

Fish Kill Plan

Mississippi Canyon 252

All samples will be sent to laboratories agreed upon by the trustees and BP.

Each laboratory shall simultaneously deliver raw data, including all necessary metadata, generated as part of this work plan as a Laboratory Analytical Data Package (LADP) to the trustee Data Management Team (DMT), the Louisiana Oil Spill Coordinator's Office (LOSCO) on behalf of the State of Louisiana, and to BP (or ENTRIX on behalf of BP). The electronic data deliverable (EDD) spreadsheet with pre-validated analytical results, which is a component of the complete LADP, will also be delivered to the secure FTP drop box maintained by the trustees' Data Management Team (DMT). Any preliminary data distributed to the DMT shall also be distributed to LOSCO and to BP (or ENTRIX on behalf of BP). Thereafter, the DMT will validate and perform quality assurance/quality control (QA/QC) procedures on the LADP consistent with the authorized Analytical Quality Assurance Plan (AQAP), after which time the validated/QA/QC'd data shall be made available simultaneously to all trustees and BP (or ENTRIX on behalf of BP). Any questions raised on the validated/QA/QC results shall be handled per the procedures in the AQAP and the issue and results shall be distributed to all parties. In the interest of maintaining one consistent data set for use by all parties, only the validated/QA/QC'd data set released by the DMT shall be considered the consensus data set. In order to assure reliability of the consensus data and full review by the parties, no party shall publish consensus data until 7 days after such data has been made available to the parties. Also, the LADP shall not be released by the DMT, LOSCO, BP or ENTRIX prior to validation/QA/QC absent a showing of critical operational need. Should any party show a critical operational need for data prior to validation/QA/QC, any released data will be clearly marked "preliminary/unvalidated" and will be made available equally to all trustees and to BP (or ENTRIX on behalf of BP).

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Approval of this work plan is for the purposes of obtaining data for the Natural Resource Damage Assessment. Parties each reserve its right to produce its own independent interpretation and analysis of any data collected pursuant to this work plan.

This work plan supersedes a version of the document dated October 27, 2010 which was signed by representatives of NOAA, Louisiana, and BP. Approval of this new version of the work plan in no way affects the validity of data gathered or procedures followed under the previously signed version. This work plan contains no changes to field procedures or other data collection described in the October 27, 2010 version. This work plan reverts data sharing language to a more standardized form and adds language to ensure that reports, records, and observational/non-analytical data collected or created under this work plan will promptly be made available for trustee review.

APPROVED:

Jennifer Bayce 12/1/10
NOAA Trustee Representative: Date

[Signature] FOR ROLAND GUIRKY 12/14/10
Louisiana Representative: Date

[Signature] 12-2-10
BP Representative: Date

Fish Kill Plan

Investigative Plan for Fish and Invertebrate Kills in the Northern Gulf of Mexico

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For the

Mississippi Canyon 252 Trustees

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Summary

This document presents a plan for monitoring and documenting fish and invertebrate kills in the north-central Gulf of Mexico. Throughout this document, the term “fish kill” is used in its most generic form and refers to all invertebrate and vertebrate fish species observed dead or moribund. As used herein, a fish kill could consist of a single dead organism whether it was associated with the MC 252 oil spill or not.

- I. Approach and Rationale.** This section describes the overall purpose and need for documenting fish kills in relation to the MC 252 Spill.
- II. Data Needs and Sources.** This section provides an overview of the types of data that may be a useful complement to this plan.
- III. Investigative and Sampling Strategy.** This section describes the approach to be used in investigating and sampling reported fish kills in both inshore and offshore environments.
- IV. Procedures for Reported Kills.** This section: (a) references how field teams should set up their equipment prior to starting field work; (b) provides an overview of the protocols teams should follow once the team has reached a specific site to study, and (c) provides general guidance on the processing of the samples and data gathered during the course of each field activity.
- V. Procedure for documenting a fish kill in inshore waters and offshore waters**
- VI. Logistic needs and implementation timing**

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I. Approach and Rationale

Fish kills represent an observable acute response to local stressors. Fish kills may also serve as an indication of a more significant problem in an area, since only a fraction of the overall number of fish impacted by an event may be visible at any one time.

