



Management Committee Meeting
December 12, 2012
Draft minutes

1. Regular Management Committee Business

The meeting was convened at the U.S. Army Corps of Engineers conference room at 10 am. Bob Nyman chaired the meeting.

George Pavlou gave an overview of EPA's role in the response to hurricane Sandy; a summary is provided in the next section below.

Minutes from the previous meeting (September 12, 2012) were approved. There were no additions to the agenda.

Bob briefly went over the schedule for HEP's budget development for FY 2013; the first budget discussion will take place by phone on Monday, January 14. He indicated that the final allocations for the National Estuary Program are not yet available but that, for the time being, we will use last year's amount of approximately \$600,000 as our planning target. He also pointed out that some responses are still needed to complete the Action Plan table, which will guide funding priorities for next year.

Kerry Kirk Pflugh provided an update on NJDEP's involvement in hurricane Sandy, which is provided in the next section below.

Doug Pabst gave an update on the HEP 2.0 process. He indicated that Irene Nielson has moved back to her permanent role as EPA Region 2 Climate Change Coordinator and introduced Alyssa Arcaya, who will act as the new HEP 2.0 Coordinator. Prior to hurricane Sandy, Management Committee and other HEP partners were in the process of preparing a number of proposals that would be presented to the Management Committee for approval and, later to the Policy Committee. There were four proposals: alignment and flagship projects, increased engagement through a HEP summit, bylaws and guiding principles, and funding. Doug indicated that we will regroup and continue working on these proposals and that climate change adaptation should be added to the list.

Regarding abandoned boats, Doug indicated that there will be a summit to discuss the issues.

Rob Buchanan provided the CAC report. The CAC held a meeting in New York on October 24, which was well attended. The meeting included an update by the Harbor Coalition, which is working on a draft resolution with Senator Gillibrand. There were also two presentations on the North Shore of Staten Island as the CAC is trying to focus on a different area of the estuary during each meeting. A presentation on the East River Blueway showed new ideas for soft edges. HEP staff and the CAC are planning the next Stewardship & Public Access Grants cycle; the request for proposals will be released earlier this year. A workshop on water quality monitoring and citizen science is also being planned.

Rob indicated that after hurricane Sandy, the issues the CAC focuses on, such as water quality and public access, are still priorities. He mentioned a New York Times Op Ed about coastal development and how the privatization of the shores lead to increased damage (the article can be accessed at <http://www.nytimes.com/2012/12/05/opinion/beaches-belong-to-the-public.html>). Also, it was suggested to invite other players to participate in HEP, such as Shaun Donovan and EDC.

After the CAC meeting, the Harbor Coalition made available a draft version of the resolution. Rob read the last paragraph of the draft and raised concerns about language that states that "...the Harbor lacks a comprehensive federal program to implement the shared vision for America's Harbor outlined" in several regional plans, which ignores the role of HEP.

Michelle Doran-McBean asked the Management Committee to provide early guidance on budget priorities so the CAC can prepare meaningful feedback on proposals. She also asked for a 2013 calendar of Management Committee meetings indicating where each meeting will take place to facilitate travel planning.

2. Superstorm Sandy Overview

The bulk of the meeting was devoted to hear about the impacts of hurricane Sandy on the NY-NJ Harbor Estuary's natural resources and the response by several agencies and groups. Slides for these presentations, as well as recordings of these talks, are posted at <http://www.harborestuary.org/aboutestuary-coastalstorms.htm>.

Opening Remarks: George Pavlou, EPA Region 2 Deputy Administrator

Mr. Pavlou noted that Hurricane Sandy prompted a need for collaboration between federal agencies and the states, cities, municipalities, NGOs, environmental groups, environmental justice groups and others. There is now an opportunity for HEP to influence the decisions that will be made as part of recovery operations in the region. As Sandy hit our area, EPA was on the ground to save lives, stabilize operations and be involved in response activities, as part of EPA's emergency support as assigned by FEMA. Now we need to move into the disaster recovery framework and there are opportunities for HEP participation. FEMA has activated six recovery-support functions, each covered by a different agency: community planning, housing, infrastructure (covered by USACE), health (HSS), natural and cultural resources (covered USFWS, DOI), and economic recovery. NOAA is in charge of climate change, even though this is not part of the recovery operations.

The President has submitted \$60.4 billion to Congress for a supplemental budget for recovery operations. EPA is trying to inject a community involvement aspect to the decision-making process. Mr. Pavlou indicated that EPA is involved with all of the other agencies in this process and HEP should be represented and be part of these committees. He will try to make this happen, but otherwise EPA can also convey HEP's message.

