

# CASCADING RESPONSE EQUIPMENT IN WASHINGTON

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## ABSTRACT 299611:

Understanding the effects of cascading response equipment is an important component of oil spill planning and response. It is critical to understand both how long it takes for equipment to reach a particular location and to understand the gaps created when equipment is cascaded out of an area. The Washington State Department of Ecology created a model to analyze the depth of equipment when verifying planning standards, and to inform decision-making when requests are made for equipment during out of state incidents.

## INTRODUCTION:

In Washington State, oil spill contingency plan holders are required to show they have access to response equipment in order to meet planning standards for the areas in which they operate. To meet these standards, plan holders rely on contractors and the equipment they have staged throughout the region. In the past, verifying compliance with planning standards was done manually; a time consuming task that generated a static picture of equipment coverage. In addition, equipment was cascaded to an area only until a standard was met. With contractors moving equipment in and out of areas, it became difficult to determine how much

extra equipment was available and whether or not a plan holder was in compliance. Thus, the goal of this project was to create a Geographic Information System (GIS) tool that could quickly produce data when analyzing planning standards based on equipment owner and the location of their equipment. The data provided by this tool will be used to help inform decisions when contractors receive requests to move equipment out of the region for large spills.

## METHODS:

### EQUIPMENT LOCATIONS

Contractors, government agencies, and many plan holders list equipment on the Western Response Resource List (WRRL). In addition to cataloging equipment in a standardized way, this database contains spatial information (latitude and longitude) that allows the information to be incorporated into GIS, see Figure 1. While the WRRL supplies information about the equipment, additional information specific to planning standards was collected and stored in a related database.

This additional information includes:

- Equipment mobilization times
- Travel Mode (Land or Water)
- Skimmer Operating Environment (Calm, Protected, Open)
- Storage Type (On Water, Shoreside)
- Vessel Travel Speeds
- Vessel Operating Area (Puget Sound, Grays Harbor, Columbia River, All)



Figure 1. Image of Equipment Locations based on the WRRL.

### EQUIPMENT TRAVELLING BY ROAD

ArcGIS Network Analyst was used to create travel times within WA State originating from a contractor's equipment staging areas. A travel speed of 35 MPH was used in Western Washington and 45 MPH in Eastern Washington. The results were "service area" polygons in one hour increments (Figure 2).

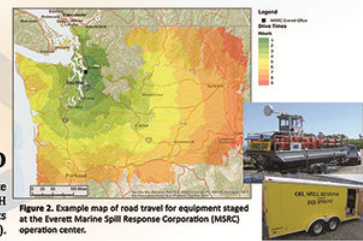


Figure 2. Example map of road travel for equipment staged at the Everett Marine Spill Response Corporation (MSRC) operation center.

### EQUIPMENT TRAVELLING BY WATER

In order to generate vessel travel times, a distance raster was created from each vessel staging location. Using vessel travel speeds and operating areas, travel times via water were created throughout the state (Figure 3).



Figure 3. Example map of water travel for MSRC's WC Park Responder vessel.

### PLANNING STANDARD AREAS

Washington Administrative Code 173-182 details equipment requirements for plan holders operating in 13 different areas, as well as facility transfer locations. The area requirements identify specific types and amounts of equipment based on the geography and operating environments found in that area. An example of the requirements for the Dungeness planning standard (WAC 173-182-390) can be seen in Table 3.

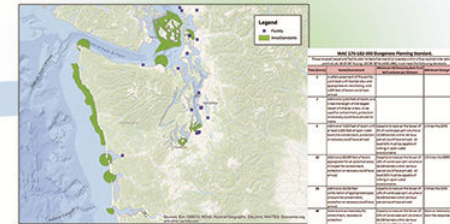


Figure 4. Image of Planning Standard Areas and Transfer Locations.

Table 3. Requirements for the Dungeness planning standard.

## RESULTS & DISCUSSION:

By intersecting road and water travel times with the planning standard areas, this tool creates two outputs: a summary of all equipment totals available for a planning area (Table 1), and a master list of a contractor's equipment and the amount of time it takes for equipment to reach the various planning standard areas (Table 2).

This output is in a format that can be imported into a plan holder's "planning spreadsheet", which is used to verify compliance with the area or transfer standards. It also provides plan reviewers, plan holders, and contractors the ability to determine how moving response equipment will impact compliance.

## REFERENCES:

- ArcGIS Network Analyst. ArcGIS Desktop: Release 10.1. Redlands, CA: Environmental Systems Research Institute. <http://resources.arcgis.com/en/help/main/10.1/index.html#//00470000001000000>
- Washington State Department of Ecology Contractor Equipment Database. Lacey, Washington: Washington State Department of Ecology, Spill Prevention, Preparedness and Response Program, 2013.
- Western Response Resource List, Edmonds, Washington: Genwest Systems Inc., 2013, <http://www.wrri.us>

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Plan Holder: MSRC ARC EQUIPMENT SPREADSHEET  
Planning Standard: Dungeness Planning Standard (WAC 173-182-390) Transfer Location: Dungeness

Equipment ID	Equipment Name	Equipment Type	Equipment Status	Equipment Location	Equipment Availability
24569	Skimmer	Skimmer	Available	Everett	Yes
24670	Skimmer	Skimmer	Available	Everett	Yes
24671	Skimmer	Skimmer	Available	Everett	Yes
24672	Skimmer	Skimmer	Available	Everett	Yes
24757	Skimmer	Skimmer	Available	Everett	Yes
24758	Skimmer	Skimmer	Available	Everett	Yes
24950	Skimmer	Skimmer	Available	Everett	Yes
24951	Skimmer	Skimmer	Available	Everett	Yes
24952	Skimmer	Skimmer	Available	Everett	Yes
24953	Skimmer	Skimmer	Available	Everett	Yes

Table 1. Table of MSRC's equipment summary for the Nisqually area.

WRRL ID	Columbia River	Grays Harbor	Neah Bay	San Juans Islands	Shell Harbor Island
24569	9	8	5	9	7
24670	9	8	5	9	7
24671	11	10	10	5	6
24672	7	6	8	7	4
24757	11	10	10	5	6
24758	9	8	9	6	4
24950	4	6	10	11	8
24951	11	10	11	6	6
24952	11	10	11	6	6
24953	9	8	9	6	4
24954	9	8	9	6	4

Table 2. Travel times for MSRC's equipment to selected planning areas.