Amateur Radio Operations during Hurricane Iselle
After Action Report, Version 1
Thursday Aug 7 through Fri Aug 8, 2014

Introduction

Tropical Storm Iselle made landfall on the Big Island on Friday, August 8, 2014. This after action report compiles information from amateur radio operations statewide during this event.

The situation and after action reports were collected using telephone, email and text messages, freeing amateur radio for operations. All dates and times are in Hawaiian Standard Time.

Operations were still ongoing on the Big Island on Saturday August 9 and Hawaii County Civil Defense is sensitive about unauthorized release of information. Results information for the Hawaii County operations is limited at this time.

Overview of Hurricane/Tropical Storm Iselle

Tropical Storm Iselle formed in the Eastern Pacific as Tropical Depression 09E on Thursday, July 31, 2014. The Central Pacific Hurricane Center assumed forecasting responsibility when the storm crossed the 140 degree longitude as a Category 2 hurricane near latitude 16.4N, travelling west-northwest at Tuesday, August 5 around 5:00 am. Iselle had peaked as a Category 4 hurricane the day before.

The Big Island of Hawaii was put on tropical storm watch at 11:00 am on August 5, with forecasted landfall on Thursday. (NWS)

The storm was forecasted to make landfall on Thursday, August 7 around 9:00 pm at near Category 1 hurricane strength. As the storm approached the Big Island and the mass of the Mauna Loa volcano, forward progress of the storm slowed and moved southward until it made landfall at 2:30 am 5 miles east of Pahala on the Kau Coast. (NWS Bulletin) Iselle discharged energy and moisture in the form of torrential wind and rain, with upwards of 7 inches measured in Puna and 14 inches in Kulani. (NWS) At 3:00 am, Iselle was at 19.2N, 155.4W just onshore near Laahana. By 5:00 am, Iselle had traveled over the lower slopes of Mauna Loa and was a 193.N 156.1W or about 39 miles northwest of South Point and 13 miles west of Milolii, moving west-northwest at 11 MPH. (NWS)

The area of the Kau Coast from Cape Kumakahi through South Point received material damage. Many trees fell in the Paradise Park and neighboring area obstructing roads and power lines. Storm surge pushed bowling ball sized rocks and black sand into beach side homes. Aluminum siding stripped off of homes.

Rainfall caused flooding, mud and debris requiring clean-up. (Residents) Hawaiian Electric Company reported 21,900 customers were affected by loss of power. Restoration may take one week. (HELCO) AT&T lost cell service and Verizon sustained service in the Pahoa area. (Pahoa resident) Hundreds line up for ice, water, tarps and supplies. (Media)

Maui residents in Upcountry Maui (Olinda, Ulupalakua, Pukalani) and Makena experienced loss of power. (via SKYWARN) Trees uprooted and other wind damage in Ulupalakua. (Media)

Iselle moved around South Point and continued moving west while traveling south of the smaller islands. Shearing winds further diminished organized circulation of the storm. Humidity remained high. Rain bands produced occasional bursts of rain and wind on the smaller islands. (Residents)

Central Maui reported light clouds, no wind, no rain and calm oceans Friday morning. (Residents)

American Radio Relay League

With the anticipated arrival of TS Iselle, cooperative arrangements with served agencies and amateur radio groups were set in motion and activated.

Power was lost to Kulani and Mauna Loa repeaters and backup power failed. The main operations took place on the Mauna Kea repeater. It however does not reach to some southern parts of the island. Simplex was used extensively on the Big Island. (AH6J)

Previously, the ARES (Amateur Radio Emergency Services) arm of the ARRL (Amateur Radio Relay League) secured arrangements and permission to have a VHF radio repeater sponsored through VOAD (Volunteer Organizations Active in Disasters) and the ARC (American Red Cross) to be installed in one of the observatories at the summit of Mauna Kea. (AH6J)

Since the radio equipment is near sensitive astronomical equipment, the agreement allowed for operations only during declared emergencies. The arrangements further allowed the repeater to be turned on for testing on the first working day of the month from 12 noon to 1:00 pm. (AH6J) With the Governor's proclamation of an emergency, a request for assistance was made to VOAD for the use of the repeater. The repeater was activated by 2:00 pm Thursday. (AH6QO)

American Red Cross

The DEM RACES-EARC ARC Headquarters team set up equipment at the ARC HQ on Thursday afternoon and monitored VHF and UHF frequencies. Operations ran from

6 pm Thursday until 4 pm Friday when the shelters were closed. HF would not be deployed until after the storm had passed, as communications with the 3 primary shelters was possible through the State RACES VHF/UHF repeater network. Key repeaters used were:

147.360 - The ARC repeater at Leahi Hospital for reports from the shelters
444.350 - The SKYWARN net, with the means to contact the DEM EOC.

