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FEMA Lake Ontario Wave and Surge Modeling

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Prepared for



Federal Emergency Management Agency

Prepared by



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1.0 INTRODUCTION

Coastal counties around the Great Lakes are vulnerable to coastal flooding. The Federal Emergency Management Agency (FEMA) commissioned the RAMPP Joint Venture to evaluate wave and storm surge levels on Lake Ontario by undertaking the following tasks:

- A. Long-Term and Seasonal-Scale Water Level Variation Analyses
- B. Short Time-Scale Event Definition for Storm Surge
- C. Development of Statistical Analysis Approach to Select Extreme Storms
- D. Wind and Pressure Field Generation for Lake Ontario
- E. Evaluation of Ice Field
- F. Wave and Storm Surge Modeling (Pilot Study Simulations)
- G. Wave and Storm Surge Production Simulations
- H. Participation in the Technology Transfer Group Meetings
- I. Facilitate Independent Quality Assurance/Quality Control (QA/QC) of work products

W.F. Baird & Associates (Baird), a part of the RAMPP team was commissioned to perform the above tasks for Lake Ontario.

1.1 Study Area

Lake Ontario borders Canada on the north side of the lake and the United States of America (USA) on the south side. There are seven American coastal counties on Lake Ontario including from west to east: Niagara, Orleans, Monroe, Wayne, Cayuga, Oswego and Jefferson as shown on Figure 1.1.



Figure 1.1 American Coastal Counties on Lake Ontario

Lake Ontario is the furthest downstream lake in the Great Lakes watershed and receives the majority of its flow from the Niagara River. The lake drains into the St. Lawrence River at Cape Vincent, and ultimately empties into the Gulf of St. Lawrence and the Atlantic Ocean.

1.2 Numerical Model Selection

The main task of the present study was to perform numerical modeling of wave heights and storm surge on Lake Ontario during extreme events. The surge on Lake Ontario is relatively small (refer to Section 3.0) and therefore the surge generally has little effect on wave generation in the nearshore zone. Consequently, two separate models were selected to simulate the wave and surge (as opposed to a coupled modeling approach). SWAN was selected to model waves and the ADvanced CIRCulation model (ADCIRC) was selected to model storm surge. The advantage to using SWAN in conjunction with ADCIRC is that they both can utilize the same irregular triangular mesh, which is generated using the Surface-water Modeling System (SMS).

SWAN is a third-generation stand-alone (phase-averaged) wave model for the simulation of waves in waters of deep, intermediate and shallow depths. SWAN simulates wave propagation in time and space, shoaling, refraction due to current and depth, frequency shifting due to currents and nonstationary depth; wave generation by wind; nonlinear wave-wave interactions (both quadruplets and triads); whitecapping, bottom friction, and depth-induced breaking; and blocking of waves by currents. ADCIRC is a two-dimensional hydrodynamic circulation model. The model was developed using traditional hydrostatic pressure and Boussinesq approximations that have been discretized in space using the finite element (FE) method and in time using the finite difference (FD) method. ADCIRC was used to simulate the currents and water surface elevation generated by wind and pressure on Lake Ontario.

1.3 Purpose of Report

The purpose of this report is to document the methodology utilized to complete tasks A through I (refer to Section 1.0) and summarize the results generated with the wave and storm surge simulations.

2.0 PHYSCIAL DATA

A number of temporal and spatial data sets were utilized for the present study. Details pertaining to each data set are provided herein.

2.1 Spatial Data

Bathymetry data were compiled from a number of sources with the main being USACE NetCDF bathymetry data. Other sources of data were utilized for areas where the NetCDF bathymetry did not provide coverage. Primarily, this included the embayments and the upper end of the St. Lawrence River, past Cape Vincent. For these areas, NOAA Electronic Navigation Charts were used for bathymetry in most embayments and the Ministry of Natural Resources Seamless Bathymetry data was used for the upper St. Lawrence River. The composite bathymetry data used for both wave and surge modeling is shown in Figure 2.1.