Throughout this document the term "fish kill" is used in its most generic form and refers to all invertebrate and vertebrate fish species observed dead or moribund.

Investigation of fish and invertebrates is an important component of the natural resources damage assessment (NRDA) process. Marine and estuarine ecosystems from Texas to Florida may be exposed to MC 252 oil and dispersants (hereafter referred to as MC 252 oil). Potential impacts of oil and dispersants on fish communities range from, but are not limited to, mortality to sublethal stress that may manifest itself in reduced fitness and decreased reproductive success. Response and cleanup efforts may also cause fish loss, stress, or other impairment. Documentation of fish kills may provide critical evidence on exposure and injury and identify natural resources that may be included in restoration activities. Further, fish kill investigations aid in ascertaining their probable cause and assist in estimating fish losses in the context of any NRDA for the MC 252 Spill.

Because fish kills have been observed and reported both inshore and offshore in areas of the north-central Gulf where MC 252 oil is known or suspected to be or to have been present, a Fish Technical Working Group ("TWG") of subject matter experts, trustee agency and BP representatives has been assembled to prepare this work plan to carry out assessment of fish kills in the north-central Gulf of Mexico to support the NRDA process established by the Oil Pollution Act of 1990 (OPA) and applicable state law.

To meet the objectives of the fish kill plan, all reported fish and invertebrate kills should be well-documented, no matter the reported cause or estimated level of impact. This does not mean that a field investigation will always be required, but it does mean that a consistent method should be used for all fish kill investigations. For that to occur with maximum effectiveness, it will require, among other things, personnel with assigned responsibilities for investigation of fish kill reports within each state and in federal waters offshore, appropriate training for those personnel, clear notification procedures and practices, consistent field practices used in investigations, and maintenance of historic records relating to kills in each of these areas for future reference.

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II. WORKPLAN OBJECTIVES: Data Needs and Sources

This work plan addresses two specific data needs/objectives: (1) gathering information on locations, causes (if known) and counts by species of fish kills in the last ten years to help establish a baseline for variability of fish kills between years, and 2) documentation and investigation of reported fish kills from April 20, 2010 until the presence of MC 252 oil is no longer detected in concentrations that could likely cause fish kills. The two objectives are addressed through standard components of fish kill investigations and documentation for reported kills.

The first objective, gathering information on recent (i.e., during the past 10 years) fish kills, is being performed by Industrial Economics, Inc. (IEc). IEc has contacted representatives from Louisiana, Mississippi, Alabama, and Florida to request records of all marine and brackish fish kills reported in areas of their states within the north-central Gulf of Mexico during the past ten years. The U.S. Fish and Wildlife Service and the National Marine Fisheries Service (NMFS) have also been requested to provide records of all kills in this area reported directly to those agencies. For each reported fish kill, IEc is collecting location data as well as information on the species observed, the count of organisms, and the cause of the kill, where known. Data obtained from the states and federal agencies is being converted into GIS layers, combined to create a map of all observed fish kills over the past ten years, as well as a map of fish kills observed since the MC 252 oil spill. These data will be provided to the NRDA trustees and BP for possible use in future analysis. Such analysis could establish a baseline for variability of fish kills between years.

III. Investigative and Sampling Strategy

A. Strategy for Reported Fish Kills (Objective 2)

- States currently follow established procedures for documenting fish kills. These procedures are consistent with guidelines set by the American Fisheries Society (AFS), as will the work proposed here (see Section IV).
- All personnel on spill-related vessels, and state, federal, and BP personnel will be instructed to call into the state hotlines (e.g, FL fish kill hotline: 800-636-0511) and the Deepwater Horizon Wildlife hotline (866-557-1401).
- All callers will be interviewed and contact information recorded by state and/or NMFS personnel.
 - (1) The hotline operators or web contact will immediately phone the state biologist and/or state hotline or NRDA Fish Kill Coordinator and relay the contact information.
 - (2) The state biologist or NRDA coordinator or designee will then contact the caller (within an hour if possible). At minimum, the following information will be obtained: Name of caller, whether the caller is involved in the oil spill response, location of fish kill, including water body name as

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well as latitude /longitude, approximate number of fish and identification of species killed, whether fish are still dying, any obvious discoloration to the water, time first observed, and geographic extent. NRDA Fish Kill Form A should be completed (see Appendix).