In this proposed supplemental budget (on which Congress is expected to act as soon as the end of the week), at this point, there is \$610 million to deal with resiliency factors to reduce the damage of any future storms, above and beyond what FEMA will pay to repair the damages to a pre-storm stage. Agriculture would get \$150 million for purchase of flood plain easements in flooded or flood-prone

coastal areas to mitigate environmental and economic risks for future events. NOAA would get \$360 million to provide technical assistance for preparedness and resiliency for coastal communities in terms of both better weather prediction models and for mitigation efforts that stabilize and restore ecosystems. Another \$100 million would go to NOAA to acquire land and restore and build coastal resiliency where rebuilding physical infrastructure is not feasible. DOI would receive \$400 million to mitigate the risk of future flooding operations and acquire and convert lands that cannot be redeveloped, increasing resiliency. USACE would get more than \$3.8 billion for energy- and water-related construction. As we move forward, this is an opportunity to coalesce HEP's views and have them represented at these six recovery-support functions, so decisions are made for the benefit of the harbor. EPA will argue for HEP's involvement in these discussions. Mr. Pavlou urged everybody to work together and develop ideas for increase resiliency.

One of the tasks Mr. Pavlou is working on is a cost estimate to improve resiliency of drinking water and wastewater facilities. When Sandy hit, EPA's four priorities were the PVSC, MCUA, Baypark Sewage Treatment Plant in Nassau County, and the Yonkers STP. Combined, these four facilities serve more than 4 billion people. Three Superfund sites in our area were affected by the superstorm and any additional costs to address these damages are not covered by FEMA. All these issues were pointed in the request for supplemental funds for EPA.

Mr. Pavlou also shared recent discussions regarding the Passaic River remediation. EPA is proposing capping with significant dredging and maintaining the navigational channels to 30 ft on the lower 2.2 miles of the river. The entire remedy for the lower 8 miles of the river would cost approximately \$1.9 billion and it would involve removal of more than 12.3 million cubic yards of heavily contaminated fine sediment. The removed sediments would be disposed off-site rather than in confined aquatic disposal facility in Newark Bay. EPA had tested several sediment decontamination technologies but the efficiency of removal is not adequate at this point.

In summary, Mr. Pavlou highlighted the opportunity to build a better harbor estuary, keeping the big picture in mind. The harbor is a natural resource for 16 million people and the goal is to protect human lives and infrastructure by protecting the estuary as a whole. As shorelines are rebuilt, we should try to do it in a more environmentally-friendly fashion. Roles that HEP could play include facilitating information, identifying where different activities need to be done.

Impact of Oil Spills on Natural Resources: Carl Alderson, NOAA

Carl talked about the string of oil spills that occurred in the Arthur Kill from Monday night, October 29th through Tuesday night, October 30th and the federal and state response to those spills. Carl showed a picture by Greenpeace the day following the spills, showing the oil sheens. After the spill, part of the problem was to determine the source and type of oil, and its movement. The following slide showed the location of the three major oil refineries and storage facilities that experienced spills, although it is likely that there were other, smaller spills, as well as leaks from boats, vehicles, and other sources. A diesel fuel tank was ruptured at Motiva Sewaren, a tank rupture at Kinder Morgan caused a biodiesel spill, while waste oil was released from the Conoco Bayway facility.

Motiva is a storage terminal and moves oil in and out by boat and truck. Slide number 6 showed the facility where two tanks containing 380,000 gallons of diesel fuel ruptured on Monday night. It is believed that the tanks did not rupture when they went up with the surge but when they came down

again. They are still looking for the rupture, which is likely on the bottom. The berm (which protects the facility) was 10 ft high, while it is estimated that the storm surge was 14 ft. The oil extended through the Arthur Kill up to Tufts Point and down to Conference House Park, in to the interior down Woodbridge Creek, Smith Creek, and in the marsh at Tufts Point and Mill Creek. Those are some of the large marshes but it affected nearly all of the shoreline. Carl pointed out that there is an ongoing investigation of the damages and he is only able to show us documents that are not part of that case. The response by NOAA and the Coast Guard was immediate and sensitive areas were closed. Helicopters were used to pinpoint the location of the oil. The cleanup is being done in conjunction with the companies. The natural resources damages assessment, of which Carl is part, will be looking at all of the data collected aurally and on the ground to determine the extent of the oil leak and the potential injury. Using boats, it was possible to see dark bands left by the fuel on marsh vegetation. These marks were above the high water, which means that the surge took it high enough to spill over the marsh plants. Some of these are fringe marshes and ascend rapidly to upland, while others are large panels of marsh that were covered with oil. Carl showed some of the response on slide 12 where the oil is being vacuumed and pumped out in Smith Creek.