Two complete radio vhf/uhf systems with Fldigi and printer were deployed using commercial power. Battery backup and generator were available in case of power outage.

Two person shifts were utilized, with a primary communicator monitoring and the second on shift resting until needed.

During that time we took the 12pm and 12am shelter counts and requests from the shelters for additional supplies.

We also relayed the shelter counts to the ARC representative at the DEM EOC. (NH7ZP)

Hawaii County

The South east side of the Big Island sustained a fair amount of damage. Post storm damage assessments are in progress (Friday afternoon). The VOAD repeater on Mauna Kea is in use by way of RFA (Request for Assistance). Requests for assistance will be through formal channels via WebEOC with State Civil Defense/HI-EMA. (WH6FM)

Utility power on Mauna Loa was out on Thursday night Aug 7. The link on the Mauna Loa 147.04 repeater was reset on Friday, Aug 8 at 6:00 am. Hawaii County amateurs were operational on 7.095 LSB (AH6JA) and later 7090 LSB (AH6J). Much of the BIWARN repeaters were not hardened and as a result could not sustain operations. Although the output of the Mauna Kea repeater was diminished, the operations was surprising, with coverage on the East side south to Paradise Park and spot coverage of the Volcano area. On the West side, spot coverage was available in Kailua and Kona. (AH6J)

Hawaii State Civil Defense/Emergency Management Agency

Planning for the event for the amateur radio community started seven days before landfall. Recognizing that in the initial stages would be a weather event with possible escalation to damage to the respective counties, the radio communications plan was architected to use the State RACES VHF RACES, linked with All-star repeaters for SCD (East Oahu) and DEM (West Oahu) to provide a common channel

for the primary purpose of weather reporting and a secondary purpose of a radio watch for SCD and DEM. Hawaii County would primarily use the VHF/UHF radio assets on the Big Island and 40 meter HF for on-island operations. (AH6RH)

A baseline plan was constructed for delinking the repeaters and would be reevaluated as the storm progressed. There has not been reliable past history in the Hawaiian area of the effects of large terrain upon a hurricane. Hurricane Jimena in 2003 went South of South Point, and TS Flossie in 2013 split into two components offshore of Hilo, with one third traveling south and two thirds traveling north, which later was deflected by Mt. Haleakala upwards of 60,000 ft. The Oahu repeaters were to be delinked as the storm approached the west end of Molokai. Depending on the expected impact, the Oahu repeaters could have been grouped into the East Oahu (444.325 and 444.350) and West Oahu (146.76 and 146.98) repeaters, with the 146.88 MHz EARC repeater available as a common channel for American Red Cross, DEM and SCD. A similar scheme was tested during Tropical Storm Flossie (2013) and Makani Pahili 2014 Hurricane Exercise with great success. SCD operators were made available for this event to SKYWARN to run a radio watch. (AH6RH)

Coordination information was obtained from other amateur radio coordinators and a web page was created and updated listing the frequency plan and expected start of operations for the event prior to landfall. (AH6RH)

SCD amateur radio operations started at 6:00 pm Thursday and ended at 3:30 am Friday. HF operations remained on 7080 USB until after the 8:30 pm meteorologist report was given, then moved to 7088 LSB for traffic from the Big Island. Radio traffic was very light. Starting at 10:05 pm, permission from SKYWARN NCS was obtained and periodic net announcements were made for any observations on flooding, storm surges, road blockages and similar reports. Similar requests were made on HF 7088 kHz. A few reports were received. At 11:10 pm, WH6FC reported via HF no winds and no rain at Ocean View, South Point. The message was relayed to SKYWARN via VHF. At 11:28 PM, KH7DX reported via HF no winds and no rain in Kailua-Kona. The messages were relayed to the DAIS Oahu position. (AH6RH)

SKYWARN carried an assessment by the CPHC NWS meteorologist at 2:50 am Friday that the storm had made landfall five miles east of Pahala at 2:30 am. That assessment was copied by SCD RACES and given to the NWS representative meteorologist at the SCD EOC and the SCD DAIS operations desk by 2:55 am. The representative meteorologist contacted the CPHC office for an update. As the storm continued to trend downward, SCD RACES VHF and HF onsite operations concluded at 3:30 am. Operations continued monitoring from home and relaying messages via email to the DAIS desk. The power status of Kalaupapa was copied and delivered via email.

