

# Leading the Way: ASTM F1780-97 (2002) A More Accurate Way to Predict Volume of Spilled Oil that Can be Recovered by Skimming Systems

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## Introduction:

•An accurate depiction of skimming system capacity is needed to determine how much on-water recovery equipment needs to be on-hand.

•**Current Method:** The EDRC method, which may yield substantial overestimates, is currently widely used to estimate skimming capacity. This method purports to show that all response resources available to Washington are capable of collecting up to a 350,000 barrel oil spill within 48 hours. Such an estimation does not compare well with performances seen in actual spill responses. EDRC is an inexact method that does not sufficiently consider environmental and operational factors.

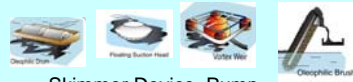
•**Improved Method:** The ASTM guide provides a framework for more accurate predictions of capacity by calling for a robust consideration of environmental and operational factors. This method shows that all the equipment available to Washington is only capable of collecting 20,000 barrels of a 50,000 barrel oil spill.

## Purpose:

Show how the ASTM method can be applied to more accurately assess skimming system capacity.

This was done in *Assessment of Capacity in Washington State to Respond to Large-scale Marine Oil Spills*, a 2009 report by the Council, which provides an estimation of how much oil can be skimmed from the water within 48 hours. A dramatic difference exists between the Council's estimate and that suggested by existing planning and policy frameworks.

## EDRC Method for Predicting Volume of Oil Recovered by Skimming Systems



$$\text{Skimmer Device Pump Capacity (barrels per day)} \times 20\% = \text{EDRC (barrels per day)}$$

Unlike the ASTM does not quantitatively consider key environmental and operational factors.

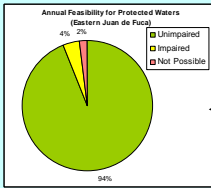
## ASTM-A More Robust Method

Quantitatively Considers Environmental Factors (Spill Behavior) and Operational Factors (Response Tactics)

### Environmental Factors

- Spill Volume and Slick area
- Average Thickness
- Evaporation
- Viscosity
- Emulsification
- Beaching of Oil
- Weather and Waves
- Darkness and Fog

Cause decreased effectiveness through time.



Percentage of Time Response Impaired by Winds and Waves

Environmental Factor Coupled with Operational Factors  
Encounter Rate = Swath Width X Encounter Speed X Average Thickness

2 Hour Arrival Time

3 Hour Arrival Time

4 Hour Arrival Time

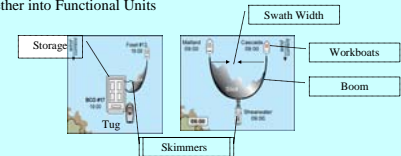
Hours of travel will vary with distance

### Operational Factors

- Available Equipment and Personnel
- Skimmer Characteristics such as, Recovery Efficiency (% oil of oil water mix), Pump Rates, and On-board Storage
- Characteristics of Workboats, Boom, Storage Devices

### Tactics

- How Equipment is Pieced Together into Functional Units



Recovery Rates Decreasing Due to Darkness and Spreading

Volume of Oil Recovered

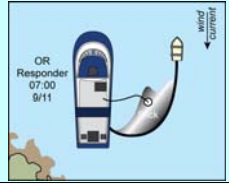
Time

Arrival Times When Skimming Starts

24 Hour Arrival Time

Skimmers A-E

Skimmer Systems with no Storage Must Stop Frequently to Off-load



## Conclusions:

- ASTM predictions more accurately reflect actual performance.
- Based on the report, a significant gap exists between the science and the policy when planning for response to oil spills in Puget Sound and in the Georgia Basin. The report found that, at best, 20,000 barrels of a 50,000 barrel instantaneous release oil spill could be recovered within 48 hours. Whereas, the existing response planning framework suggests a six-fold excess capacity is in place (350,000 barrels skimmed within 48 hours).
- Existing estimations provide a false sense of security regarding response capacity.
- Policy decisions such as how to invest limited funds are currently based on incomplete analysis.
- Based on improper analysis, the level and quality of investment in response may be compromised under the existing planning scheme.
- It is critical that future decisions be made based on more complete analysis, a good frame work for this type of analysis is ASTM F1780.