At the Kinder Morgan facility in Carteret the scenario was similar. The height of the storm surge was not recorded but it was enough to top the containment structure and two biodiesel tanks ruptured. The amount of oil released is still uncertain. At the time of the spill there were strong south east winds and most of the oil moved into nearby marshes. The soybean-based biodiesel does not stain vegetation and cannot be detected visually like the petroleum-based diesel.

Slide 17 showed the area of the Motiva spill with restored marshes that could have been affected by the spill marked in red. A similar slide showed restored marshes near the Motiva facility; however none of these are believed to have been affected by the spill.

At the Conoco facility, there was damage beyond oil spilling, including destruction of buildings, decks, barges, etc. In this case, the spill involved a waste oil relay station. There is an Olympic-size open pit on Morris' Creek containing about 20 thousand gallons of waste oil. The oil escaped from there on the surge (estimated 16 to 18 ft above mean low water—the highest ever recorded in the harbor). The oil left a visible band on marsh vegetation and swamp forests that were heavily impacted. There are 500 people working to clean up this spill using a variety of techniques. None of the restored wetlands in the vicinity of the facility are believed to be impacted by the spill.

Impacts on Natural Resources within Gateway: Dave Avrin, National Park Service

Dave talked about the impacts of Sandy on the natural, cultural and recreational resources of Gateway. Gateway is a National Park Service site in New York City at the mouth of NY Harbor and it includes Jamaica Bay, part of the Rockaways, parts of Staten Island, and Sandy Hook in New Jersey. It is surrounded by some of the hardest hit communities.

In Jamaica Bay, Fort Tilden, the beach clubs, and Jacob Riis were hit hard by the storm. Employees living in the park with their families were displaced. Floyd Bennett Field is now used as a major staging area for emergency response. The Wildlife Refuge reopened on Thanksgiving weekend. Both the East and West Pond were breached by the storm (slide 3). The West Pond was a semi-freshwater pond but now is part of Jamaica Bay. The Jacob Riis bathhouses, built in the late 1930s to early 1940s, were directly hit by the surge and suffered major damage. The site has a large parking lot that has been used

for debris removal and relocation operations after the storm. The USACE estimated that roughly 1 million cubic yards of trash have passed through the site. Floyd Bennett Field, New York City's first municipal airport became a very important recovery site, holding water trucks, ambulances, and National Guard troop encampments. Slide 8 showed the damage to the Fort Tilden shoreline. Shore Rd has been completely washed away. The NPS is considering retreat alongside adaptation and does not expect to rebuild this road. It is uncertain whether the Riis Bath House will be restored. Plumb Beach is located by the Belt Parkway. After Hurricane Irene threatened to impact the Parkway, NYC Parks, NPS and others worked fast to place approximately 170 thousand cubic yards of sand. Although the work had not been finished prior to Sandy, it was not affected by this storm.

At Sandy Hook, most of the buildings are important cultural resources. Sandy caused a lot of damage to the buildings and the sewage and freshwater treatment systems. NPS hopes to reopen some recreational beaches by Memorial Day. Slides 11 and 12 showed damage to a multiple use trail and the maintenance yard.

In Staten Island, Miller Field is surrounded by some of the most devastated areas. Miller Field and Fort Wadsworth were also used for response operations. Some parts of Great Kills Park have been reopened.

NPS still has much work ahead to determine the extent of damages to natural resources. However, at first glance, it looks like the marshes that have been restored in Jamaica Bay fared very well. NPS will be working with several partners to assess hazardous waste and oil spill damages. It is still unknown what the damages are to wildlife populations. NPS expects it to be somewhat minor: Although changes are anticipated, it is expected that wildlife can adapt to the impacts of natural events like storms. NPS is still determining if the breaches at West and East Ponds will be left to evolve naturally or whether they will be actively managed.

New Jersey Department of Environmental Protection Perspective: Kerry Kirk Pflugh, NJDEP

Kerry indicated that most of NJDEP's activities are posted on their website, where more details can be found. NJDEP's scope is broad and it includes overseeing dams and reservoirs, water supply, wastewater treatment plants, water quality, nuclear safety, debris management, shore protection (in coordination with the USACE and local governments), and parks.

