

R.I. Department of Environmental Management

Division of Fish & Wildlife
Fort Wetherill Marine Laboratory
3 Fort Wetherill Road
Jamestown, Rhode Island 02835

Fish Kill Response - Standard Operating Procedure (SOP)

This SOP is a guide for Marine Fisheries staff in responding to reports of fish kills, and will be applicable to all fish, shellfish and other invertebrates found within Rhode Islands marine/estuarine waters. (See also the [Protocol for DEM Response to a Report of an Environmental Incident on Narragansett Bay.](#))

Definition of a fish kill:

A 'fish kill' is a significant and sudden death of fish, shellfish and other aquatic animals. Such events are characterized by large numbers of animals dying over a short time, usually in a defined area.

Initial Notification

1. When a call is received, the staff member who receives the call should fill out the [Fish Kill Notification Form.](#)
2. If a call is received from a private party, contact DEM Emergency dispatch at 222-3070 so information can be routed to the proper office(s).
3. Based on the initial report, proper staff should be notified to respond.
4. The number of staff to respond will be determined by the size/severity of the kill.
5. Responding staff should locate proper forms, equipment and ice (located in dry lab freezer), and proceed to the site. (Refer to the [Fish Kill Response Equipment Checklist](#) for a full list of equipment and the [Fish Kill Investigation Package](#) for a complete set of forms.)

Once on location:

1. Talk to any witnesses/observers. Take a statement from any person at the scene who may have pertinent information. Their identity should be established, and statements should be signed and witnessed.
2. Any information recorded during an inspection should be written in pen. Do NOT use pencil!
3. Determine the extent of the kill by walking the length of shoreline or accessing the site by boat.
4. If visual observations confirm an obvious chemical contaminant, immediately contact the DEM Office of Emergency Response.
 - During normal business hours (Mon-Fri, 8-4), call (401) 222-1360. Otherwise – off-hours or if unsuccessful reaching that number -- call the DEM Division of Law Enforcement at (401) 222-3070.

- If there is chemical contamination, do NOT sample the area! Wait for the DEM Office of Emergency Response to provide further instructions.
5. If no chemical contamination is observed, proceed with an investigation. Begin to fill out [The Fish Kill Investigation Report Form](#) and continue to use it throughout site inspection. Information should include, but is not limited to:

- # of fish	- Symptoms/ conditions
- Weather	- Dimensions
- Species affected	- Water quality
 6. Photographs should be taken of the entire site. Evidence of dead or affected fish and any other materials suspected of being associated with the fish kill should also be photographed. The date, time and location of sequential photographs, and the name of the photographer should be recorded in the field notebook.
 7. Take water quality samples along the entire extent of the kill. Sampling should be conducted in the kill zone and in unimpacted areas. Document the exact location of each sample in the field notebook.
 - a. Water samples for analysis should be taken in clean plastic *Nalgene* bottles.
 - b. The bottle should be held underwater with its cap on until the desired depth is reached.
 - c. Proceed to remove the cap and fill the bottle up to its neck.
 - d. The sample bottle should now be sealed without retaining an air bubble.
 - e. Place bottles on ice in a cooler.
 8. If possible, control or background conditions should be sampled using the same methods as described above. (Control samples capture water quality conditions outside of the kill zone.)
 9. Instruments should be calibrated before sampling and should be documented in field notes. YSI readings (temp, DO, salinity, conductivity) should be taken immediately when arriving at the fish kill site for the most accurate representation of water quality. All data should be recorded in field notebook and should be dated and signed.
 10. When ready to take fish samples or handle fish, wear proper protection (gloves). If fish are alive, make every attempt to keep a few of them alive in ambient water. Do NOT place fish in “fresh” saltwater.
 11. If no fish are alive, then place 3-5 of the freshest dead fish in separate bags and cover with bags of ice. Make sure each bag is labeled with a chain of custody tag. Do not place fish directly on ice!! Keep them in a cooler. Further investigation will determine whether water and/or fish samples should be sent to a lab for further evaluation.
 12. Make physical observations, and if possible perform a simplified necropsy on a few fish. Refer to the [Fish Kill Investigation Form](#) for a list of possible physical conditions. Look for any abnormalities, which could lead to a possible explanation of the fish kill. Record any relevant information in field notebook and

data sheets. Photographs SHOULD be taken of dead or affected fish and any other affected organisms!!!!

13. Based on the type of kill and/or location, the most accurate counting method should be determined by using one of the following:

a. Shoreline Count

- Determine the length of the affected shoreline by subdividing the shoreline into equal segments of a fixed length.
- Count the total number of segments in the affected shoreline.
- Then randomly select at least 3 segments.
- Multiply the average or total count of fish in each segment by the appropriate expansion factor.
- Hence: (# of fish/segment) x (total number of segments in fish kill zone) = Estimate of total population killed

b. Area sampling (lakes)

- Total Number = (# fish counted) x EV
- EV = (Total area effected)/(area sampled)
- For example: 100 fish were counted in an area of 10 acres². The lake was 100 acres². Hence: Total number = 100 x (100/10) = 1000 fish

c. Complete Count

- Count all fish over the entire extent of the kill. (This method is appropriate for a relatively small kill.)

14. Regardless of the counting method, staff should identify, measure and weigh (if appropriate), all fish within sampling area(s). Only fish larger than 6 inches should be weighed.

15. Record all information on the [Fish Counting Record Form](#).

16. If deemed necessary by field staff, begin to measure appropriate water quality parameters by using the *Saltwater LaMotte Kit* and other test kits. Record all information in a field notebook and on correct forms.

17. When all water quality testing is complete, a field biologist should determine whether fish and/or water samples should be brought to a laboratory for further testing.

18. If the field biologist determines that further testing is needed, contact the appropriate laboratory for proper instructions and handling methods. Appropriate laboratories include:

- Pathology

1. URI-East Farm, Pathology (fish/shellfish)
Contact: Marta Gomez-Chiarri, Pathologist (401) 874-2917

- Toxicology
 1. RIDOH Laboratory, Toxicology & Microbiology
Contact: Dr. Ewa King, (401) 222-1999 (toxicology)
Contact: Dr. Ken Jones, (401) 222-5596 (microbiology)
 2. ESS Laboratory, Toxicology
Contact: Kevin Braga, (401) 578-2036 (cell)
- Water Quality
 1. BAL Laboratory, Microbiology (68M00331723)
Contact: Darlene Capuano, Director, (401) 785-0241
 2. R.I. Analytical, Microbiology (68M00331727)
Contact: Leslie Koon, (401) 737-8500 ext 109

19. Any samples taken to a lab should include a chain of custody tag, in which all information should be filled out.

20. A **Fish Kill Investigation Report** should be completed and submitted within 24 hours of event, and an electronic copy should be sent to the following staff:

- Jason Osenkowski, Deputy Chief, Fish and Wildlife
jason.osenkowski@dem.ri.gov
- Alicia Good, Assistant Director, Water Resources
alicia.good@dem.ri.gov
- Dean Hoxsie, Chief, Enforcement
dean.hoxsie@dem.ri.gov
- James Ball, Chief, Emergency Response
james.ball@dem.ri.gov
- Mark Gibson, Deputy Chief, Marine Fisheries
mark.gibson@dem.ri.gov
- Veronica Masson, Federal Assistance Coordinator, Marine Fisheries
veronica.masson@dem.ri.gov

The above procedure has been approved and adopted by the Office of Marine Fisheries, Division of Fish and Wildlife.

Signature Title Date

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