IMPROVEMENT OF STORM DAMAGE PREDICTION SYSTEM

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PROBLEM DEFINITION

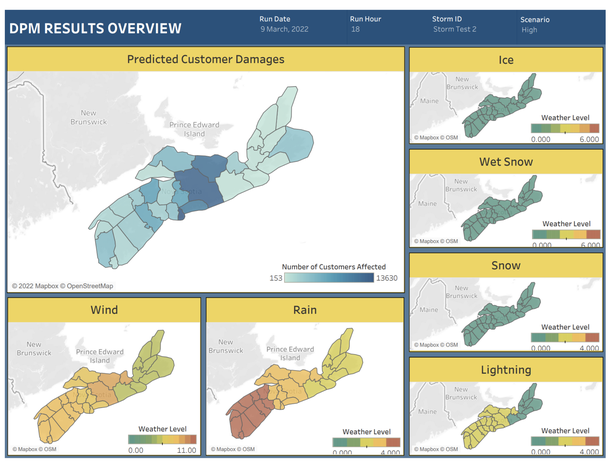
- **Nova Scotia Power Inc.** (NSPI) supplies power to over 520 000 residential, commercial and industrial customers across Nova Scotia.
- In anticipation of a severe weather event, the **Damage Prediction Model** (DPM) is used to predict the location and magnitude of damages to NSPI's power systems. This information is then consulted when formulating services restoration plans, as well as used to confirm response and resource decisions during the actual event.
- The aim of the project is to improve the client's ability to make accurate damage predictions by improving the relevant process and tools.

Objectives

- Improve Model Performance & Calibration
- Improve User Interface
- Increase Data Visualization Capabilities
- Update Standard Operation Procedure

DATA VISUALIZATION

Deliverable Example: Tableau Dashboard



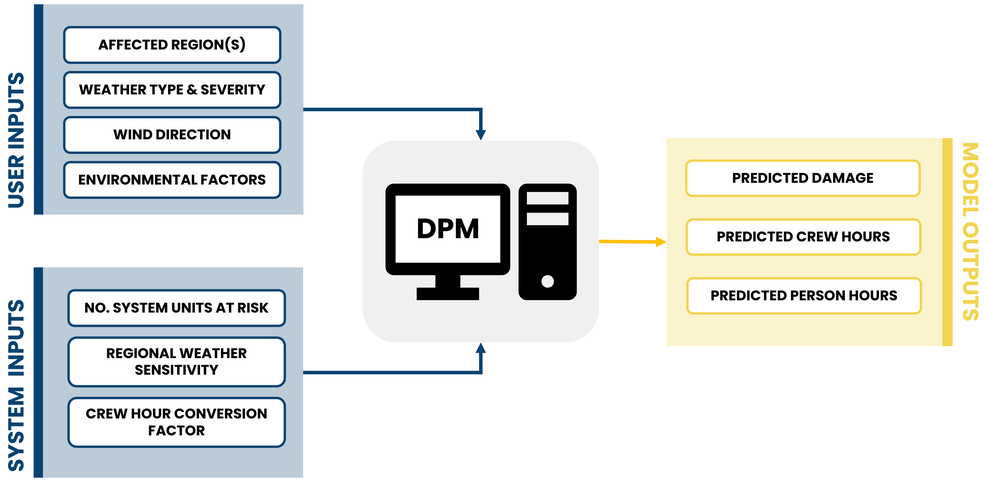
Purpose: To provide insight on changes to the regional damage predictions and weather severity over time, as well as significant differences between the forecasting scenarios.

DAMAGE PREDICTION MODEL

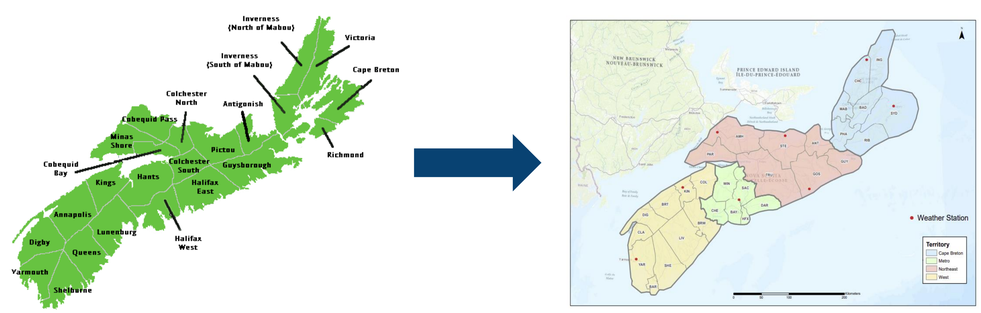
Summary of Model Improvements

- ***Conducted Software Maintenance*** - removed nine major bugs
- ***Streamlined Code*** - reduced model script by 900 lines of code
- ***Increased Model Capabilities*** – added additional functions to add/remove depots, recall previous inputs, and record important model information between model runs
- ***Updated Documentation*** – annotated code for future maintenance
- ***Updated Geographical Locations*** – converted model from counties to depots to improve overall compatibility between tools
- ***Updated Report Format*** - converted from HTML to PDF/Excel

Damage Prediction Model: Inputs & Outputs

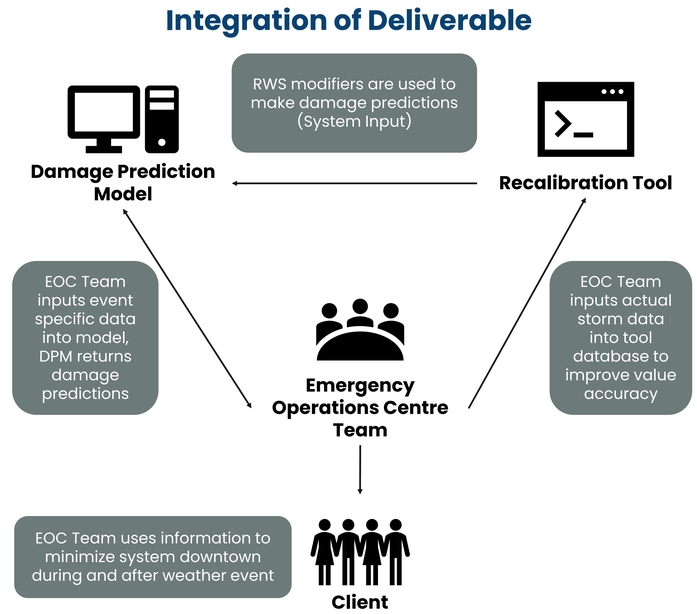


Deliverable Example: Counties to Depots Maps



RECALIBRATION TOOL

Integration of Deliverable



Purpose: To reduce the amount of time and skill required to calibrate the regional weather sensitivity modifiers.

- The **regional weather sensitivity** (RWS) modifiers are constant values used by the DPM to take into account how weather effects affect regions differently.
- RWS modifiers are currently being recalibrated manually twice a year by the EOC Team.
- Using Excel Solver, this tool will allow for faster and more accurate recalibration, as well as eliminate any knowledge loss during process turnover between employees.

RECOMMENDATIONS

- Explore the possibility of improving the prediction accuracy of the Damage Prediction Model through machine learning and neural networks.
- Incorporate database software into DPM tool to minimize risk of data loss and/or information overflow.

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