One diesel-powered patrol train inspecting the Metro-North's Hudson line, which runs north along the Hudson River, found a 40-foot boat blocking the tracks

NEW YORK (AP) -- The floodwaters that poured into New York's deepest subway tunnels may pose the biggest obstacle to the city's recovery from the worst natural disaster in the transit system's 108-year history.

Critical electrical equipment could be ruined. Track beds could be covered with debris. Corrosive salt water could have destroyed essential switches, lights, turnstiles and the power-conducting third rail.

Several of the tunnels that carry cars and subway trains beneath New York City's East River remained flooded Tuesday. The head of the Metropolitan Transportation Authority said it was too early to tell how long it would take to pump them dry and make repairs.

There has always been flooding in the tunnels, which collect storm water constantly, even in the lightest of rains. But authorities said there has never been anything like the damage inflicted by Hurricane Sandy. The South Ferry subway station, at Manhattan's southern tip, had water up to its ceiling.

The high water meant inspectors weren't immediately able to assess how badly the water had damaged key equipment, raising the possibility that the nation's largest city could be forced to endure an extended shutdown of the system that shuttles more than 5 million riders to work and home every day.

Mayor Michael Bloomberg guessed it could take four days for train service to resume. And even then it was unclear how much of the nation's largest public transit system would be operational.

"If there are parts of the subway system we can get up, we will get them up," MTA Chairman Joseph Lhota said. But he suggested that, for a time, the system would be a patchwork, with buses filling in many of the gaps. Buses resumed operations Tuesday evening. Fares were being waived through Wednesday.

Experts suggested that the cost of repairs could be staggering.

A report released last year by the New York State Energy Research and Development Authority estimated that a flood roughly comparable to the one that hit the city Monday night would do $10 billion in damage to the transportation infrastructure and cause another $40 billion in economic losses due to the paralyzing effects of a crippled transit system.

Klaus Jacob, an environmental disaster expert at Columbia University who oversaw the portion of the report dealing with transit disruptions, said the study estimated that it would take four weeks to get the subway system back to 90 percent of normal capacity.

"I'm not saying that this is definitely what is going to happen here," he cautioned.

But he said the transit authority's challenges are severe.

"In the tunnels under the East River, all the signal-and-control systems are underwater. And it is salt water," he said. "It's not just that it doesn't work right now. It all has to be cleaned, dried, reassembled and tested. And we are not sure what the long-term corrosion effect might be."

At the time of the study, he said, the MTA also had only a fraction of the large pumps it would need to get major floodwaters out of train and vehicle tunnels quickly.

The study looked at the kind of flood that the Federal Emergency Management Agency estimates would only strike the city every 100 years.

This week's storm, he said, illustrates the pressing need for better defenses against the higher water levels that will come with a warmer planet.

"I think we have come to the end of studies. What we need now is action," he said.

Some authorities were contemplating the same ideas.

"We have to start thinking about how we redesign the system so this doesn't happen again," Gov. Andrew Cuomo said. "I don't think anyone can sit back anymore and say, `I'm shocked at this weather pattern.' There is no weather pattern that can shock me anymore."

Seven subway tunnels and two vehicular tunnels took on massive amounts of water during the night as the rivers that surround Manhattan rose to record levels. Nearly 4,000 feet of the Brooklyn-Battery Tunnel remained heavily flooded Tuesday morning. Water also poured into the Queens-Midtown Tunnel across the East River. Floodwaters also inundated parts of the PATH system that brings commuters from New Jersey to the World Trade Center site and midtown Manhattan.

The subway system has built-in pumps that typically remove 13 million gallons of water from the tubes across the city. Special pump trains were being deployed to handle the extra load.

The MTA cut power to tracks before the flood, hoping to minimize damage, but until the tunnels and stations are dry, inspectors won't know if the precautions worked.

"We'll find out. But right now, we just don't know," said Charles Seaton, an MTA spokesman.

Water in the two vehicle tunnels receded slightly as the tide fell Tuesday morning, but the massive pumps that will eventually empty the tubes were unable to immediately make headway because the places where they normally send water - the river and sewer system - remained so high, the outflow pipes in the pumping system were still submerged.

"Our pumps are working. It's just that the water has no place to go," MTA spokeswoman Judy Glave said. "We pump it out and it just comes back in."

Pasquale DiFulco, a spokesman for the Port Authority of New York and New Jersey, offered no estimate on how long it might be before the PATH commuter rail lines reopen.

"We're still trying to assess what happened," he said.

Most of the city's bridges did well during the storm and reopened Tuesday when the wind died down. Two, leading out to the ravaged Rockaway barrier islands, remained closed because of flood damage in the surrounding neighborhoods. A train causeway to the Rockaways also remained closed because of flooding.

There were other problems in the transportation system. Some rail yards and bus garages took on water. Sludge and debris covered some tracks. Trees blocked bus routes. Workers will need to walk hundreds of miles of track on foot to search for damage. At least 40 Long Island Rail Road power stations lost electricity, and the overhead power lines that allow Metro-North trains to operate were damaged in several areas.

One diesel-powered patrol train inspecting the Metro-North's Hudson line, which runs north along the Hudson River, found a 40-foot boat blocking the tracks in Ossining, N.Y., officials said.