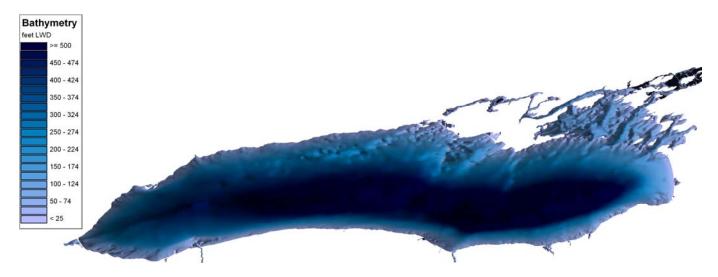


Figure 2.1 Lake Ontario Bathymetry Compilation (Legend in Feet, LWD)

Horizontal and vertical datums adopted for this project include Geographical, NAD 83 and feet Low Water Datum (LWD = 243.44 ft), respectively.

2.2 Temporal Data

2.2.1 Water Level Gage Data

Water level data on Lake Ontario were obtained from the National Oceanic and Atmospheric Administration (NOAA) and the Canadian Hydrographic Service (CHS). All available Lake Ontario gage data locations are shown in Figure 2.2.



Figure 2.2 Lake Ontario Gage Locations

The outflow of Lake Ontario to the St. Lawrence River is controlled by the current regulation plan at the Moses Saunders Power Dam (1958D with deviations). This plan has been in effect since 1960, and thus 1960 is the ideal starting time for all lake level analyses in this report, since prior to this period the lake level range was different and fluctuated naturally. This ensures the US gages have 51 years of data (1960-2010), except for Olcott (1967-2010). The temporal coverage of each water level gage on Lake Ontario is shown in Figure 2.3.

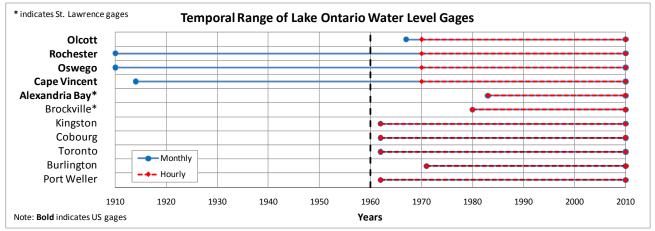


Figure 2.3 Available Lake Ontario Gage Data (US and CND gages)

Considering that the study focuses solely on flooding hazards for the United States shoreline, the NOAA gages were the focus of this study, including Olcott, Rochester, Oswego, and Cape Vincent as illustrated in Figure 2.4. Detailed long-term and seasonal scale analysis of these water level gages is provided in Section 3.0.

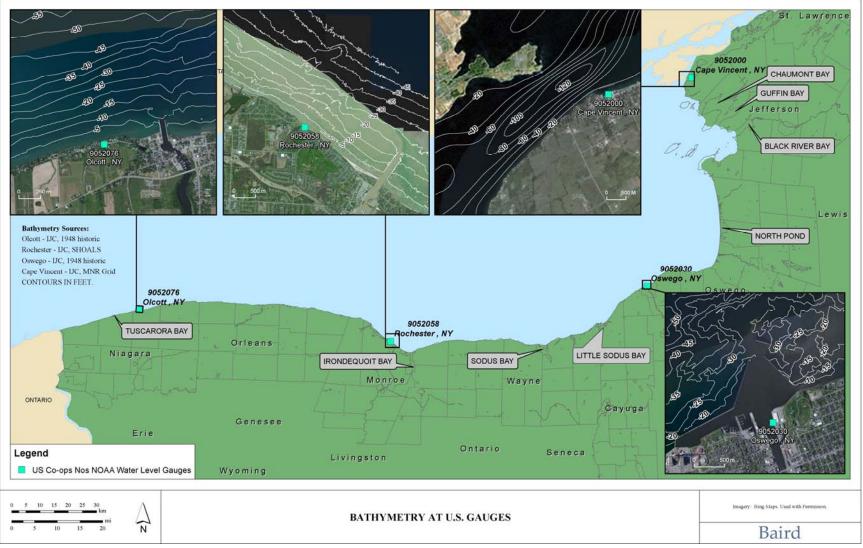


Figure 2.4 Lake Ontario and Nearshore Bathymetry for the NOAA Water Level Gages

2.2.2 Wind and Pressure Data

Two sources of wind and pressure data were utilized for the present study, including:

