Use of Trajectory Modeling To Analyze Variations On the Response Strategies for Inland Spills

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Key Response Questions

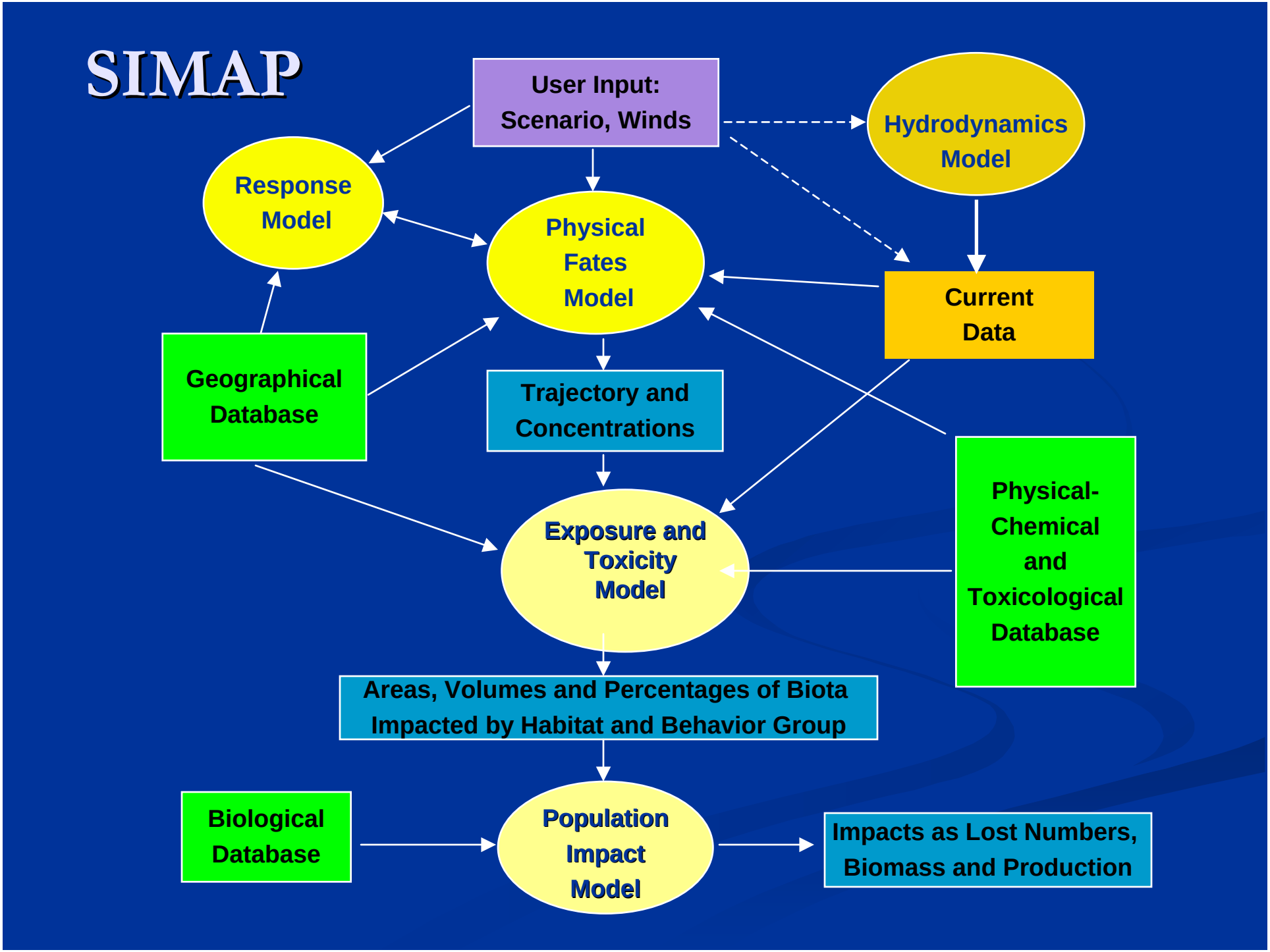
- How can we maximize effectiveness of oil removal operations for specific types of spill situations in inland areas?
- How might the outcomes have been different with a variation on the response employed?
- What is the optimal response strategy for a particular location and situation?
- How can we better train responders to think strategically to minimize spill impacts when there are fewer real spills?

One approach:

SIMAP

- ASA developed Natural Resource Damage Assessment Models for CERCLA and OPA NRDA Regulations (1984-1996)
- ASA has continued development as SIMAP (Spill Impact Model Application Package)

