this monitoring plan are those that are popular commercial and recreational species harvested from coastal Louisiana and the Gulf of Mexico. Priority species and numbers of individuals desired for adequate sample representation are presented below. Additional species, or large individuals of a given species, may be analyzed if warranted. All species should be rinsed well in ambient water from which the sample was collected to remove sediment and foreign objects before preparing as follows:

- ▶ *Finfish*: Samples submitted to the lab must be representative of edible tissues. Composite samples are intended to represent 3-12 individuals of similar size (within 15% length). Muscle tissue, filleted from bone and skin, is the common method of representing “edible portions” for human health risk assessment. However, whole fish may be submitted individually to represent potential exposures of those who eat whole fish or to represent potential contamination of other food sources through processing. Whole fish and filleted samples must not be combined in the same composite sample.

### Finfish species to be sampled:

- ▶ Black drum
- ▶ Cobia
- ▶ Croaker
- ▶ Dolphin
- ▶ Greater amberjack
- ▶ Grouper (do not mix species)

### ***Finfish species to be sampled (continued):***

- ▶ Gulf menhaden
  - ▶ King mackerel
  - ▶ Red drum
  - ▶ Red snapper
  - ▶ Sheepshead
  - ▶ Southern flounder
  - ▶ Spotted seatrout
  - ▶ Striped mullet
  - ▶ Tuna (do not mix species)
  - ▶ Other species as warranted or requested by state agencies
- 
- ▶ *Shrimp*: Shrimp samples will consist of a composite of individuals collected at the same station, possibly requiring more than one trawl attempt. Samples will composite all *Penaeid* spp. together as one “Shrimp” sample. Composite samples will include 100 whole shrimp of similar size (within 15% length, if possible) as available to make a target sample weight of 2 pounds. Samples will be wrapped in aluminum foil, placed in ziplock bags and placed on wet ice unless analysis cannot be performed within 3 days of collection, in which case the sample will be frozen. Samples may be held frozen (-70deg C) and remain viable for analysis at a later date. Prior to chemical analysis, the head, shell, appendages and vein will be removed to minimize the potential for contamination of edible portion of the shrimp.
  - ▶ *Blue crabs*: Crab samples will be submitted to the lab as whole body on wet ice. Each crab will be wrapped in aluminum foil individually, placed in a zip-lock bag and placed on wet ice. At the lab, the samples will be composited; each composite will consist of 6-12 crabs as available to make one pound. Meat tissue and the hepatopancreas (crab fat) will be analyzed separately. Hard- and soft-shelled crabs should not be combined in the same composite sample. Samples will be wrapped in aluminum foil, placed in ziplock bags and placed on wet ice unless analysis cannot be performed within 3 days of collection, in which case the sample will be frozen. Samples may be held frozen (-70deg C) and remain viable for analysis at a later date.
  - ▶ *Oysters*: Oyster samples will consist of a composite of 20 individuals as available (30 oysters if “seed-size”). Whole oysters (shell intact) will be thoroughly cleaned externally and wrapped in aluminum foil, placed in a ziplock bag and placed on wet ice for submittal to the laboratory unless analyses cannot be performed within 3 days of collection. Samples may be held frozen (-70deg C) and remain viable for analysis at a later date.

### **Data Evaluation**

The Louisiana Departments of Health and Hospitals (DHH), Environmental Quality (DEQ), Wildlife and Fisheries (DWF), and Agriculture and Forestry (DAF) are authorized to protect public health and the environment. The DHH, DEQ and DAF may recommend to the DWF and the Wildlife and Fisheries Commission (WFC) that fishing in an area be closed or regulated due to chemical contamination.

To determine if oil spill-related COC are present in seafood at levels that may pose a risk to public health, the seafood data will be evaluated in accordance with the methods described in *Draft Protocol for Issuing Public Health Advisories for Chemical Contaminants in Recreationally Caught Fish and Shellfish* (January 2010) prepared by DHH, in collaboration with DEQ, DAF and DWF.

This document is Appendix B and is available on the Internet on the DHH website: <http://www.dhh.louisiana.gov/offices/page.asp?id=205&detail=5749> and the DEQ website: <http://www.deq.louisiana.gov/portal/Default.aspx?tabid=1631>.

Specific research questions, plan of analysis and data evaluation will be performed by a panel comprised of staff from state agencies and contracted experts, and the findings and recommendations will be made publicly available through the public education component detailed in section III of this document.

### **Protocols for fish consumption advisories**

This draft protocol provides a standardized approach for the development and issuance of fish/shellfish consumption advisories in the State of Louisiana. The purpose of a consumption advisory is to reduce or eliminate possible adverse public health impacts due to the ingestion of toxic substances present in some fish and shellfish. Advisory recommendations primarily pertain to the consumption of recreationally-caught fish and shellfish. During the advisory process, information such as the species and sizes of fish/shellfish affected, the contaminants present, their concentrations and distribution within organisms, the physical, chemical and toxicological properties of the contaminants and local population consumption practices and customs are evaluated using standard risk assessment methods. The results of this evaluation are used to determine if an advisory is needed for the protection of human health.

A fish and shellfish consumption advisory is issued when sufficient chemical contamination data exists to support a recommendation to limit the amount of fish and shellfish eaten from a particular water body. When health guidelines are exceeded, restrictions on the amount and type of fish and shellfish eaten are needed to protect human health. To meet this goal, fish and shellfish consumption advisories may recommend limits on consumption of a specific type of fish and shellfish or may recommend limits on consumption by a particular population, such as pregnant and breast-feeding women. Usually, the fish and shellfish consumption advisory recommends a certain number of meals per week or month. Recommendations regarding food preparation and health effects associated with the chemicals of concern are also provided in each advisory message.

This process will also be used when the seafood/shellfish is deemed “safe” to eat or with no restrictions. DHH will be responsible for informing and advising on processes to recertify species previously under an advisory using the plan developed in Appendix B, *Protocol for Issuing Public Health Advisories for Chemical Contaminants in Recreationally Caught Fish and Shellfish*.

## *Part II. Louisiana Seafood Safety Public Education*

### **Objective**

Few things are as synonymous with Louisiana as high-quality seafood. The state produces one-third of the seafood consumed in the U.S. and the \$3 billion seafood industry is a major economic engine as well as a significant draw for tourists both domestic and international. Even as we prove, through extensive testing, that our seafood is safe when the MC 252 event subsides, it is clear there has been extensive damage to the public perception of seafood grown and harvested in Louisiana. This plan outlines an extensive effort to understand consumer behavior behind the perceptions, produce a campaign to educate the public on the safety and quality of Louisiana seafood, and monitor the effectiveness of the campaign for its duration. In effect, we will be rebranding Louisiana seafood regionally, nationally and internationally for what it was known for before the oil spill – the highest quality seafood available. Key to this initiative are the safety testing program and the certification programs contained within this plan. However, these plans are not useful if we do not have the resources to educate the public. Key audiences for the public education campaign will be determined based on the market research. This plan is not intended to simply be a broad advertising initiative, but rather, a targeted, science-based campaign designed to achieve the goal of returning public trust to our product.

### **Program Components**

#### **Research and Development**

Phase I of the plan will be an extensive study of perceptions among key audiences to include polling and surveys, as well as focus groups. It will target regional consumers and restaurants as well as consumers in our largest restaurant markets, such as Los Angeles, Chicago, Baltimore, New York, Washington D.C. and Las Vegas with a secondary survey of select smaller markets.

#### **Key strategies**

- ▶ Polling/Surveys
- ▶ Focus Groups
- ▶ Development of a creative mission statement outlining current perception, barriers to improving perception, and what program elements should be incorporated to make consumers confident in Louisiana seafood products

#### **Public education creative**

Development and production of a cohesive campaign will include television and radio spots; print and outdoor ads; field marketing through contact with opinion leaders; and appropriate digital marketing and social media networking.

#### **Ad buys**

Research will drive specifics of the ad buys and how to structure field marketing. From previous research conducted during the state's recovery from hurricane Katrina and Alaska's experience during the Exxon Valdez spill, we know key markets, such as the restaurant markets noted above, will be critical to the long-term success of rebranding Louisiana seafood. We are proposing a saturation in the key identified markets for year one with annual adjustments based on consumer research and data-gathering.

## **Database development and management**

It is critical that people are able to access safety information in a discernable and consumer-friendly format, which will require creation of consumer-friendly interpretations of the testing results for public consumption presented in a regularly-updated database of results.

In addition, given today's digital consumer, a database of where Louisiana seafood is available would allow national consumers to access the highest quality product wherever they are through social networking and app development.

## **Digital Marketing**

Efforts are underway to partner with major stakeholders, such as the Louisiana Seafood Promotion and Marketing Board, to develop a Web site and aggressive social networking and mobile media efforts to reach a broader audience.

### ***Key strategies***

- ▶ Website development and maintenance
- ▶ Social networking establishment and maintenance
- ▶ Development of mobile applications (apps) to access databases on seafood safety and availability

## **Media Relations**

In addition to media buys and digital efforts, we will tap traditional media with an aggressive outreach effort to educate them about aggressive testing for seafood safety and the quality of Louisiana seafood.

### ***Key strategies***

- ▶ Identify a firm or hire personnel to conduct outreach to primary media units
- ▶ Develop proposal to include travel for writers/producers as well as travel to national restaurant and tourism trade shows.

## **Monitoring and evaluation**

A final piece of the research component would be an ongoing monitoring of consumer perceptions and effectiveness of campaign.

### ***Key strategies***

- ▶ Polling, surveys and focus groups conducted regularly for the duration of the campaign
- ▶ Evaluation efforts will dictate ongoing changes and improvements to the campaign

## **Stakeholders/Partners**

Recognizing that it is essential that the state agencies leading the seafood safety effort do not work in isolation, we have identified key partners who would also sit on a formally-developed panel to oversee this marketing effort. They would include representatives from:

- ▶ Louisiana Department of Culture, Recreation and Tourism
- ▶ Louisiana Seafood Promotion and Marketing Board

- ▶ Louisiana Travel and Promotion Association
- ▶ Louisiana Oyster Task Force
- ▶ Louisiana Restaurant Association
- ▶ Southern Shrimp Alliance
- ▶ National Restaurant Association
- ▶ Louisiana Promotion and Research Board
- ▶ Louisiana Catfish Promotion Board
- ▶ Louisiana Coastal Conservation Association
- ▶ America's Wetlands Foundation
- ▶ The Louisiana Department of Agriculture and Forestry
- ▶ The Louisiana Department of Economic Development

### **Key Action Steps/Timeline**

- ▶ Assemble the stakeholders panel: Within one month of plan approval
- ▶ Develop requests for proposals for R&D/evaluation and monitoring components, and database development: Within one month following panel creation.
- ▶ Negotiate and finalize contracts for those components: Within two months after RFPs finalized.
- ▶ R&D work conducted and results analyzed and delivered: Within one month of contract approval.
- ▶ Databases and tools created: Within four months of contract approval.
- ▶ Creative created and produced: Within one month after initial R&D complete.
- ▶ Ad buys begin: Within six months of plan approval
- ▶ Identify vendor(s) for digital media components: Within one month of panel creation.
- ▶ Digital media development: Can begin conceptual work prior to R&D completion and development of creative, but will not be complete until creative is complete
- ▶ Identify strategy for media relations (whether to contract out with a vendor or create a temporary, full-time position on staff to handle): Within two months of panel creation.
- ▶ Develop plan for traditional media outreach: Within two months of R&D completion.
- ▶ Execute plan: Immediately at the conclusion of development of creative.
- ▶ Begin monitoring and evaluation program: As soon as ad buys begin
  - Reports and recommendations due quarterly for the first year and annually for each subsequent year.

### *Part III. Louisiana Wild Seafood Certification Program*

In an effort to improve consumer trust in Louisiana seafood, seafood products, restaurants and related businesses, the Louisiana Wild Seafood Certification Program will be created. The program allows for both Louisiana seafood harvesters and processors to certify their products based on quality control and food safety standards.

#### **What is a Louisiana Certified Harvester?**

The Louisiana Selective Harvester Program certifies seafood harvesters that are implementing food safety practices developed by university and industry scientists, food safety experts and harvesters. This voluntary program is based on State and Federal guidelines to train seafood harvesters in monitoring the quality and safety of Louisiana seafood from the time they are caught to when they are delivered to retail outlets and consumed by the public. The program will be made available to all seafood harvesters.

#### **What is a Louisiana Certified Processor?**

The Louisiana Selective Harvester Program certifies seafood processors that are implementing food safety practices developed by university and industry scientists, food safety experts and processors. This voluntary program is based on State and Federal guidelines to train seafood processors in monitoring the quality and safety of Louisiana seafood from the time they are caught to when they are delivered to retail outlets and consumed by the public. The program will be made available to all seafood shippers and processors, handlers/suppliers and retailers.

#### **Best Handling Practices**

Best Handling Practices (BHP) are part of a food safety and quality control program developed by DAF, DWF, DHH, the Louisiana State University Agricultural Center, FDA and United States Department of Agriculture (USDA) for seafood harvesters and processors. The goal is to improve product quality and reduce food-borne illness. The BHP program describes key steps that harvesters and processors can use to help reduce or minimize contamination of seafood by potential disease-causing organisms.

#### **What is involved in the program?**

The voluntary Louisiana Selective Harvester/Processor program will be a joint effort of the DAF, LSU AgCenter, DHH, DWF and Louisiana harvesters, processors, food handlers and distributors. The program begins with training for harvesters, handlers, processors and their workers on the application of BHP food safety principles to the harvesting, processing and transporting of seafood. Each participant has to complete the training before gaining entry into the program. As part of the training program, harvesters and processors will develop a business/certification plan for their operation incorporating safety and quality control principles, as well as Louisiana BHP guidelines.

**Once the participant completes the training classes, an inspector will visit the site and complete the site inspection. The location will need to qualify along with the participants.**

Once a harvester or processor feels that they have met the Louisiana BHP guidelines, a team of inspectors from the DAF inspects the operation for a review of the implementation of BHP practices.

The DAF employs specially certified inspectors to conduct inspections. The inspection covers ten main areas:

- ▶ Best Handling Practices (BHPs)
- ▶ Environmental Assessments
- ▶ Hazard Analysis and Critical Control Points (HACCP)
- ▶ Cold Chain Guidelines
- ▶ Sanitary Code
- ▶ Co-mingling
- ▶ Condition (Physical Specifications)
- ▶ Uniformity
- ▶ Weights and Measures
- ▶ Trace Back system

Hazard Analysis and Critical Control Point (HACCP) is a critical component. HACCP is a management system by which food safety is addressed through the analysis and control of biological, chemical and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product. HACCP is designed for use in all segments of the food industry from growing, harvesting, processing, manufacturing, distributing and merchandising to preparing food for consumption.

This protocol is provided to ensure a uniform and cost-effective AFDO/Alliance HACCP training program for the processing and importing of fish and fishery products for commerce in the United States. The current protocol is addressed at least annually by the Seafood HACCP Alliance Steering Committee working in collaboration with the AFDO Board of Directors and selected AFDO Committees.

Additional recommendations may be made during the inspection. Random inspections will also take place. The goal of the inspection is to confirm that the harvester and/or processor have successfully applied required BHP from the moment of capture to the final distribution of the seafood product.