NJDEP carried out many tasks as part of preparations before the storm, including lowering reservoir levels to accommodate rainfall, instructing private dam owners to inspect dams, closing shellfish beds statewide as a precaution for possible stormwater runoff and sewage contamination, inspecting and taking a number of precautions at nuclear power plants, closing all state parks, and reaching out to towns, municipalities, and counties to clean streets, clear storm drains and remove any debris to reduce flooding. The Commissioner signed an administrative order to deal with anticipated significant problems such as debris.

During the storm, NJDEP Office of Emergency Management coordinated its response with the EPA, the State Police, FEMA, USACE, USGS, and other critical agencies to protect dams, reservoirs, water supply facilities, and wastewater treatment plants. NJDEP had access to real-time analyses of the flood and knew what the areas of greatest concern would be.

After the storm, the two major challenges were the extensive power outages and flooding impacting the ability of facilities to operate. Over the first days, the focus was to restore power to facilities for treatment and water delivery, and NJDEP took the lead to reconnect all facilities. Out of 604 water supply facilities statewide, 70 were in distress, and 19 systems had water advisories affecting more than 200,000 people. As of early December 7 small facilities still had boil water advisories, all of them in Ocean County. During the height of the storm there were 80 wastewater treatment plants impacted, affecting 3.5 million people; NJDEP took generators and fuel to get them back online and immediately started monitoring the entire area on a daily basis. The data were posted regularly on the hurricane webpage and show the progression of water quality. NJDEP also issued advisories for recreational use, primary contact and fishing. All the advisories have been lifted except in the Raritan. The main challenge remaining now is debris management; NJDEP is working with towns on this and starting to think about rebuilding efforts. There is a new czar and the Department of State will provide staff to work with the czar on this issue. The new FEMA elevations and current building codes will guide reconstruction.

Water Quality Monitoring: Beau Ranheim, NYCDEP

Beau talked about the Harbor Survey and some of the infrastructure issues. NYCDEP's boat is located at the Brooklyn Navy Yard, which experienced some flooding. Although they had taken the boats out of the water as a precaution, the floating docks floated over the piers and a 6,000 gallon fuel tank ended up in the middle of the dock. NYCDEP was also building a remote monitoring system with 9 stations, which was inundated and all the electronics and other equipment was lost. Only one main monitoring station was lost. They were back on the water on November 6th and sampled 6 to 12 stations, mostly on the Hudson River and Jamaica Bay, none of which seemed to have any major problems. Initially, not all the stations were sampled because the biggest boat could not operate until a week and a half later, when repairs to the dock and other structure were completed. The water appeared to be clean, with secchi depths at least twice the typical values. NYCDEP had just transitioned to winter sampling (once monthly); however, because of the storm, the agency will be sampling weekly throughout the whole winter. So far, it appears that hurricane Irene had more of an impact on water quality than Sandy did. Irene caused a pulse of fresh water that made the harbor fresh for about a week. Although Sandy caused much infrastructure damage, it brought a surge of clean, salt water. The only issues regarding water quality were some wastewater treatment plant interruptions, the major one in New York City being Rockaway, which is a relatively small plant. It closed down completely but most of the people served by the plant were no longer in the area, so there was not much sewage coming to the plant and the impact on water quality was minor, as confirmed by samples around the area. There were a couple of minor shutdowns but most of the treatment system in NY made it through. The sampling so far has not shown any harbor-wide issues or any new water quality problems. All the chlorophyll a, dissolved oxygen, and bacteria data is posted weekly (other data are posted as they are quality controlled) on NYCDEP's website, on the Harbor Water section.

Water Quality Monitoring: Ashley Slagle, PVSC and NJHDG

Ashley Slagle indicated that PVSC was able to prevent damages to their sampling boat by taking it out of the water ahead of the storm. They also took out their floating docks; however the surge tossed it over the creek that runs next to the plant, from where it was recovered and put back in place. The PVSC plant also experienced extensive flooding and loss of power until recently, so they were not able to sample until three weeks after the storm. NJDEP and EPA were able to conduct water quality sampling