- A decision to send a Fish Kill investigation team to document any fish kill will depend on the approximate size of the kill, the time of the report, and the location (which influences response time), and/or whether the state is already responding to the event.
- All fish kills (whether an investigation team is sent or not) will be reported to the NOAA NRDA Fish Kill Coordinator or designee. If an investigation team is not sent to the field, the rationale will be included as a memo and attached to Form A.
- If a Fish Kill investigation team is sent to a site, they will follow the guidelines in Section IV and complete Appendix Form B (Parts 1-3).
- GIS map(s) of all fish kills will be updated weekly and sent to the Fish TWG as well as all trustees and BP.
- For kills reported in offshore federal waters, staff from the state closest to the kill may receive the initial report, but field investigation will be coordinated and performed by NOAA NRDA teams. NRDA Fish Kill Forms A and B should be completed.

IV. Procedures for Reported Kills

A. Notification

Within geographic regions across the north-central Gulf, different agencies have different duties and responsibilities regarding investigations of fish kills. Special circumstances may apply in areas such as state wildlife management areas or refuges, U.S. Fish & Wildlife Service refuges, National Park Service areas, state parks and recreation areas, where additional agencies or sections have responsibilities. For offshore federal waters, NOAA will serve as the lead in fish kill evaluations.

Across the region, phone numbers for reporting fish kills have been established for state and federal aquatic resource management agencies (see Table 1). Additionally, contacts from the public or other agencies may flow through other channels. When an event is reported, the primary fish kill contact person for the relevant State or Federal Agency will receive notification and record the notice in his/her daily log, including the time of notice and the person from whom the notice is received.

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Table 1. Points of Contact for Fish Kill Information in the Gulf States.

State	Region	Name	Organization	Hotline
Louisiana	Saltwater	Jason Adriance	LDWF	[REDACTED] (800) 442-2511 (225)219-3640 or (24 hr) (225) 342-1234
	Freshwater	Bobby Reed	LDWF	
	Statewide Game Thief Hotline	LDWF		
	Single Point of Contact (LDEQ)			
Alabama	Saltwater	Kevin Anson	AL DCNR-MRD	[REDACTED]
	Freshwater	David Armstrong	AL DCNR	
Mississippi	Saltwater	Mike Beiser	MS DEQ	[REDACTED] (800) 222-6362
	Freshwater	Mike Beiser	MS DEQ	
Florida	Saltwater	Fish Kill Hotline	FWC	(800) 636-0511
		Theresa Cody	FWC	[REDACTED]
Deepwater Horizon Wildlife Distress Hotline				(866) 557-1401

B. Criteria for Defining Investigative Effort

Not every reported fish kill will justify or require a full field investigation. Determination of the severity of a kill (minor, moderate or major) is based on the particular details of a report. Rationale for the classification will be included along with the level of follow up investigation recommended. For a minor kill, the caller may adequately describe the composition and extent.

Field investigation activities can be divided into three categories, depending on the severity of the reported kill and species involved.

- 1) Minor kills may not require a full investigation. These would be handled by interagency communication among appropriate personnel. The total investigation will be to obtain appropriate information from the reporting person via phone or e-mail, to document that information appropriately, to maintain that documentation and to transmit a copy of the Initial Report of Fish Kill form to the appropriate State or Federal agency offices and the NOAA NRDA Fish Kill Coordinator or designee.

- 2) Moderate kills, especially where predominated by forage species, and where natural causes are identified, or where the report indicates that the kill is too old to make determination of cause, will be covered by a qualitative survey, with rough estimates of magnitude and composition. Again, the total investigation will be to obtain appropriate information from the reporting person via phone or e-mail, document appropriately, maintain documentation and transmit a copy of the Initial Report of Fish Kill form to state and NOAA NRDA coordinators (NRDA Fish Kill

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Form A). In this case though, adequate justification for a decision on a potential field investigation must be included in the report.

3) Major fish kills, especially where MC 252-induced causes are suspected or identified, will require a full field investigation using quantitative techniques.