After a successful inspection, the harvester and/or processor will be certified as a Louisiana Harvester and/or Processor with in the program. The location must be inspected every year in order to maintain the certification and ensure qualifications are being maintained. During the annual inspection, if a harvester and/or processor is found to be out of compliance in any of these areas, they are issued an infraction. Each infraction is recorded at one of four levels, ranging from a Minor Infraction to a Flagrant Violation. The Compliance Inspection Process provides opportunities for harvesters and/or processors to take corrective action on infractions that would not result in unsafe product entering the market. Flagrant Violations, which may lead to unsafe product entering the market, result in decertification from the program. The decertification may last up to one year depending on the violation. A harvester and/or processor can regain certification based on correction of the infractions and compliance during a correctional inspection.

**“Certified Wild Louisiana Seafood” Service Mark**

The “Certified Wild Louisiana Seafood” Service Mark, in combination with the national marketing campaign, will be a source of assurance that the product has been certified through the program to meet all quality standards from the time the product was caught to the moment it is purchased.

The “Certified Wild Louisiana Seafood” Service Mark will be carried on our member companies’ bills of lading, and may be on shipping manifests and other documents. The Service Mark will be easily recognizable to buyers of seafood. The Service Mark will ensure that the public is only buying from Certified Harvesters and Processors.

Restaurants will also be allowed to participate in this program by displaying the Service Mark if “Certified Wild Louisiana Seafood” is sold at the establishments. Restaurants participating in the program must certify that they comply with the best practice handling standards.

**What does this mean to a consumer?**

The certified harvesters and/or processors and retail establishments have taken the key steps necessary and are doing the best job they can to include preventive steps that help keep seafood safe and high quality seafood. However, food safety is still everyone’s responsibility. While there is no way to guarantee that products are always free from contamination, those implementing these best practices and achieving and maintaining BHP certification will help assure definitive steps are taken to keep food safe for the consumer.

**Louisiana Seafood Safety Response Plan Advisory Panel**

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## Appendix A: Preliminary Budget

### Budget and Justification

#### Louisiana Seafood Safety Response and Quality Certification Plan

#### Overview

The estimated twenty-year budget totals \$457,519,269, with \$276,703,354 in media purchases for the public education campaign. Year 1 includes both one-time start up costs and annual operating cost estimates as detailed in the attached budget table totaling \$44,542,933 for the four state agencies collaborating on this plan, including anticipated onetime ramp-up costs and initial public education campaign surge. Year two includes estimated ongoing expenditures, and accounts for savings that will be realized by shifting from the use of private labs for testing to the Department of Health and Hospitals/ Office of Public Health Lab, totaling \$35,458,894. Subsequent years costs assume a 3% increase annually for inflation, and reflect annual decreases in media purchases. The average estimated annual cost of this initiative is \$22,876,000.

#### Budget Justification, Year 1

(Note: Estimates for years 3-20 are based on year 2 estimates, and assume an annual inflation increase of 3%.)

#### Personnel and benefits

*Laboratory Personnel:* Salaries and benefits for 6.0 FTE's (for 6 months of year 1) lab analysts are anticipated as the DHH laboratory increases capacity to assume testing for hydrocarbons and other COC's. Subsequent years include 6.0 FTE. In addition, 2.0 FTE lab personnel are required by DAF for the certification program.

*Sample Collection Personnel:* A total of ten (10) additional FTE's (two teams of two for DHH, and two teams of three for DEQ) will be required between DHH and DWF to collect the approximately 400 shellfish, finfish, and water samples each month across 8 million acres of LA coast. Most will be trained in sensory detection techniques and will serve as the early warning system backed up by laboratory testing.

*Data management Personnel:* Three FTE data managers will be required at \$60,000 per year. Two housed at DHH (Environmental Epidemiology), and one at DEQ focusing on sediment and water data sets. One FTE data analyst (\$60,000 with 30% benefits) is required by DAF for the certification program.

*Data Evaluation:* Three FTE data analysts will be required to perform tasks in data analysis and interpretation and presentation (2.0 FTE DHH ID Epidemiology, and 1.0 FTE DEQ).

*Information Technology Analysts:* 2.0 FTE at \$70,000 will be required to develop and maintain systems to support testing, data analysis and evaluation.

*Seafood Certification Coordinator:* 1.0 DAF personnel to oversee implementation of the certification program, and

*Seafood Inspectors:* DAF 15.0 FTE at \$60,000 plus 30% benefits to conduct certification inspections.

#### Equipment

*Lab equipment:* This onetime cost includes equipment necessary to enhance lab capacity to perform hydrocarbon testing on water and tissue samples and other COC's. Estimated ongoing equipment costs include maintenance costs of \$30,000 per year.

## Appendix A: Preliminary Budget (continued)

*Vehicles:* Onetime cost of nine (9) boats with motor and trailer (\$45,000 each), and nine (9) towing vehicles (\$25,000) are required to collect and deliver samples to the laboratory. Fifteen vehicles will be purchased at \$20,000 each by DAF for certification program inspectors.

*Sampling Gear:* This includes dredges, gill nets, trawls, etc. necessary for collecting (catching) tissue samples and need to be replaced on an ongoing basis.

### Supplies

*Sampling supplies:* Includes ice chests, ice, nitrile gloves, aluminum foil, plastic bags, and other supplies needed by agencies to collect specimens according to established protocols.

### Contractual

*Data Evaluation:* Estimated annual contractual costs for academic researchers with expertise in study design, sampling statistics, toxicology, seafood safety, risk communication and social marketing.

*Laboratory Testing:* Estimated cost for tissue and water testing performed by private laboratory for one year while DHH/OPH testing capacity consistent with NOAA standards is established. Cost estimates for the DHH/OPH laboratory (starting in year 2) are based on 400 tests per month.

*Sensory Testing:* Estimated \$3000/ month for specialized seafood testing capabilities to be performed and verified by chemical testing.

*Public Education Campaign:* Estimated costs for this national campaign are detailed in the budget table and include onetime costs for initial research and assessment, development of creative, ongoing monitoring and evaluation, and resources necessary for a targeted national campaign to communicate the findings of scientific evaluation of Louisiana seafood. The costs were estimated referencing several sources, including the Alaskan response to rebuilding its seafood brand after Valdez and Louisiana's experience with rebuilding the state's brand to tourists following Hurricane Katrina. It also takes into account the need for national and international exposure through media buys and media relations, as well as the high costs of media buy in targeted restaurant markets that tend to be large media markets.

### Travel

*Fuel:* The cost for towing vehicles is estimated to be \$70/ day for 20 days/ month for each vehicle, and \$50/ day for 20 days/ month for sample collection boats.

### Other

*Data analysis, evaluation and communication infrastructure:* This cost is estimated to cover agency expenses associated with information technology infrastructure, risk communications, document production and other costs associated with operating this program.

*Software upgrades:* Periodic software upgrades are anticipated for information systems used in this initiative, including EQuIS, Starlims and other proprietary data systems.

*Vehicle maintenance costs:* estimated at \$500/ vehicle / year on average.

### Administrative Overhead

Overhead costs vary from 15-25% on personnel and contractual costs across agencies, and 2% on major purchases.

Appendix A: Preliminary Budget (continued)

**Louisiana Seafood Safety Response  
and Quality Certification Plan  
Preliminary Twenty-Year Budget Summary**

Year 1	\$	44,542,933
Year 2	\$	35,458,894
Year 3	\$	32,763,450
Year 4	\$	30,309,247
Year 5	\$	28,173,564
Year 6	\$	26,278,225
Year 7	\$	24,600,239
Year 8	\$	23,118,470
Year 9	\$	21,814,226
Year 10	\$	20,649,418
Year 11	\$	19,650,685
Year 12	\$	18,783,810
Year 13	\$	18,036,569
Year 14	\$	17,397,986
Year 15	\$	16,858,214
Year 16	\$	16,408,420
Year 17	\$	16,040,686
Year 18	\$	15,747,918
Year 19	\$	15,523,766
Year 20	\$	15,362,549
<b>Total</b>	<b>\$</b>	<b>457,519,269</b>

**Louisiana Seafood Safety Response and Quality Certification Plan**

**Appendix A: Preliminary Budget (continued)**

Louisiana Seafood Safety Response and Quality Certification Plan Preliminary Year 1 Budget									
	DHH		DWF		DEQ		DAF		Total Yr 1
	One-time	Year 1	One-time	Year 1	One-time	Year 1	One-time	Year 1	
<b>Personnel and Benefits</b>									
Laboratory		180,000						156,000	336,000
Sample Collection		350,000		300,000					650,000
Data Management		120,000				60,000		78,000	258,000
Data Evaluation		120,000							120,000
Information Technology Analysts		140,000							140,000
Seafood Certification Coordinator								110,500	110,500
Inspectors								1,170,000	1,170,000
<b>Equipment</b>									
Lab equipment and maintenance	290,100	30,000							320,100
Boats/ Motor/ Trailer	90,000		315,000						405,000
Vehicles	80,000		175,000					300,000	555,000
Sampling Gear	1,000	24,000		5,040					30,040
<b>Supplies</b>									
Sampling Supplies		5,000		9,600				16,000	30,600
<b>Contractual</b>									
Laboratory Testing (one-year contract)									
Chemistry - Water		753,600							753,600
Chemistry - Tissue		2,350,920							2,350,920
Organoleptic/ Sensory		36,000							36,000
Data Evaluation		200,000							200,000
Public Education Campaign									
R&D/Monitoring and Evaluation	250,000	200,000							450,000
Creative	1,000,000								1,000,000
Ad Buys		31,500,000							31,500,000
Database Development and Management	45,000	50,000							95,000
Digital Marketing	195,000	50,000							245,000
Media Relations		200,000							200,000
<b>Travel</b>									
Fuel - Boat		33,600		84,000					117,600
Fuel - Car		33,600		84,000				37,500	155,100
<b>Other</b>									
Data and communication infrastructure		100,000		50,000		50,000			200,000
Software Upgrades		30,000			15,000				45,000
Vehicle maintenance		2,000		3,500				7,000	12,500
Website development and maintenance								150,000	150,000
Promotional/Outreach materials								500,000	500,000
<b>Sub-Totals</b>	1,951,100	36,508,720	490,000	536,140	15,000	110,000	0	2,525,000	42,135,960
<b>Administrative Overhead</b>									
	39,022	1,882,180	9,800	80,421	300	16,500	0	378,750	2,406,973
<b>Totals</b>	1,990,122	38,390,900	499,800	616,561	15,300	126,500	0	2,903,750	
<b>Grand total year 1 cost estimate</b>									<b>44,542,933</b>

## Louisiana Seafood Safety Response and Quality Certification Plan

### Appendix A: Preliminary Budget (continued)

<b>Louisiana Seafood Safety Response and Quality Certification Plan Preliminary Budget: Year 2</b>					
	<b>DHH</b>	<b>DWF</b>	<b>DEQ</b>	<b>DAF</b>	<b>Total</b>
	Year 2	Year 2	Year 2	Year 2	Year 2
<b>Personnel and Benefits</b>					
Laboratory	360,000			156,000	516,000
Sample Collection	350,000	300,000			650,000
Data Management	120,000		60,000	78,000	258,000
Data Evaluation	120,000		60,000		180,000
Information Technology Analysts	140,000				140,000
Seafood Certification Coordinator				110,500	110,500
Inspectors				1,170,000	1,170,000
<b>Equipment</b>					
Lab equipment maintenance	30,000				30,000
Sampling Gear	24,000	5,040			29,040
<b>Supplies</b>					
Sampling Supplies	5,000	9,600		16,000	30,600
Laboratory supplies	440,972				440,972
<b>Contractual</b>					
Data Evaluation	200,000				200,000
Organoleptic/ Sensory	36,000				36,000
Public Education Campaign					
R&D/Monitoring and Evaluation	50,000				50,000
Ad Buys	28,350,000				28,350,000
Creative	39,474				39,474
Database Development and Management	50,000				50,000
Digital Marketing	50,000				50,000
Media Relations	200,000				200,000
<b>Travel</b>					
Fuel - Boat	33,600	84,000			117,600
Fuel - Car/ Truck	33,600	84,000		37,500	155,100
<b>Other</b>					
Data analysis and evaluation infrastructure	150,000	75,000	100,000		325,000
Software Upgrades	30,000				30,000
Vehicle maintenance	2,000		7,000	7,000	16,000
Website development and maintenance				150,000	150,000
Promotional/Outreach materials				500,000	500,000
<b>Sub-Totals</b>	<b>30,814,646</b>	<b>557,640</b>	<b>227,000</b>	<b>2,225,000</b>	<b>33,824,286</b>
<b>Administrative Overhead</b>	<b>1,183,162</b>	<b>83,646</b>	<b>34,050</b>	<b>333,750</b>	<b>1,634,608</b>
<b>Grand Total</b>	<b>31,997,808</b>	<b>641,286</b>	<b>261,050</b>	<b>2,558,750</b>	<b>35,458,894</b>

Appendix A: Preliminary Budget (continued)

Louisiana Seafood Safety Response and Quality Certification Plan Preliminary Budget: Year 3					
	DHH	DWF	DEQ	DAF	Total
	Year 3	Year 3	Year 3	Year 3	Year 3
<b>Personnel and Benefits</b>					
Laboratory	370,800			160,680	531,480
Sample Collection	360,500	309,000			669,500
Data Management	123,600		61,800	80,340	265,740
Data Evaluation	123,600		61,800		185,400
Information Technology Analysts	144,200				144,200
Seafood Certification Coordinator				113,815	113,815
Inspectors				1,205,100	1,205,100
<b>Equipment</b>					
Lab equipment maintenance	30,900				30,900
Sampling Gear	24,720	5,191			29,911
<b>Supplies</b>					
Sampling Supplies	5,150	9,888		16,480	31,518
Laboratory supplies	454,201				454,201
<b>Contractual</b>					
Data Evaluation	206,000				206,000
Organoleptic/ Sensory	37,080				37,080
Public Education Campaign					
R&D/Monitoring and Evaluation	51,500				51,500
Ad Buys	25,515,000				25,515,000
Creative	40,658				40,658
Database Development and Management	51,500				51,500
Digital Marketing	51,500				51,500
Media Relations	206,000				206,000
<b>Travel</b>					
Fuel - Boat	34,608	86,520			121,128
Fuel - Car/ Truck	34,608	86,520		38,625	159,753
<b>Other</b>					
Data analysis and evaluation infrastructure	154,500	77,250	103,000		334,750
Software Upgrades	30,900				30,900
Vehicle maintenance	2,060		7,210	7,210	16,480
Website development and maintenance				154,500	154,500
Promotional/Outreach materials				515,000	515,000
<b>Sub-Total</b>	<b>28,053,585</b>	<b>574,369</b>	<b>233,810</b>	<b>2,291,750</b>	<b>31,153,515</b>
<b>Administrative Overhead</b>	<b>1,144,946</b>	<b>86,155</b>	<b>35,072</b>	<b>343,763</b>	<b>1,609,936</b>
<b>Grand Total</b>	<b>29,198,532</b>	<b>660,525</b>	<b>268,882</b>	<b>2,635,513</b>	<b>32,763,450</b>

Louisiana Seafood Safety Response and Quality Certification Plan

Appendix A: Preliminary Budget (continued)