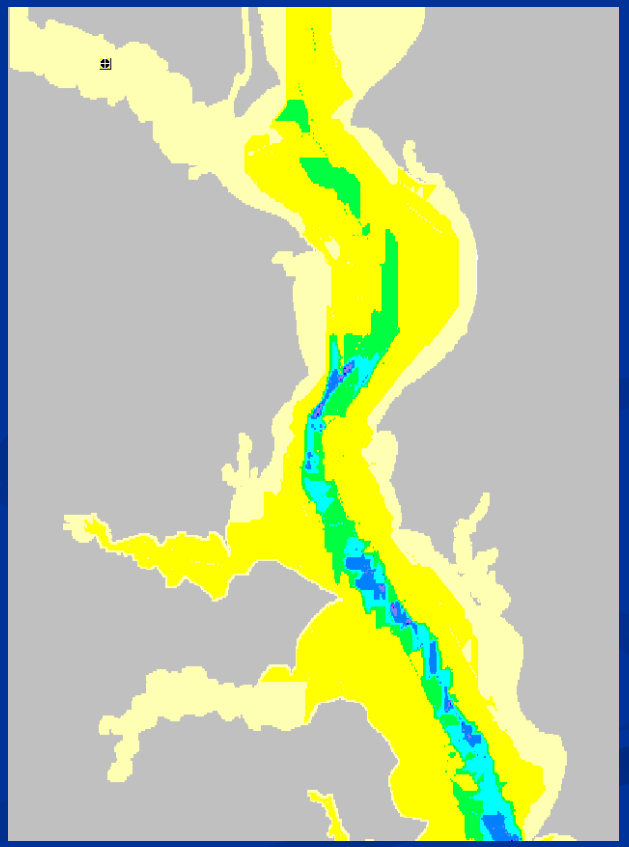
SIMAP

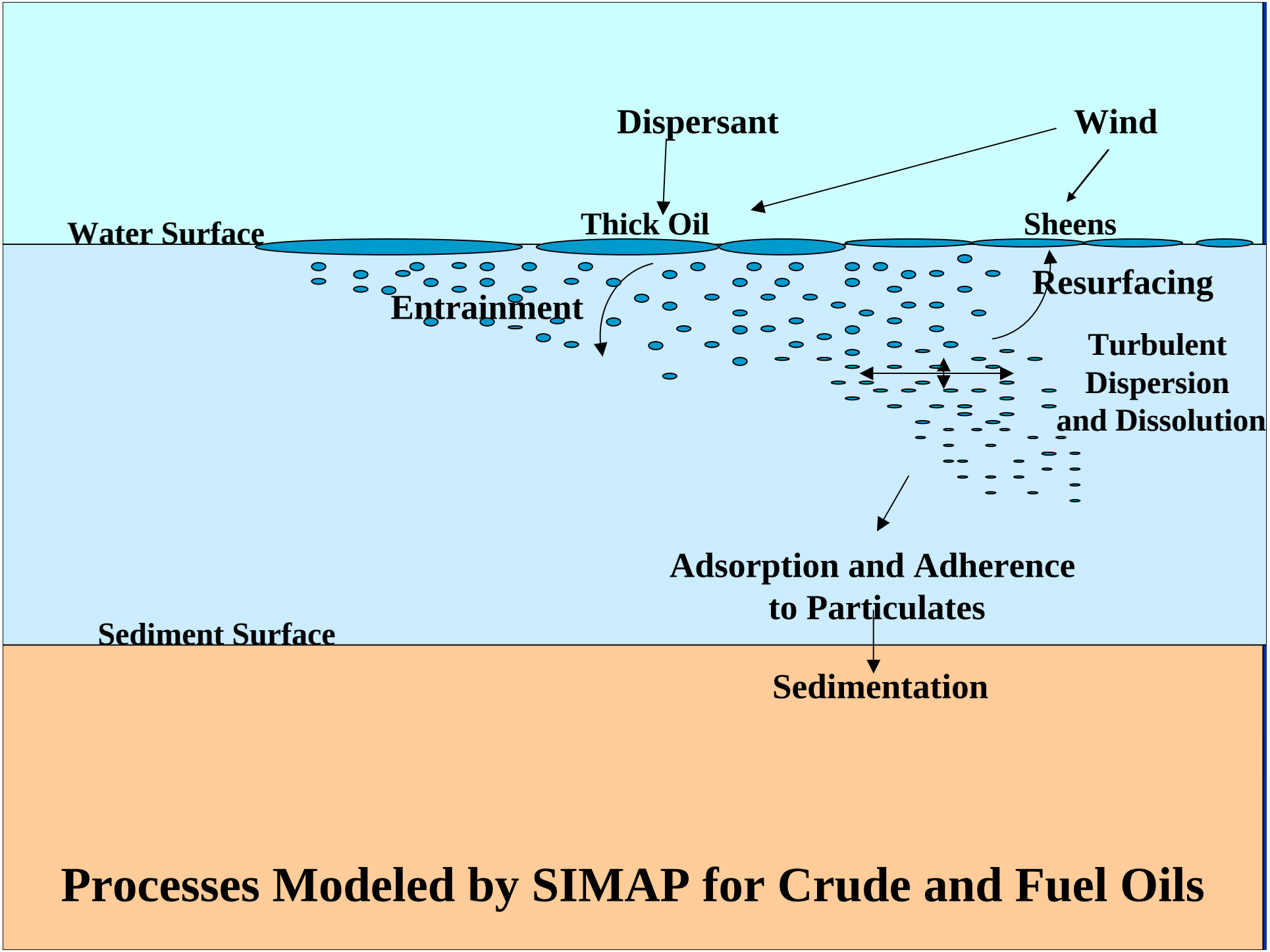


Scenario Specifications

User-specified or based on actual historic spill

- Date, time, duration
- Location
- Fuel/oil type and characteristics
- Amount
- Environmental conditions
  - Winds
  - Currents
  - Temperature
  - Salinity
- Geographical data
  - Shoreline and habitat type
  - Depth