It is important to document all reported fish kills, even if field investigations are not warranted or possible. In every instance, a report of the findings must still be maintained by the responsible office and reported within 48 hours to the NOAA NRDA Fish Kill Coordinator or designee.

V. Procedures for Full Field Investigation of Fish Kills (Reported)

If any procedure that would normally be followed for the purposes of this section or its subsections is modified, replaced, or omitted due to adverse field conditions, equipment unavailability, the professional judgment of the investigation team, or any other reason, the rationale for modifying, replacing, or omitting the procedure will be included in the investigation documentation.

A. General Methodology for Inshore Waters

Form B parts 1-3 will be completed for any field investigation. For reported kills, AFS Fish-Kill Counting Guidelines described in Southwick and Loftus (2003) will be used. Generally, whenever possible, the standard fish kill counting guidelines established by the AFS will be used, with the understanding that some modification will be necessary to account for tidal (ebb/flow) conditions. The most applicable guidelines must be determined by the field investigation team. The field investigation team will log, with sufficient detail, the rationale supporting the decision to use a particular methodology. The selection of the most appropriate method for estimating fish kill numbers and species composition will be dependent on the type of habitats affected. In some cases, strand line counts may be used, while in other cases, transects, segments, or other methods will be needed (see Chapter 3 Southwick and Loftus [2003]). The use of stratification to estimate mortality may often be necessary in areas that are inaccessible due to the remote and expansive nature of coastal marsh habitat (e.g., as is true in much of Louisiana).

The Open-Water Method A is the most appropriate method published for areas of broken marsh where no refined map is available. Additional problems may exist in these areas and use of the established guidelines may not be possible. In such cases, a combination of methods may be appropriate. For instance, if a kill encompasses a combination of bayou habitat, small tributaries, some broken marsh area, and adjacent embayments, the bayou and tributaries may be quantifiable by the Small Stream Method. While this method assumes directional flow, during a tidal scenario, the sampling and counting methods may need to be modified to avoid having dead or moribund individuals repeatedly pass an observation point or transect multiple times. The small embayments may be quantifiable by the Open-Water Method A or B. Broken marsh conditions may not be easily quantifiable by any of these methods, and should be surveyed as described below.

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Techniques such as the use of a trawl, seine, sweep net or cast net may be used to determine if any live or dead fish, crustaceans, or benthic organisms are in the area.

Any small kills, as in bays or canals will be quantified by a total count of the fish on the banks and in the water. A random (not arbitrary) sub-sample may be necessary for length measurements. At least 30 total length measurements of a species will be taken before sub-sampling is considered. A discussion of the sub-sampling methods are described in the AFS Fish Kill Counting Procedures (Chapters 2 and 3).

Kills in bayous will be quantified either by total counts or by the Small Streams Method, unless the investigation team recognizes these methods to be impractical under the specific conditions encountered. If that is so, they will log those reasons. This same logging of choice of procedures will be followed whenever there is a question about technique.

Fish kills in lakes/embayments will be quantified using the methods developed for freshwater systems in AFS under Open Water Methods whenever possible. Exceptions may include shorelines that are inaccessible or ill-defined. In these cases, alternative methods must be used. Similarly, in broken marshes, limited access may render listed AFS procedures impractical. The Open-Water Method A can be modified for use in these areas, given proper attention to tidal (ebb/flow) conditions.

B. Special Method for Fish Kill Counting in Broken Marsh

As mentioned above, the basic method for fish kill counting in broken marsh can be adapted from methods described in the AFS Fish Kill Counting Guidelines Open-Water Method A, except that special equipment such as an airboat is required to run the transects. The baseline for transects is established as in that method, and transects of a given width are run perpendicular to the baseline. The difference from the AFS procedure is that shoreline and open-water areas are covered in the same transect, without attempting to differentiate between them. The location of the transects has to be established prior to running them by setting out stakes and flagging to allow a relatively straight line to be run from one end of the transect to the other. Shoreline should be handled as part of the transect, with the same width of shoreline counted as open water, but initially with the fish noted along the shoreline separated from the fish in the open-water part of the transect. For instance, if fish are being counted in an open water transect, one person in the investigation team would count fish within two meters off the port side of the boat, while another person would count the fish within two meters off the starboard side of the boat. Therefore, fish within a 4 meter area would be counted while traveling along the shoreline, and the width of the shoreline count would be the same as the width of the open water transect. This allows the investigation team to determine if the sample of shoreline is sufficient to adequately characterize the shoreline biomass. Fish drift correction factors will be estimated based on the methods described in the AFS Procedures for narrow streams or open water, with the understanding that some modification may be necessary to account for tidal conditions, *i.e.* bidirectional and variable-intensity flow.