starting on November 5th. PVSC sampled the lower Passaic, Newark Bay, Hudson River, and the outfall site in Upper New York Bay multiple times during their first sampling week and later added all of their usual sampling locations. Ashley then showed a map of NJHDG's sampling sites alongside the locations sampled by NJDEP and EPA. The map included geometric means for fecal coliform results as well as the lowest and highest results for each location. Ashley noted that the press provided information about single sample results and characterized them as "unacceptable" if they were greater than 14 cfu/100 mL (colony-forming units per 100 milliliters). Those standards, however, are for direct shellfish harvest waters, which does not apply to the waters sampled. Ashley emphasized that it is important to understand what the standard are for the waters sampled. For the lower Passaic and Hackensack, Newark Bay, and Arthur Kill, the standard is a 30-day geometric mean less than 1,500 cfu/100 mL and there is no single-sample maximum associated with those standards. Ashley also pointed out that there is a dry-weather background source in the Passaic River and that all of the samples were taken after the bypass to the treatment plant was taken off. All of the flows were coming back to PVSC and the plant was discharging through its outfall in Upper New York Bay, so these numbers do not show any of the impacts of the bypass, as no sampling could be conducted at that time. The following slide showed results for the Hudson River sites, which were all well below the standard (30-day geometric mean below 770 cfu/100 mL). Very quickly after the storm, the values observed were similar to what is normally found in those waters. The following slide showed results for Raritan Bay and River sites and included the different standards that apply in that area. The Raritan River currently has a new enterococcus-based standard but, because the available data is for fecal coliform, the old standard was used for comparison. One of the Raritan River sites exceeded the old fecal coliform standard due to a very high value measured right after the storm by NJDEP. Otherwise, the other sites showed typical numbers for those waters. All the data are posted on the NJDEP and PVSC sites (www.nj.gov/pvsc) along with all of their post-Sandy updates.

Rapid Assessment of Aquatic Resources: Colin Grubel, Queens College

Colin Grubel, a graduate student at Queens College, CUNY Graduate Center, gave an update on the rapid assessment of aquatic resources. He has been working with John Waldman (Queens College), Jim Lodge and Dennis Suszkowski (Hudson River Foundation) and the National Wildlife Foundation, on rapid assessment of damage by hurricane Sandy to the estuary. It was a fairly broad survey that covered some of the things already mentioned so far.

There was a particular interest in assessing impacts to specific species. The USACE has been conducting a finfish survey and had some interesting possible results. Four weeks prior to the storm, the samples were dominated by bay anchovy and a bit of blueback herring. Two weeks after the storm, there were large numbers of blueback herrings and small numbers of alewives, American shad, and Atlantic menhaden. This could indicate an increase in fish migrating out of rivers and into the ocean—a phenomenon that was observed after hurricane Irene last year—but it is too early to confirm this hypothesis.

There is currently a project to plant eelgrass in Gowanus Bay and, at this point it looks like there was no damage to the plants. The oyster restoration sites further up by the Bronx River only saw a bit of shell displacement but no visible damage.

The West Pond breach in Jamaica Bay can be positive for the diamondback terrapins that nest around that area because it increases their potential foraging and breeding habitats. The storm also flattened

some dunes, further increasing available breeding habitat. The sand deposited in some areas by the hurricane could also be beneficial for horseshoe crabs, although this depends on the grain size and there is no field data available at the moment. At Breezy Point, a lot of American beach grass has been wiped out but the roots have reportedly survived and will likely come back but a little bit thinner. This could be good for sandpipers and black skimmers that nest in the area. The biggest problem in Jamaica Bay is probably the rebuilding that needs to be done in the human community that will likely continue through the spring and beyond and will bring disturbance, possibly harming the species nesting in the area. The Riis Park parking lot is being now used as a dumping ground, attracting cats and dogs, possibly raccoons and other predators, which could have a major impact on nesting activities.

On Staten Island, the East shore was hit very hard, tidal waters are reported to have reached up to 150 feet inland, bringing sand—understory in some places is covered by three inches of sand. Phragmites stalks have been carried much further – about 400 feet inland, also covering the understory and this could have an impact in the spring. The bluffs at Great Kills, which used to be home to kingfishers and swallows, were completely wiped out. It is unknown whether the birds will be able to return or will have to find new habitat. Another concern are ponds along the shore, which were within the flood zone: There is a new, yet unnamed, leopard frog species discovered in Staten Island whose breeding locations are within the flood zone and are known to be active at the time of year the storm hit. Although this species' tolerance to salinity is unknown, it is believed to be lower than straight sea water. On the west side of Staten Island, the oil spill had a huge impact. Prall's Island was completely overwashed. The area that NYC Parks was planting to encourage wading birds nesting was destroyed by the storm and the fencing was knocked out.