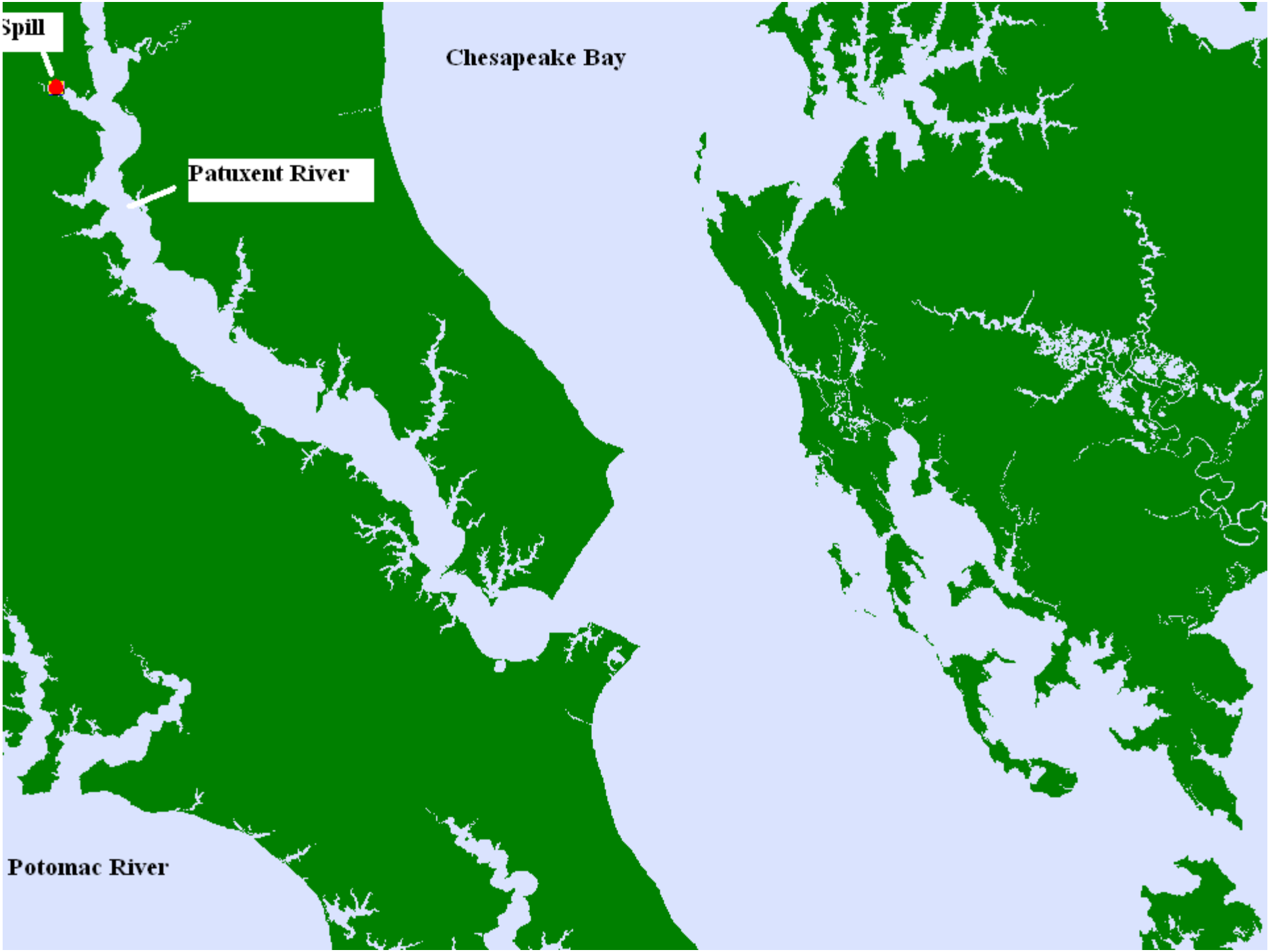


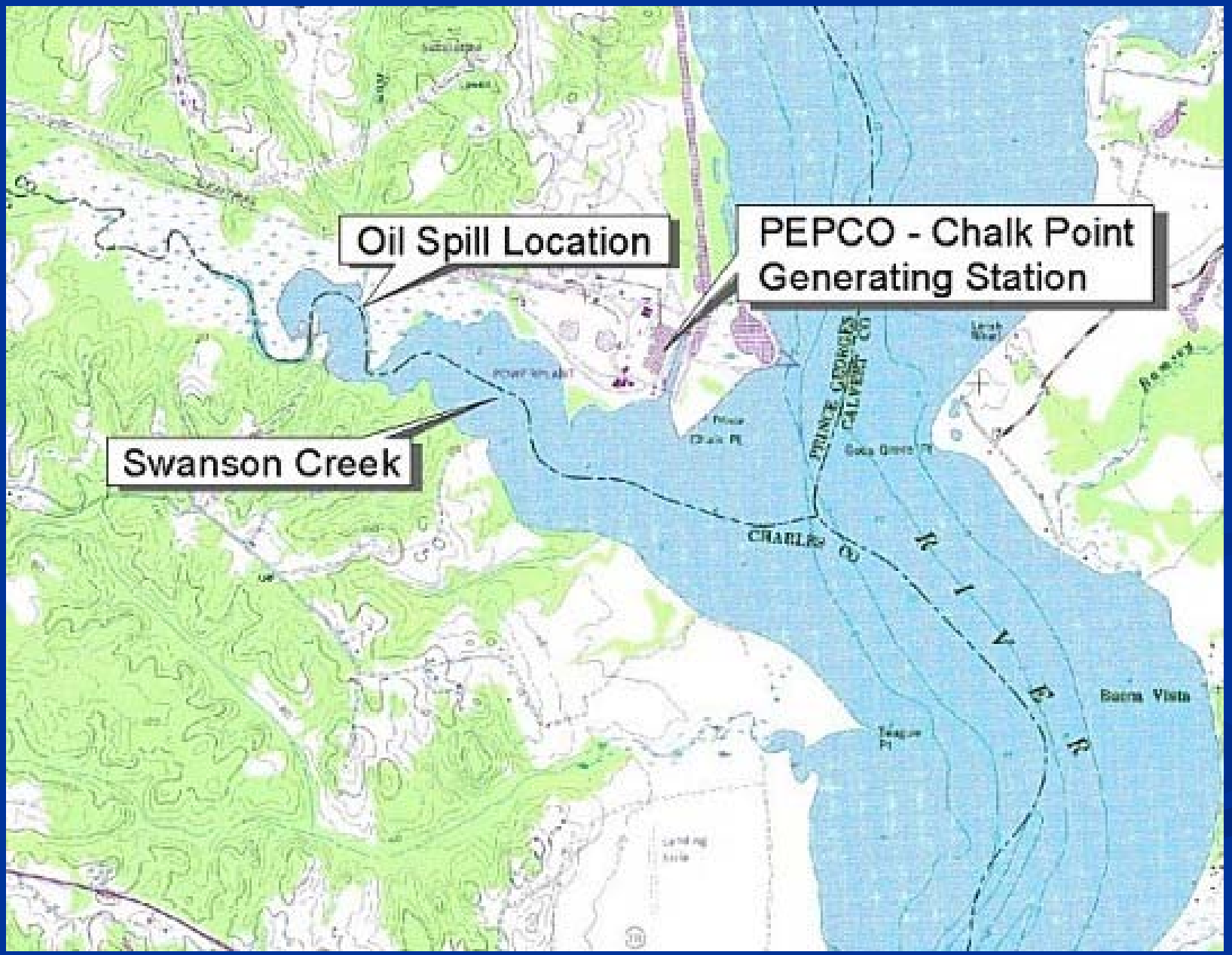
Processes Modeled by SIMAP for Crude and Fuel Oils

Case Study

Why this spill is instructive:

- Caused extensive impacts to wetlands after failures to follow through on directives set forth by the FOSC
- Involved the deployment of defective, poorly-maintained boom that broke
- Arrival of a storm on the second day after the spill created challenges for responders.

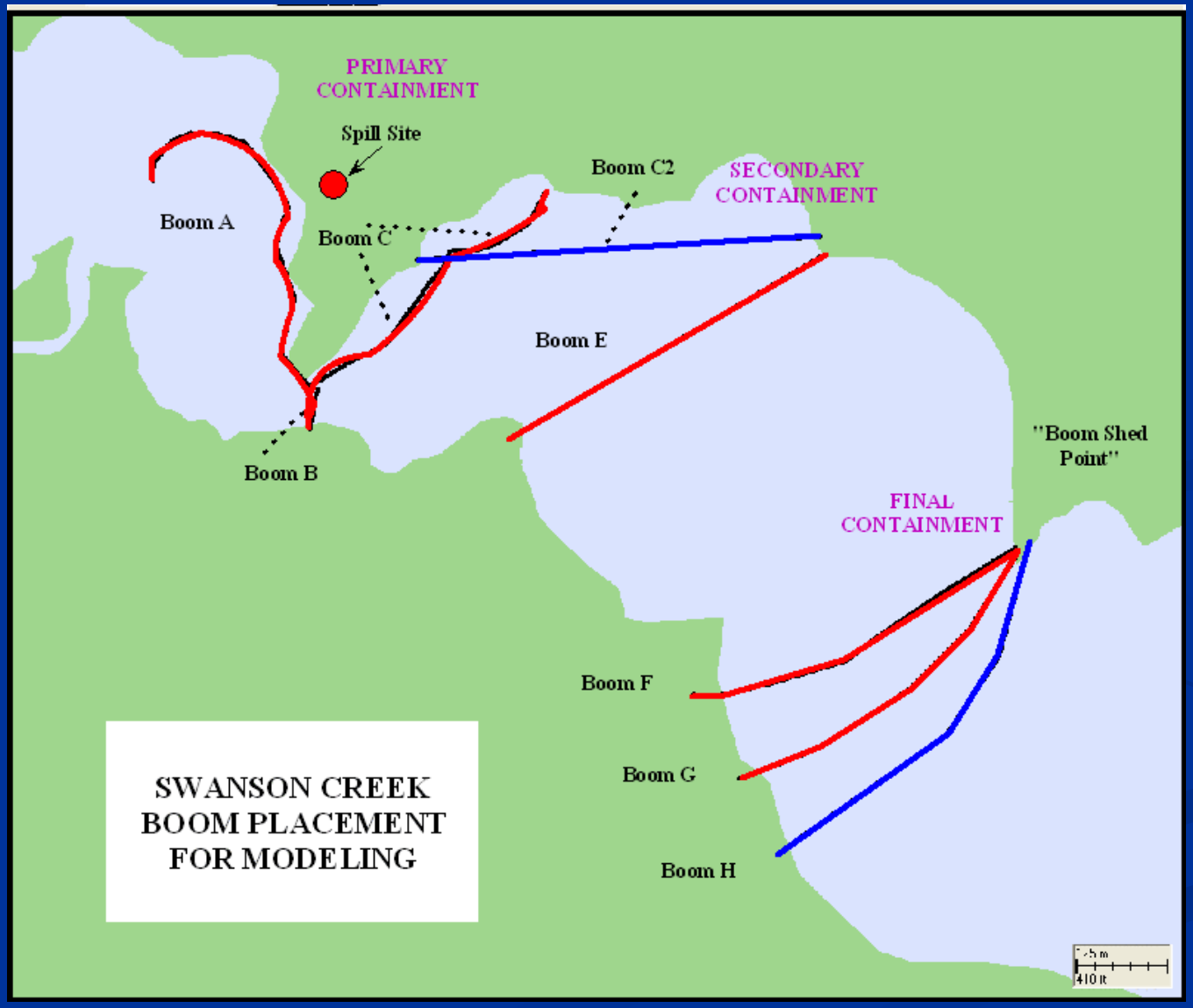

Spill
Chesapeake Bay
Patuxent River
Potomac River


Oil Spill Location
PEPCO - Chalk Point Generating Station
Swanson Creek
PRINCE GEORGES CO
CHARLES CO
P A T U X E N T R
Barns Vista

