DEVELOPING GEOGRAPHIC RESPONSE STRATEGIES: A MODEL APPROACH

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ABSTRACT: *A critical element of an oil-discharge/hazardous-substance-release contingency plan is its utility in guiding protection of priority sensitive areas following a discharge or release. This paper discusses a cooperative effort to develop such a tool, the Geographic Response Strategy (GRS), that may be used by other regions in their own contingency plans. A GRS combines local knowledge of sensitive areas with proven operations and logistics into a document with specific guidance for rapid response that can be used in the field. A GRS includes a site map, photograph, and table of associated information describing the resources to protect, operational tactics to carry out the protection, equipment and personnel needs, and site access. Sites are selected based on their environmental sensitivity, the risk of a discharge/release, and the ability to protect the site. Natural resource trustee agencies make preliminary site selections. After consideration of public comments, a GRS Work Group selects the GRS sites. An Operations/Tactics Subgroup designs the response strategy using basic response tactics. GRSs are field tested, when possible, to verify operational feasibility and to ensure that proposed response actions do not inadvertently harm sensitive resources. Completed GRSs for a subarea are compiled into an addendum to the appropriate federal/state subarea contingency plan. The collaborative process to create GRSs is a recent development in Alaska. Concepts framed at a 1998 workshop in Anchorage coalesced early work on site-specific response plans into a common approach that was accepted by the Alaska Regional Response Team. Since 1999, over 145 site-specific GRSs have been prepared for high-risk sensitive areas by work groups consisting of representatives of oil industry; spill response organizations; federal, state, and local agencies; tribal entities; and citizens groups. The GRS process helps stakeholders and the public understand what actions may be feasible during a response.*

Background

A primary reason for responding to oil discharges/hazardous substance releases is to prevent injury to sensitive areas in the environment. These sensitive areas may include biological resources (e.g., fish, birds, wildlife, plants and animals, and their habitat), historic properties [defined in 16 United States Code section 470(w)(5) as any prehistoric or historic district, site, building, structure or object included in, or eligible for inclusion on the National Register; including artifacts, records, and remains], and human uses (e.g., boat moorings, shellfish farms, fish hatcheries, water intakes, and recreation sites). Actions taken during the initial hours of response to a spill can be critical to the effective protection of sensitive areas. Timely protection depends upon having a structure in place to systematically guide responders. With more than 586,000 square miles of land mass and 33,000 miles of shoreline in Alaska, most of it pristine, response planners are faced with the large task of preparing to conduct timely and effective response activities to protect sensitive areas.

The State of Alaska, the Federal On-Scene Coordinators (OSC), and the Alaska Regional Response Team (Alaska RRT) adopted *The Alaska Federal/State Preparedness Plan for Response to Oil and Hazardous Substance Discharges/Releases, Volume I (Unified Plan)* in 1994. The plan serves as the federal regional contingency plan for Alaska under the *National Oil and Hazardous Substance Pollution Contingency Plan* and as the *State Master Oil and Hazardous Substance Discharge, Prevention, and Contingency Plan* for the State of Alaska. The *Unified Plan* provides statewide policy, organization, and procedures for responding to oil discharges and hazardous substance releases (USCG et al., 1994). Subarea Contingency Plans (SCP) were subsequently developed, as Volume II, to cover

specific response planning information, including sensitive areas, for each of 10 subareas of the state (the original four federal planning "areas" were divided into 10 "subareas"). Three work groups were established in each subarea to prepare elements of the SCP: operations, logistics, and sensitive areas (the latter was established on a statewide basis).

During 1995, the Sensitive Areas Work Group (SAWG) prepared a long-range strategic plan with the goal of "... ready availability of current, accurate location and sensitivity information about sensitive areas for use in response to oil and hazardous substances spills in Alaska." An objective identified for the year 2000 and beyond, was to create detailed sensitive areas data and identify response strategies for protecting significant sensitive areas vulnerable to spills (SAWG, 1995).

The Prince William Sound Regional Citizens Advisory Council (PWS RCAC) undertook a study in 1998 to examine what other states had done to prepare site-specific response plans. In particular, this study examined the work done in the early 1990s in Washington and Oregon to develop site-specific geographic response plans (Heimowitz, 1995 and Logan, 1998). As a result of the study, the PWS RCAC Board of Directors adopted a position supporting geographic response planning in Alaska; urging agencies to develop standards for their development; and suggesting a process to build such plans and incorporate them into agency and industry plans (Robertson, 1998).

