Preston Hudlow

GEOG 419

Tom Allen

Lab 9

Q1: How does tidal circulation influence the oil spill trajectory in the simulation? Explain.

Tidal circulation influences the spill by drawing the oil slick outward into the Chesapeake Bay and then pushing it landward. These shifting tidal movements cause the oil to spread unevenly, but you could potentially help stop the spread in the first three hours as it spills out in a lateral pattern before disbursing in the current. You could also get a majority of the spill during time stamp 04:15 when the current is grouping the spill back together pushing it towards the land.

Q2: Can you determine a point in time where the spill of fuel oil is more concentrated versus widely dispersed? If so, this could be a critical time for attempting to contain the spill with booms. At what point in time and location does the spill wash ashore onto beaches in the the model simulation?Is there a critical time point at which the spill enters Lynnhaven Bay?

Discounting the first 3 hours as the spill is continuously spreading around time stamp 03:30 the wind and current start grouping the spill together before it pushes it landward.

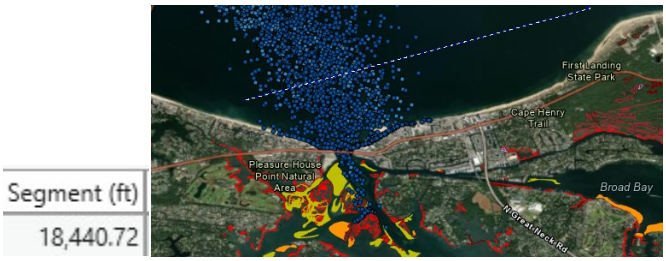
It first touches the shore at time stamp 07:15. AM note the tide

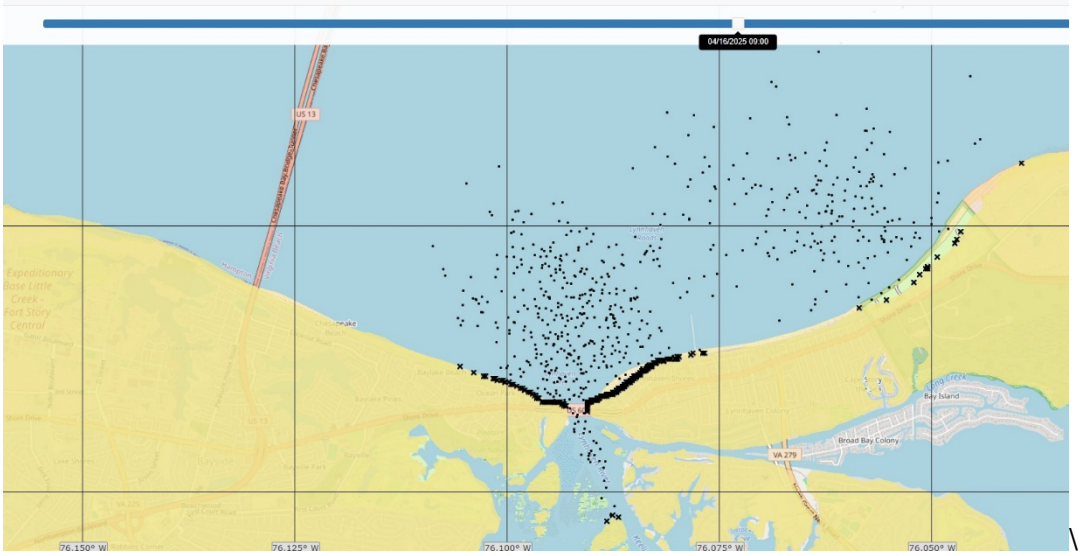
Around time stamp 08:30 the oil leakage into Lynnhaven bay increases drastically which could be critical for the environment.

Q3: Looking at the spill animation in WebGNOME and the progression in the map, at what point in time do responders need to be focused to protect the inlets at Ocean View and Lynnhaven?

Responders should be protecting these locations no later than 07:00. By 07:15 the first wave of the spill will start to reach near shore, and by 07:30 the build up starts to increase to critical levels.

Q4: If you could deploy the response team with 2 boats and 6,600 ft of boom by 9am on April 16th would you be able to surround and contain the oil slick? i.e., do you have enough boom? where would you place it? Explain in 1 paragraph. Include an optional map if helpful.





\

Unfortunately, by 9:00am the spread would be too wide and cover over 18,000ft seen in figure 1 & 2. However, you could still use these efforts at 9:00am and set up the boom in front of the Lynnhaven outlet which would collect a good amount before everything reaches ashore.

good

Q5: Identify Resources at Risk: Focus now on the potential impact areas (shorelines, wetlands/habitats, and population/socio economic features in the ESI maps. A) List 3-4 vulnerable features from these ESI categories and B) Describe what top resource at risk you would focus on protecting, and why.

Some areas of focus to protect would be salt marshes, exposed tidal flats, fish habitats, beaches, and residential communities along Ocean view. I think the top resource at risk that I would focus on protecting would be salt marshes as they are highly sensitive and play a crucial roll for biodiversity. If contaminated it would be very difficult to clean and could have a major impact on the ecosystem.

Q6: How could additional RS/GIS resources be utilized in response to this spill event? Describe TWO examples of other remote sensing and/or GIS data that might be used to inform or coordinate this response, how they could be integrated into response.

One could be to utilize drones to cover areas over saltmarshes to ensure the contaminated zones.

Another would be utilizing satellite imagery which could track real time movement of the spill and help identify impacted areas.

SAR? sensor? little to now real time option, possibly PLANE

Q7-10: ON YOUR OWN: Return to the model setup in GNOME online and edit the setup to a customized change. You can decide to edit the location of the spill, the volume, duration, fuel type, or the wind. Export your results and add them to compare them to your prior basic results. Describe your experimental run and how the results and impact would differ from the previous preconfigured example.

In the experimental change, I increased the spill volume from 60,000 gallons to 120,000 gallons, keeping the original location and time the same. I also raised the wind speed slightly to 25–30 knots from the southwest. As a result, the greater volume and stronger winds caused the oil slick to spread more rapidly and cover a wider area. The slick reached the shoreline earlier, around 6 to 9 hours after the spill, and affected a larger stretch across Ocean View and Cape Henry. Containment would have been much more challenging, with the booms at the inlets likely being overwhelmed and requiring more resources and a faster deployment to control the spill.

indeed!

would be good to show map and compariso