- Measured wind and pressure data from meteorological stations and airports around Lake Ontario from 1961 to 2010; these data were converted into a gridded product using the Natural Neighbor (NN) routines developed by NOAA-GLERL; and
- The National Center for Environmental Prediction (NCEP) Climate Forecast System Reanalysis (CFSR) wind data from 1979 to 2010.

Details pertaining to the two different data sets are provided in the following sub-sections and an in-depth discussion regarding the comparison between them is provided in Section 5.3.

2.2.2.1 Meteorological Stations and Airports for Natural Neighbor

Meteorological data were available from two main sources: the Meteorological Service of Canada (MSC) and the National Data Centre (NDC), NOAA. The quality of the wind data varied in both space and time because the data were recorded with different instruments for different periods. Figure 2.5 shows the location of the meteorological stations around Lake Ontario.

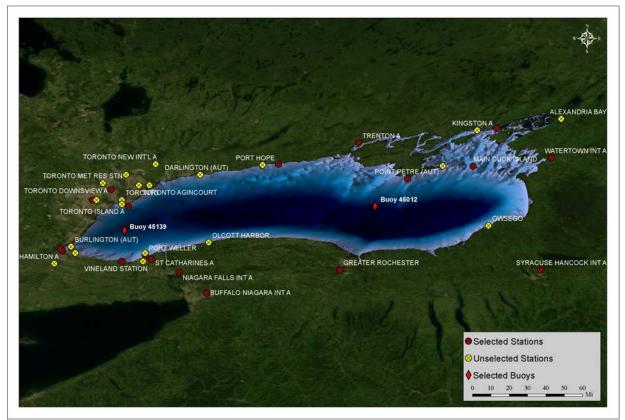


Figure 2.5 All Meterological Stations Near Lake Ontario



After analyzing available wind data, twenty-eight stations (including two buoys) were chosen to generate the Natural Neighbor wind field. These stations are shown in Figure 2.6.

Figure 2.6 Selected Meterological Stations

Of twenty-eight stations, nine include pressure data as follows: Burlington Piers, Kingston Airport, Niagara Falls International Airport, Point Petre, Greater Rochester, St. Catharines Airport, Toronto Airport, Trenton Airport and Watertown International Airport. These nine stations were used to generate the Natural Neighbor pressure fields.

The data were interpolated to create a wind and pressure field covering all of Lake Ontario using the Natural Neighbor Interpolation Technique as described in Sambridge et al. (1995). Natural Neighbor Interpolation is a weighted average of the functional values associated with data, which are natural neighbors of the point at which interpolation is being made.

2.2.2.2 Gridded Wind and Pressure Data (NCEP CFSR)

The National Centers for Environmental Prediction (NCEP) Climate Forecast System Reanalysis (CFSR) is a coupled atmosphere-ocean-land surface-sea ice system. It currently provides wind and pressure data over a 31-year period from 1979 to 2009. CFSR atmospheric, oceanic, and land

surface output products are available on an hourly basis at a horizontal resolution of 0.5° latitude × 0.5° longitude (Saha et. al., 2010).

Due to the coarse resolution of the CFSR data relative to Lake Ontario, particularly in the north-south direction, the CFSR grid points located in or along the perimeter of the lake were compared against measured wind data at two buoy locations. Figure 2.7 shows the location of the buoys and the CFSR data points considered in the analysis. This was done to determine how well the model predicts wind speed over water. The CFSR points located in the blue box were compared against Buoy 45012 and those located in the red box were compared against Buoy C45139. Correction factors were applied to each grid location based on a comparative analysis of wind speed by directional quadrant (8 quadrants in total). The purpose of the correction was to adjust the CFSR wind speeds to be more representative of conditions over water. Figures 2.8 and 2.9 illustrate this process by showing a comparison of the uncorrected and corrected wind speeds for all quadrants of the CFSR grid point closest to Buoy 45012 (refer to Figure 2.7). A review of the uncorrected data showed that the interpolated wind field was underestimated for the stronger wind speeds, which are important for the storm modeling completed for this study. As expected, the corrected data showed a stronger statistical correlation with the measured data. This analysis was completed for each (CFSR) grid point highlighted as blue squares in Figure 2.7. The corrected CFSR wind data was then interpolated to the model mesh in order to drive both the ADCIRC and SWAN models.