Louisiana Seafood Safety Response and Quality Certification Plan Preliminary Budget: Year 4					
	DHH	DWF	DEQ	DAF	Total
	Year 4	Year 4	Year 4	Year 4	Year 4
<b>Personnel and Benefits</b>					
Laboratory	381,924			160,680	542,604
Sample Collection	371,315	318,270			689,585
Data Management	127,308		63,654	80,340	271,302
Data Evaluation	127,308		63,654		190,962
Information Technology Analysts	148,526				148,526
Seafood Certification Coordinator				113,815	113,815
Inspectors				1,205,100	1,205,100
<b>Equipment</b>					
Lab equipment maintenance	31,827				31,827
Sampling Gear	25,462	5,347			30,809
<b>Supplies</b>					
Sampling Supplies	5,305	10,185		16,974	32,464
Laboratory supplies	467,827				467,827
<b>Contractual</b>					
Data Evaluation	212,180				212,180
Organoleptic/ Sensory	38,192				38,192
Public Education Campaign					
R&D/Monitoring and Evaluation	53,045				53,045
Ad Buys	22,963,500				22,963,500
Creative	41,878				41,878
Database Development and Management	53,045				53,045
Digital Marketing	53,045				53,045
Media Relations	212,180				212,180
<b>Travel</b>					
Fuel - Boat	35,646	89,116			124,762
Fuel - Car/ Truck	35,646	89,116		39,784	164,546
<b>Other</b>					
Data analysis and evaluation infrastructure	159,135	79,568	106,090		344,793
Software Upgrades	31,827				31,827
Vehicle maintenance	2,122		7,426	7,426	16,974
Website development and maintenance				159,135	159,135
Promotional/Outreach materials				530,450	530,450
<b>Sub-Total</b>	<b>25,578,243</b>	<b>591,600</b>	<b>240,824</b>	<b>2,313,704</b>	<b>28,724,372</b>
<b>Administrative Overhead</b>	<b>1,112,956</b>	<b>88,740</b>	<b>36,124</b>	<b>347,056</b>	<b>1,584,875</b>
<b>Grand Total</b>	<b>26,691,199</b>	<b>680,340</b>	<b>276,948</b>	<b>2,660,760</b>	<b>30,309,247</b>

Appendix A: Preliminary Budget (continued)

Louisiana Seafood Safety Response and Quality Certification Plan Preliminary Budget: Year 5					
	DHH	DWF	DEQ	DAF	Total
	Year 5	Year 5	Year 5	Year 5	Year 5
<b>Personnel and Benefits</b>					
Laboratory	393,382			165,500	558,882
Sample Collection	382,454	327,818			710,273
Data Management	131,127		65,564	82,750	279,441
Data Evaluation	131,127		65,564		196,691
Information Technology Analysts	152,982				152,982
Seafood Certification Coordinator				117,229	117,229
Inspectors				1,241,253	1,241,253
<b>Equipment</b>					
Lab equipment maintenance	32,782				32,782
Sampling Gear	26,225	5,507			31,733
<b>Supplies</b>					
Sampling Supplies	5,464	10,490		17,484	33,437
Laboratory supplies	481,862				481,862
<b>Contractual</b>					
Data Evaluation	218,545				218,545
Organoleptic/ Sensory	39,338				39,338
Public Education Campaign					
R&D/Monitoring and Evaluation	54,636				54,636
Ad Buys	20,667,150				20,667,150
Creative	43,134				43,134
Database Development and Management	54,636				54,636
Digital Marketing	54,636				54,636
Media Relations	218,545				218,545
<b>Travel</b>					
Fuel - Boat	36,716	91,789			128,505
Fuel - Car/ Truck	36,716	91,789		40,977	169,482
<b>Other</b>					
Data analysis and evaluation infrastructure	163,909	81,955	109,273		355,136
Software Upgrades	32,782				32,782
Vehicle maintenance	2,185		7,649	7,649	17,484
Website development and maintenance				163,909	163,909
Promotional/Outreach materials				546,364	546,364
<b>Sub-Total</b>	<b>23,360,335</b>	<b>609,348</b>	<b>248,049</b>	<b>2,383,116</b>	<b>26,600,848</b>
<b>Administrative Overhead</b>	<b>1,086,639</b>	<b>91,402</b>	<b>37,207</b>	<b>357,467</b>	<b>1,572,716</b>
<b>Grand Total</b>	<b>24,446,975</b>	<b>700,751</b>	<b>285,256</b>	<b>2,740,583</b>	<b>28,173,564</b>

Appendix A: Preliminary Budget (continued)

<b>Louisiana Seafood Safety Response and Quality Certification Plan Preliminary Budget: Year 6</b>					
	<b>DHH</b>	<b>DWF</b>	<b>DEQ</b>	<b>DAF</b>	<b>Total</b>
	Year 6	Year 6	Year 6	Year 6	Year 6
<b>Personnel and Benefits</b>					
Laboratory	405,183			170,465	575,649
Sample Collection	393,928	337,653			731,581
Data Management	135,061		67,531	85,233	287,824
Data Evaluation	135,061		67,531		202,592
Information Technology Analysts	157,571				157,571
Seafood Certification Coordinator				120,746	120,746
Inspectors				1,278,491	1,278,491
<b>Equipment</b>					
Lab equipment maintenance	33,765				33,765
Sampling Gear	27,012	5,673			32,685
<b>Supplies</b>					
Sampling Supplies	5,628	10,805		18,008	34,441
Laboratory supplies	496,318				496,318
<b>Contractual</b>					
Data Evaluation	225,102				225,102
Organoleptic/ Sensory	40,518				40,518
Public Education Campaign					
R&D/Monitoring and Evaluation	56,275				56,275
Ad Buys	18,600,435				18,600,435
Creative	44,428				44,428
Database Development and Management	56,275				56,275
Digital Marketing	56,275				56,275
Media Relations	225,102				225,102
<b>Travel</b>					
Fuel - Boat	37,817	94,543			132,360
Fuel - Car/ Truck	37,817	94,543		42,207	174,566
<b>Other</b>					
Data analysis and evaluation infrastructure	168,826	84,413	112,551		365,790
Software Upgrades	33,765				33,765
Vehicle maintenance	2,185		7,879	7,879	17,943
Website development and maintenance				168,826	168,826
Promotional/Outreach materials				562,754	562,754
<b>Sub-Total</b>	<b>21,374,350</b>	<b>627,629</b>	<b>255,490</b>	<b>2,454,609</b>	<b>24,712,079</b>
<b>Administrative Overhead</b>	<b>1,065,488</b>	<b>94,144</b>	<b>38,324</b>	<b>368,191</b>	<b>1,566,147</b>
<b>Grand Total</b>	<b>22,439,838</b>	<b>721,773</b>	<b>293,814</b>	<b>2,822,800</b>	<b>26,278,225</b>

Appendix A: Preliminary Budget (continued)

Louisiana Seafood Safety Response and Quality Certification Plan Preliminary Budget: Year 7					
	DHH	DWF	DEQ	DAF	Total
	Year 7	Year 7	Year 7	Year 7	Year 7
<b>Personnel and Benefits</b>					
Laboratory	417,339			175,579	592,918
Sample Collection	405,746	347,782			753,528
Data Management	139,113		69,556	87,790	296,459
Data Evaluation	139,113		69,556		208,669
Information Technology Analysts	162,298				162,298
Seafood Certification Coordinator				124,369	124,369
Inspectors				1,316,845	1,316,845
<b>Equipment</b>					
Lab equipment maintenance	34,778				34,778
Sampling Gear	27,823	5,843			33,665
<b>Supplies</b>					
Sampling Supplies	5,796	11,129		18,548	35,474
Laboratory supplies	511,207				511,207
<b>Contractual</b>					
Data Evaluation	231,855				231,855
Organoleptic/ Sensory	41,734				41,734
Public Education Campaign					
R&D/Monitoring and Evaluation	57,964				57,964
Ad Buys	16,740,392				16,740,392
Creative	45,761				45,761
Database Development and Management	57,964				57,964
Digital Marketing	57,964				57,964
Media Relations	231,855				231,855
<b>Travel</b>					
Fuel - Boat	38,952	97,379			136,331
Fuel - Car/ Truck	38,952	97,379		43,473	179,803
<b>Other</b>					
Data analysis and evaluation infrastructure	173,891	86,946	115,927		376,764
Software Upgrades	34,778				34,778
Vehicle maintenance	2,319		8,115	8,115	18,548
Website development and maintenance				173,891	173,891
Promotional/Outreach materials				579,637	579,637
<b>Sub-Total</b>	<b>19,597,592</b>	<b>646,458</b>	<b>263,155</b>	<b>2,528,247</b>	<b>23,035,452</b>
<b>Administrative Overhead</b>	<b>1,049,108</b>	<b>96,969</b>	<b>39,473</b>	<b>379,237</b>	<b>1,564,787</b>
<b>Grand Total</b>	<b>20,646,700</b>	<b>743,426</b>	<b>302,628</b>	<b>2,907,484</b>	<b>24,600,239</b>

Louisiana Seafood Safety Response and Quality Certification Plan

Appendix A: Preliminary Budget (continued)

Louisiana Seafood Safety Response and Quality Certification Plan Preliminary Budget: Year 8					
	DHH	DWF	DEQ	DAF	Total
	Year 8	Year 8	Year 8	Year 8	Year 8
<b>Personnel and Benefits</b>					
Laboratory	429,859			180,847	610,706
Sample Collection	417,918	358,216			776,134
Data Management	143,286		71,643	90,423	305,353
Data Evaluation	143,286		71,643		214,929
Information Technology Analysts	167,167				167,167
Seafood Certification Coordinator				128,100	128,100
Inspectors				1,356,351	1,356,351
<b>Equipment</b>					
Lab equipment maintenance	35,822				35,822
Sampling Gear	28,657	6,018			34,675
<b>Supplies</b>					
Sampling Supplies	5,970	11,463		19,105	36,538
Laboratory supplies	526,544				526,544
<b>Contractual</b>					
Data Evaluation	238,810				238,810
Organoleptic/ Sensory	42,986				42,986
Public Education Campaign					
R&D/Monitoring and Evaluation	59,703				59,703
Ad Buys	15,066,352				15,066,352
Creative	47,134				47,134
Database Development and Management	59,703				59,703
Digital Marketing	59,703				59,703
Media Relations	238,810				238,810
<b>Travel</b>					
Fuel - Boat	40,120	100,300			140,421
Fuel - Car/ Truck	40,120	100,300		44,777	185,198
<b>Other</b>					
Data analysis and evaluation infrastructure	179,108	89,554	119,405		388,067
Software Upgrades	35,822				35,822
Vehicle maintenance	2,388		8,358	8,358	19,105
Website development and maintenance				179,108	179,108
Promotional/Outreach materials				597,026	597,026
<b>Sub-Total</b>	<b>18,009,268</b>	<b>665,851</b>	<b>271,050</b>	<b>2,604,095</b>	<b>21,550,264</b>
<b>Administrative Overhead</b>	<b>1,037,056</b>	<b>99,878</b>	<b>40,657</b>	<b>390,614</b>	<b>1,568,205</b>
<b>Grand Total</b>	<b>19,046,324</b>	<b>765,729</b>	<b>311,707</b>	<b>2,994,709</b>	<b>23,118,470</b>

Appendix A: Preliminary Budget (continued)

Louisiana Seafood Safety Response and Quality Certification Plan Preliminary Budget: Year 9					
	DHH	DWF	DEQ	DAF	Total
	Year 9	Year 9	Year 9	Year 9	Year 9
<b>Personnel and Benefits</b>					
Laboratory	442,755			186,272	629,027
Sample Collection	430,456	368,962			799,418
Data Management	147,585		73,792	93,136	314,513
Data Evaluation	147,585		73,792		221,377
Information Technology Analysts	172,182				172,182
Seafood Certification Coordinator				131,943	131,943
Inspectors				1,397,041	1,397,041
<b>Equipment</b>					
Lab equipment maintenance	36,896				36,896
Sampling Gear	29,517	6,199			35,716
<b>Supplies</b>					
Sampling Supplies	6,149	11,807		19,678	37,634
Laboratory supplies	542,340				542,340
<b>Contractual</b>					
Data Evaluation	245,975				245,975
Organoleptic/ Sensory	44,275				44,275
Public Education Campaign					
R&D/Monitoring and Evaluation	61,494				61,494
Ad Buys	13,559,717				13,559,717
Creative	48,548				48,548
Database Development and Management	61,494				61,494
Digital Marketing	61,494				61,494
Media Relations	245,975				245,975
<b>Travel</b>					
Fuel - Boat	41,324	103,309			144,633
Fuel - Car/ Truck	41,324	103,309		46,120	190,753
<b>Other</b>					
Data analysis and evaluation infrastructure	184,481	92,241	122,987		399,709
Software Upgrades	36,896				36,896
Vehicle maintenance	2,460		8,609	8,609	19,678
Website development and maintenance				184,481	184,481
Promotional/Outreach materials				614,937	614,937
<b>Sub-Total</b>	<b>16,590,921</b>	<b>685,827</b>	<b>279,181</b>	<b>2,682,218</b>	<b>20,238,147</b>
<b>Administrative Overhead</b>	<b>1,028,995</b>	<b>102,874</b>	<b>41,877</b>	<b>402,333</b>	<b>1,576,079</b>
<b>Grand Total</b>	<b>17,619,916</b>	<b>788,701</b>	<b>321,059</b>	<b>3,084,550</b>	<b>21,814,226</b>

## Louisiana Seafood Safety Response and Quality Certification Plan

### Appendix A: Preliminary Budget (continued)

<b>Louisiana Seafood Safety Response and Quality Certification Plan Preliminary Budget: Year 10</b>					
	<b>DHH</b>	<b>DWF</b>	<b>DEQ</b>	<b>DAF</b>	<b>Total</b>
	Year 10	Year 10	Year 10	Year 10	Year 10
<b>Personnel and Benefits</b>					
Laboratory	456,037			191,860	647,898
Sample Collection	443,370	380,031			823,401
Data Management	152,012		76,006	95,930	323,949
Data Evaluation	152,012		76,006		228,019
Information Technology Analysts	177,348				177,348
Seafood Certification Coordinator				135,901	135,901
Inspectors				1,438,952	1,438,952
<b>Equipment</b>					
Lab equipment maintenance	38,003				38,003
Sampling Gear	30,402	6,385			36,787
<b>Supplies</b>					
Sampling Supplies	6,334	12,161		20,268	38,763
Laboratory supplies	558,610				558,610
<b>Contractual</b>					
Data Evaluation	253,354				253,354
Organoleptic/ Sensory	45,604				45,604
Public Education Campaign					
R&D/Monitoring and Evaluation	63,339				63,339
Ad Buys	12,203,745				12,203,745
Creative	50,004				50,004
Database Development and Management	63,339				63,339
Digital Marketing	63,339				63,339
Media Relations	253,354				253,354
<b>Travel</b>					
Fuel - Boat	42,563	106,409			148,972
Fuel - Car/ Truck	42,563	106,409		47,504	196,476
<b>Other</b>					
Data analysis and evaluation infrastructure	190,016	95,008	126,677		411,700
Software Upgrades	38,003				38,003
Vehicle maintenance	2,534		8,867	8,867	20,268
Website development and maintenance				190,016	190,016
Promotional/Outreach materials				614,937	614,937
<b>Sub-Total</b>	<b>15,325,885</b>	<b>706,402</b>	<b>287,557</b>	<b>2,744,236</b>	<b>19,064,079</b>
<b>Administrative Overhead</b>	<b>1,024,610</b>	<b>105,960</b>	<b>43,134</b>	<b>411,635</b>	<b>1,585,339</b>
<b>Grand Total</b>	<b>16,350,495</b>	<b>812,362</b>	<b>330,690</b>	<b>3,155,871</b>	<b>20,649,418</b>