In June 1998, in response to the PWS RCAC study, the Alaska RRT tasked the SAWG to develop an approach to incorporate geographic response planning into the Alaska contingency planning process (Alaska RRT, 1998). A workshop was proposed and a steering committee was created with representatives from the U.S. Department of the Interior (DOI) (chair of the SAWG), the Cook Inlet and PWS RCACs, the Alaska Department of Environmental Conservation (ADEC), and the PWS Oil Spill Recovery Institute (OSRI).

Approximately 100 people attended the resulting November 1998 workshop. After presentations and discussions, workshop participants agreed to make the following recommendations to the Alaska RRT (OSRI et al., 1999):

- The term "geographic response strategy" should be used instead of "geographic response plan," to eliminate potential confusion with any State of Alaska legal requirements for "plans" or ongoing contingency planning.
- GRSs should be integrated into the ongoing area/subarea planning process.
- GRSs should include maps that identify priority sensitive areas to protect; workable, operational tactics to protect those areas; and site access.
- GRSs should be developed for specific areas based on the risk of contamination from an oil or hazardous substance spill, the environmental sensitivity, and the ability to protect the identified sensitive areas.
- GRSs should not be prescriptive nor should the tactics, equipment, or other response resources described in them be legal requirements. Rather, GRSs should serve as guidelines, and the process should allow for GRSs to be easily updated or modified should conditions warrant.
- GRSs should be developed through an open process in partnership with state, federal, and local governments; industry and spill response cooperatives; landowners; and interest groups. The process should include public review.
- Operational strategies should consider a range of response tools and tactics and, where practicable, tactics should include more than diversion booming.
- Detailed response planning that is underway should continue, not await the development of GRS standards, but be adjusted later, if necessary.
- Field and table-top exercises should be conducted to validate the GRSs.
- The process to update GRSs and disseminate modifications to SCPs should be simple and straightforward.
- The Alaska RRT should lead in establishing statewide standards for GRSs.

The workshop results were presented to the Alaska RRT in February 1999. Alaska RRT members endorsed the GRS concept for inclusion into SCPs and requested that prototype GRSs be developed for the Cook Inlet Subarea (Alaska RRT, 1999). During the same time frame, ADEC was reviewing oil discharge prevention and contingency plans submitted by crude oil facility operators in central Cook Inlet. ADEC placed conditions on the approval of these plans, requiring operators to participate in a work group to develop site-specific response plans for environmentally sensitive areas that might be impacted by oil discharges from their facilities (per 18 Alaska Administrative Code 75.425). As a result, a work group was established to develop a process for creating GRSs in Alaska, and to build and validate at least 20 GRSs for the central portion of the Cook Inlet Subarea. The Cook Inlet prototype has provided a model for GRS development elsewhere in Alaska.

Guiding principles

The Cook Inlet GRS development project resulted in the following guiding principles (Robertson, et al., 2000):

- The GRS should identify sensitive resources at risk and set priorities for their protection.
- The GRS should contain workable techniques to protect sensitive areas.
- The GRS document should be designed to meet the needs of responders in the field.
- The strategies should be flexible so they can be modified, as necessary, to fit the prevailing conditions at the time of a response.
- The GRS should not unnecessarily duplicate information contained in the Unified Plan or the relevant SCP.
- The GRS document must be easy to use, validate, and update.
- The GRS document content is more important than form.
- The GRS development process should increase public awareness of response plans before an incident occurs.
- The final GRS document should be inexpensive to produce.
- The final GRS document terminology should be compatible for use with any response using the incident command system.

The process

The process described below is typically followed to implement the November 1998 workshop recommendations and

achieve the guiding principles described above. First, a GRS Work Group (Work Group) for a geographic area is organized. Work Group member organizations helping fund the GRS development project become the project sponsors, and their representatives sign a memorandum of agreement that identifies the purpose of the work, Work Group membership, GRS format and content, funding, the development process, and a project schedule.

Work Group members typically include representatives of industry facility/vessel plan holders, oil spill response organizations, state and federal natural resource trustee agencies, local governments, federally recognized tribes, citizen groups, and non-governmental organizations (e.g., PWS and Cook Inlet RCACs). Sponsoring members provide staff or hire contractors to support the project; ADEC and industry provide the Work Group co-chairs. The Work Group typically meets three to four times throughout the project. Initial meetings include SAWG members and focus on identifying priority sensitive areas to be protected.