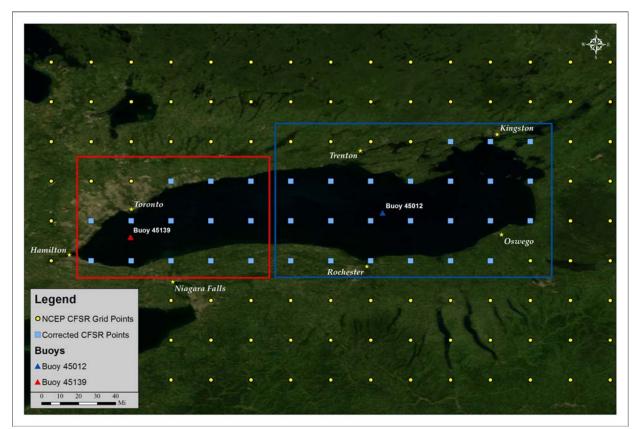


Figure 2.7 NCEP CFSR Data Points and Corresponding Buoy for Wind Speed Corrections

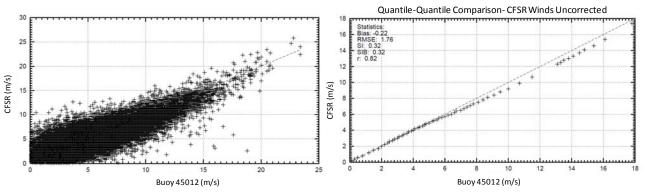


Figure 2.8 Comparison of uncorrected CFSR Wind Speed at One Grid Point to Buoy 45012

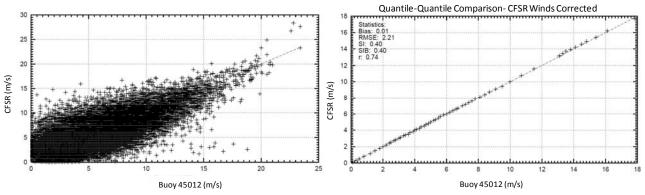


Figure 2.9 Corrected CFSR Wind Speed at One Grid Point to Buoy 45012

Note, Quantile-Quantile (Q-Q) plots were also used to evaluate the data statistically. A Q-Q plot is a graphical technique for assessing whether two data sets are statistically equivalent. In this approach the quantiles (percentages of data points below a given wind speed value) were plotted against the quantiles of the second data set. If equivalent quantiles provide equivalent wind speed, the data sets are statistically similar, as is the case in Figure 2.9.

2.2.3 Historical Ice Cover Data for Lake Ontario

According to available records, Lake Ontario has never completely frozen. Rather, ice cover tends to concentrate in shallower nearshore areas and in calmer sheltered areas, such as eastern Lake Ontario. It is possible to have some ice coverage on Lake Ontario from November through April.

A database of Lake Ontario ice concentration consisting of 51 years (1960-2010) was compiled from various sources. Data from 1960 to 1972 were synoptic ice charts from an ice concentration climatology database developed by Assel et al. (1983). Data post 1972 were polygonal digital ice data compiled by GLERL.

The data consists of a percentage of ice coverage on Lake Ontario for various spatial and temporal periods. The time between ice maps varies in the order of weeks to days and the older datasets tend to be incomplete. The grid resolution has also been refined with time as shown in Table 2.1 and Figure 2.10.

