Tug Escort Analysis and Emergency Response Towing Vessel Analysis Reports Corrections Statement

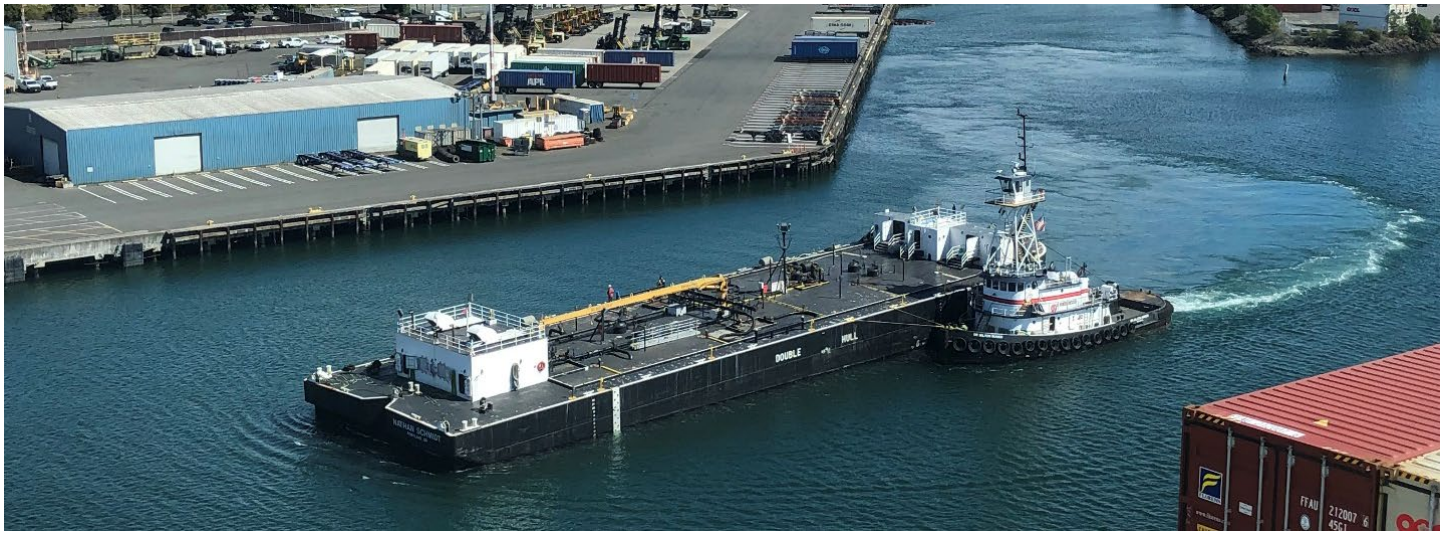

Figure 1. Tug maneuvering a barge.

In February 2024, Ecology identified a computing error that pertains to two reports we published in September 2023: “Summary of Tug Escort Analysis Results: Report to the Legislature pursuant to RCW 88.16.260” and “Emergency Response Towing Vessel (ERTV), and Analysis of an Additional Emergency Response Towing Vessel: Report to the Legislature pursuant to RCW 88.46.250”.

Part of the analysis process involved linking two tables of simulation results from our oil spill risk model. One table contained a list of simulated loss of propulsion incidents for tank vessels, the other table indicated whether the tank vessel was escorted by a tug in the model. The tank vessel escort table was misread during this process, resulting in some escort assignments not being recorded correctly. For example, we recorded an Articulated Tug Barge (ATB) as having a tug escort when it should not have, or we recorded an oil tanker as not being escorted when it should have. Tug escorts were simulated as described in the report, and this error did not affect evaluations of tugs of opportunity. Some results for tank vessel drift groundings were impacted by this error. While never presented in either of the reports, the count of simulated drift groundings was the foundation for subsequent analyses and results presented in both reports.

The simulation results were analyzed to help estimate potential outcomes and any analysis of model results assumes a certain degree of uncertainty. Ecology analyzed the differences due to the computing error and found the impacts were negligible and did not change any analysis or conclusions of either report. The analysis remains accurate and the information from both reports remain valid for their intended purpose as described in the reports.

Additionally, Ecology’s oil spill risk model is designed as a stochastic model. This means its results are determined, in part, by random selection with each simulation run producing unique output.

