Two-and-a-half years after Superstorm Sandy caused $450 million in flood damage to NJ Transit trains and rail yards, the agency has won a grant worth nearly $850,000 to improve its forecasting of floods.

The money will be shared with researchers at Stevens Institute of Technology in Hoboken, who will use the grant from the Federal Transit Administration to create a hyper-local forecasting network, said Alan Blumberg, an oceanography professor at Stevens.

Before Sandy, Blumberg's computer models did a good job along the Jersey Shore, creating predictions that fell within 5 percent of actual flooding levels, he said. But as Sandy's storm surge moved closer to North Jersey, forecasts by Stevens Institute and the National Oceanic and Atmospheric Administration got progressively worse.

"Our forecasts for Hurricane Sandy were low," Blumberg said. "The forecasts weren't so great. And they were confusing."

Along the Hudson River and lower New York Harbor, the flood surge was 20 percent higher than federal predictions. That caused higher-than-expected water levels up and down the waterfront, including inside NJ Transit's Hoboken Terminal.

Forecasts grew even less reliable as flooding moved up the Passaic and Hackensack rivers, said Blumberg, because there were no sensors or computer models in place to predict water levels there. That added to problems at NJ Transit's low-lying Meadows Maintenance Complex in Kearny, where agency leaders decided to park trains, breaking with the agency's own storm plan.

The 70 locomotives and 273 railcars mistakenly left at yards in Hoboken and the Meadowlands cost the agency $100 million in flood damage.

"I don't think we really looked very closely at those areas," Blumberg said. "We were more focused on the lower harbor and the Hudson River. So now we'll pay attention more specifically to the Meadowlands area."

To do that, Blumberg's team will install sensors along Newark Bay and the Hackensack and Passaic rivers. They'll buy faster computers capable of receiving and crunching all that data and displaying the forecasts more quickly to the public.

That faster communication is important because, before Sandy hit, even Blumberg's flawed predictions could have reduced damage from the storm. For example, his models showed that the west side of Jersey City along the Hackensack River would experience worse flooding than the east side, along the Hudson. Ignorant of that risk, many taxi companies moved their cars from Hoboken Terminal to yards on the Hackensack River, which led to famous photographs of yellow cabs inundated by water.

"I knew that was going to happen," Blumberg said, "but I had no way to communicate it."

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