Operations of the 147.04 Mauna Loa repeater was probably interrupted during the peak of the storm. Utility power to the Mauna Loa area was lost around 6:30 pm Thursday. Network connectivity associated with the microwave system was

disrupted around 2:00 am Friday. The control operator reset the repeater around 6:00 am Friday and operations were restored. (AH6RH)

Honolulu County/Department of Emergency Management

DEM RACES amateur radio operations were from 6:00 pm Thursday to 3:00 pm Friday. Repeaters of the linked SCD RACES/DEM RACES repeater system were monitored.

Peter Yuen KH6JBS reported to the Kaiser High School shelter on Friday, after completing his assignment at State Civil Defense. (N6NCT)

Kauai County

The SKYWARN amateur radio Kauai county coordinator emailed a notice to Kauai SKYWARN spotters and amateur radio public service communicators on Wednesday, August 6, regarding the SKYWARN net that was to be activated the following day. The message detailed the activation time, as well as details on radio frequencies, reporting guidelines and contact information.

For Kauai, the statewide SKYWARN net was accessible on the Peacock Flats 146.760 repeater for amateur stations located on the eastern portion of the island. HF frequency was 7.080 USB. Propagation and signal conditions for both VHF and HF were good during the net period.

Radio activity on Kauai was very light because there was no significant weather from Hurricane Iselle affecting the island during the net period.

Kauai operators greatly appreciate the efforts of the individuals that worked shifts as Net Control Stations (NCS), loggers and assistants at the National Weather Service SKYWARN station in Honolulu. Thank you too, to all the amateurs that submitted storm reports. (NH7YS)

Maui County

Maui ARES activated at the Maui County EOC for SKYWARN operations at 6:00 p.m. Thursday August 7, 2014. Operations were terminated at about 3:00 p.m. Friday August 8, 2014 after the NWS took down the Hurricane warning for Maui and Honolulu counties. The EOC was set up to operate on 40 meters and on both the State RACES 147.02 and MCDA VHF and UHF repeaters, on both phone and Fldigi. (KH6H)

Reports received included power outages in the Upcountry Maui area and some reports of damage in the Ulupalakua area. Most stations reported little or no damage and only brief heavy rainfall. (KH6H)

Power to Kalaupapa, Molokai was reported out, and 75% restored by Aug 8 1:02 pm. It was 100% restored on Aug 8 7:35 pm. (NH6LK) The Maui EOC monitored and noted a damage report from Kalaupapa sent directly to SKYWARN at NWS Honolulu. (KH6H) Lionel NH6LK was one of three amateur radio operators that passed the first remote VE testing session at Kalaupapa in 2011. (AH6RH)

National Weather Service/SKYWARN

SKYWARN activation was received via an e-mail from Chris Benchley, NWS Acting Warning Coordination Meteorologist, on early morning Tuesday, August 5, 2014. Activation would begin at 12 noon on Thursday, August 7, 2014. Tentative deactivation date was setup for Saturday, August 9, 2014, but will depend on the weather situation as it developed. The net actually deactivated on Friday, August 8, 2014 at 5:40 p.m. after the 5:00 p.m. weather report and the lead meteorologist on duty agreed that there will be no further need to continue the SKYWARN net.

The following linked State RACES and DEM RACES repeaters handled voice and Fldigi MT63-1KL for digital storm report messages:

146.760, 146.980, 147.020, 147.040, 147.060, 444.325, 444.350

Also 7.080 USB was used for both voice and Fldigi MT63-1KL digital storm report messages.

What went well:

- Good communications were established on 444.325 at the NWS amateur radio station, KH6SW.
- The linked repeaters gave excellent coverage and there were no failures, except the 147.040 on the Big Island at the end of the net. We were not sure when the repeater went down. It is now back on line.
- We had at least two radio operators per shift but Clem (KH7HO) had to pull several shifts to ensure coverage.
- Two radio operators were in training and they were able to get on the radio to give the SKYWARN preamble and got to talk to several check-ins.
- Announcing that SKYWARN net to only receive significant weather reports helped reduce the number of radio traffic and kept the frequencies open.
- Not doing check-ins but only receiving significant weather reports reduce the need to keep a check-in log but only log those with reports and then check out.
- Having SKYWARN as the NCS help coordinate any traffic to county EOCs and to the State EOC.