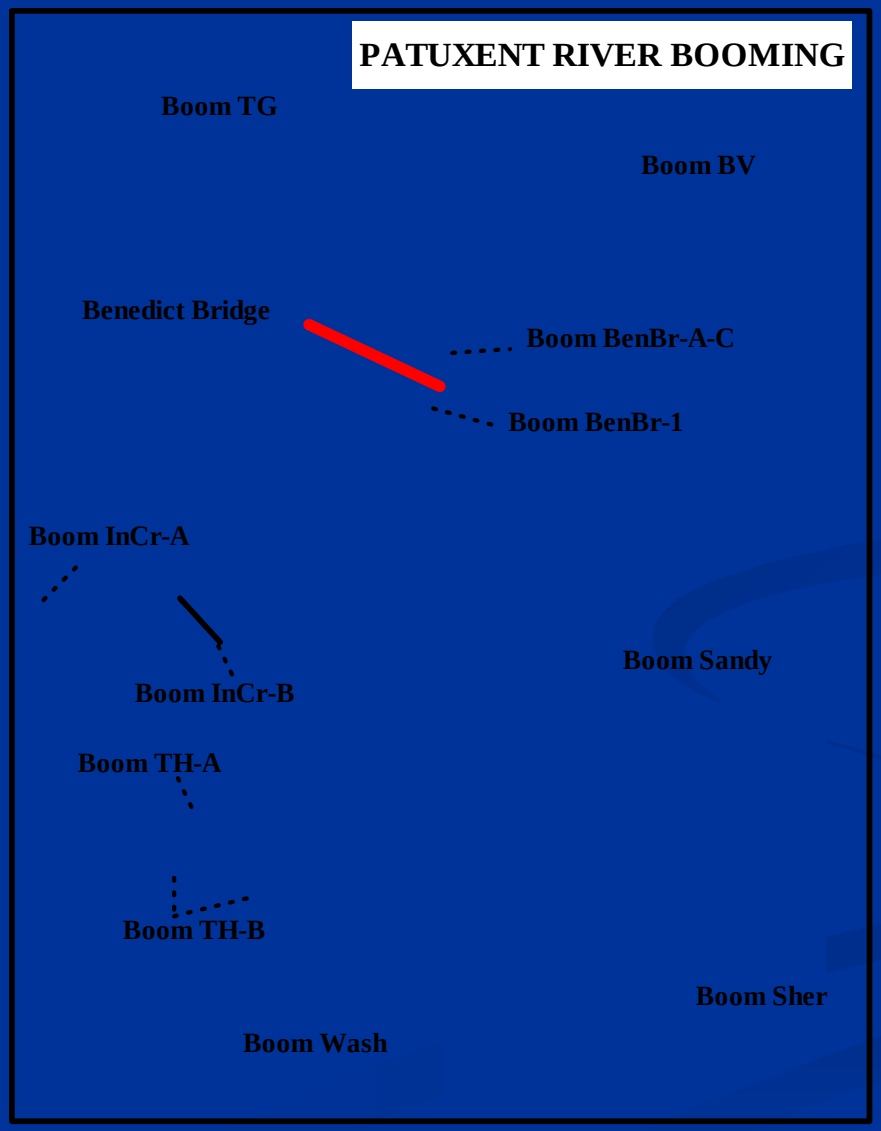
Impacts to Sensitive Wetlands

Impacts to Property

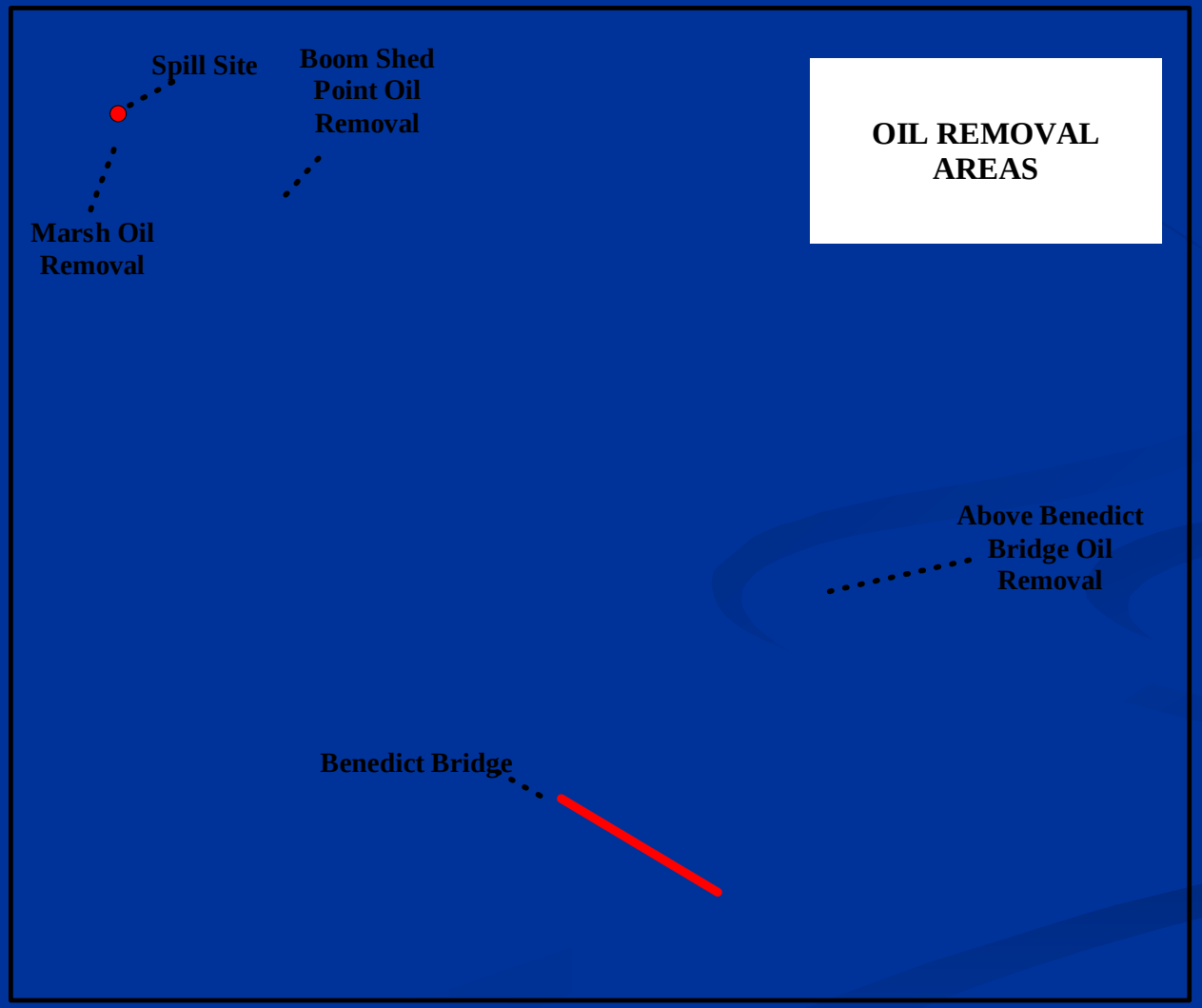
Response: Swanson Creek Booming



Patuxent River Booming



Oil Removal

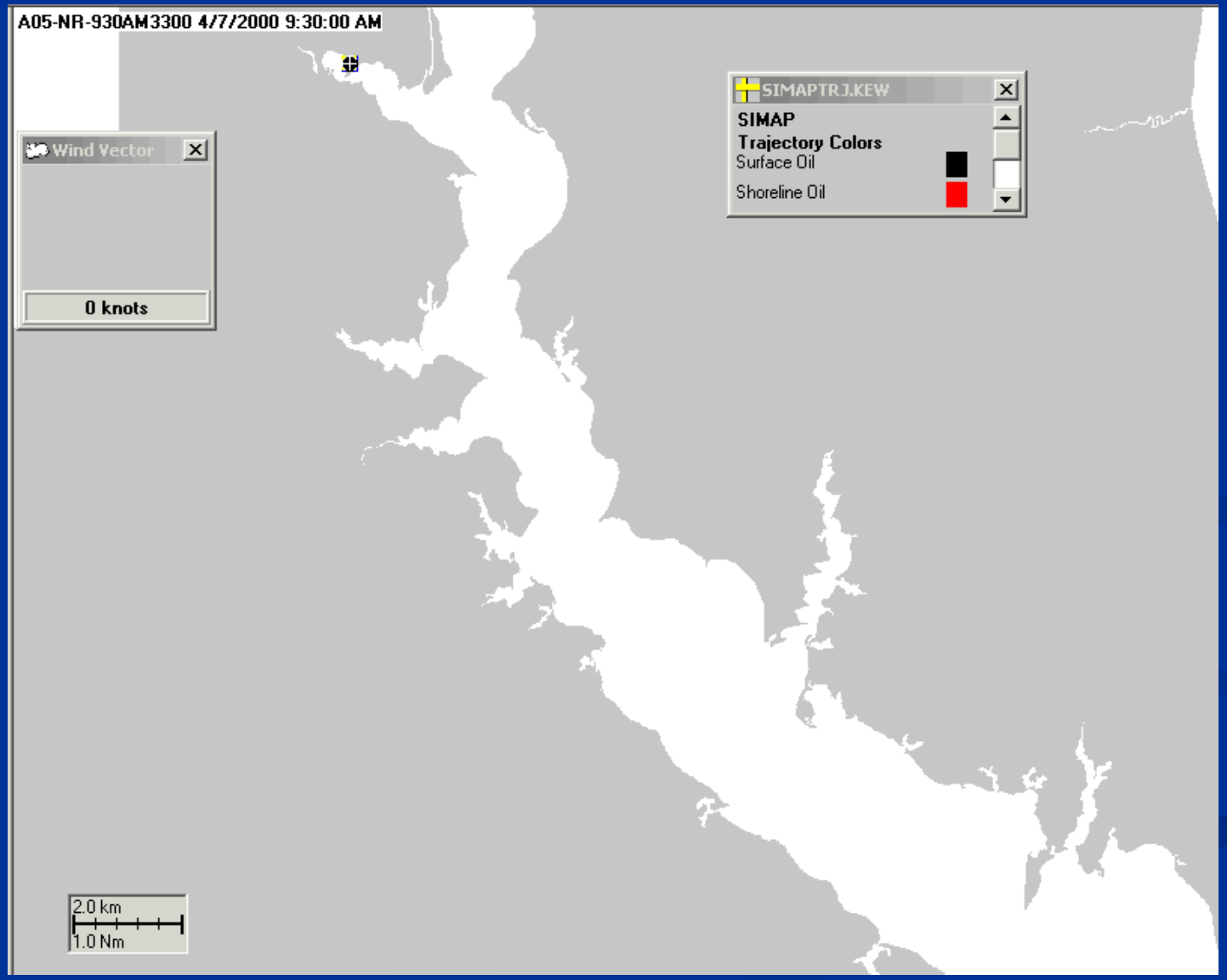


Scenarios Modeled

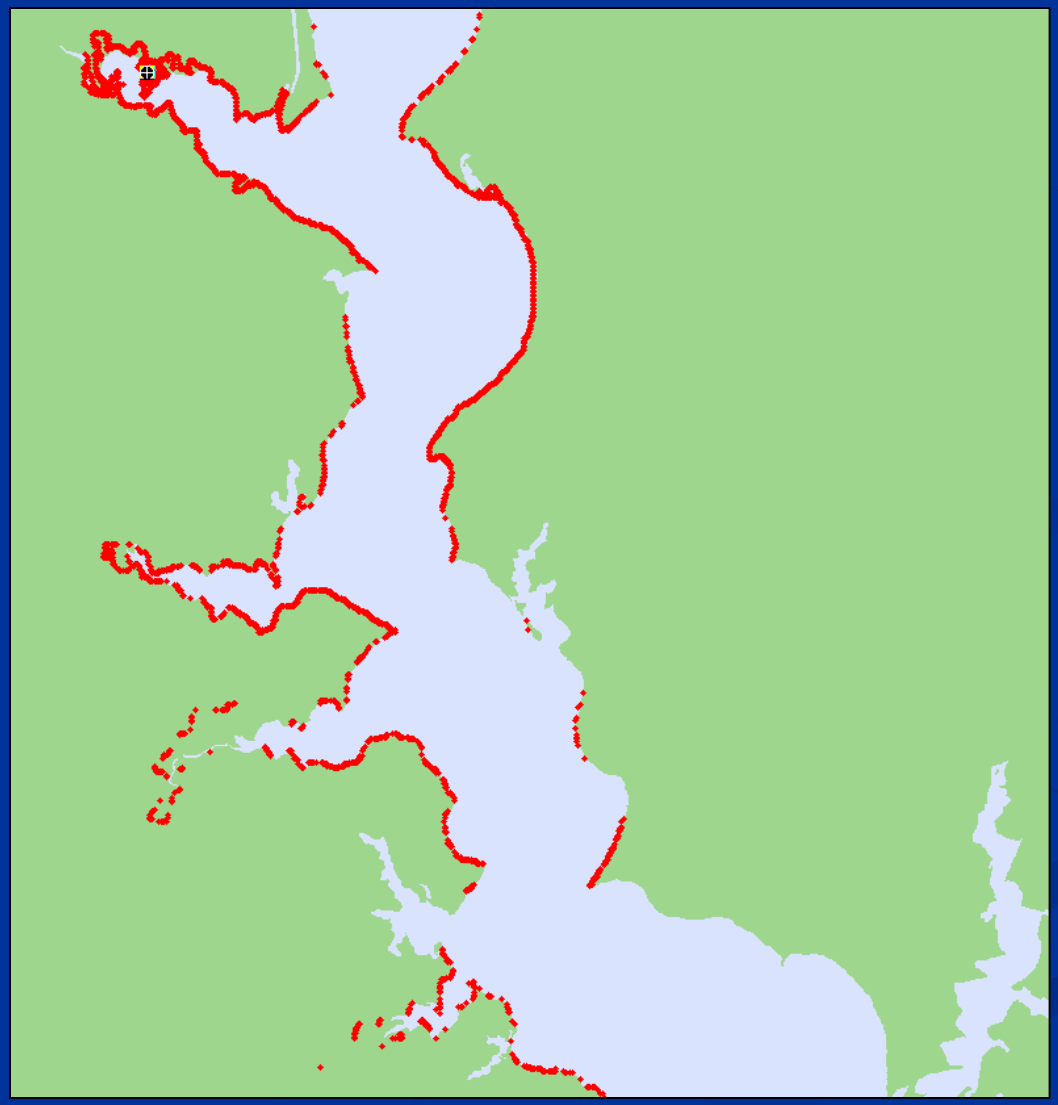
- Actual Swanson Creek response (booms breaking) plus Patuxent River booming as per actual response
- Actual Swanson Creek response (booms in good condition, properly anchored) plus Patuxent River booming as per actual response
- Actual Swanson Creek response (booms breaking) with additional booms deployed as ordered by FOSC plus Patuxent River booming as per actual response
- No response (no booms or removal)

- Actual response ("ACTUAL")
- Actual response with good booming ("A-GOOD")
- Actual response plus FOSC booming ("FOSC")
- No response ("NO RESP")