Tug Escort Analysis Report

- For the tug escort analysis, we simulated 87,225 loss of propulsion events. The computing error impacted 17 (0.0195 percent) of the loss of propulsion events. The original analysis found 2,829 vessel drift groundings. Without the computing error, the analysis would have found 2,846 vessel drift groundings.
- For the tug escort analysis, this issue could potentially impact results presented in approximately 60 tables in the report and references in the report text to values in these tables. Many values within each table would be unchanged. Values within tables reporting relative (percent) change would see the greatest difference. Trends identified in the report would not change but the specific values cited to support those statements would be different.
- Values were re-calculated for a representative selection of report tables. Examples from this re-calculation are presented below. (Values in report rounded to the nearest 0.0001 for absolute values and the nearest 0.01 percent for relative values. A value of 0.0001 equates to 1 drift grounding in 10,000 simulation runs.)
    - Drift Grounding, absolute value for ATB for Scenario 1 [Not presented in report]
        - Original results: 0.0006 (rounded down from 0.000624)
        - Revised results: 0.0006 (rounded down from 0.000624)
    - Drift Grounding, absolute value for ATB for Scenario 2 [Tables A-16, A-18]
        - Original results: 0.0005 (rounded down from 0.000528)
        - Revised results: 0.0006 (rounded up from 0.000564)
    - Drift Grounding Change from Scenario 1 to 2, absolute value for ATB [Table A-28]
        - Original results: -0.0001 (rounded down from -0.000096)
        - Revised results: -0.0001 (rounded down from -0.000060)
    - Drift Grounding Change from Scenario 1 to 2, relative value for ATB [Table A-27]
        - Original results: -15.38 percent
        - Revised results: -9.62 percent
        - NOTE: these relative values report a percent change based on extremely small values (less than 0.0001) shown in the previous bullet.
    - Drift Grounding, absolute value for Rosario Strait, excluding ferries for Scenario 1 [Not presented in report]
        - Original results: 0.0049 (rounded up from 0.004898)
        - Revised results: 0.0049 (rounded up from 0.004884)
    - Drift Grounding, absolute value for Rosario Strait, excluding ferries for Scenario 2 [Table A-10]
        - Original results: 0.0045 (rounded up from 0.00447)
        - Revised results: 0. 0045 (rounded up from 0.00447)
    - Drift Grounding Change from Scenario 1 to 2, for Rosario Strait, excluding ferries [Table A-26]
        - Original results: -0.0004 (rounded up from -0.000427)
        - Revised results: -0.0004 (rounded up from -0.000414)
    - Drift Grounding Change from Scenario 1 to 2, relative value for Rosario Strait, excluding ferries [Figure 7, Table A-25]
        - Original results: -8.73 percent

    - Revised results: -8.48 percent
    - NOTE: these relative values report a percent change based on extremely small values (less than 0.0001) shown in the previous bullet.
- The results comparisons above are representative of how the revised results would impact the report. Among vessel types, ATBs would have had the largest differences in values. The scale of the differences across geographic zones are consistent with the differences presented for Rosario Strait. Overall, these differences would not change the conclusions in the report.
- The Board of Pilotage Commissioners will continue to use this report and the oil spill risk model to inform their decision making for the Tug Escort rulemaking.

Emergency Response Towing Vessel Analysis Report

- For the ERTV analysis, we simulated 212,749 loss of propulsion events. The computing error affected 30 (0.0141 percent) of the loss of propulsion events. The original analysis identified 6,140 vessel drift groundings. Revised results found 6,170 vessel drift groundings.
- When exclusively evaluating the benefit of ERTVs, the computing error impacted only 4 tank vessel loss of propulsion events that would have otherwise been saved by an ERTV.
    - An ERTV in Deltaport, Roche Harbor, or Sidney would have saved a drifting ATB that suffered a loss of propulsion in Vancouver.
    - An ERTV in Deltaport would have saved a drifting towed oil barge that suffered a loss of propulsion in the Strait of Georgia.
    - An ERTV in Roche Harbor would have saved a drifting towed oil barge that suffered a loss of propulsion in Haro Strait and Boundary Pass.
    - An ERTV in Sidney would have saved a drifting towed oil barge that suffered a loss of propulsion in the Southern Gulf Islands.
- These 4 incidents would change the relative benefit provided by a Roche Harbor ERTV by less than 0.01 percent for all three oil spill risk metrics we reported for the entire study area. We found similar changes for an ERTV modeled in Sidney, BC.
- A change of less than 0.01 percent is below the level of accuracy we used to describe results in the main body of the report. The computing error would not change the relative values in the main body.
- Adjusting values due to the computing error would impact approximately 100 tables and all references in the report text to values in tables. Many values within each table will be unchanged. Values within tables reporting relative (percent) change would see the greatest difference. Trends identified in the report would not change but the specific values cited to support those statements would be different.
- These differences would not change the conclusions in the report.

Nhi Irwin
nhi.irwin@ecy.wa.gov
360-791-5514