Because the 10 subareas in Alaska are large (ranging from 4.3 million to 96.6 million acres, and including 1,800 to 6,500 miles of coastal shoreline), the Work Group divides the subarea into smaller, more manageable areas referred to as "zones." The "areas of major concern," defined in the Sensitive Areas Section of the applicable SCP, are used as the basis of selecting proposed GRSs in each zone. A matrix (figure 1) is generated that lists specific sensitive areas and their natural resource or human use values. Data for the matrix are provided by natural resource trustee agency representatives. Sites are added to the matrix based on input from local natural resource agency managers and the public review process, as discussed in more detail below. While all sites on the matrix may "qualify" for a GRS, limited financial resources have typically required reducing the list to a smaller number of sites. The decision on which sites are a "priority" for the development of GRSs is determined by evaluating sites that: (1) are at risk from a spill, (2) have numerous "major concern" values, (3) have values of significance (e.g., threatened or endangered species), (4) can be successfully protected under typical environmental conditions, and (5) are representative of other similar types of sites found in the zone (since the same strategy may be applied to similar sites). A site chosen for GRS development need not have all five features, but probably will contain most, if not all, of them.

Southeast Alaska geographic response strategy resource matrix (excerpt).

Location	Priority	lat (N)	lon (W)	Marine Mammals	Fish	Birds	Coastal Habitat	Commercial Fishing	Historic Properties	Subsistence Use
ZONE 9										
Disenchantment Bay	1	59 59	139 32	H	R	M, C, K	R, K			I
Monti Bay	1	59 33	137 47	H	H, S		K	S		F, I
Situk	1	59 26	139 32	S	E, S		T, M	S		F
Lituya Bay	2	58 38	137 34		R	C	M, R, I	H	M	
Kageet Pt.	3	60 03	141 11			C	R			

1 = first 50 priority site 2 = second 25 priority site 3 = third 25 priority site

Code key to Southeast Alaska matrix (excerpt)

Marine Mammals	Fish	Birds	Coastal Habitat	Commercial Fishing	Historic Properties	Subsistence Use	Resource Concentration
H = Harbor Seal rookeries and haulouts	H = Herring spawning areas	S = Colony of over 500 seabirds	M = Marsh or estuary	S= Intensive salmon fishery	R = **Report** any cultural resources found during operations to the FOSC Historic Properties Specialist	F = High use salmon harvest areas	Number indicates the total number of sensitive resources in each column counted for each site (excluding cultural resources)
S = Steller Sea Lion rookeries and haulouts	E = Eulachon spawning concentration	C = Waterfowl & shorebird winter concentration	T = Sheltered tidal flat	H = Salmon hatchery or ocean pen	I = FOSC Historic Properties Specialist should **Inspect** site prior to operations	I = High use marine invertebrate area	
Primary sources: SE SCP, NOAA ESI maps	Primary sources: ADFG, FWS	Primary sources: SE SCP,	Primary sources: NOAA ESI maps	Primary Sources: ADFG data	Primary sources: ADNR, USFS	Primary sources: ADFG, USFS data	N/A

Figure 1. Example sensitive areas site matrix and key.

The Work Group then undertakes a public information, review, and comment process. Area residents are notified of the project and the proposed GRS sites through a news release, public notices in local papers, radio talk shows, public meetings, and, in some cases, an Internet web site. Letters are mailed to representatives of interest groups, local governments, and tribal entities. Sites identified through this process are typically added to the list of GRS sites.

While historic properties may be some of the sensitive resources a GRS is designed to protect, it is important to ensure that proposed GRS response activities do not adversely affect historic properties. Participation by appropriate federal and state historic properties specialists in the GRS development and validation process helps ensure that implementation of GRS response strategies will not injure historic properties. In addition, following consultation with appropriate tribal and private landowner representatives, agency historic properties specialists identify one of three statements to be included on each GRS regarding the degree of historic protection required (USCG et al, 2002). Similarly, federal and state biologists include special considerations in the GRS to mitigate the potential effects of response activities to biological resources under their agencies' management authority.