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If a boat is not available, then some semi-quantitative methods will be used. Preliminary ground surveys will define the area that cannot be quantified due to lack of access. Photos (see NRDA procedures for photo documentation) will be taken, and the areas of the kill noted on field maps. Ground-truthing will be necessary for species identification and quantification of the size and weight of the fish.

If anthropogenic causes, especially MC 252-related causes, are suspected, appropriate evidence tags and chain of custody forms must be included with any samples collected during the investigation.

C. Special Method for Fish Kill in Offshore waters

For reported kills in offshore waters, where fish are found at the surface, the open water methodology will be used to estimate kill. Form B parts 1-3 will be completed.

D. Water Quality Measurements

All sites will have physical/chemical data recorded at surface and bottom (Temp., salinity, D.O., pH). Visual observations of oiling conditions in the general area will be recorded (sheen, tar balls, submerged oil, no observed oil, etc.). Form B part 3 is dedicated to water quality reporting.

E. Sample Collection Procedures

Whenever biological samples are collected incident to a fish kill investigation, especially where MC252 oil or other anthropogenic causes are suspected as a cause of mortality, chain of custody procedures must be adhered to by the sampler from the moment of collection of the sample, during transport and maintenance of each sample, through to submission of the sample for laboratory analysis. Such procedures include the use of evidence tags, accurate completion of appropriate forms, and completed forms must be maintained with any samples collected during the investigation. All protocols for labeling and sampling collection will follow NRDA guidelines that have already been established. See general NRDA procedures for documentation.

VI. Reporting

An Initial Report of Fish Kill (e.g., Form A, Notification of Fish Kill or Abnormality Form as attached) will be completed by the NRDA Fish Kill coordinator and filed for each reported event, even if no field investigation takes place. For reported kills in which no field investigation occurred, the required report(s) will include justification for the level of investigation determined to be appropriate. All field notes, records, appropriate notification sheets or other records generated in implementing the procedures described in Section IV and V must be maintained in a manner that allows for complete and verifiable documentation which makes retrieval verifiably complete for legal purposes.

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An important component of form B (field investigation) is to accurately record species identification, estimate extent of the kill, document the state of the samples collected – i.e., fresh and intact, decaying and moribund, etc. Environmental conditions such as scavenger activity or bird feeding will also be noted, as well as water quality measurements.

Copies of all reports and correspondence will be sent to NOAA NRDA Fish Kill coordinator within 24 hours of the incident. All reports, records, and observational/non-analytical data collected or created under this work plan will be uploaded to the NOAA NRDA site [REDACTED] by the NRDA Fish Kill coordinator within 24 hours of receipt, for review by the NRDA Trustees.

VII. Logistic Needs and Implementation Timing

A. Staffing

- NRDA Fish Kill coordinators have been named.
- Rapid investigation of reported kills, as warranted in the field, by one team of four consisting of a boat captain, federal and state agency biologists, and a BP representative. If a state agency or BP chooses not to have a representative attend a particular investigation, the investigation may still go forward.

B. Schedule

- Start survey in October 2010.

C. Estimated Cost

- Day rate for Investigation and Inshore teams

Boat	[REDACTED]	[REDACTED]
Personnel	[REDACTED]	[REDACTED]
Total		\$5200/day

- Day Rate for Offshore Teams

Boat (assuming a 30-40ft boat)	[REDACTED]	[REDACTED]
Personnel	[REDACTED]	[REDACTED]
Total		\$6300/day

The NOAA NRDA Coordinator costs [REDACTED] (including expenses). The field costs for reported fish kills are based on the day rates identified above. While the

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total costs for investigation of reported fish kills will be dependent on the number, location, and magnitude of any reported fish kills, the expected cost totals \$184,000 assuming a total of 10 inshore field-days (3 have occurred to date), and a total of 60 days for the NOAA NRDA Coordinator.