Ice Coverage Map Temporal Extents	Grid Resolution (Number of Gridpoints within Extents of Lake Ontario)		
1960 - 1972	758		
1973 - 2006	2,804		
2007 - 2010	11,187		

 Table 2.1 Summary of Ice Coverage Maps' Grid Resolution

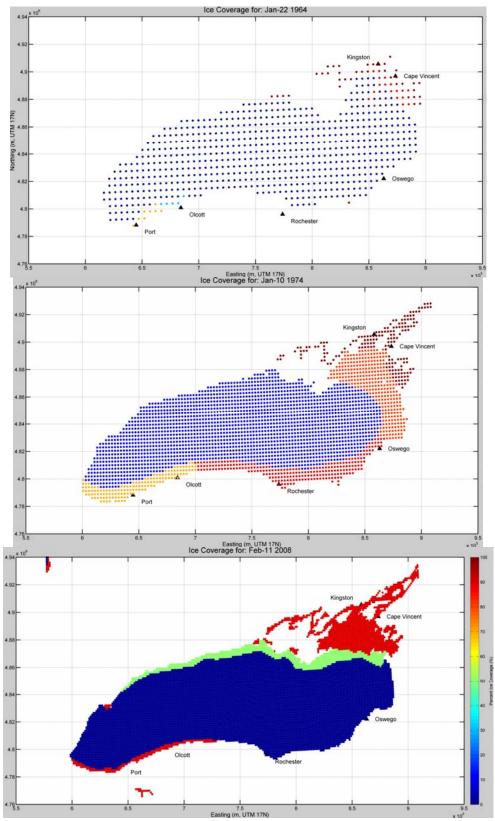


Figure 2.10 Example of Three Ice Coverage Maps with Different Grid Resolution 1964 (top), 1974 (middle), 2008 (bottom)

2.2.4 Flow Data for the Niagara and St. Lawrence Rivers

The Niagara River, which flows north from Lake Erie, is the main source of water entering Lake Ontario. Flow from Lake Ontario is discharged through the St. Lawrence River to the Atlantic Ocean. Parts of these two rivers were included in the ADCIRC model domain as flow boundaries.

The flow that is discharged through the St. Lawrence River is a combination of the flow entering from the Niagara River combined with many smaller tributaries. Therefore, the discharge flow through the St. Lawrence River exceeds the inflow from the Niagara River. However, for the purpose of modeling, small tributaries were omitted and the flow entering through the Niagara River was set equal to that discharge through the St. Lawrence River so as not to bias the storm surge predictions. Data used to define the flow boundaries were obtained from NOAA's Great Lakes Environmental Research Laboratory (GLERL) for the period of 1960 to 2005, and then from Environment Canada for the period of 2005 to 2011. A compilation of the data is shown in Figure 2.11.

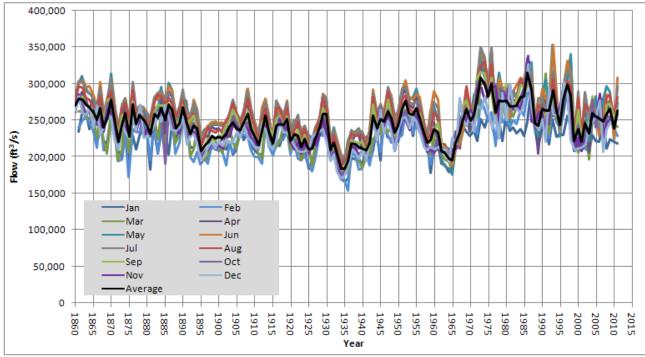


Figure 2.11 St. Lawrence River Monthly Average Flow

2.2.5 Wave Buoy Data

Waves have been measured in Lake Ontario using buoys at twelve locations, as shown in Figure 2.12. There are several inconsistencies in the recorded wave and wind data; the period and duration of the parameters varied considerably. In addition, the buoys are removed during winter (November to March). The long-term data are biased due to the lack of recorded winter storms that

often produce some of the largest and most severe wave conditions. Finally, there was a considerable change in the type and pay loads of the two long-term buoys (C45135, C45139) after 1996. Initially, data were recorded by 3 m diameter buoys from 1988 to 1996. However, after 1996 the data were recorded by large 12 m discus buoys which do not respond well to short period wave conditions. These various factors were considered when using the measured wave data to verify the SWAN model outputs.