Appendix A: Preliminary Budget (continued)

Louisiana Seafood Safety Response and Quality Certification Plan Preliminary Budget: Year 11					
	DHH	DWF	DEQ	DAF	Total
	Year 11	Year 11	Year 11	Year 11	Year 11
<b>Personnel and Benefits</b>					
Laboratory	469,718			197,616	667,334
Sample Collection	456,671	391,432			848,103
Data Management	156,573		78,286	98,808	333,667
Data Evaluation	156,573		78,286		234,859
Information Technology Analysts	182,668				182,668
Seafood Certification Coordinator				139,978	139,978
Inspectors				1,482,121	1,482,121
<b>Equipment</b>					
Lab equipment maintenance	39,143				39,143
Sampling Gear	31,315	6,576			37,891
<b>Supplies</b>					
Sampling Supplies	6,524	12,526		20,876	39,926
Laboratory supplies	575,368				575,368
<b>Contractual</b>					
Data Evaluation	260,955				260,955
Organoleptic/ Sensory	46,972				46,972
Public Education Campaign					
R&D/Monitoring and Evaluation	65,239				65,239
Ad Buys	10,983,371				10,983,371
Creative	51,505				51,505
Database Development and Management	65,239				65,239
Digital Marketing	65,239				65,239
Media Relations	260,955				260,955
<b>Travel</b>					
Fuel - Boat	43,840	109,601			153,441
Fuel - Car/ Truck	43,840	109,601		48,929	202,370
<b>Other</b>					
Data analysis and evaluation infrastructure	195,716	97,858	130,477		424,051
Software Upgrades	39,143				39,143
Vehicle maintenance	2,610		9,133	9,133	20,876
Website development and maintenance				195,716	195,716
Promotional/Outreach materials				633,385	633,385
<b>Sub-Total</b>	<b>14,199,175</b>	<b>727,594</b>	<b>296,184</b>	<b>2,826,563</b>	<b>18,049,515</b>
<b>Administrative Overhead</b>	<b>1,023,618</b>	<b>109,139</b>	<b>44,428</b>	<b>423,984</b>	<b>1,601,169</b>
<b>Grand Total</b>	<b>15,222,793</b>	<b>836,733</b>	<b>340,611</b>	<b>3,250,548</b>	<b>19,650,685</b>

## Louisiana Seafood Safety Response and Quality Certification Plan

### Appendix A: Preliminary Budget (continued)

Louisiana Seafood Safety Response and Quality Certification Plan Preliminary Budget: Year 12					
	DHH	DWF	DEQ	DAF	Total
	Year 12	Year 12	Year 12	Year 12	Year 12
<b>Personnel and Benefits</b>					
Laboratory	483,810			203,545	687,355
Sample Collection	470,371	403,175			873,546
Data Management	161,270		80,635	101,772	343,677
Data Evaluation	161,270		80,635		241,905
Information Technology Analysts	188,148				188,148
Seafood Certification Coordinator				144,177	144,177
Inspectors				1,526,585	1,526,585
<b>Equipment</b>					
Lab equipment maintenance	40,317				40,317
Sampling Gear	32,254	6,773			39,027
<b>Supplies</b>					
Sampling Supplies	6,720	12,902		21,503	41,124
Laboratory supplies	592,629				592,629
<b>Contractual</b>					
Data Evaluation	268,783				268,783
Organoleptic/ Sensory	48,381				48,381
Public Education Campaign					
R&D/Monitoring and Evaluation	67,196				67,196
Ad Buys	9,885,034				9,885,034
Creative	53,050				53,050
Database Development and Management	67,196				67,196
Digital Marketing	67,196				67,196
Media Relations	268,783				268,783
<b>Travel</b>					
Fuel - Boat	45,156	112,889			158,045
Fuel - Car/ Truck	45,156	112,889		50,397	208,441
<b>Other</b>					
Data analysis and evaluation infrastructure	201,587	100,794	134,392		436,773
Software Upgrades	40,317				40,317
Vehicle maintenance	2,688		9,407	9,407	21,503
Website development and maintenance				201,587	201,587
Promotional/Outreach materials				652,387	652,387
<b>Sub-Total</b>	<b>13,197,312</b>	<b>749,422</b>	<b>305,069</b>	<b>2,911,360</b>	<b>17,163,163</b>
<b>Administrative Overhead</b>	<b>1,025,770</b>	<b>112,413</b>	<b>45,760</b>	<b>436,704</b>	<b>1,620,648</b>
<b>Grand Total</b>	<b>14,223,082</b>	<b>861,835</b>	<b>350,829</b>	<b>3,348,064</b>	<b>18,783,810</b>

Appendix A: Preliminary Budget (continued)

<b>Louisiana Seafood Safety Response and Quality Certification Plan Preliminary Budget: Year 13</b>					
	<b>DHH</b>	<b>DWF</b>	<b>DEQ</b>	<b>DAF</b>	<b>Total</b>
	Year 13	Year 13	Year 13	Year 13	Year 13
<b>Personnel and Benefits</b>					
Laboratory	498,324			209,651	707,975
Sample Collection	484,482	415,270			899,752
Data Management	166,108		83,054	104,825	353,988
Data Evaluation	166,108		83,054		249,162
Information Technology Analysts	193,793				193,793
Seafood Certification Coordinator				148,503	148,503
Inspectors				1,572,382	1,572,382
<b>Equipment</b>					
Lab equipment maintenance	41,527				41,527
Sampling Gear	33,222	6,977			40,198
<b>Supplies</b>					
Sampling Supplies	6,921	13,289		22,148	42,358
Laboratory supplies	610,408				610,408
<b>Contractual</b>					
Data Evaluation	276,847				276,847
Organoleptic/ Sensory	49,832				49,832
Public Education Campaign					
R&D/Monitoring and Evaluation	69,212				69,212
Ad Buys	8,896,530				8,896,530
Creative	54,641				54,641
Database Development and Management	69,212				69,212
Digital Marketing	69,212				69,212
Media Relations	276,847				276,847
<b>Travel</b>					
Fuel - Boat	46,510	116,276			162,786
Fuel - Car/ Truck	46,510	116,276		51,909	214,695
<b>Other</b>					
Data analysis and evaluation infrastructure	207,635	103,818	138,423		449,876
Software Upgrades	41,527				41,527
Vehicle maintenance	2,768		9,690	9,690	22,148
Website development and maintenance				207,635	207,635
Promotional/Outreach materials				671,958	671,958
<b>Sub-Total</b>	<b>12,308,176</b>	<b>771,904</b>	<b>314,221</b>	<b>2,998,701</b>	<b>16,393,003</b>
<b>Administrative Overhead</b>	<b>1,030,842</b>	<b>115,786</b>	<b>47,133</b>	<b>449,805</b>	<b>1,643,566</b>
<b>Grand Total</b>	<b>13,339,019</b>	<b>887,690</b>	<b>361,354</b>	<b>3,448,506</b>	<b>18,036,569</b>

Louisiana Seafood Safety Response and Quality Certification Plan

Appendix A: Preliminary Budget (continued)

Louisiana Seafood Safety Response and Quality Certification Plan Preliminary Budget: Year 14					
	DHH	DWF	DEQ	DAF	Total
	Year 14	Year 14	Year 14	Year 14	Year 14
<b>Personnel and Benefits</b>					
Laboratory	513,274			215,940	729,214
Sample Collection	499,016	427,728			926,745
Data Management	171,091		85,546	107,970	364,607
Data Evaluation	171,091		85,546		256,637
Information Technology Analysts	199,607				199,607
Seafood Certification Coordinator				152,958	152,958
Inspectors				1,619,554	1,619,554
<b>Equipment</b>					
Lab equipment maintenance	42,773				42,773
Sampling Gear	34,218	7,186			41,404
<b>Supplies</b>					
Sampling Supplies	7,129	13,687		22,812	43,628
Laboratory supplies	628,721				628,721
<b>Contractual</b>					
Data Evaluation	285,152				285,152
Organoleptic/ Sensory	51,327				51,327
Public Education Campaign					
R&D/Monitoring and Evaluation	71,288				71,288
Ad Buys	8,006,877				8,006,877
Creative	56,280				56,280
Database Development and Management	71,288				71,288
Digital Marketing	71,288				71,288
Media Relations	285,152				285,152
<b>Travel</b>					
Fuel - Boat	47,906	119,764			167,669
Fuel - Car/ Truck	47,906	119,764		53,466	221,136
<b>Other</b>					
Data analysis and evaluation infrastructure	213,864	106,932	142,576		463,372
Software Upgrades	42,773				42,773
Vehicle maintenance	2,852		9,980	9,980	22,812
Website development and maintenance				213,864	213,864
Promotional/Outreach materials				692,117	692,117
<b>Sub-Total</b>	<b>11,520,873</b>	<b>795,061</b>	<b>323,648</b>	<b>3,088,662</b>	<b>15,728,244</b>
<b>Administrative Overhead</b>	<b>1,038,637</b>	<b>119,259</b>	<b>48,547</b>	<b>463,299</b>	<b>1,669,742</b>
<b>Grand Total</b>	<b>12,559,509</b>	<b>914,320</b>	<b>372,195</b>	<b>3,551,961</b>	<b>17,397,986</b>

Appendix A: Preliminary Budget (continued)

Louisiana Seafood Safety Response and Quality Certification Plan Preliminary Budget: Year 15					
	DHH	DWF	DEQ	DAF	Total
	Year 15	Year 15	Year 15	Year 15	Year 15
<b>Personnel and Benefits</b>					
Laboratory	528,672			222,419	751,091
Sample Collection	513,987	440,560			954,547
Data Management	176,224		88,112	111,209	375,545
Data Evaluation	176,224		88,112		264,336
Information Technology Analysts	205,595				205,595
Seafood Certification Coordinator				157,547	157,547
Inspectors				1,668,140	1,668,140
<b>Equipment</b>					
Lab equipment maintenance	44,056				44,056
Sampling Gear	35,245	7,401			42,646
<b>Supplies</b>					
Sampling Supplies	7,343	14,098		23,497	44,937
Laboratory supplies	647,582				647,582
<b>Contractual</b>					
Data Evaluation	293,707				293,707
Organoleptic/ Sensory	52,867				52,867
Public Education Campaign					
R&D/Monitoring and Evaluation	73,427				73,427
Ad Buys	7,206,190				7,206,190
Creative	57,969				57,969
Database Development and Management	73,427				73,427
Digital Marketing	73,427				73,427
Media Relations	293,707				293,707
<b>Travel</b>					
Fuel - Boat	49,343	123,357			172,700
Fuel - Car/ Truck	49,343	123,357		55,070	227,770
<b>Other</b>					
Data analysis and evaluation infrastructure	220,280	110,140	146,853		477,273
Software Upgrades	44,056				44,056
Vehicle maintenance	2,937		10,280	10,280	23,497
Website development and maintenance				220,280	220,280
Promotional/Outreach materials				712,880	712,880
<b>Sub-Total</b>	10,825,606	818,913	333,357	3,181,322	15,159,198
<b>Administrative Overhead</b>	1,048,978	122,837	50,004	477,198	1,699,017
<b>Grand Total</b>	11,874,583	941,750	383,361	3,658,520	16,858,214

Louisiana Seafood Safety Response and Quality Certification Plan

Appendix A: Preliminary Budget (continued)

Louisiana Seafood Safety Response and Quality Certification Plan Preliminary Budget: Year 16					
	DHH	DWF	DEQ	DAF	Total
	Year 16	Year 16	Year 16	Year 16	Year 16
<b>Personnel and Benefits</b>					
Laboratory	544,532			229,091	773,624
Sample Collection	529,406	453,777			983,183
Data Management	181,511		90,755	114,546	386,812
Data Evaluation	181,511		90,755		272,266
Information Technology Analysts	211,763				211,763
Seafood Certification Coordinator				162,273	162,273
Inspectors				1,718,184	1,718,184
<b>Equipment</b>					
Lab equipment maintenance	45,378				45,378
Sampling Gear	36,302	7,623			43,926
<b>Supplies</b>					
Sampling Supplies	7,563	14,521		24,201	46,285
Laboratory supplies	667,010				667,010
<b>Contractual</b>					
Data Evaluation	302,518				302,518
Organoleptic/ Sensory	54,453				54,453
Public Education Campaign					
R&D/Monitoring and Evaluation	75,629				75,629
Ad Buys	6,485,571				6,485,571
Creative	59,708				59,708
Database Development and Management	75,629				75,629
Digital Marketing	75,629				75,629
Media Relations	302,518				302,518
<b>Travel</b>					
Fuel - Boat	50,823	127,058			177,881
Fuel - Car/ Truck	50,823	127,058		56,722	234,603
<b>Other</b>					
Data analysis and evaluation infrastructure	226,888	113,444	151,259		491,592
Software Upgrades	45,378				45,378
Vehicle maintenance	3,025		10,588	10,588	24,201
Website development and maintenance				226,888	226,888
Promotional/Outreach materials				734,267	734,267
<b>Sub-Total</b>	<b>10,213,569</b>	<b>843,481</b>	<b>343,358</b>	<b>3,276,761</b>	<b>14,677,169</b>
<b>Administrative Overhead</b>	<b>1,061,711</b>	<b>126,522</b>	<b>51,504</b>	<b>491,514</b>	<b>1,731,251</b>
<b>Grand Total</b>	<b>11,275,280</b>	<b>970,003</b>	<b>394,862</b>	<b>3,768,275</b>	<b>16,408,420</b>

Appendix A: Preliminary Budget (continued)

<b>Louisiana Seafood Safety Response and Quality Certification Plan Preliminary Budget: Year 17</b>					
	<b>DHH</b>	<b>DWF</b>	<b>DEQ</b>	<b>DAF</b>	<b>Total</b>
	Year 17	Year 17	Year 17	Year 17	Year 17
<b>Personnel and Benefits</b>					
Laboratory	560,868			235,964	796,832
Sample Collection	545,289	467,390			1,012,679
Data Management	186,956		93,478	117,982	398,416
Data Evaluation	186,956		93,478		280,434
Information Technology Analysts	218,115				218,115
Seafood Certification Coordinator				167,141	167,141
Inspectors				1,769,730	1,769,730
<b>Equipment</b>					
Lab equipment maintenance	46,739				46,739
Sampling Gear	37,391	7,852			45,243
<b>Supplies</b>					
Sampling Supplies	7,790	14,956		24,927	47,674
Laboratory supplies	687,020				687,020
<b>Contractual</b>					
Data Evaluation	311,593				311,593
Organoleptic/ Sensory	56,087				56,087
Public Education Campaign					
R&D/Monitoring and Evaluation	77,898				77,898
Ad Buys	5,837,014				5,837,014
Creative	61,499				61,499
Database Development and Management	77,898				77,898
Digital Marketing	77,898				77,898
Media Relations	311,593				311,593
<b>Travel</b>					
Fuel - Boat	52,348	130,869			183,217
Fuel - Car/ Truck	52,348	130,869		58,424	241,641
<b>Other</b>					
Data analysis and evaluation infrastructure	233,695	116,848	155,797		506,339
Software Upgrades	46,739				46,739
Vehicle maintenance	3,116		10,906	10,906	24,927
Website development and maintenance				233,695	233,695
Promotional/Outreach materials				756,295	756,295
<b>Sub-Total</b>	<b>9,676,852</b>	<b>868,785</b>	<b>353,659</b>	<b>3,375,064</b>	<b>14,274,360</b>
<b>Administrative Overhead</b>	<b>1,076,700</b>	<b>130,318</b>	<b>53,049</b>	<b>506,260</b>	<b>1,766,326</b>
<b>Grand Total</b>	<b>10,753,552</b>	<b>999,103</b>	<b>406,707</b>	<b>3,881,324</b>	<b>16,040,686</b>