In the Meadowlands area, also tidal surge entered into freshwater ponds and there were a number of fishkills, including in the Hackensack River, likely caused by the sudden increase in salinity. Kearny marsh is now more of a freshwater lake surrounded by phragmites, instead of having floating phragmites beds. It had been an important breeding site for least bitterns and it is unknown how that could be affected. The leopard frog was known to mate and breed in some of the ponds affected by flooding and increased salinity.

Throughout the harbor area it seems that phragmites restoration sites are largely unharmed. The only site known to have been hit hard by the storm is up in Soundview Park. Aside from that, the Bronx River fared well and may even benefit, as trees and branches that fell into the river can benefit the American eel population and other species.

A report on this project was being submitted that same day and should be made available soon. There are also other reports backed by the National Fish and Wildlife Foundation covering the East Coast that are being submitted.

Wastewater treatment plants: Keith Mahoney, NYCDEP

Keith Mahoney started by putting the NYC system in perspective (slide 3): There are 14 treatment plants with a design capacity of approximately 2 billion gallons per day that actually treat about 1.2 billion gallons per day in dry weather. There are also 4 CSO retention facilities, 96 pump stations and about 3,300 miles of combined sewers, 2,200 miles of sanitary sewers, and 1,800 miles of separate storm sewers. NYCDEP conducted a series of preparations before the storm (listed in slide 4), including: established a 24-hour incident command center staffed by senior DEP managers; conducted drills at

their facilities; readied pumps and generators for quick deploy; scheduled additional staff to work Oct 29/30; stocked on chemicals and fuel; protected key equipment; notified electrical and mechanical contractors to be on standby; tested communication systems; and stationed operations managers at key facilities.

During the storm, several plants were flooded (slide 5). The Rockaway plant was completely submerged. The Oakwood Beach plant was inundated. Only three plants were down: Rockaway had the longest outage; there was a short one in North River, and there were some issues at Newtown Creek, particularly at the Manhattan pump station. There were 51 pump stations affected by flooding or power loss.

After the storm (slide 6), NYCDEP worked to restore major operations. Extreme flows continued at most plants, but all were functioning and had some level of treatment two days after the storm, except Rockaway, which resumed pumping and primary treatment the following day. By November 2nd, 99% of wastewater flows were being treated.

Keith then showed a series of slides (7 through 10) illustrating some of the damage at the facilities. Rockaway was the most severely impacted. All the basements and galleries were flooded and the electrical system was shorted out. The water had to be pumped out, electrical equipment dried out, and wires and conduits replaced. In Coney Island, the digester building was flooded. Typically, the electrical equipment was the most damaged after the storm, corroded by salty water. The Manhattan pump station, which pumps feed from Manhattan to the Newtown Creek treatment station, went down as electrical equipment was destroyed.

Since the storm, NYCDEP has been assessing damage, which is estimated at about \$90 million throughout the city (slide 11). The lessons learned are listed on slide 12 and include: NYCDEP's preparedness generally worked out well, there were no injuries, and operations were restored fairly quickly; electrical equipment will be raised above new FEMA 100-year flood elevations, all conduits and junction boxes will be water-tight (many pumping stations are in private areas or within other municipalities and will work with them to get agreements to elevate equipment); many sandbags were stolen and will look into other alternatives; the fuel shortages and significant disruption to transportation were not anticipated and in the future they will have stations outside of the flood area and bus workers in; prolonged power outages were not anticipated and will evaluate mobile fueling systems for emergency generators.

Wastewater treatment plants: Ashley Slagle

PVSC experienced a 12-foot storm surge—5 feet above its seawall, which caused power loss and extensive flooding. As a result all flows had to bypass the plant. NJDEP immediately issued a water conservation notice to the municipalities in the PVSC service area. PVSC also requested that industries also curtail or withhold their discharges if possible. All flows came back to PVSC on November 3rd and were receiving primary treatment and disinfection at that time. The plant stopped accepting sludge from outside sources. NJDEP requires additional data before approving PVSC to resume acceptance of trucked-in liquid waste, which is expected some time this week. As of November 23, PVSC is meeting secondary treatment requirements and is in compliance with TSS and BOD standards. The plant is currently operating in manual mode as they continue to repair and replace damaged equipment. The saline surge has corroded all electrical components. EPA and NJDEP compliance staff was at the plant

daily through the end of November and NJDEP personnel continues to go periodically. EPA sent representatives from Region 6 who dealt with the Katrina catastrophe, FEMA was also on-site intermittently, and USACE was there for weeks doing pumpout with their unwatering SWAT team which also dealt with the Holland Tunnel. PVSC estimates damages to the plant at \$200 to 300 million and are meeting with FEMA to determine engineering controls needed to mitigate future flooding. All the updates are posted on the PVSC website, including all the measures taken in anticipation of the storm. Ashley did not have updates from the other plants, but those that were impacted have updates on their websites.

