

NOAA FISHERIES

Restoration
Center

Arctic Trajectory Analysis Planner



What is TAP?

Trajectory Analysis Planner (TAP) is a software tool designed to help develop a plan that protects an area against likely oil spills by addressing questions such as:

- If oil is spilled at a given spot, what shoreline locations are likely to be affected?
- How much time do we have to respond at a given location before the oil arrives?
- How will the site be oiled at a given location?
- Where might a spill occur that could threaten a particular location of concern?
- What level of response is needed to adequately address the impact of a potential spill?

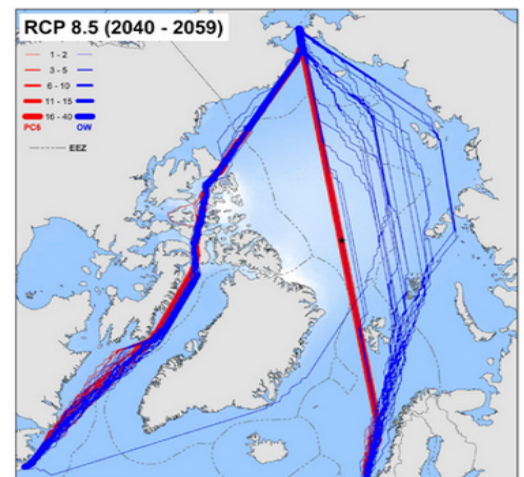
The Arctic TAP is available at:
<http://response.restoration.noaa.gov/oil-and-chemical-spills/oil-spills/response-tools/trajectory-analysis-planner.html>

New tool for oil spill contingency planners in the Arctic

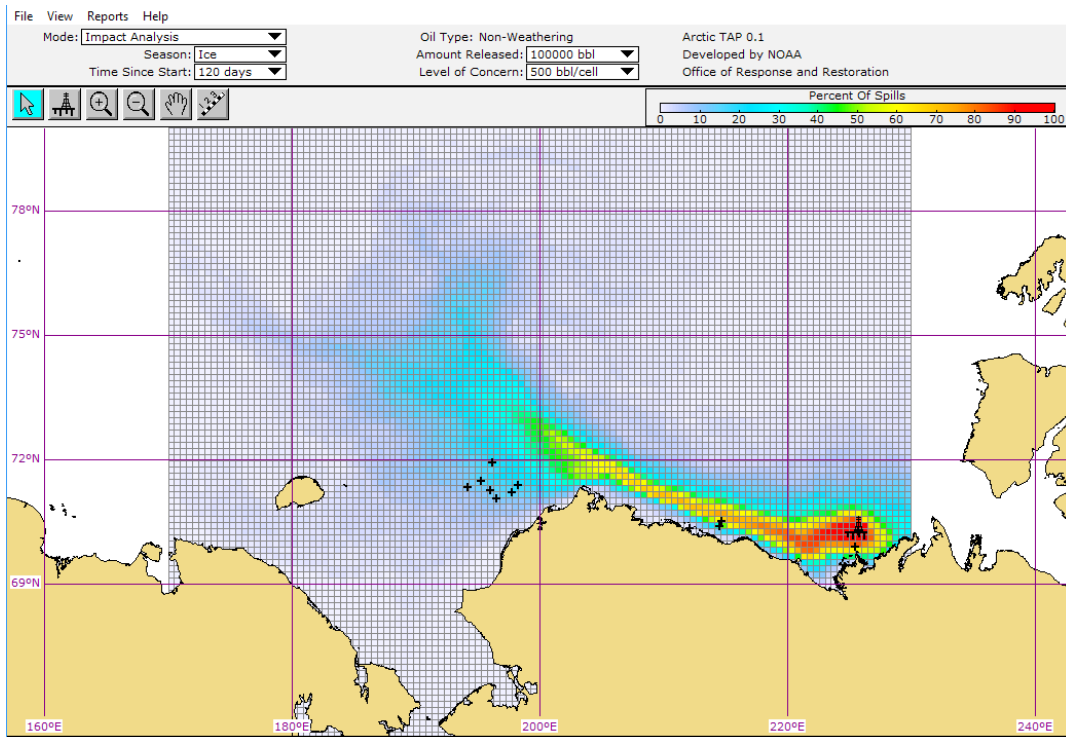
The Arctic is home to sensitive natural resources. These waters are also host to oil exploration and production activities, heavy vessel traffic, and are bordered by land-based facilities that transfer, store, and handle oil. This combination of sensitive resources and potential oil spill sources increases the risk of a damaging spill.