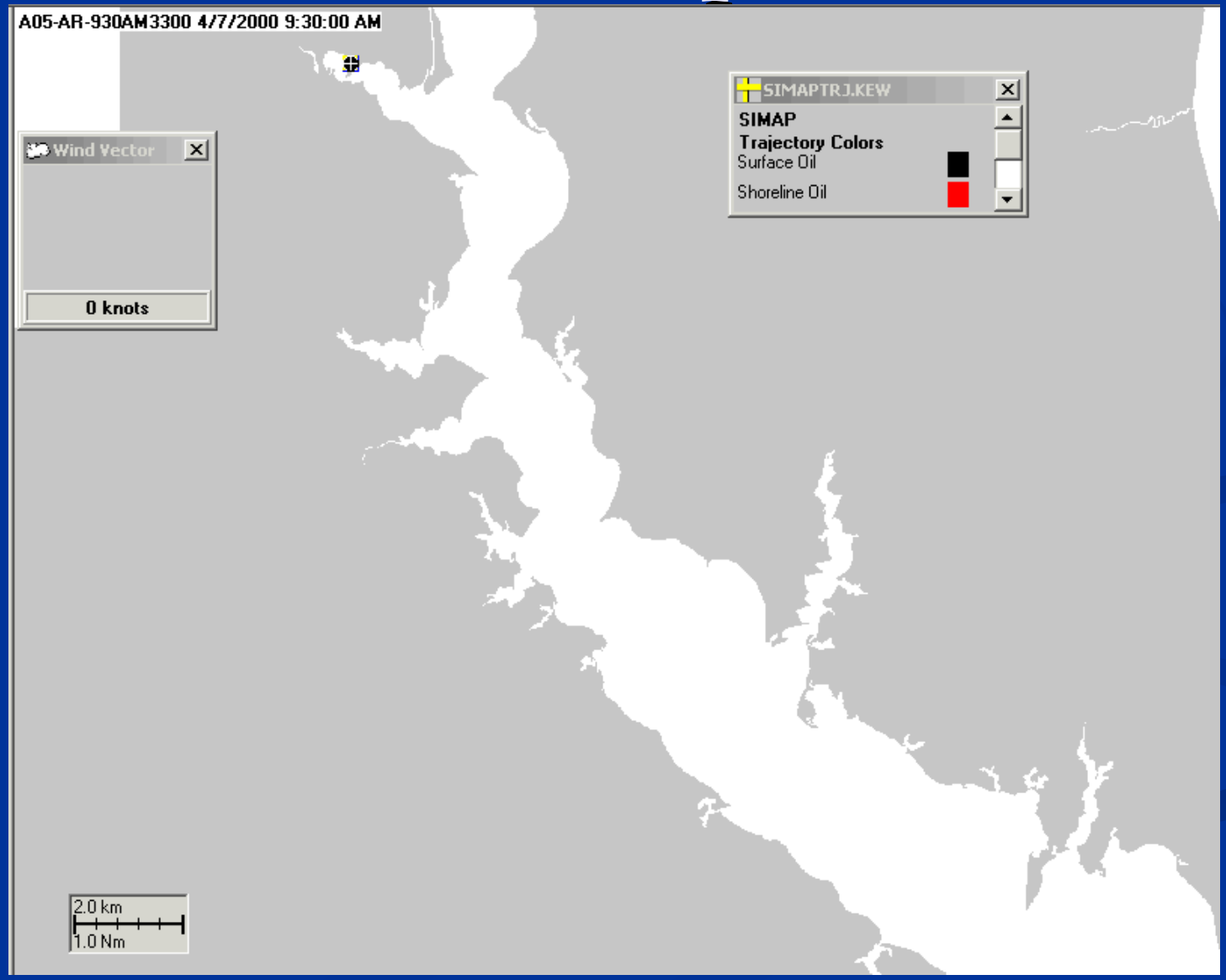
No Response



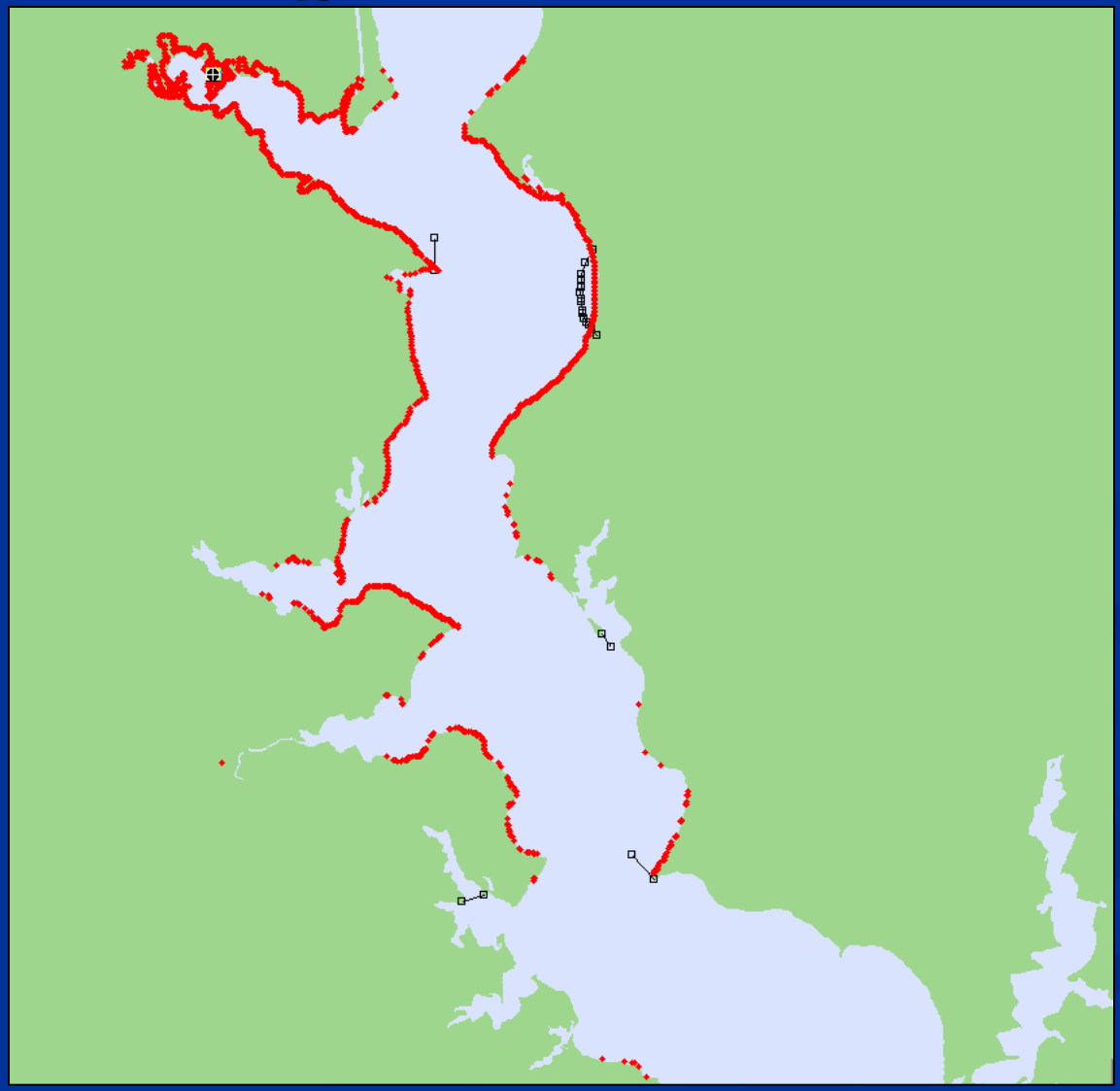
No Response Shoreline Impact



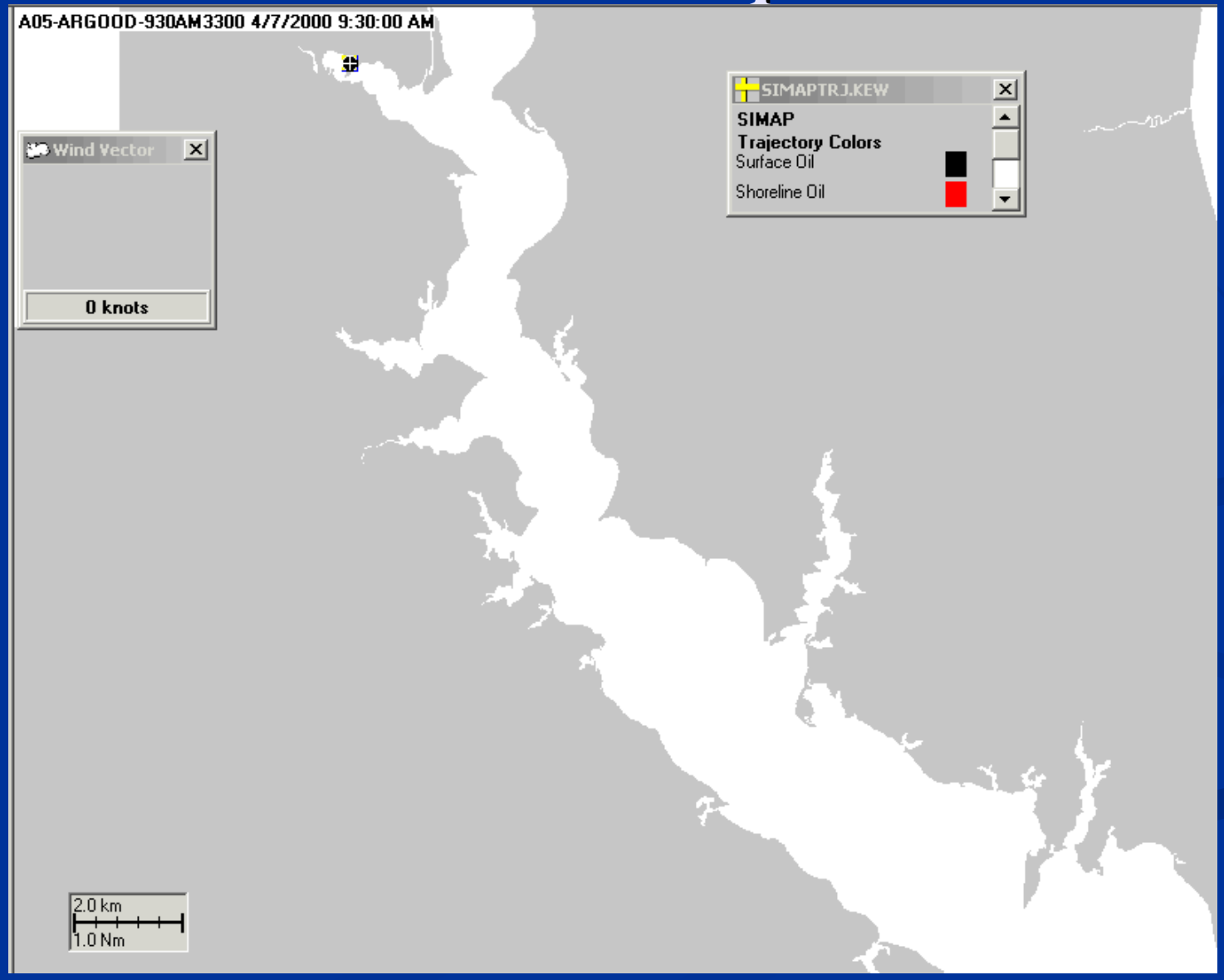
Actual Response



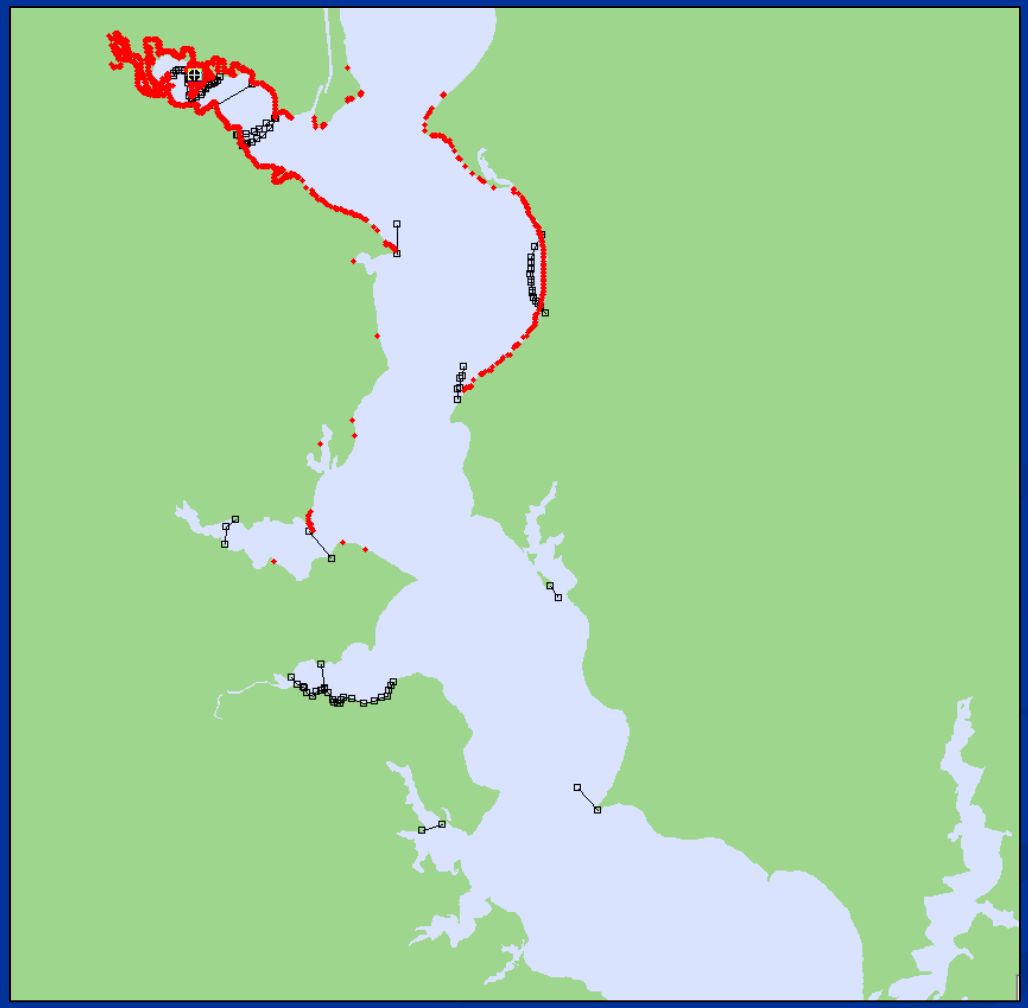
Actual Response Shoreline Oiling



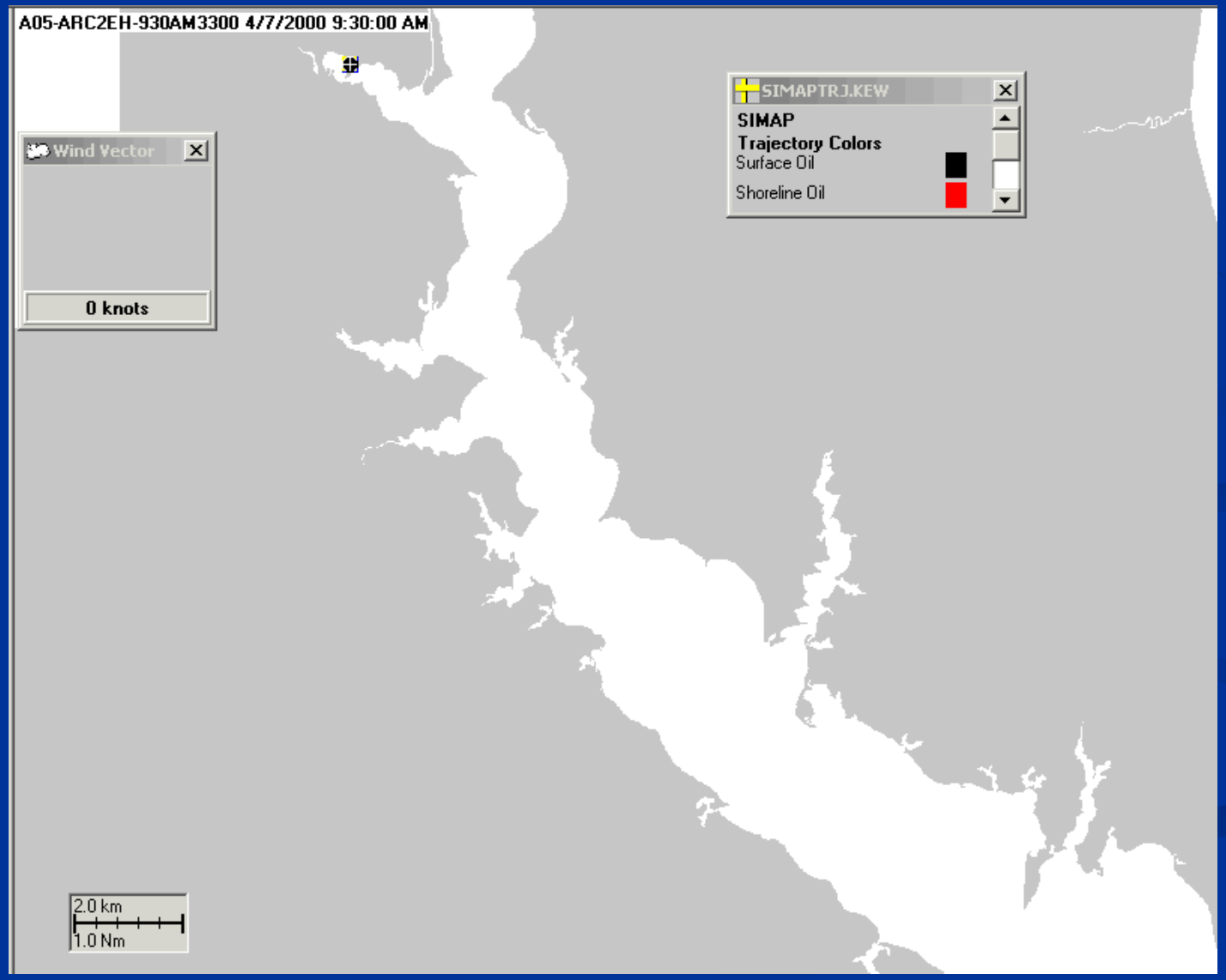
A-Good Response



A-Good Response Shoreline Impact

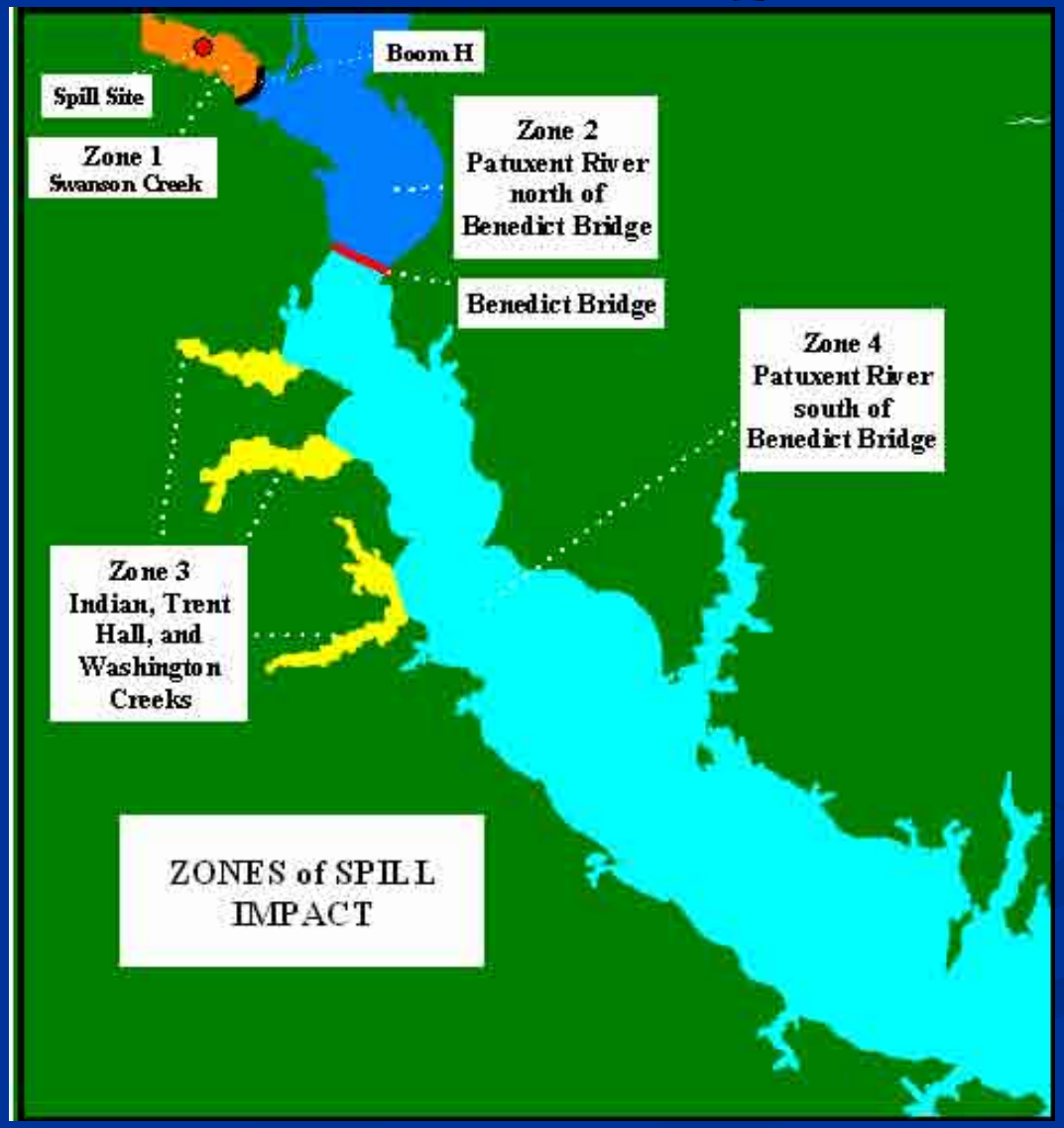


FOSC Response



FOSC Response Shoreline Impact

Zones of Impact



Shoreline Impact (m^2)

Scenario	Total	Zone 1	Zone 2	Zone 3	Zone 4	Outside Swanson Creek
NO RESP	23,029	4,919	6,055	5,178	6,877	18,110
ACTUAL	16,277	5,026	5,947	1,118	4,185	11,250
A-GOOD	9,543	6,573	2,808	9	152	2,969
FOSC	10,285	5,339	4,570	36	340	4,946

Reductions in Shoreline Impact Compared with No Response

Reductions in Shoreline Impact Compared with Actual Response

Reduction in Shoreline Oiling

- Lower response costs
- Less shoreline response required
- Less impact on sensitive wetlands by oil and by response operations
- Fewer wildlife impacts

Evaluating Response Strategies With Modeling

- After a spill to derive "lessons learned"
- Training of spill responders and strategists
- Contingency planning