Louisiana Seafood Safety Response and Quality Certification Plan

Appendix A: Preliminary Budget (continued)

Louisiana Seafood Safety Response and Quality Certification Plan Preliminary Budget: Year 18					
	DHH	DWF	DEQ	DAF	Total
	Year 18	Year 18	Year 18	Year 18	Year 18
<b>Personnel and Benefits</b>					
Laboratory	577,694			243,043	820,737
Sample Collection	561,647	481,412			1,043,059
Data Management	192,565		96,282	121,521	410,369
Data Evaluation	192,565		96,282		288,847
Information Technology Analysts	224,659				224,659
Seafood Certification Coordinator				172,155	172,155
Inspectors				1,822,822	1,822,822
<b>Equipment</b>					
Lab equipment maintenance	48,141				48,141
Sampling Gear	38,513	8,088			46,601
<b>Supplies</b>					
Sampling Supplies	8,024	15,405		25,675	49,104
Laboratory supplies	707,631				707,631
<b>Contractual</b>					
Data Evaluation	320,941				320,941
Organoleptic/ Sensory	57,769				57,769
Public Education Campaign					
R&D/Monitoring and Evaluation	80,235				80,235
Ad Buys	5,253,312				5,253,312
Creative	63,344				63,344
Database Development and Management	80,235				80,235
Digital Marketing	80,235				80,235
Media Relations	320,941				320,941
<b>Travel</b>					
Fuel - Boat	53,918	134,795			188,713
Fuel - Car/ Truck	53,918	134,795		60,176	248,890
<b>Other</b>					
Data analysis and evaluation infrastructure	240,706	120,353	160,471		521,530
Software Upgrades	48,141				48,141
Vehicle maintenance	3,209		11,233	11,233	25,675
Website development and maintenance				240,706	240,706
Promotional/Outreach materials				778,984	778,984
<b>Sub-Total</b>	<b>9,208,345</b>	<b>894,848</b>	<b>364,268</b>	<b>3,476,316</b>	<b>13,943,778</b>
<b>Administrative Overhead</b>	<b>1,093,825</b>	<b>134,227</b>	<b>54,640</b>	<b>521,447</b>	<b>1,804,140</b>
<b>Grand Total</b>	<b>10,302,170</b>	<b>1,029,076</b>	<b>418,909</b>	<b>3,997,763</b>	<b>15,747,918</b>

Appendix A: Preliminary Budget (continued)

Louisiana Seafood Safety Response and Quality Certification Plan Preliminary Budget: Year 19					
	DHH	DWF	DEQ	DAF	Total
	Year 19	Year 19	Year 19	Year 19	Year 19
<b>Personnel and Benefits</b>					
Laboratory	595,025			250,334	845,359
Sample Collection	578,497	495,854			1,074,351
Data Management	198,342		99,171	125,167	422,680
Data Evaluation	198,342		99,171		297,513
Information Technology Analysts	231,399				231,399
Seafood Certification Coordinator				177,320	177,320
Inspectors				1,877,507	1,877,507
<b>Equipment</b>					
Lab equipment maintenance	49,585				49,585
Sampling Gear	39,668	8,330			47,999
<b>Supplies</b>					
Sampling Supplies	8,264	15,867		26,446	50,577
Laboratory supplies	728,860				728,860
<b>Contractual</b>					
Data Evaluation	330,570				330,570
Organoleptic/ Sensory	59,503				59,503
Public Education Campaign					
R&D/Monitoring and Evaluation	82,642				82,642
Ad Buys	4,727,981				4,727,981
Creative	65,245				65,245
Database Development and Management	82,642				82,642
Digital Marketing	82,642				82,642
Media Relations	330,570				330,570
<b>Travel</b>					
Fuel - Boat	55,536	138,839			194,375
Fuel - Car/ Truck	55,536	138,839		61,982	256,357
<b>Other</b>					
Data analysis and evaluation infrastructure	247,927	123,964	165,285		537,175
Software Upgrades	49,585				49,585
Vehicle maintenance	3,306		11,570	11,570	26,446
Website development and maintenance				247,927	247,927
Promotional/Outreach materials				802,353	802,353
<b>Sub-Total</b>	<b>8,801,665</b>	<b>921,694</b>	<b>375,196</b>	<b>3,580,606</b>	<b>13,679,161</b>
<b>Administrative Overhead</b>	<b>1,112,981</b>	<b>138,254</b>	<b>56,279</b>	<b>537,091</b>	<b>1,844,605</b>
<b>Grand Total</b>	<b>9,914,646</b>	<b>1,059,948</b>	<b>431,476</b>	<b>4,117,696</b>	<b>15,523,766</b>

## Louisiana Seafood Safety Response and Quality Certification Plan

### Appendix A: Preliminary Budget (continued)

<b>Louisiana Seafood Safety Response and Quality Certification Plan Preliminary Budget: Year 20</b>					
	<b>DHH</b>	<b>DWF</b>	<b>DEQ</b>	<b>DAF</b>	<b>Total</b>
	Year 20	Year 20	Year 20	Year 20	Year 20
<b>Personnel and Benefits</b>					
Laboratory	612,876			257,844	870,720
Sample Collection	595,852	510,730			1,106,581
Data Management	204,292		102,146	128,922	435,360
Data Evaluation	204,292		102,146		306,438
Information Technology Analysts	238,341				238,341
Seafood Certification Coordinator				182,640	182,640
Inspectors				1,933,832	1,933,832
<b>Equipment</b>					
Lab equipment maintenance	51,073				51,073
Sampling Gear	40,858	8,580			49,439
<b>Supplies</b>					
Sampling Supplies	8,512	16,343		27,239	52,094
Laboratory supplies	750,725				750,725
<b>Contractual</b>					
Data Evaluation	340,487				340,487
Organoleptic/ Sensory	61,288				61,288
Public Education Campaign					
R&D/Monitoring and Evaluation	85,122				85,122
Ad Buys	4,255,183				4,255,183
Creative	67,202				67,202
Database Development and Management	85,122				85,122
Digital Marketing	85,122				85,122
Media Relations	340,487				340,487
<b>Travel</b>					
Fuel - Boat	57,202	143,004			200,206
Fuel - Car/ Truck	57,202	143,004		63,841	264,047
<b>Other</b>					
Data analysis and evaluation infrastructure	255,365	127,682	170,243		553,291
Software Upgrades	51,073				51,073
Vehicle maintenance	3,405		11,917	11,917	27,239
Website development and maintenance				255,365	255,365
Promotional/Outreach materials				826,424	826,424
<b>Sub-Total</b>	<b>8,451,078</b>	<b>949,345</b>	<b>386,452</b>	<b>3,688,024</b>	<b>13,474,899</b>
<b>Administrative Overhead</b>	<b>1,134,077</b>	<b>142,402</b>	<b>57,968</b>	<b>553,204</b>	<b>1,887,650</b>
<b>Grand Total</b>	<b>9,585,155</b>	<b>1,091,746</b>	<b>444,420</b>	<b>4,241,227</b>	<b>15,362,549</b>

**Appendix B: Roles and Responsibilities**

Species	Monthly Frequency	Monthly Number of Coastal Areas Sampled	Monthly Number of Areas (Oysters)	Monthly Number of Processing Plants	Agency			Tests performed		
					Collecting	Packaging	Transporting	Sensory	PAH	TH
Shrimp	2/ coastal study area	7 Coastal Study areas	N/A	8, varies	DWF/DEQ Assist	DWF/DEQ Assist	DWF/DEQ Assist	X	X	X, unless unnecessary
Oysters	3 weeks/mo	N/A	30, depending on conditions	8, varies	DHH	DHH	DHH	X	X	X, unless unnecessary
Crabs	2/ coastal study area	7 Coastal Study areas	N/A	8, varies	DWF/DEQ Assist	DWF/DEQ Assist	DWF/DEQ Assist	X	X	X, unless unnecessary
King mackerel	2/zone	All 3 Offshore Zones	N/A	8, varies	DWF	DWF	DWF	X	X	X, unless unnecessary
Cobia	2/zone	All 3 Offshore Zones	N/A	8, varies	DWF	DWF	DWF	X	X	X, unless unnecessary
Greater amberjack	2/zone	All 3 Offshore Zones	N/A	8, varies	DWF	DWF	DWF	X	X	X, unless unnecessary
Tuna (do not mix species)	2/zone	All 3 Offshore Zones	N/A	8, varies	DWF	DWF	DWF	X	X	X, unless unnecessary
Grouper (do not mix species)	2/zone	All 3 Offshore Zones	N/A	8, varies	DWF	DWF	DWF	X	X	X, unless unnecessary
Red snapper	2/zone	All 3 Offshore Zones	N/A	8, varies	DWF	DWF	DWF	X	X	X, unless unnecessary
Dolphin	2/zone	All 3 Offshore Zones	N/A	8, varies	DWF	DWF	DWF	X	X	X, unless unnecessary
Southern flounder	2/ coastal study area	7 Coastal Study areas	N/A	8, varies	DWF/DEQ Assist	DWF/DEQ Assist	DWF/DEQ Assist	X	X	X, unless unnecessary
Spotted seatrout	2/ coastal study area	7 Coastal Study areas	N/A	8, varies	DWF/DEQ Assist	DWF/DEQ Assist	DWF/DEQ Assist	X	X	X, unless unnecessary
Red drum	2/ coastal study area	7 Coastal Study areas	N/A	8, varies	DWF/DEQ Assist	DWF/DEQ Assist	DWF/DEQ Assist	X	X	X, unless unnecessary
Croaker	2/ coastal study area	7 Coastal Study areas	N/A	8, varies	DWF/DEQ Assist	DWF/DEQ Assist	DWF/DEQ Assist	X	X	X, unless unnecessary
Gulf menhaden	2/ coastal study area	7 Coastal Study areas	N/A	8, varies	DWF/DEQ Assist	DWF/DEQ Assist	DWF/DEQ Assist	X	X	X, unless unnecessary
Striped mullet	2/ coastal study area	7 Coastal Study areas	N/A	8, varies	DWF/DEQ Assist	DWF/DEQ Assist	DWF/DEQ Assist	X	X	X, unless unnecessary
Black drum	2/ coastal study area	7 Coastal Study areas	N/A	8, varies	DWF/DEQ Assist	DWF/DEQ Assist	DWF/DEQ Assist	X	X	X, unless unnecessary
Sheepshead	2/ coastal study area	7 Coastal Study areas	N/A	8, varies	DWF/DEQ Assist	DWF/DEQ Assist	DWF/DEQ Assist	X	X	X, unless unnecessary
Water, Ambient	2/ mgmt area	7 management areas	30		DWF/DHH in oyster	DWF/DHH in oyster	DWF/DHH in oyster areas		X	X, unless unnecessary
Other species	as needed		N/A	8, varies	Sampling agency	Sampling agency	Sampling agency	X	X	X, unless unnecessary

**Appendix C: State/Federal Seafood Program Contacts**

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**Appendix C: State/Federal Seafood Program Contacts (continued)**

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**PROTOCOL FOR ISSUING PUBLIC HEALTH ADVISORIES  
FOR CHEMICAL CONTAMINANTS IN  
RECREATIONALLY CAUGHT FISH AND SHELLFISH**

*DRAFT FOR PUBLIC COMMENT*

*Prepared by*

**Louisiana Department of Health and Hospitals, Office of Public Health, Section of  
Environmental Epidemiology and Toxicology,  
in collaboration with  
Louisiana Department of Environmental Quality,  
Louisiana Department of Agriculture and Forestry and  
Louisiana Department of Wildlife and Fisheries**

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## TABLE OF CONTENTS

<b>PREAMBLE</b> .....	<b>4</b>
<b>1.0 INTRODUCTION</b> .....	<b>5</b>
<b>1.1 BASIS OF AUTHORITY</b> .....	<b>5</b>
<b>2.0 CATEGORIES OF PUBLIC HEALTH ADVISORIES</b> .....	<b>7</b>
<b>2.1 INTERIM HEALTH ADVISORY</b> .....	<b>7</b>
<b>2.2 FISH AND SHELLFISH CONSUMPTION ADVISORY</b> .....	<b>7</b>
<b>3.0 FISH AND SHELLFISH CONSUMPTION ADVISORY PROCESS</b> .....	<b>8</b>
<b>3.1 DETERMINE THE NEED FOR AN ADVISORY</b> .....	<b>8</b>
<b>3.1.1 Step 1 – Data Collection</b> .....	<b>8</b>
3.1.1.1 Target Species.....	9
3.1.1.2 Individual vs. Composite Samples .....	9
3.1.1.3 Tissue Cuts.....	10
3.1.1.4 Sample Preparation and Quality Assurance / Quality Control (QA/QC) Measures.....	10
3.1.1.5 Analytical Parameters and Required Detection Limits.....	11
<b>3.1.2 Step 2 - Review and Evaluate Data</b> .....	<b>12</b>
3.1.2.1 Data Quality Objectives.....	12
3.1.2.2 Screening .....	13
<b>3.1.3 Step 3 - Perform Exposure and Toxicity Assessments</b> .....	<b>14</b>
3.1.3.1 Determine Site-Specific Meal Limits.....	16
<b>3.2 ADVISORY DEVELOPMENT</b> .....	<b>19</b>
3.2.1 Step 1 - Coordinate Agency Actions.....	21
3.2.2 Step 2 - Inform the Public .....	21
3.2.3 Step 3 - Advisory Re-Evaluation .....	21
3.2.4 Step 4 – Advisory Rescission .....	22
<b>4.0 INSTRUCTIONS TO THE PUBLIC FOR USING ADVISORIES</b> .....	<b>23</b>
<b>4.1 SENSITIVE SUBPOPULATIONS</b> .....	<b>23</b>
<b>4.2 FOOD PREPARATION AND COOKING</b> .....	<b>23</b>
<b>5.0 NOTIFICATION OF STATE AGENCIES</b> .....	<b>24</b>
<b>5.1 WHERE TO REPORT SUSPECTED SEAFOOD CONTAMINATION</b> .....	<b>24</b>
<b>REFERENCES</b> .....	<b>25</b>

## PREAMBLE

The protocol for Louisiana's fish and shellfish advisories is designed to provide standardized guidelines regarding the development and issuance of fish and shellfish consumption advisories while allowing for the incorporation of site-specific data that are reliable and validated. The steps in the process, such as investigation of contaminants in fish tissue, determination of the need for an advisory, and the ultimate interagency consultation, follow the same procedural steps for each location, but variations in advisory procedures or recommendations may occur due to the consideration of appropriate site specific factors. These factors include issues such as site-specific data quality, species and size of contaminated fish, distribution of the contaminant within the organism, presence of single or multiple contaminants, toxicological properties of the contaminant, and characteristics of the affected population. The Louisiana Department of Health and Hospitals (LDHH) in coordination with the Louisiana Department of Environmental Quality (LDEQ), Louisiana Department of Wildlife and Fisheries (LDWF) and Louisiana Department of Agriculture and Forestry (LDAF), seeks to inform the public, in an expedient manner, of the potential risks of fish and shellfish consumption while advocating full enjoyment of Louisiana's delicious and abundant fish and shellfish resources.