Marine Debris Removal and other Port Issues: John Tavolaro, USACE

As George Pavlou mentioned, FEMA assigns different emergency support functions to federal agencies. USACE had three main functions: emergency power, which is was important during the first part of the storm and is essentially completed at this point; un-watering of all the tunnels; and debris cleanup. That represents about \$300 million. USACE's Caven Point facility is the operation base for drift collection vessels, the survey unit, and support to other groups like NOAA. Normally when flooding is predicted, USACE will secure equipment in a safe place (e.g., drift boats are normally sent to Haverstraw Bay) and materials inside the shop area are moved to higher shelves. Normally one or two people remain at the facility but not this time, which was a fortunate decision as the building was destroyed. In addition, the pumps were not functioning, there was no electricity, gasoline tanks did not rupture but were flooded with salt water, and survey and other equipment was lost. Thus the facility was not operational for the important functions it was needed in the following days: marine debris removal and surveys.

The port community is very organized and had previous experiences with 9/11 and storms Irene and Lee last year. The USCG has a Marine Transportation System Recovery Unit (MTSRU), responsible for planning for, and responding to, port closures. As the port was closed in accordance with emergency management plans and all big vessels were sent out to sea, the MTSRU was in charge of determining the actions needed to bring the vessels back. The first step was to ensure there were no obstructions in the navigation channels. Unlike during Irene, in this case the main concern was not sediments but debris. It took the USACE and NOAA four days to determine whether the main shipping channels were free of debris or not (for the most part, they were). The first priority was to reopen the port so fuel barges could come in. The USACE is still in the process of cleaning up debris from the storm. The amount of debris collected over three weeks after hurricane Sandy was about the same amount that is normally collected over three months, and even more is expected: The moon tide on December 13 (and subsequent higher than average tides) will remobilize debris that was deposited behind marshes. This debris is not part of the FEMA assignment: USACE has a mandate to collect floating debris but not to gather debris accumulated on marshes. The USCG has the authority to ensure that any vessels stuck in the marshes are free of fluids that could spill, but it does not have the authority to remove the vessels.

Impact of Sandy on Superfund Sites: Lora Smith, EPA

Lora Smith provided an overview of hurricane Sandy impacts on Superfund Sites in the region. Lora showed a map of all the Superfund sites within HEP's footprint and a detail of those that are by the waterfront. Prior to the storm, EPA inspected several of the sites. Since the storm, EPA has assessed all 150 remedial sites within the counties where an emergency had been declared. It is believed that none of the sites suffered damage that would pose a threat to human health or the environment. EPA

collected samples at several sites. Lora provided an overview of these sites history and post-Sandy samples in a series of slides, including websites for each site where these data is or will be posted. A summary is provided below.

Newtown Creek site samples were taken from a flooded basement and from the creek itself. As expected, levels of bacteria were high due to CSO discharges. Chemical pollutants that were tested were below the levels of concern or not detected. The results were similar for four samples collected at the Gowanus Canal and two surrounding buildings that had been flooded.

Prior to the storm, several pilot studies had been started at Berry's Creek site marshes. These were undisturbed by the storm, indicating a stable sediment environment.

The Horseshoe and adjacent Atlantic Resources sites had undergone soil cleanup and marsh restoration and none of this work was damaged by the storm. EPA is conducting bathymetric and aerial surveys of the sites to see if there are any changes in conditions that need to be taken into account for the upcoming sediment cleanup.

Residences and commercial buildings by the Passaic River were flooded during the storm. EPA took a sample from the river and three from adjacent residences in the Ironbound area. As with other sites, bacteria levels were high but most chemicals were below levels of concern or not detected. Arsenic, iron and lead exceeded water drinking standards in two of the residential samples. However, these were flood waters and people only had limited contact; thus EPA does not consider these levels to be cause for concern.

The Raritan Bay Slag site was sampled at the public playground area, and at a beach area previously enclosed by a fence. Three of the samples were below the residential cleanup standards while the fourth was above this value. EPA is taking additional samples to determine how the contamination has moved and will replace the fence and signage. Lora showed pictures of this site, showing slag pieces revealed as a result of storm scour.

