

## **Rhode Island Oil Spill Science Team: RIDEM/DFW Marine Shoreline Assessment**

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### **Objectives-**

1. Establish spill event category (1,2, or 3)
2. Determine location and extent of shoreline impacted
3. Identify critical marine fishery resources at risk
4. Document mortality and estimate absolute magnitude if possible
5. Acquire, process and preserve biological samples
6. Generate summary report and provide technical assistance to Trustees
7. Document Division of Fish and Wildlife (DFW) staff time and expenses

### **Procedures-**

Immediately following an event, consultation between senior DFW managers (Chief and Deputy Chiefs) and DEM early response teams will allow the marine deputy chief to determine the appropriate level of DFW marine section response. If a shoreline impact to marine resources is evident or likely, the DFW marine section is then briefed on:

- A. Type of spill (fuel type)
- B. Magnitude of spill (how many gallons)
- C. Likely impact zone (from early plume path data)
- D. Intervening climatic events (season, weather)

In view of the above factors and in consideration of marine resources in the impact zone, the marine Deputy Chief establishes an event category. Events categories rank from 1 to 3 and scale approximately as the logarithm of spill volume and toxicity of material. The Marine fisheries deputy chief then mobilizes appropriate field teams and establishes a headquarters at the Jamestown DFW facility. Scientific staff conducts preliminary impact site reviews.

Category 1 Event (up to 10,000 gallons, small area, low toxicity)- Marine scientific staff acquires GIS data on impact area. Based on the above data and updated plume path/dispersion analysis, supervising biologists may set up shoreline presence-absence surveys. If needed, marine section personnel staff the sampling teams. In this category, the impact area is small and impact analysis is restricted to qualitative observations. The

Penn 460 event is a good example where DFW field teams reviewed a small, oiled shoreline in Middletown and found no evidence of mortality.

Category 2 Event (100,000's gallons, medium area)- Marine scientific staff acquires GIS data on impact area. Based on the above data and updated plume path/dispersion analysis, supervising biologists may set up treatment-control sample transects or may utilize a census (complete count) of dead/moribund animals. Staffing sampling teams requires full mobilization of the marine section with support from auxiliary DFW staff. The impact area is moderate in size. Impact assessment consists of identity and counts of species killed during the event on successive tidal cycles. Estimation of mortality rates may be done if there is sufficient data. Gibson and Lynch (1990) reported on the results of such a study following the World Prodigy spill in Rhode Island Sound.

Category 3 Event (millions gallons, large area, high toxicity)- Scientific staff acquires GIS data on impact area. Based on the above data and updated plume path/dispersion analysis, supervising biologists' set up treatment-control sampling transects. Staffing sampling teams requires full mobilization of the marine section, auxiliary DFW staff and outside volunteers. Impact area is extensive making presence-absence assessment or complete census impractical. A statistical estimate of mortality is required involving concentrating sampling effort in the high tide deposition field. Procedures for such estimation are given in Gibson et al. 1997a as employed following the North Cape event. Samples are taken along transects throughout the impact zone on each falling tide until the mortality event is over. A sample transect consists of 200 meters of beach with quad rat stations set at 25 meter intervals. The sampling transect is aligned parallel to the shore and superimposed on the high tide deposition field. At each station, 5 replicate counts are made by randomly deploying a 1-meter square quadrat sampler. Comparable sampling is done at control areas. All dead and moribund animals within the sampler are recorded on field logs and collected. Samples are processed and data transferred from field logs to computer at the Jamestown lab. Based on the stratified mean quadrat density and the area of impact from GIS data, a statistical estimate of mortality is made. Biological samples are used to characterize the size composition, sex ratio, and reproductive condition of losses. Additional analyses beyond mortality/loss estimation may be required to fully document the impacts to fisheries (Gibson et al. 1997b, French et al. 2001, 2003).