- Able to use a mobile HP printer to print Fldigi digital messages, however, we did not receive many digital messages to forward to the lead meteorologist on duty. Most of the messages were delivered on the manual weather reports.
- There was not much radio traffic. The Hawaii county, which was the first island to be affected by Iselle, had setup their own local net which help reduce the radio traffic on the statewide net.
- Using a cellular carrier mobile WiFi hub allowed several of us with the Hurrivac program on our laptops to monitor the track of both tropical cyclones. It help visual see how the storms would track in the Central Pacific and what the tropical force winds coverage would be at designated times.
- Those who brought their personal laptop with the Fldigi and Flmsg programs were ready to receive any Fldigi messages.
- Morale of the net radio operators were positive and were waiting to pass any significant weather reports to the lead meteorologist on duty.
- Clem brought a cot and change of clothes. The Meteorologist in Charge graciously allowed Clem to use his office as Clem's sleeping area during the activation and shower facilities were available.
- Excellent support and partnership from NWS personnel.

What could be improved:

- There is a need for more SKYWARN trained radio operators. It was difficult to get sufficient SKYWARN net radio operators. Four were out of state. The activation during working hours prohibited several operators from reporting to NWS. Also several were also with State and DEM RACES, which were activated Thursday evening to the State or to the DEM EOCs. Also one was assigned to the ARC HQ to help with shelter communications.
- For a severe hurricane striking the island of Oahu, need to prepare for SKYWARN radio operators who would be willing to hunker down in the NWS Honolulu Forecast Office and be able to operate. The operators will not be able to do shift changes with radio operators arriving or leaving their shifts. They will need to be in the Honolulu Forecast Office during the storm. It may several days in a worse case situation.
- There was very little traffic on HF on 7.080 USB. May need to consider changing to 7.088 LSB, a more popular HF frequency so we can get more information.

Overall, we were able to support the NWS. (KH7HO)

Participants

Served Agency	Operations Started/Stopped	Participants	
American Red Cross	Aug 7 6:00 pm /Aug 8 4:00 pm	WH6EAQ, KF7NGK, NH7ZP	
Hawaii County EOC	Ongoing	WH6FM	
Hawaii County		AH6J, AH6JA	
Hawaii State EOC	Aug 7 6:00 pm /Aug 8 3:30 am	KH6JBS, AH6RH, AH6SP	
Honolulu County EOC	Aug 7 6:00 pm /Aug 8 3:00 pm	WH7BB, WH6EJL, WH7PD, KH6PRD, NH6XL, three guest operators	
Kauai County		NH7YS	
Maui County EOC	Aug 7 6:00 pm /Aug 8 3:00 pm	KH6H, NH6Y	
National Parks Service - Kalaupapa	Aug 7/Aug 8 5:35 pm	NH6LK	
National Weather Service Honolulu WFO	Aug 7 12:00 pm /Aug 8 5:40 pm	KH7CR, KH6DQ, WH6DRH, WH6EAO, WH7GG,	146.76, 146.98, 147.02, 147.04, 147.06,

Served Agency	Operations Started/Stopped	Participants	
		WH6GR, KH7HO, KH6U	444.325, 444.350, 7080 USB

Notes and Comments

The effectiveness of the SKYWARN net is largely due to the work that the statewide coordinator, Clement Jung, KH7HO, has done building the SKYWARN amateur radio structure for Hawaii over the years. Mr. Jung is to be congratulated. Mahalo as well to Ron Hashiro, AH6RH, the Hawaii state RACES coordinator for his leadership in coordinating and promoting amateur radio public service communication in Hawaii. (NH7YS)

Lessons Learned

The Anderson Powerpole connectors on one set of equipment on the Big Island failed and had to be replaced. It is possible that corrosion from long term exposure to the vog (volcanic fumes) with high sulfur content may have affected the connector. (AH6J)

At South Point, the horizontal winds were so strong that the vertical rain gauges could not measure rainfall rate. To be effective, the vertical rain gauges would have to be turned horizontally to capture rainfall. (AH6JA)

The use of common state-wide channels for monitoring progress during the early stages amongst NWS, SCD/HI-EMA and DEM with joint operations was shown to be successful. (AH6RH)

Contributors

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* - vetted the contributions in the final After Action Report.