All requests for copies of this document should be directed to the Louisiana Department of Health and Hospitals, Office of Public Health, Section of Environmental Epidemiology and Toxicology (SEET). The SEET may be contacted as follows:

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This document is also available on the Internet on the LDHH SEET website:  
<http://www.dhh.louisiana.gov/offices/page.asp?id=205&detail=5749> and the LDEQ Water Quality Division (WQD) website: <http://www.deq.louisiana.gov/portal/Default.aspx?tabid=1631>

## 1.0 INTRODUCTION

Chemicals released to the environment from point sources such as industrial and municipal discharges and from nonpoint sources such as agricultural runoff and atmospheric deposition have contaminated some surface waterbodies in the State of Louisiana. Many chemical contaminants concentrate in fish and shellfish by accumulating in fatty tissues or selectively binding to muscle tissue (the fillet). Even extremely low concentrations of bioaccumulative chemicals in a waterbody may result in fish or shellfish tissue concentrations high enough to pose health risks to fish consumers.

In order to safeguard and protect public health from chemically-contaminated fish / shellfish, consumption advisories may be issued in Louisiana from time to time, and have been issued since the early 1980s. This protocol provides a standardized approach for the development and issuance of fish / shellfish consumption advisories in the State of Louisiana. The purpose of a consumption advisory is to reduce or eliminate possible adverse public health impacts due to the ingestion of toxic substances present in some fish and shellfish. Advisory recommendations primarily pertain to the consumption of recreationally-caught fish and shellfish. During the advisory process, information such as the species and sizes of fish / shellfish affected, the contaminants present, their concentrations and distribution within organisms, the physical, chemical and toxicological properties of the contaminants, and local population consumption practices and customs are evaluated using standard risk assessment methods. The results of this evaluation are used to determine if an advisory is needed, and if so, define the amount of fish / shellfish that can be safely consumed from the waterbody.

Risk assessment and risk management of chemically-contaminated fish are complex processes because of the many considerations involved in setting fish consumption advisories, including both the health risks and benefits of fish consumption and the potential impact of advisories on economic and societal factors. Therefore, even though the steps in the advisory process, such as the investigation of contaminants in fish tissue, the assessment of health risks, and the ultimate interagency consultation are the same for each waterbody evaluated, the basis of decision for different advisories may vary due to the consideration of various site-specific factors.

A listing of consumption advisories currently in effect in the State of Louisiana may be obtained at LDHH's website: <http://www.dhh.louisiana.gov/offices/page.asp?id=205&detail=5749>; or LDEQ's website: <http://www.deq.louisiana.gov/portal/tabid/1631/Default.aspx>.

### 1.1 Basis of Authority

The Louisiana Departments of Health and Hospitals (LDHH), Environmental Quality (LDEQ), Wildlife and Fisheries (LDWF), and Agriculture and Forestry (LDAF) are authorized to protect public health and the environment. The LDHH, LDEQ and LDAF may recommend to the LDWF and the Wildlife and Fisheries Commission (LWFC) that fishing in an area be closed or regulated due to chemical contamination. The LDHH issues advisories in accordance with

Louisiana Revised Statutes (L.R.S.) 40: 4A(13), 40:5(20), and 36:258B. The LDEQ issues advisories in accordance with LRS 30:2074.B.1. The LWFC functions by authorities presented in L.R.S. 56:5, 6 and 22. The LDWF operates as the enforcement and analytical body of the aforementioned Commission. The LDAF has statutory authority to issue appropriate orders to mitigate and / or remediate pesticide contamination as per L.R.S. 3:3277, 3:3308 and Louisiana Administrative Code 7:XXIII.213.

DRAFT

## **2.0 CATEGORIES OF PUBLIC HEALTH ADVISORIES**

### **2.1 Interim Health Advisory**

An interim health advisory is issued when the State Health Officer decides that compelling but insufficient data exist to suggest a potential health threat to the public. Additional data will be collected and analyzed within one year of imposing an interim advisory to confirm or disprove that a health threat exists. Therefore, the interim advisory is only a temporary alert to the public and is expanded or lifted depending on the results of additional sampling and analyses. Within one year the interim advisory will be converted to a fish / shellfish consumption advisory or rescinded.

### **2.2 Fish and Shellfish Consumption Advisory**

A fish and shellfish consumption advisory is issued when sufficient chemical contamination data exists to support a recommendation to limit the amount of fish and shellfish eaten from a particular water body. When health guidelines are exceeded, restrictions on the amount and type of fish and shellfish eaten are needed to protect human health. To meet this goal, fish and shellfish consumption advisories may recommend limits on consumption of a specific type of fish and shellfish or may recommend limits on consumption by a particular population, such as pregnant and breast-feeding women. Usually, the fish and shellfish consumption advisory recommends a certain number of meals per week or month. Recommendations regarding food preparation and health effects associated with the chemicals of concern are also provided in each advisory message.

### **3.0 FISH AND SHELLFISH CONSUMPTION ADVISORY PROCESS**

Fish / shellfish consumption advisories warn the public which fish and shellfish contaminant levels pose a health risk to the public. The advisory process utilizes biota sampling results in conjunction with risk assessment to characterize the need for a consumption advisory at a particular waterbody. The steps involved in the advisory process are described in the following sections.

#### **3.1 Determine the Need for an Advisory**

Suspicion of significant fish tissue contamination may result from existing data on environmental media (e.g., sediment, soil, water, biota), from the occurrence of localized chemical releases to surface water (some of which may have occurred in the distant past), from knowledge of widespread environmental contamination issues, or from other means. Preliminary data collection is designed to screen targeted waterbodies in an efficient manner. For cost-effectiveness, the Environmental Protection Agency (EPA) recommends that states collect only one size class for each target species and focus on the larger fish within a species commonly harvested by the local population (EPA, 2000). In this way, the states will maximize their chances of detecting high levels of chemical contamination in the single composite sample collected for each target species. When fish-tissue contamination is detected in preliminary screenings, the waterbody is targeted for further evaluation (see Section 3.1.1). While EPA does not recommend a standard default sample size, general guidelines for determining sample sizes are presented in *Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories Volume I Fish Sampling and Analysis* (EPA, 2000). At any point in this process an advisory can be issued in the interest of protecting public health when compelling data exist, such as inordinately high contaminant levels, even when these data are insufficient.

##### **3.1.1 Step 1 – Data Collection**

When preliminary data suggest potential fish-tissue contamination, a more extensive, comprehensive data evaluation or collection is conducted. The objective of conducting a comprehensive data collection effort is to provide adequate characterization of the contaminant concentrations in the edible species to support the risk assessment and advisory process. The list of target analytes is based on known contaminants in sediments or waters, known discharges from nearby industries, and contaminants such as chlorinated pesticides known to be highly bio-accumulative, and therefore, likely to be concentrated in aquatic organisms.

The laboratory analysis of fish and shellfish tissue for chemical contaminants is performed according to applicable state and federal quality assurance procedures. The agencies ensure the accuracy, precision, and reliability of the data generated, as well as the use of the department-approved methodologies in the generation of that data. If the contaminant is a pesticide or is agricultural in origin, laboratories operated by LDAF may be utilized. To expedite the advisory process, analyses may be performed by the LDHH Laboratory Services Division. Quality control and

assurance associated with the samples' handling, preparation and analyses are reviewed and must meet the requirements of LDEQ, LDHH, LDWF and LDAF.

### *3.1.1.1 Target Species*

During the screening process, fish species selected for analyses should include those most representative of the following niches or trophic levels depending on the contaminant of concern: bottom-feeders, predators and browsers / foragers. In freshwater ecosystems, at least one bottom-feeding and one predator fish species should be collected. In estuarine or marine ecosystems, either one bivalve and one finfish species or two finfish species should be collected. More comprehensive sampling will be conducted after preliminary sampling indicates consistently excessive fish-tissue contamination, and will include a wide range of age / size classes from each target species to provide information on the nature and extent of contamination within the given fish population. When data from these samples indicate contaminant levels that may be of a human health concern but data are not adequate for determining advisory needs, additional sampling may be conducted to provide more information specific to those fish species and age / size classes to which anglers of those waters would most likely be exposed. Target species should include all species commonly caught and consumed by area anglers. While the EPA's advisory guidance document (EPA, 2000) only makes recommendations for the sampling of bottom-feeders and predators, many browsers / foragers are captured and consumed in Louisiana (e.g., bluegills). Thus, browsers / foragers may also be collected to fully represent Louisiana's aquatic food web. Creel surveys, if available, are valuable to determine what fish and / or shellfish are caught and the consumption patterns of anglers in the area.

### *3.1.1.2 Individual vs. Composite Samples*

Fish tissue samples submitted for analyses may represent individual specimens or a composite of individuals. Composite sample analyses provide an estimate of the average contaminant concentration across a group of individual fish within a species and can be a cost effective way to provide data on more fish. However, if size of the fish and/or cost of analyses allow, analyses of individual fish samples may be performed which provide more detailed information of the presence of a given contaminant within that species population.

Composite samples are generated by removing targeted tissue from several fish of the same species and same size ( $\pm 15\%$  by length) and placing the tissue in a single sample container as per approved protocols. A good quality control practice is to periodically provide for a duplicate sample of a submitted composite (5-20% of all samples). The duplicate may be generated by using the target tissue from the opposite side of the fish (i.e., right-side fillet for composite sample and left-side for duplicate composite sample). Duplicates may also be produced by laying the rendered fillets from each individual in an alternating orientation of head to tail, then tail to head, etc. and cutting the stack of fillets to split the tissue sample. This method can be used when sufficient tissue is available so as not to require tissue removal from the opposite side of the individual fish.

Individual samples are generated by removing target tissue from one specimen and placing the tissue in a single sample container as per approved protocols. Individual samples are used when fish size and/or monetary resources for analytical services are not limiting; when more detailed information of the variability of a given contaminant among individuals is desired; and / or when only one individual of a particular size class is available for analyses, such as with a particularly large or uncommon specimen. A duplicate for individual samples should be generated periodically by using the target tissue from the opposite side of the fish (i.e., right-side fillet for sample and left-side for duplicate sample).

The amount of tissue provided for a given sample should be approximately 200 grams (wet weight), but this will vary with the laboratory and analyses. Samplers should discuss sample mass with the receiving laboratory prior to initiating sampling.

#### *3.1.1.3 Tissue Cuts*

The advisory development process in Louisiana is based on analyses of edible tissues. Typically, this means muscle tissue fillets without skin, bones, or organs. For species where organs are also considered edible, the organs may be included with the muscle tissue for analysis, and / or analyzed separately, when differences exist in population consumption habits. For example, edible tissue of crabs typically includes all leg and claw meat, back shell meat, and body cavity meat. The hepatopancreas (“crab fat”) may be included for analysis as determined by the eating habits of the local population or subpopulations of concern. However, fat should be analyzed separately to enable the evaluation of health risks associated with consuming crabs of variable fat content. When assumptions are made regarding the removal of fat prior to consumption, guidance statements attesting to such are included in the advisory. Hard- and soft-shelled crabs should not be combined in the same composite.

#### *3.1.1.4 Sample Preparation and Quality Assurance / Quality Control (QA/QC) Measures*

Samples should be collected, preserved, processed, and analyzed according to scientifically valid, cost-effective, standardized procedures as discussed in the most current version of *Guidance for Assessing Chemical Contamination Data for Use in Fish Advisories Volume 1 Fish Sampling and Analysis* (EPA 2000). The integrity and security of samples and data should be maintained at all times. Record keeping and documentation procedures should be adequate to ensure traceability of all samples and data from initial sample collection through final reporting and archiving, and to ensure the verifiability and defensibility of reported results. Data quality should be assessed, documented, and reported properly. Reported results should be complete, accurate, and comparable with those from other similar monitoring programs. Quality control and assurance practices used should be at least equivalent to those described by the LDEQ Quality Management Plan to ensure that the quality of data created or received by LDEQ complies with its data policy.

Laboratory results should be reported with any information necessary to ensure the validity of the sample. Supporting documentation should include, when available, analyte name, waterbody name, sampling location (monitoring station identification or latitude / longitude coordinates), sampling date, sample collection procedures, sample preservation and processing procedures, analytical methods used for quantitation of target contaminants, method detection and quantitation limits, percent lipid composition, species name, composite sample identification (ID) number, sample size for each composite sample, fish length (average individual lengths for each fish in a composite), estimated age, sample weight, tissue cut type analyzed, indication of the presence or absence of contaminant detection (yes / no), QA / QC results (i.e., blank results, spiked samples results, split sample results, equipment calibration results, internal QA /QC check results, etc.), a detailed description of recordkeeping and documentation procedures for maintaining laboratory log books and reporting forms, significant figures, units of reporting, routine procedures to assess the accuracy and completeness of records, and a detailed description of the database variables and layout for transparent oversight.

Any events that occur during sample handling that may affect the integrity of the data will be noted on the field data sheet and on the laboratory data forms. Deviations and events will be reviewed to determine if the impact causes a sample or resulting data to be invalid. All sampling will be conducted according to the quality assurance and control procedures referenced in the most current version of *Guidance for Assessing Chemical Contamination Data for Use in Fish Advisories Volume 1 Fish Sampling and Analysis* (EPA 2000).

Duplicate fish tissue data will be qualified using relative percent difference (RPD). If the RPD is greater than 100%, the sample will be rejected. The RPD (%) is calculated as the absolute value of:

$$\left[ \frac{(x_1 - x_2)}{\frac{x_1 + x_2}{2}} \right] * 100$$

where:

$x_1$  = Concentration observed in the original sample;

$x_2$  = Concentration observed in the duplicate sample.

### 3.1.1.5 Analytical Parameters and Required Detection Limits

The analyte list for preliminary data collection efforts should include all bioaccumulative chemicals known or suspected to be present in the waterbody. In general, chemicals that have the potential to bioaccumulate are identified as having a log  $K_{ow}$  greater than or equal to 2.3 (EPA, 1989). Commonly encountered bioaccumulative analytes include, but are not limited to, organochlorine pesticides, polychlorinated biphenyls, polychlorinated dibenzodioxins and

dibenzofurans, certain other organochlorine compounds (such as chlorinated benzenes, styrenes and butadienes) and certain metals. The final analyte list used for comprehensive sampling efforts should include all chemicals detected at levels of potential concern during the preliminary sampling event.

The analytical capabilities and quality control procedures of the laboratory tests used in measuring concentrations in solid media (tissue) also need to be considered. In order to obtain data that are suitable for risk assessment and the advisory process, it is imperative that the reporting limits (RL) in tissue are within the analytical capabilities of the analytical method and laboratory techniques employed and below levels that represent health concerns. EPA guidance recommends that the reporting limit (RL) for tissue analysis be at least five times lower than the screening value for a given target analyte (EPA, 2000, Vol.1). In general, laboratories conducting the analytical evaluation of fish tissues should have instrument detection limits in the sub-parts per trillion (ppt) range. A list of EPA-recommended detection limits for commonly encountered bioaccumulative contaminants is provided in the most current version of EPA's *Guidance for Assessing Chemical Contamination Data for Use in Fish Advisories Volume I Fish Sampling and Analysis*.