After the first sites are chosen for GRS development, representatives from industry, response agencies and organizations, and other interested parties form an Operations/Tactics Subgroup (Subgroup). The Subgroup prepares a description of generic spill response tactics to use in the GRSs, including response resource requirements, deployment considerations and limitations, the purpose of the tactic, and a sketch of implementation. The generic tactics that have been identified include deflection booming, diversion booming, exclusion booming, shore-side recovery, marine recovery, free-oil recovery, passive collection and debris removal, and cold water deluge.

The Subgroup gathers information for each GRS site, including the specific location of sensitive areas to protect, details on beach morphology, and information on tidal fluctuations and weather/seasonal effects. Other factors considered are the size of the area to be protected, water depths, location of available response resources, immediate or nearby commercial or recreational activities, and upland ownership or management.

The Subgroup, using the above information and the best available maps, charts, and photographs, identifies the extent of the site to be protected and the most appropriate spill response strategy for this site. GRSs can be designed for areas ranging in size from the mouth of a small stream to a mile-long series of barrier islands. The strategy is developed by applying and adapting the generic spill response tactics to address the specific characteristics of the site.

The Subgroup also offers considerations for appropriate site access, staging areas, and response logistics. This information is summarized in chart and table form for each GRS and is presented to the Work Group for consideration and discussion at a Work Group meeting.

The Subgroup, and any interested Work Group members, typically visit each GRS site to evaluate the feasibility of the proposed response operation and to ensure that the proposed tactics do not result in injury to sensitive areas. During, or before, site visits, discussions are held with local residents who know prevailing local weather and sea conditions. Modifications to the proposed GRS may be made based on additional information obtained during these site visits.

Field deployment to validate the practicality of the GRS is typically conducted when a response exercise is scheduled in the vicinity. GRS response exercises serve the dual purpose of verifying whether the tactics used in the GRS will meet intended objectives and providing a training opportunity for spill response personnel. Any modifications to the tactics that result from field activities are incorporated into the GRSs (or issued as change orders to GRSs published in SCPs).

When the Work Group has finished work on GRSs for the zone(s), the GRS document is forwarded to the appropriate subarea committee for review and approval. Following approval, that document is published and disseminated as a draft for public review. Public meetings are held in key communities in the applicable subarea. After the public review period, usually 30 to 60 days, the subarea committee reviews and evaluates comments received and incorporates revisions into the GRS document, as appropriate. The GRS document is then published as an addendum to the SCP.

The product

The GRS Work Group maintains a focus on the end-user, namely, on-scene response personnel. As a result, GRSs are designed to be straightforward and functional. The GRS document appears in three forms: (1) an insert into existing SCPs (8-1/2" by 11" size), (2) a large field copy (11" by 17" size), and (3) electronically on compact disk and at a state-maintained Internet web site, with links from both federal and state Internet web sites.

The entire GRS document consists of four parts:

- Part One includes an introduction describing the purpose of the GRSs, how they are used, how they were developed and by whom, a description of the geographic zones, and whom to contact for more information. Part One also includes the site selection matrix and a discussion of how the sites were prioritized and selected.
- Part Two includes a description of the generic spill response tactics used in the GRSs, including the symbols used on the maps.
- Part Three contains the site-specific GRSs themselves (further described below).
- Part Four includes a list of references.

Part Three consists of a two-sided, 11" by 17" document. Side one contains a high-resolution color nautical chart (or topographic map or aerial photograph) of the site (figure 2). The map includes symbols identifying the tactics to be used, their operational location, and access and staging areas. Side one also includes a low-oblique, color, aerial photograph of the site and a map legend. Side two provides a table with the site location (including latitude-longitude), a summary of the strategy, implementation instructions, response resource requirements, site access notes, permit needs, seasonal constraints, sensitive resource values being protected, historic properties considerations, and any other special considerations (figure 2).

The GRS documents (in PDF [portable document format] files) are located at the Alaska Geo-Spatial Data Clearinghouse (http://www.asgdc.state.ak.us/maps/cplans/subareas.html) and are posted as a link on the Alaska RRT Internet web site (http://www.akrrt.org). At the time of publication, 145 GRSs for three subareas have been completed using the process described in this paper. It is anticipated that 60 additional GRSs will be completed by 2004.