The Parties acknowledge that this budget is an estimate, and that actual costs may prove to be higher. BP's commitment to fund the costs of this work includes any additional reasonable costs within the scope of this work plan that may arise. The trustees will make a good faith effort to notify BP in advance of any such increased costs. The need to continue any on-site efforts will be re-evaluated on January 3, 2011.

All results of the review of historic fish kills and reports of fish kills between April 20, 2010 through the end of this effort will be regularly provided to the NRDA trustees and BP.

Literature Cited

Southwick, R. I. and A. J. Loftus (eds.) 2003. Investigation and Monetary Values of Fish and Freshwater Mussel Kills. Am. Fish. Soc. Sp. Publ. 30. xv+175 pp.

Appendix- FORMS

NRDA Fish Kill Form A: Notification of Fish Kill or Abnormality

NRDA Fish Kill Form B: Fish Kill Field Form (Parts 1-3)

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NRDA Fish Kill Form A: NRDA Notification of Fish Kill or Abnormality

Date received:	NRDA contacted by: Phone #:	Report #: NRDA grid ID - year (A or B) + date A = 2010, B = 2011
Time received:	Email: Date/time: Origin of report:	Person receiving report:
Est. date of fish kill:	Phone #: Email: Date/time:	State Record #:
Geographic Location		
Latitude:	Longitude:	NRDA sample grid ID:
Location description (State, County/Parish, Water body):		
<u>State</u>	<u>County/Parish</u>	<u>Water body</u>
<u>Comments:</u>		
Species and Numbers Reported:		Suspected causes:
<u>Species</u>	<u>Number</u>	Low D.O. _____
		Fishing _____
		Agriculture _____
		Oil _____
		Unknown _____
		Other, specify _____
		Reported condition:
		All dead _____
		Dead and dying _____
		Dying _____
		Gasping _____
		Erratic swimming _____
		Other, specify _____
Are fish still dying?	Will a field investigation be made? If so, by whom?	
Yes _____	Yes _____ NRDA _____	
No _____	No _____ Other, specify _____	
If no investigation made, justification for no further action:		Other agencies/individuals involved:
_____ Unable to confirm location		
_____ Report too old for investigation		
_____ Incident sufficiently handled by other agencies		
_____ Very few fish involved in kill		
_____ Outside of NRDA target area		
_____ Other, specify:		
Comments:		

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NRDA Fish Kill Form B : NRDA Fish Kill Field Investigation Form (Part 1)

Date of investigation:	Time of investigation: <u>Start</u> <u>End</u>	Report #: <small>NRDA grid ID - year (A or B) + report date A = 2010, B = 2011</small>
Trustee investigator team:	Representative investigator team:	
Geographic location:		
<u>Latitude</u>	<u>Longitude</u>	<u>NRDA sample grid ID</u>
<u>State</u>	<u>County/parish</u>	<u>Water Body</u>
<u>Notes:</u>		
Description of surroundings:	Abnormal water characteristics	Weather Conditions:
<input type="checkbox"/> Wooded <input type="checkbox"/> Houses/camps <input type="checkbox"/> Industry <input type="checkbox"/> Agriculture <input type="checkbox"/> Marsh <input type="checkbox"/> Beach <input type="checkbox"/> Other, specify:	<input type="checkbox"/> None <input type="checkbox"/> Odor, specify: <input type="checkbox"/> Color, specify: <input type="checkbox"/> Excessive algae bloom <input type="checkbox"/> Oily sheen <input type="checkbox"/> Other, specify:	
Condition of dead fish:	Symptoms of distressed fish:	
<input type="checkbox"/> Whole, with or without body color <input type="checkbox"/> Partially decomposed <input type="checkbox"/> Lesions <input type="checkbox"/> Evidence of fishing mortality <input type="checkbox"/> Pectoral fins extended anteriorly <input type="checkbox"/> Other, specify:	<input type="checkbox"/> Gaspng <input type="checkbox"/> Convulsive <input type="checkbox"/> Erratic swimming <input type="checkbox"/> Lethargic <input type="checkbox"/> Other, specify:	
Photo log:		
<u>Photo #</u>	<u>Time</u>	<u>Comments</u>