Additional information related to EPA Sandy recovery actions can be found at www.epa.gov.

Impacts north of the Tappan Zee Bridge: Sacha Spector, Scenic Hudson

Sacha provided an overview of the storm's impacts in the upper part of the estuary. Sacha showed preliminary USGS data at the height of the storm tide. The storm surge at the Battery was approximately 9 ft, leading to 12 to 13-ft tides. Moving up the Hudson River, the surge decayed quickly but then stayed roughly constant or slightly rising up to Albany, where it was 6.5 feet. Sandy set record-high water levels throughout the Hudson except at Albany, where the record was set by hurricane Irene. As noted by previous presenters, Irene brought large amounts of freshwater leading to high water levels upstream, whereas Sandy's surge pushed sea water and thus had a stronger impact in the southern areas of the estuary. It is estimated that over 40 acres of shorelines along the Hudson were inundated. During the storm, storm surge projections were available in real time, although many people (notably, mayors throughout the Westchester waterfront) were unaware of that. This points to a disconnect between emergency preparation and the data needed to inform those efforts. Sacha characterized Sandy as a "nonpoint disaster" for the estuary, as there were hundreds of small spills and combined sewer overflows. A map on slide 3 displayed the locations of EPA-permitted facilities that

have toxic materials near or within the flood zone. There were lots of reports of fuel tanks that became buoyant and popped out of the ground releasing materials. Some of Sandy's impacts include oil spills and inundated wastewater treatment plants (e.g., in Kingston); inundated railroad corridors lines and stations (including the Metro North repair facility in Croton Harmon); many inundated marinas, some of which included fuel and oil storage; many new waterfront developments were inundated (e.g., in Tarrytown and Peekskill).

Scenic Hudson has been working along the estuary over the last couple of years trying to project and model sea level rise. Sacha showed a map of projected future flooding along the Hudson River just south of Albany (slide 4). Many areas are expected to become permanently inundated in the coming decades. Scenic Hudson is also looking at the number of brownfield sites, either remediated or not, that were under water during Sandy. Remediation typically removes some of the contamination and places clean fill on top, which raises the question of whether flooding or permanent inundation may flush some of the remaining contaminants. Working with NYSDEC, NYSDOS, and other partners, Scenic Hudson has been working to create a storm surge and sea level rise adaptation plan that protects coastal lands, creates resilient parks, and identifies places where restoration or removal of shoreline barriers will be most advantageous in terms of coastal resilience. They have also conducted outreach, especially after hurricane Irene, on how to build resilient waterfronts. They held a meeting in Peekskill after Sandy, attended by almost every mayor in Westchester, and there is much interest on how they can protect public access while providing storm buffering. Sandy presents an opportunity to introduce forward-looking planning. Elected officials have expressed the need for data to better deal with short-term events like Sandy but also for long-term goals. Scenic Hudson is about to launch a website (a preview was shown in slide 7) to visualize both storm surge and sea level rise, which is expected to help address this need.

Ongoing Climate Change Activities: Irene Nielson, EPA

Irene acted as HEP 2.0 coordinator and now is back to her permanent position as EPA Region 2 Climate Change Coordinator. Irene said she believes the HEP 2.0 work is very promising and she supports integrating the climate adaptation aspects into this pursuit. EPA has been working on a climate change adaptation plan, which will be finalized over the first quarter of 2013. Irene indicated that EPA welcomes HEP to be part of the ongoing adaptation planning activities. An executive order in 2009 called for an interagency climate change adaptation task force to develop recommendations on adapting to climate change domestically and internationally. These recommendations were delivered to the President on October 2010. One of the key recommendations called for every federal agency to develop and implement a climate adaptation plan. In June 2011, Administrator Jackson issued a policy on climate adaptation and required every regional EPA office to develop an adaptation plan, which is being done now. The plans will be submitted to the Council on Environmental Quality at the White House before June 2013. The plan for Region 2 covers eight areas: vulnerability assessment (on which there will be a lot of information after Sandy); actions on climate adaptation; agency-wide strategic measures (which includes financial mechanisms); legal and enforcement issues; training and outreach; partnership with tribes, vulnerable populations and places; and evaluation and pilot projects. The national EPA Adaptation Plan is expected to be released to the public very soon. It will indicate national priorities for adaptation planning and will have the regional plan philosophy nested in.