

This guide includes information about response methods now used during oil spill responses in marine environment. It provides guidelines for developing response actions, evaluating incident-specific feasibility issues for both on-water and shoreline environments, and developing incident-specific strategies.

The final section of this guide includes detailed descriptions of the response methods now in use during oil spill responses in marine environments. These descriptions begin on page 41 with Natural Recovery.

Strategies for Selecting Response Methods

During emergency response operations, available information may be highly uncertain and fragmented at best, as will forecasts of environmental conditions or evaluations of response equipment needs. Nonetheless, the response community must sort out what is actually known about the spill, and select and deploy equipment as soon and as effectively as possible. What information is needed to help guide the response? What can be done to promote any gains in environmental protection?

Because the goal of oil spill response is to minimize the overall impacts on natural and economic resources, some resources will be of greater concern than others; and response options offering different degrees of resource protection will be selected accordingly. Decisions regarding cleanup method(s) must balance two factors: 1) the potential environmental impacts with the no-action alternative, and 2) the potential environmental impacts associated with a response method or group of methods.

Potential impacts can be determined before considering the need for, or type of, response strategies. For example, evaluating a gasoline spill in an exposed seawall environment might lead to the conclusion that, due to evaporation and low habitat use, minimal environmental effects will occur and further evaluation is unwarranted. On the other hand, assessing a spill of a middle-weight crude oil in a soft intertidal area would likely indicate a high potential for environmental effects; therefore, response methods would need to be evaluated.

The decisions to select response methods should consider the potential of each possible method for reducing the environmental consequences of the spill and the response (including a natural recovery alternative). The method, or combination of methods, that most reduces consequences effectively, should be the preferred response strategy. A method that increases impacts in the short term can be the preferred alternative if it speeds up recovery. (Recovery cannot be defined as pre-spill conditions since natural changes in biological communities will introduce variability to organisms affected by the spill.)

The environmental consequences of a spill and the response will depend on the specific spill conditions, such as the type and amount of oil, weather conditions, habitat where the spill occurred, and effectiveness of the response methods. It is imperative that planners and responders discuss and develop resource protection priorities during contingency planning so that valuable time is not lost during an actual response.

Guidelines for Developing Response Actions

This document provides information to help the reader understand the tradeoffs that were considered in developing the Environmental Considerations for Marine Oil Spill Response (API et al.) and the Characteristics of Coastal Habitats (NOAA, 2000). These companion documents reflect a consensus of extensive and technically appropriate, pre-spill decision processes regarding response:

- **Goals** (overall aims of the response, defined by government);
- **Objectives** (specified response outcomes, defined by response management);
- **Strategies** (plans used to carry out objectives, protect resources at risk);
- **Tactics** (specific actions taken to carry out a strategy); and
- **Windows of opportunity** (timeframe during which response actions are viable).

Goals

Generally, oil spill response goals, in order of priority, are:

1. Maintain safety of human life;
2. Stabilize the situation to preclude it from worsening; and
3. Minimize adverse environmental and socioeconomic impacts by coordinating all containment and removal activities to carry out a timely, effective response.

Objectives

Responders should develop incident-specific objectives and strategies to address all three goals simultaneously. While attaining the first two goals, responders must develop incident-specific response objectives that achieve the third goal (minimize further spill impacts and protect resources at risk). Objectives must be clearly articulated and be measurable and achievable, e.g., prevent oil from reaching a specific part of the shoreline from one point to another. Effectively planning and executing a response requires a framework within which limited response resources (people, equipment, time) can be allocated to protect multiple resources at risk. Not all of these can be protected, some will have higher priorities than others for protection.

Strategies

Strategies are the conceptual plans designed to achieve response objectives. For example, a combination of mechanical containment and recovery equipment, dispersants, and in-situ burning can prevent oil from reaching the shoreline.

Initial spill conditions will play a large role in developing an effective strategy, and sufficient initial information must be gathered to determine:

- Type and amount of oil spilled;
- Spill location;
- Behavior of spilled oil;
- Spill trajectories and persistence;
- Locations and resources that may be impacted, and types of impacts; and
- Current and forecast weather.

As information is gathered, strategies can be developed (and revised) to protect those resources at risk. Though response strategies will vary according to incident-specific conditions, strategies can often be established in spill response planning, consistent with response goals.

Tactics

Tactics are site-specific and individual activities taken to implement strategies, and can also be established in spill response plans, consistent with response goals. Specific tactics are usually developed for 12- to 24-hour time periods.

Windows of Opportunity

Windows of opportunity (timeframes during which response actions are viable) are constrained or bound by certain influences or conditions, and are available, or “open,” for limited times.

Three primary windows exist following a marine oil spill. Within each window, certain spill control measures can be taken to minimize adverse environmental effects:

Very early - Oil is fresh and concentrated near the discharge source.

- Window may be open for 1-2 days; and
- Responders focus on source control, containment near the source, and removal (these offer the best opportunities to reduce adverse environmental impacts).

Early - Oil has spread, is no longer concentrated, and threatens sensitive resources and habitats.

- Window may be open for several days to weeks;
- Sensitive resources and habitats are threatened; and
- Responders work to minimize the spread of oil, prevent it from contacting resources at risk, and protect resources and habitats most vulnerable to longer-term oil impacts.

Later - Oil has stranded.

- Window may be open for days to months, or longer; and
- Responders use habitat-appropriate shoreline cleanup options to minimize environmental effects and enhance natural recovery (in some cases, oil may be left to degrade naturally because physical removal would cause a greater negative impact than leaving it in place).

Options for reducing spill impacts during each of these windows are addressed later, but, because information regarding Window 2 will be site-specific (and is addressed in area contingency plans), the emphasis here is on Windows 1 and 3. Figure 1 depicts the range of response possibilities for a generic, large marine oil spill (generalized response phases and windows illustrate the relative timing constraints of various response options).