In the face of many unknowns NOAA and others in the oil spill response profession are being called upon to make important decisions about oil spill response plans, habitat protection, and habitat restoration. NOAA developed the Arctic TAP to answer the crucial question in any Area Contingency Plan: How do I develop a plan that protects my area against likely spills? TAP graphically uses the results of thousands of simulated oil spills to help emergency planners understand and anticipate many possible outcomes. Planners can use these statistically valid scenarios to develop realistic local-area contingency plans for oil spill response.

The timing for the Arctic TAP is pivotal. Currently transportation routes are being determined for passage through the Arctic and geographic response strategies are being developed.



Projections for new Arctic shipping routes in 2040-2059 under rapid climate warming. Image reproduced from Smith and Stephenson (2013).



5 Modes of TAP Output:
 Shoreline Impact Analysis helps to answer: If oil is spilled at a given spot, what shoreline locations are likely to be affected?

Response Time Analysis helps estimate how quickly a response must be mounted at a location of concern to precede arrival of the oil.

Site Oiling Analysis helps visualize how a location of concern would likely be oiled by a spill at a given location.

Threat Zone Analysis helps to answer: Where might a spill occur that could threaten a particular location of concern?

Resource Analysis helps estimate the level of response needed to adequately address impacts of modeled spills and the quantity of a particular resource that could be impacted by given spills.

Advancements of the Arctic TAP

The Arctic TAP can be used to estimate the probability that an oil spill might threaten specific shorelines, how long it might take for the oil to arrive, which locations could be worst impacted, and how much oil might threaten a location.

To make these estimates, TAP analyzes statistics from thousands of simulated oil spill trajectories originating at 48 potential spill sites. These trajectory runs were started at random times within a 20 year time period to represent a variety of current, wind, and ice conditions.

An important advancement for this edition of TAP is that the effects of ice on oil transport are included in the model. Since the Arctic is heavily influenced by ice this is an important and necessary advancement in oil trajectory modeling.

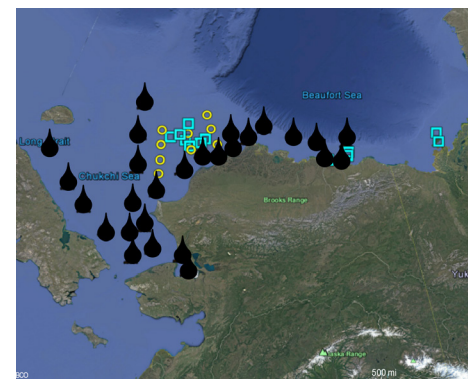
Limitations

The Arctic TAP can't provide all of the information one might want for oil spill response planning. The Arctic TAP cannot predict:

- movement of a real oil spill or particular future oil spill;
- movement of debris from a platform;
- movement of different kinds of oil and petroleum products;
- movement of subsurface plumes of oil;
- differences in how oil would move during different months of the year;
- movement of oil from locations other than the 48 simulated spill sites;
- specific combinations of wind and wave heights that could bring oil ashore.

Due to rapid changes in the Arctic environment, the TAP released in 2017 may need updating on a regular basis.

48 sites were chosen to represent potential oil and gas activity, pipelines, fuel locations, and vessel traffic.



Start sites for spills in the Arctic TAP. The drilling platform sites are shown as blue squares, the pipeline sources as yellow circles, and the vessels as black droplets.

The Arctic TAP was developed by NOAA's Office of Response and Restoration (Emergency Response Division) and the NOAA Restoration Center, with funding from National Fish and Wildlife Foundation.

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