### 3.1.2 Step 2 - Review and Evaluate Data

Following laboratory testing, data are supplied to LDHH for review. Data evaluated include those received from state agencies (LDEQ, LDWF, LDAF), federal agencies (EPA, ATSDR), principal responsible parties (PRPs), non-governmental organizations (NGOs), or other sources. Evaluations are generally limited to data from the last three years of available data to ensure that recommendations are relevant to the current conditions. Data collected during infrequent events (such as hurricanes and remediation events) are included in the analyses as these events are representative of potential exposures during real-world events. Data accepted for evaluation are verified and must meet QA/QC criteria set forth in Section 3.1.1.4 and data quality objectives presented in Section 3.1.2.1.

#### 3.1.2.1 Data Quality Objectives

Many elements of the risk assessment process involve significant uncertainty (e.g. due to spatial and temporal variability in species- and tissue-specific contaminant levels; the effects of concurrent exposures to a mixture of contaminants from other sources or species; variations in area-specific and species-specific consumption rates or population profiles; etc.). Data gaps can add significantly to the uncertainty associated with exposure and risk assessment (e.g., where deficiencies are noted with respect to insufficient sampling of all species of concern; number of fish collected per sample; size or weight of fish collected; area fish collected from; etc.).

Under these circumstances, data will be reviewed for comprehensiveness and data limitations will be identified. Where possible, recommendations for re-sampling and / or -analysis will be made to minimize uncertainty. However, in the event significant uncertainties remain, health-conservative

assumptions will be used to ensure the protection of public health. It should be noted that, divergence from default assumptions may occur.

The primary data quality objectives include but are not limited to the following: (1) samples are collected, processed and analyzed according to scientifically valid, standardized procedures; (2) record keeping and documentation procedures are adequate to ensure the traceability of all samples and data from initial sample collection through final reporting and archiving and to ensure the verifiability and defensibility of reported results; (3) field blanks (number and analyses) and field duplicates (number and analyses) are reported and indicate reproducibility; (4) data quality is assessed, documented, and reported properly, and reported results are complete and accurate; (5) sample specifics are noted and justifiable (target species and size class, sampling site locations, target contaminants, number of samples and fish per sample, tissue type analyzed); and (6) spatial and temporal variability are adequately characterized with an appropriate sample number.

### *3.1.2.2 Screening*

Data meeting data quality objectives are segregated by species, location, and when there is sufficient data, by size. An arithmetic mean of contaminant concentration in wet weight is obtained for each species. The arithmetic mean contaminant concentration is used to represent the exposure concentration for edible fish / shellfish and is used in the screening and advisory process. Non-detect samples are included in the mean. Concentrations of contaminants which are below the reporting limit (RL) are assigned a value of zero if more than half of the samples were below the RL, otherwise they are assigned a value of one-half the RL. Those contaminants which are not detected or detected at very low average concentrations and do not pose a health threat are eliminated from further consideration.

Prior to initiating the public health advisory process, the species-specific mean contaminant concentration in fish / shellfish tissue is compared against the tissue screening level (TSL) to identify waterbodies, fish / shellfish species, and contaminants that require further evaluation. TSLs are screening values which are defined as concentrations of contaminants in fish or shellfish tissue that are of potential public health concern and that are used as thresholds against which levels of contamination in similar tissue collected from the ambient environment can be compared. TSL guidelines are available for selected contaminants on the LDEQ Water Quality Division (WQD) websites at the following URL: <http://www.deq.louisiana.gov/portal/Default.aspx?tabid=1631>. The TSLs will be revised as needed to ensure that the advisory process is based on the most current toxicity information available. If the mean concentration of a contaminant in fish / shellfish tissue exceeds the TSL, then the waterbody, contaminant(s), and / or fish / shellfish species of potential concern are further evaluated. The screening process provides a rapid measure for identifying waterbodies, chemicals, and fish / shellfish species of potential concern.

The EPA-recommended risk-based methods for developing screening values are presented in the U.S. EPA's "*Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories*"

(EPA, 2000). Methods presented in this guidance document are used in conjunction with the assumptions presented in Table 1 to develop Louisiana fish-tissue screening levels.

### 3.1.3 Step 3 - Perform Exposure and Toxicity Assessments

If the mean concentration of a contaminant in fish / shellfish tissue exceeds the TSL, then a comprehensive fish sampling plan is developed and implemented as discussed in Section 3.1.1. The resulting data are then used in the advisory process to calculate an allowable monthly meal limit as discussed below.

In order to determine if fish and shellfish consumption practices present an unacceptable risk to those who consume recreationally-caught fish and shellfish, exposure potential must be considered. The assessment of exposure requires assumptions be made, some of which are the fish / shellfish consumption rate (gm / day), frequency of exposure (meals / week), duration of exposure (years), and consumer body weight. Assumptions used in estimating exposure may vary depending on population characteristics. Sensitive sub-populations such as pregnant women and breast-feeding children are considered during the assessment. LDHH makes every attempt to use exposure assumptions that best characterize the local consumption habits and behaviors when assessing risk to a particular community. When there is doubt as to which assumptions most accurately reflect the exposure situation, LDHH's policy is to consider a worst-case scenario that gives the public more conservative, safer fish consumption recommendations.

The default exposure assumptions used in the advisory process are discussed below and summarized in Table 1.

*Fish / Shellfish Consumption Rate.* Anglers may be interviewed or creel surveys and / or needs assessments performed to determine the species and sizes which are commonly consumed. Fish / shellfish consumption rates vary in Louisiana, but resident consumption is usually estimated to range between 20 and 150 grams of fish per day. In the absence of site-specific consumption data, advisories will be based on the default adult consumption rate and frequency of 30 grams per day for 365 days per year. This consumption rate equates to four eight-ounce meals / month and defines the exposure level that is used in calculating the monthly meal limit and in determining the need for a consumption advisory. A default consumption rate and frequency of 15 grams per day for 365 days per year (four four-ounce meals/month) will be assumed for children. When data are available and appropriate for the advisory process, the default consumption rate will be adjusted to account for site-specific exposure conditions. Local practices, customs, gender, age or health status should be considered in selection of the appropriate consumption rate. Other site-specific consumption data may be obtained from: 1) appropriate EPA guidance documents; 2) consumption surveys (what fish and how much is eaten); and 3) creel surveys (what fish species and size are actually caught and kept).

Consumer Body Weight. Advisories are issued for a standard population where the average adult individual is assumed to have a body weight of 70 kg (about 154 pounds) and an average child individual is assumed to have a body weight of 35 kg (EPA, 2000). This assumption is consistent EPA recommendations (EPA 1997; EPA 2000) and is used by EPA to derive toxicity values (EPA 2008). When specific sub-populations are targeted (children, women, different ethnic groups, etc.), it is recommended that the population body weight assumptions be adjusted accordingly using either site-specific data, EPA default values (EPA 1997), or current U.S. Census Bureau population statistics.

Exposure Duration and Averaging Time. The exposure duration estimates the total time of exposure. EPA's fish guidance document does not define a single exposure duration assumption for all sites (EPA, 2000). In the absence of federal guidelines, the exposure duration, or duration of the consumption of fish / shellfish from the same waterbody, can be based on site-specific population mobility data for the area of concern. In the absence of site-specific mobility or exposure duration data, a reasonable maximum exposure default of 30 years is assumed. An exposure duration of 30 years represents the 90<sup>th</sup> percentile for the length of time a person resides at the same residence and hence is assumed to fish from the same waterbody (EPA 1991). This means that advisories are written with regards to protecting an individual who eats recreationally-captured seafood from a specific waterbody over an extended period of time. As such it is conservatively assumed that individuals will be exposed to the same contaminant level by eating fish from the same waterbody for the assumed exposure period.

The averaging time is the period over which exposure is averaged. The averaging time selected depends on the type of toxic effect being assessed. For long-term exposure, the averaging time is equal to the exposure duration. For carcinogens, total cumulative exposure is prorated over a lifetime. Therefore, the averaging time for carcinogens is 70 years (EPA, 2000).

The exposure level is integrated with a chemical-specific toxicity value to estimate the potential health risk. A toxicity value is a numerical expression of a chemical's dose-response relationship that is used to assess the health risk associated with chemical exposure. The sources of toxicity values include: EPA's Integrated Risk Information System (IRIS); Agency for Toxic Substances and Disease Registry (ATSDR); EPA's Provisional Peer Reviewed Toxicity Values (PPRTVs); other EPA sources, such as EPA's Health Effects Assessment Summary Table (HEAST) tier 3; and non-EPA sources such as the California EPA. The toxicity values most frequently used in the fish advisory process are EPA's reference dose and cancer slope factor. These values are described below. EPA recommends that when toxicity values are available for both carcinogenic and noncarcinogenic health effects for a compound, the health effect resulting in the most conservative meal consumption limit be used as the basis for the advisory.

Reference Dose. A reference dose (RfD) is an estimate of daily exposure (including sensitive populations) that are likely to be without appreciable risk of deleterious effects during a lifetime (EPA, 2000). Reference doses are expressed in terms of milligram of contaminant per kilogram of consumer body weight per day (mg/kg-d). The RfD is based on the premise that there is a threshold dose below which there are no noncarcinogenic health effects. The RfD is used to determine an acceptable daily intake for contaminants that may produce noncarcinogenic health effects. By integrating the RfD, the mean value of chemical concentrations in fish tissue, and standard default exposure assumptions (consumption rate, body weight, exposure duration), the acceptable consumption rate for fish/shellfish (i.e., acceptable monthly meal limit) can be determined. This information is then used to determine the necessity of a seafood consumption advisory.

Cancer Slope Factor. A cancer slope factor (CSF) is a plausible upper-bound estimate of the probability of a carcinogenic response per unit intake of a chemical over a lifetime of exposure to a particular level of a potential carcinogen. A CSF is expressed in units of risk per milligram of contaminant per kilogram of consumer body weight per day (risk/mg/kg-d). The CSF is based on the hypothesis that the mechanism for carcinogenesis is non-threshold because there is believed to be essentially no level of exposure to such a chemical that does not pose a finite probability, however small, of generating a carcinogenic response. The CSF is used to determine an acceptable daily intake for contaminants that may produce carcinogenic health effects. By integrating the CSF, a target risk level, the mean value of chemical concentrations in fish tissue, and standard default exposure assumptions (consumption rate, body weight, exposure duration), the acceptable consumption rate (acceptable monthly meal limit) for fish/shellfish can be determined. This information is then used to determine the necessity of a seafood consumption advisory.

### *3.1.3.1 Determine Site-Specific Meal Limits*

This section presents the procedure, equations, and assumptions used in developing fish meal consumption limits for seafood advisory recommendations. The guidance provided in this section was adopted from EPA's "*Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories*" (Volume 2, EPA, 2000), and is discussed in greater detail elsewhere (SEET, 2007).

It should be stressed that the monthly consumption limits calculated as part of the advisory process pertain only to people regularly consuming fish caught in Louisiana waters. Consumption limits are designed to protect people who catch and consume fish from a specific waterbody for an extended period of time at a constant consumption rate.

If a calculated monthly meal limit is a fractional value, the value is rounded down to the nearest whole number so as not to exceed the maximum acceptable cancer risk or non-carcinogenic hazard index and ensure that public health is adequately protected.

When a contaminant has toxicity values for both carcinogenic and non-carcinogenic health effects, meal limits are calculated for both types of health effects. The health effect resulting in the more conservative monthly meal limit is used as the basis for the advisory. However, if only a carcinogenic toxicity value is available, then only a monthly meal limit for carcinogenic health effects is calculated. If only a noncarcinogenic toxicity value is available, then only a monthly meal limit for noncarcinogenic health effects is calculated.

Contaminant concentrations are generally derived from raw fillets that have had the skin and fat removed, unless site-specific data indicate otherwise (e.g., if a population eats other tissues, such as fat from crab, or organs from whole fish, then those tissues may be considered in the calculation of monthly meal limits). Advisories based on skin-, and fat-free fillets should include a statement recommending removal of skin and fat since these portions of the fish were not considered in the estimation of safe consumption limits.

The exposure assumptions considered in setting consumption advisories are summarized in Tables 1. It is important to note that site-specific data, passing data quality criteria, are preferred over default assumptions where available. When additional guidance is needed to address site-specific conditions, the guidelines provided in the U.S. EPA's "*Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories*" (Volumes 1-4; EPA, 2000) will prevail.

Methods for deriving consumption limits for both carcinogenic and non-carcinogenic compounds are presented below.

**Equation 1** is used to assess carcinogens and is derived from the basic formulas:

$$\text{Cancer Risk} = \text{Exposure (mg/kg-day)} * \text{Cancer Slope Factor (risk / (mg/kg-day)}^{-1})$$

$$\text{where Exposure} = \frac{\text{Contaminant Concentration} * \text{Consumption Rate} * \text{Exposure Duration}}{\text{Body weight} * \text{Averaging time}}$$

**Equation 4** is used to assess non-carcinogenic toxicants with non-cancer health effects and is derived from the basic formula:

$$\text{Hazard Quotient} = \text{Exposure (mg/kg-day)} / \text{Reference Dose (mg/kg-day)}$$

The following equations are used to calculate a site-specific monthly meal limit for each target species.

**Carcinogenic health effects for a single contaminant are calculated as presented below.**

**Equation 1** calculates an allowable daily consumption of contaminated fish and shellfish based on a compound's carcinogenicity.

$$CR = \frac{R * BW * AT}{CSF * C * ED} \quad \text{EQN. 1}$$

where

CR	=	Maximum allowable seafood Consumption Rate (kg / day)	= ans. Eqn. 1
R	=	Maximum acceptable lifetime Risk (unitless)	= $1.00 \times 10^{-4}$
BW	=	Consumer Body Weight (kg)	= 70 kg
AT	=	Averaging Time	= 70 years
CSF	=	Cancer Slope Factor ((mg / kg-day) <sup>-1</sup> )	= see IRIS, EPA
C	=	Species avg. chemical Concentration (mg / kg or ppm)	= mean
ED	=	Exposure Duration	= 30 years

**Equation 2** converts the maximum allowable consumption rate derived from **Eqn. 1** to the number of allowable meals per month:

$$ML = \frac{CR * T}{MS} \quad \text{EQN. 2}$$

where

ML	=	Maximum allowable Meal Limit (meal / month)	= unknown
CR	=	Maximum allowable seafood Consumption Rate (kg / d)	= ans. Eqn. 1
MS	=	Meal Size (kg fish and shellfish / meal)	= 0.227
T	=	Time-averaging period (=365.25 d / 12 mo)	= 30.44 d / mo

Carcinogenic health effects for multiple contaminants are calculated as:

$$CR_c = \frac{R * BW * AT}{ED * [(CSF_1 * C_1) + (CSF_2 * C_2) + \dots (CSF_i * C_i)]} \quad \text{EQN. 3}$$

**Equation 2** converts the maximum allowable consumption rate derived from **Eqn. 3** to the number of allowable meals per month.