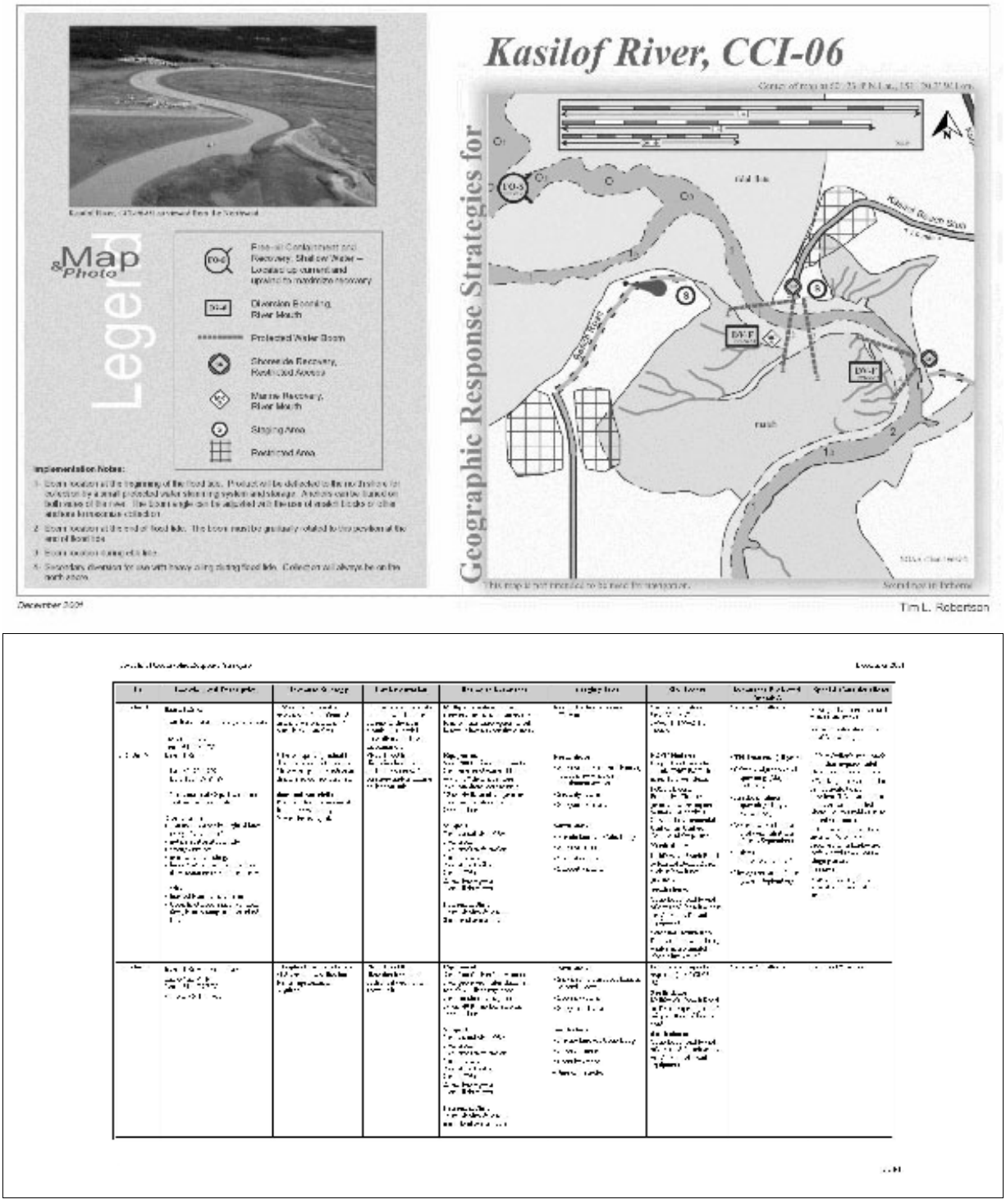

Figure 2. Example geographic response strategy (side one and two).

Conclusion

The GRS development process has provided a tool for rapid response: (1) to help protect priority sensitive areas following an oil discharge or hazardous substance release, (2) for training responders before an incident, and (3) for developing shared expectations among response participants and the public about what can be protected. The collaborative approach taken in Alaska for sensitive areas protection through the development of GRSs has also served to strengthen working relationships among stakeholders. This process and the resulting product may be useful for contingency planning in other regions.

Biography

Douglas Mutter is the Regional Environmental Assistant for the DOI Alaska Office of Environmental Policy and Compliance. Among other responsibilities, he chairs the SAWG, is the Designated Federal Officer for the *Exxon Valdez* Oil Spill Public Advisory Committee, and serves on the Oil Spill Recovery Institute Advisory Board.

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