### **Personnel Resources-**

The DFW marine fisheries section (1 deputy chief, 2 supervising biologists, 8 biologists, 4 technical support staff, 3 contractual employees), auxiliary DFW staff from other sections (freshwater fishery biologists),

University scientists and students, NGO conservation groups (Save the Bay), and citizen volunteers may all be involved in spill assessment depending on event category. Small spills such as Penn 460 were handled entirely by DFW marine staff while a major event such as North Cape required all of the above. Spill response staff for the shoreline zone is organized by team with the number and makeup of teams dependent on spill category. The preferred structure of a shoreline field team is as follows:

- 1 Team leader- DFW marine fisheries scientists with spill experience
- 1 Support scientist- DFW marine or freshwater biologist
- 2 Technical support- DFW technicians or volunteer support.

### **Equipment Resources-**

Response to a spill event can require significant vehicle and sea going vessel assets. In order to reach impact areas, DFW staff may need to drive off-road over beaches or travel via work boat all while carrying field equipment. Marine equipment assets are as follows:

#### DFW Vehicle Assets

- 4 medium duty 4X4 pickup trucks, trailer capable
- 2 heavy-duty 4X4 pickup trucks, trailer capable
- 1 SUV 4X4, trailer capable
- 1 passenger sedan

#### DFW Vessel Assets

- 2, 16-ft work, w/25-40 hp outboards, w/trailers
- 1, 17 ft center console Boston whaler w/70 hp outboard, w/trailer
- 1, 18 ft Maritime center console w/90 hp outboard, w/trailer
- 1, 21 ft Ken Kraft w/ small wheelhouse and 90 hp outboard
- 1, 22 ft C-Hawk w/ small wheelhouse and 150 hp outboard
- 1, 29-ft Dyer shellfish hydraulic dredge RV
- 1, 42 ft Bruno Stillman bottom trawl RV

#### Sampling Equipment

Available at Jamestown DFW facility

**Facility-** The Jamestown DFW marine facility is ideally suited to serve as headquarters for a shoreline response/assessment exercise during an oil spill event. The facility is a combination office/laboratory/workshop complex at Fort Wetherill. The office areas are fully computerized and

internet capable. Phone, fax, and copy services are available along with meeting rooms. A small kitchen and showers are available for staff on extended duty. Laboratory facilities include a dry lab for sample analysis and a wet lab for preparation. A running seawater and tank system is also operational to hold live specimens. A workshop with hand and power tools is attached to the lab for repair and maintenance. Sea going work boats and research vessels can be docked at the facility. Parking for state vehicles, trailers, and visitors is available.

**Budget-** The average costs for DFW marine staff (salary and benefits) and equipment per 7-hour workday is provided below.

Personnel-	Supervisory	\$293.61
	Scientific	\$242.18
	Technical Support	\$215.31
Vessels-	Research Vessels	\$50.00
	Work boats	\$30.00
	Skiffs	\$15.00
Vehicles-	4X4 Pickups	\$20.00
	Passenger vehicles	\$15.00
	Miscellaneous Supplies and Services, per person	\$10.00

### Literature Cited

Gibson, M.R., and T.R. Lynch. 1990. A study of mortality in crabs and lobsters at Hull Cove, Jamestown and Gooseberry Beach, Newport following the World Prodigy oil spill in Rhode Island Sound. Paper presented at the 1990 Spring meeting, Southern New England Chapter, American Fisheries Society. University of RI, Narr., RI.

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Gibson, M.R. 1998. Potential egg production from lobsters killed in the North Cape oil spill and replacement estimates using recycled commercial catch. Rhode Island Division of Fish and Wildlife. Report to NOAA/RIDEM Trustees.

French, D.P., C.A. Manen, M. Gibson, and J. Catena. 2001. Quantifying the scale of restoration required to compensate for the impacts of the North Cape oil spill on fish and invertebrates. Proceedings of the 2001 International Oil Spill Conference & Exposition, American Petroleum Institute, March 26-29, Tampa Florida.

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