**Non-Carcinogenic health effects for a single contaminant are calculated as presented below.**

**Equation 4** calculates an allowable daily consumption of contaminated fish and shellfish based on a compound's non-carcinogenic health effect.

$$CR = \frac{RfD * BW}{C} \quad \text{EQN. 4}$$

where

CR	=	Maximum allowable seafood Consumption Rate (kg/day)	= ans. Eqn. 4
RfD	=	Reference Dose (mg / kg-day)	= see IRIS, EPA
BW	=	Consumer Body Weight (kg)	= 70 kg
C	=	Species avg. chem. Concentration (mg/kg or ppm)	= mean

**Equation 2** converts the maximum allowable fish and shellfish consumption rate derived from **Eqn. 4** to the number of allowable meals per month.

Noncarcinogenic health effects for multiple contaminants with the same critical effect / target organ are calculated as:

$$CR_{nc} = THQ * BW * \left[ \frac{RfD_1}{C_1} + \frac{RfD_2}{C_2} \dots \frac{RfD_i}{C_i} \right] \quad \text{EQN. 5}$$

**Equation 2** converts the maximum allowable fish and shellfish consumption rate derived from **Eqn. 5** to the number of allowable meals per month.

If the contaminant elicits both carcinogenic and non-carcinogenic health effects, the maximum allowable fish consumption rates (CR) calculated for each type of health effect are compared and the lower of the two values is selected for calculation of the monthly meal limit (Equation 2).

For the purpose of determining the need for an advisory, an acceptable monthly meal limit is defined as four meals per month (52 weeks/year, 30 years). Therefore, a calculated monthly meal limit less than four meals per month indicates the need for a seafood consumption advisory. If a calculated monthly meal limit is a fractional value, the value is rounded down to the nearest whole number so as not to exceed the maximum acceptable cancer risk or non-carcinogenic hazard index and ensure that public health is adequately protected. A calculated allowable monthly meal limit may be modified if reliable and validated site-specific information is available.

### 3.2 Advisory Development

If there are public health concerns associated with exposure to constituents, further evaluation may be incorporated into the decision-making process. Many factors go into the decision of whether to issue an advisory. Besides the quantitative estimates of population risk, other considerations include data quality / variability and societal impacts (e.g., impacts on community health, recreation, economics and traditions). While all risks and impacts are considered in some way, the agencies may elect to focus on one or a few of the potential risks or impacts. The EPA fish advisory guidance document gives suggestions for what to consider when determining the need to issue an advisory:

*“It is suggested that the planning and evaluations for fish advisories be carried out on a site-specific basis whenever feasible. As discussed previously, local population characteristics and impacts on local traditions and economies may vary considerably from one area to another. Various types of information are required for decision-making. Some may be of a quantitative nature (e.g., risks associated with current consumption patterns, the estimated costs of various program activities, staffing requirements, impacts on property values). The quantitative values may be best estimates; however, this type of predictive information often contains significant uncertainty and should be considered accordingly. Most information collected for a fish advisory program will likely be of a qualitative nature (e.g., potential cultural impacts on targeted populations, nutritional impacts). Some form of risk characterization is also assumed to have been generated, although it may not be precise and should be considered a rough estimate even when detailed analyses have been carried out....Federal risk assessment methods were designed primarily to provide a means to establish exposure limits (e.g., for drinking water standards) and generate protective rather than predictive estimates. Consequently, the risk estimates should be considered an indication of maximum risk rather than a precise predictor of actual risk. As discussed previously, risk reduction through implementation of fish advisory programs are characterized as “benefits” for purposes of discussing advantages and disadvantages of various options. Benefits are those cases or people who would have been affected that were not affected as a result of reductions in their consumption of contaminated fish. A wide variety of risk management options have been considered in this document. The selection of which options to consider for inclusion in a fish advisory program is a critical decision. ...Restricting access to waterbodies or banning fishing may not be an option in areas where no regulatory authority is held by the overseeing fish contamination problems. (In most areas, however, the health department will have authority to restrict access in cases where a clear and present danger to the public exists.) Significant constraints on program options may also be imposed by budgetary or other conditions. ...The full spectrum of risk management options should be considered prior to selecting a particular subset of activities. This approach enables risk managers to review the advantages and disadvantages of all possibilities with*

*other interested parties, so that the final decisions may be considered objective and fully thought through.” (EPA, 2000. Vol 3, Ch 4).”*

### 3.2.1 Step 1 - Coordinate Agency Actions

When the risk assessment indicates the presence of contaminated fish and shellfish and a population of anglers likely to consume this fish and shellfish, members of LDEQ, LDWF and LDHH meet to discuss and weigh public health options.

Ultimately, an advisory is recommended when the LDHH determines that it is necessary to protect the public health. The SEET then develops a draft of the recommended fish / shellfish consumption advisory with the consultation and approval of the State Health Officer. The draft advisory along with the basis of the decision to issue the advisory (e.g., fish tissue data, meal limit calculations, relevant site-specific factors, etc.) is forwarded to the Secretaries (or designated representatives) of LDHH, LDEQ and LDWF for review. In order for the draft advisory to become public record, concurrence must first be obtained from the Secretaries and / or designated representatives of LDHH, LDEQ and LDWF. The LDAF is involved in the advisory process when the contaminant is a pesticide or agricultural in origin. Approval by the Commissioner of Agriculture and Forestry is required for the issuance of an advisory related to agricultural chemicals. Consultation with Centers for Disease Control (CDC) / ATSDR will be conducted as necessary. Figure 1 outlines these procedures.

### 3.2.2 Step 2 - Inform the Public

Once all involved agencies agree to the advisory, local officials are informed of the findings of the agencies and the pending issuance of a seafood consumption advisory. Following notification of the local officials, an announcement is made to the general public within three to five days. Some flexibility in the time elapsed between notification of local officials and the public is allowed during emergency events for more timely notification of the public. The public are notified of the advisory through a news release in the affected area and the SEET website. The basis of decision for the consumption advisory will be provided on the SEET and LDEQ websites and shall include sampling date; waterbody sampled; species sampled; contaminant assessed; tabulated sample results including average, minimum, and maximum contaminant concentrations; meal limit calculations; site-specific factors considered, and consumption advisory and precautionary postings where relevant. Following the issuance of the press release, the advisory is provided to the Louisiana State Library for distribution to all state repositories. Signs are posted at area public boat launches warning potential anglers about eating fish from the waterbody. Advisory information is also placed in the LDWF fishing regulations. Public meetings in local communities may be conducted to explain to local leaders and residents the fish / shellfish consumption advisory and the data on which it is based.

### 3.2.3 Step 3 - Advisory Re-Evaluation

When fish and shellfish data become available from a site with a consumption advisory, the site is re-characterized based on the newly calculated annual average chemical-specific fish-tissue concentrations. These revised annual average tissue concentrations are reviewed by LDHH, LDEQ, LDWF and LDAF and updates to advisories are recommended and discussed by all parties. Once the data review and risk analyses are completed, a plan of action is designed to update the advisory and inform the public of any changes in the existing advisory. The updating of the advisories may be categorized into two groups: 1) advisories which must be changed to reflect the current conditions and 2) advisories that remain unchanged because of little or no change in the analyses' results.

Trends in the fish-tissue contaminant data will be evaluated based on the mobility, bioaccumulation, and transport of the chemical(s) of concern (COCs). These trends are analyzed to prevent the variability of the data from adversely impacting risk assessment decisions. However, only one sampling event of adequate size and unacceptable average chemical concentration is necessary for issuance or continuance of an advisory.

In order to lift an advisory, average COC concentrations in fish / shellfish tissue samples must be acceptable (*i.e.*, below current TSL), for at least three consecutive sampling events over a minimum period of two years. Ongoing evaluation will occur to determine the need for changes in the fish / shellfish consumption advice given in the advisories.

If an advisory must remain in effect because health guidelines are exceeded in the trend analysis of the most recent data analyses, the local government is informed. A news release in the community lets the public know that the advisory has been reviewed and contamination is still present. The effectiveness of this public communication process regarding fish and shellfish advisories is evaluated by LDHH.

#### 3.2.4 Step 4 – Advisory Rescission

To rescind an advisory, a rescinding letter is written by the State Health Officer and approved by the Secretaries and Assistant Secretaries of the LDHH, LDEQ and LDWF (and / or LDAF, if necessary). State officials, state agencies and local elected officials (e.g. mayors, parish councils, and / or police juries) in the area where the advisory is in effect are notified by LDHH. After local and state government is informed of the decision to lift advisory, a news release is issued in the community and major newspapers.

## **4.0 INSTRUCTIONS TO THE PUBLIC FOR USING ADVISORIES**

The public is strongly encouraged to follow the instructions given in each health advisory. It is important to keep in mind that each advisory is issued for a particular area. Likewise, the health advice is also specific to the types and concentrations of chemicals identified at each site. Consequently, certain areas may have fish and shellfish consumption limits on specific species while another area may have a “no consumption” advisory on all fish and shellfish. The public should be aware that the health advisory is practical, protective advice reflecting all the best available data.

### **4.1 Sensitive Subpopulations**

It is also important to understand that different groups within the general populations are more sensitive and may be considered by LDHH to tolerate different levels of contamination. Pregnant and breastfeeding women and young children require the most cautious and conservative approaches to health and risk analyses because developing fetuses and young children are especially sensitive. Also, anglers who may consume large quantities of fish and shellfish may be at greater risk for exposure to chemically contaminated fish and shellfish.

### **4.2 Food Preparation and Cooking**

Most contaminants are lipophilic (*i.e.*, the chemicals tend to concentrate in the fat) so methods of preparation and cooking can also protect the public from contaminants in fish and shellfish. Trimming the fat and skin will reduce the amount of contaminants in the fish and shellfish. Cooking methods to minimize fat include baking, broiling, and grilling because the fat drains away from the fish and shellfish. The public is encouraged to discard the juices which contain the fat (and most of the toxins) to further reduce exposure. Some contamination, like mercury and other heavy metals, however, are pervasive in the edible fish tissue and remain in the fish and shellfish even after cooking.

## **5.0 NOTIFICATION OF STATE AGENCIES**

### **5.1 Where to Report Suspected Seafood Contamination**

The public should report suspected fish and shellfish contamination in store-bought or commercially-caught fish and shellfish to LDHH's Division of Sanitarian Services- Fish and Shellfish Unit (225-342-7550) or via the LDHH's Environmental Health Services Hotline (toll free at 1-800-256-2775). Complaints about recreationally-caught fish and shellfish that are suspected of being chemically contaminated are handled by LDHH's Section of Environmental Epidemiology and Toxicology (SEET) (888-293-7020). Office hours are 8:00 am to 4:30 pm Monday through Friday. There is also a statewide toll-free number to LDHH for the Office of Public Health where suspected chemical contamination of aquatic wildlife may be reported (1-800-256-4609).

Oyster harvesting is a major industry in Louisiana, and is strictly regulated by the LDHH's Molluscan Shellfish Program. Questions regarding oysters should be directed to 225-342-7617 or the statewide toll-free number 1-800-256-2775. This program monitors bacterial levels in oyster growing areas to determine which area are suitable for harvesting. There is a risk associated with consuming raw fish and shellfish as is the case with other raw protein products. A statewide health advisory warns that if a person suffers from chronic illness of the liver, stomach, or blood, or has other immune disorders, fish and shellfish should be eaten fully cooked. This advisory is required to be prominently posted at all establishments selling raw fish and shellfish for human consumption. It is based on the presence of non-pollutant, naturally-occurring bacteria in uncooked fish and shellfish, as well as the possibility of the presence of pollutant bacteria.

Advisories that involve bacterial or other infectious diseases are handled by LDHH's Division of Sanitarian Services in consultation with the Infectious Epidemiology Section of LDHH's Center for Community Health. Questions regarding bacterial levels in specific water bodies can be answered by contacting Sanitarian Services at 225-342-7550 or toll-free at 800-256-2775. Questions regarding diseases caused by bacteria may be answered by LDHH's Infectious Epidemiology Section at 800-256-2748. All of these offices can also be reached through the Office of Public Health's statewide toll free number 1-800-256-4609.

## REFERENCES

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**TABLE**

**Table 1.** Louisiana's Consumption Advisory Program's Current Default Assumptions<sup>A</sup> (August 2008)

Item	Issue	Definition	Alternate Assumptions (SEET, 2007)	LA Assumptions	Source Reference
1	Fat Composition	Residual fat in seafood (ex. Crab) after cooking.	(1) Continuous range from 0 to 100%.	<sup>B</sup> 0% Fat  LA suggests removing fat before eating.	EPA, 1997. EPA, 2003. EPA, 2000.
2	Consumption Rate	Amount of fish consumed on a daily basis.	(1) Continuous range from 20- 165 g/day	30 g/day for adults (or one 8 oz. (1/2 pound) meal/week or four 8 oz. meals/month). 15 g/day for children (or one 4 oz. (1/4 pound) meal/week or four 4 oz meals/month)	EPA, 1995. Ratard, 1993.
3	Consumption Fraction	Fraction of individual seafood consumption from area.	(1) Continuous range from 0 to 100%	Irrelevant as advisories recommend site-specific meal limits (not total seafood limits); <sup>3</sup> Ratard, 1993.	
4	Exposure Duration	= (Exp Frequency (365 days) * Exp Duration (X))	(1) 30 yrs (2) 70 yrs	X= 30 yrs	EPA, 2000.
5	Absorption Rate	Percentage of contaminant absorbed in the GI tract after seafood consumption.	(1) 100% default value	1 (100%).	EPA, 2000.
6	Food Preparation and Cooking Reduction Factors	Percent reduction of a chemical due to meal preparation and / or cooking.	(1) 30% (2) 50% (3) 0% default value	0%	EPA, 2000.
7	Acceptable Risk	Risk of developing disease for all exposed individuals.	(1) $1.00 \times 10^{-4}$ (2) $1.00 \times 10^{-5}$ (3) $1.00 \times 10^{-6}$	$1.00 \times 10^{-4}$	EPA, 2000.
8	Acceptable Hazard Quotient	Measure of potential for disease in exposed individuals	(1) 1.0	1.0	EPA, 2000.
9	Non-Detect Treatment	Way of representing values for samples for which contaminants were not detected (below the detection limit).	(1) Zero (2) 1/2RL (half reporting limit)	Zero unless >1/2 samples from a waterbody are above RL then apply 1/2RL to non-detects	EPA, 2003. EPA, 2000. EPA, 1992.
10	Fish Tissue Chemical Concentration Averaging Value	Numeric basis for fish advisory.	(1) Arithmetic Mean (2) Median (3) Geometric Mean	Arithmetic Mean	EPA, 2000.
11	Species-specific Advisories	How fish are grouped as the basis for the advisory.	(1) Species-specific (2) Category (fin- or shell-fish) (3) All Seafood	Base advisories on species.	LDEQ, LDHH, LDWF consensus.
12	Acceptable Meal Limit	The acceptable number of meals consumed on a monthly basis	(1) Range from 0.5 to 16 meals per month	4	EPA, 2000

**Notes:** **A.** U.S. EPA-suggested body weights are applied. For adults these values are 70 and 35 kg kilograms for adults and children, respectively. **B.** U.S. EPA doesn't have specific advice (<sup>2</sup>EPA, 2003). A USDA study estimated crab fat to be 0.8% (raw) (<sup>1</sup>EPA, 1997). EPA policy for crabs is: "Edible tissue includes leg and claw meat, back shell meat and body cavity meat. Internal organs (hepatopancreas) are removed" (<sup>4</sup>EPA, 2000).

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**FIGURE**

**Figure 1.** Flowchart for Evaluation of Seafood Tissue Data

