Project Status, May 2018: CS-175; Dynamic Collection System Control

Summary

The two areas of focus for the project CS-175; Dynamic Collection System Control are: analysis of dynamic control for the GDRSS system, and an operator decision support dashboard. Here we provide a review of progress made for each of these tasks and discuss future work.

Updates

Dynamic Control for the GDRSS

Last Month:
- Built MBC framework for CC-Fair-Freud pumps and gates buy downstream capacity (CC RTB). Ran simple simulations with these controls

This Month:
- Refined the setup for CC-Fair-Freud MBC process.
- Ran models with this setup, exploring parameter combinations that result in best management of storage resources (ie. No/low release.)
- Control is very sensitive to the difference in cost-curve parameters for assets in the market. Parameter selection is an ongoing topic of investigation.
- Extended capabilities of the MBC framework to simulate multiple markets across the collection system within the same model. Ie. Parallel markets making local control decisions. (NEED Schematic.)
- In total ran 5 markets at one time: 4 markets with ISDs, 1 with the CC-Fair-Freud complex.
- Results to follow.

Adding the capability to run multiple parallel markets is an import step to running this control framework in real-time. To accomplish this task will also require access to level, flow, and state measures that we currently do not have credentials to access. These measures were compiled and shared with GLWA. Currently, we require assistance in gaining access to measures.

Decision Support Dashboard

Last Month:
- Built back-end applications to support the Decision Support Dashboard.

This Month:
- Continued to build the backend. Made improvements in our SWMM API. Can more easily read and interpret SWMM input file information in python.
- This gives us more flexibility to supply different input information to SWMM.
- With these tools, built a front-end component that visualizes forecasted precipitation accumulation for each subcatchment in a SWMM model. (FIGURE.) This figure can be found here: https://s3.us-east-2.amazonaws.com/klabglwa/forecast_map.html. Figure is updated hourly.
- Figure will eventually become part of the decision support dashboard.

Markets	Control Points	Downstream
1	Conner Creek Forebay, Conner Creek Storm Pump Station, Freud Storm Pump Station	Conner Creek Retention Basin, Fairview Pump Station

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2	ISD002, ISD003, ISD004	Weatherby below ISD002, West Side Relief
3	ISD005	Clark Relief Below ISD005, DRI
4	ISD006, ISD007, ISD008, ISD009, ISD010	First – Hamilton, DRI
5	ISD011, ISD012, ISD013	Connant – Mt. Elliott, Lieb Screen Facility

Figure 1. Visualization
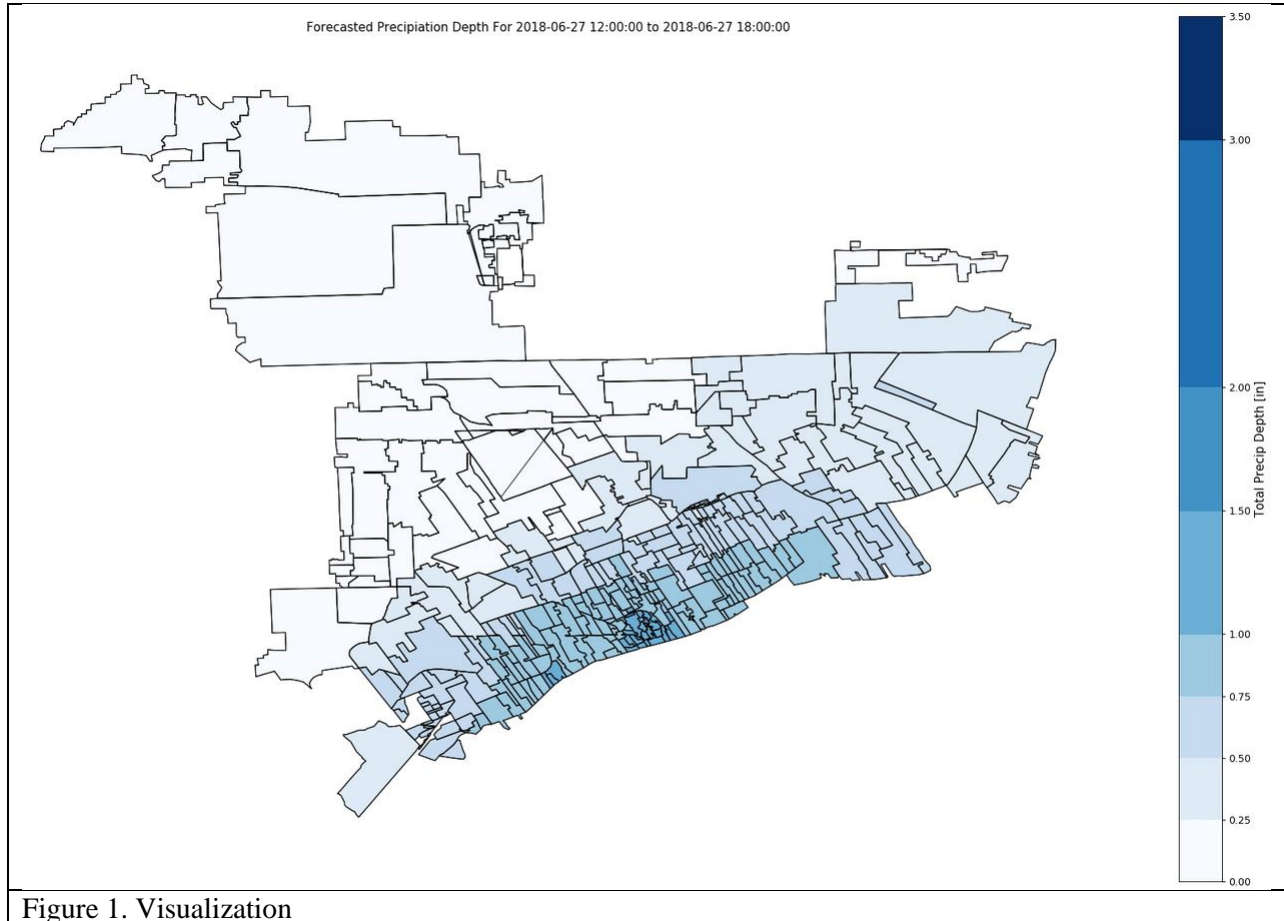
Future Work
What We Need: Assistance in receiving access to the remaining data on our "Wish-List."
Continue to experiment with parameter and cost-curve optimization for CC-Fair-Freud market and others. Search for best parameter combinations that meet downstream objects. And account for travel times into our decision framework.

Reporting
We look forward to providing an update of our progress on July 31, 2018.

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