

US F&W Hurricane sandy lessons learned:

Immediate response:

- Diesel powered trucks are preferred during emergency responses. The public primarily uses gasoline and this resulted in a major gas shortage. Diesel was however plentiful. Diesel vehicles also have an increased range due to a larger fuel tank and better fuel economy. This allowed us to stop for fuel less often, avoiding long lines and delays.
- With the destruction from the hurricane and public evacuations there were no hotels for a large radius around NYC, Long Island and NJ. We housed our personnel in facilities on our refuges. Using the generators and portable electric heaters, we were able to make comfortable bases of operations. Consolidating personnel made the most of our generators and heaters. Space was very limited so air mattresses worked well in keeping people off cold floors.
- Batteries were used up quickly. The cache issued a lot of batteries. With there being no power a lot of items were run on batteries. The cache was prepared for a wildfire, not a long term power outage and response operations together.
- Rope of various sizes was used after the storm. We used heavy line to provide better control of hazard trees guiding them around structures and utilities. An arborist rated bull line (dynamic rope) is best for this.
- When sawing storm damaged trees the public may be “back feeding” into the grid with an improperly hooked up generator. The power company can have the switches off (dead line) and the lines may still be energized. We relied on utility personnel to confirm the line was dead.
- A 500 gallon gasoline buffalo trailer that was brought up from Florida was a big help. The buffalo was more efficient and much safer than 5 gallon cans. A Hazmat endorsed CDL is required to pull the trailer or whenever total volume is over 110 gallons. This volume restriction applies to multiple cans as well as bulk. Most portable tanks are only rated for diesel. Gasoline is classified as a flammable liquid and diesel is classified as a combustible liquid. When transporting flammable liquids in bulk, a DOT-406 compliant container ([49 CFR §173.242](#)) is needed. The typical portable tanks used for transporting diesel fuel do not meet that criteria and are not suitable for use with gasoline.
- Telephones both land and cell were not functioning well within the hurricane area. Text messaging was far more reliable than the telephones. While not ideal it allowed a means of communications beyond the range of radios.

Hurricane sandy lessons learned:

Debris inventory and reconnaissance

- A pair of amphibious Marshmaster's allowed us access to muddy and difficult areas of the marsh and wrack line. Areas that would have been difficult or impossible to reach were safely inventoried.
- Kayaks were used in areas inundated with water to travel to debris sites. A pair of kayaks easily fit into the back of a pickup truck and can be portaged if needed by a single person. This allowed us to access areas where the surge had not drained yet.
- Airboats were used on large areas of open marsh. The airboats were much faster than the Marshmasters, but were tide dependent restricting useful hours of operation. The airboats were only able to cross large tidal ditches when they were covered in water. Low tide drained ditches were an obstacle but with tide planning we were able to use them.
- Wrack lines needed to be inventoried for physical debris and hazardous materials. The phragmites in the wrack line made it difficult to see all hazards. Rubber boots/ waders with steel inserts provided us some protection from the spikes and sharp debris.

Suggested cache items to inventory for hurricane response

Generators-	With outdoor RV rated x-cords
Electric Heaters-	Radiant worked best
Chainsaws-	With spare parts
Fuel cans-	Large numbers of 5 gal cans to distribute gasoline
Batteries-	Large number used
Rope-	Heavy/ light line (suggest a good quality arborist rope)
Electric heaters-	Run by generators
Waders/ rubber boots-	Wet conditions from the storm surge
Kayak/ Canoe-	To reach otherwise inaccessible areas
Air mattresses-	Cheap, easy to store

Note:

Fuel buffalo - USFWS has purchased two multi-fuel rated DOT406 trailers. These 500 gallon trailers are capable of transporting Diesel, Gasoline, Jet-A, and Avgas. One trailer will be based at Wallkill NWR (Sussex NJ) located within NFFPC and the other will be based at Blackwater NWR (Cambridge MD) located within the Mid-Atlantic Compact.