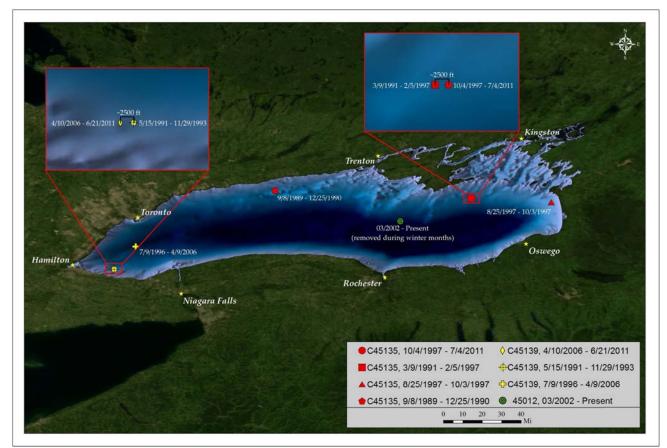


Figure 2.12 Lake Ontario Buoy Locations

2.3 **Previous Studies**

Several previous studies were utilized during the investigation and are briefly summarized.

2.3.1 Revised Report on Great Lakes Open-Coast Flood Levels – Phase 1

The measured historical water level gage data for the US shoreline of the Great Lakes were analyzed in 1988 to establish extreme values for return periods of 10, 50, 100 and 500 years. For each lake, different elevations were reported for segmented geographic regions (USACE, 1988).

2.3.2 Baird 2003 WAVAD Hindcast on Lake Ontario

Baird completed a wind-wave hindcast on Lake Ontario for the International Joint Commission (Baird, 2003). The original hindcast was completed with WAVAD, a second generation spectral wave model used for wind-wave hindcasting. The temporal duration of the analysis was 1961 to 2000. Recently, the hindcast was extended to the end of 2010 for an industrial client. The data is proprietary but Baird has the authority to use the waves for analytical purposes, which we did for this study. The raw time series data cannot be transferred or distributed.

3.0 WATER LEVEL ANALYSIS

Section 3.0 of the report describes the analysis of long- and short-term water level trends on Lake Ontario.

3.1 Evaluation of Gage Locations

The location of the water level gages used in the analysis was evaluated to determine the site conditions, such as degree of exposure and distance of the intake pipe from the shoreline. Background information was collected during a literature review and in direct conversation with NOAA officials to understand the unique site conditions at each gage. Figure 3.1 depicts a cross-section of a typical NOAA gage house on Lake Ontario. Note that this section only depicts the water level measurement techniques, not meteorological data.

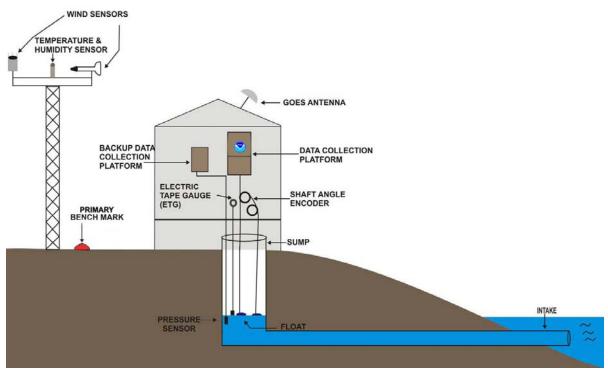


Figure 3.1 Definition Sketch of a Typical NOAA Gage House

The intake pipe typically extends some distance into the lake from the gage house, as seen in Figure 3.1. The lake level is determined by measuring the travel time of a reflected signal from a downward facing acoustic sensor in the well, which is connected to the intake pipe. With the aid of a calibrated reference point, the water surface is accurate to 0.1 ft (NOAA, 2005). The acoustic sensor is mounted inside a PVC protective well, which is more open to the local lake dynamics than the traditional stilling well and does not mechanically filter much of the wind waves or chop (NOAA, 2005).

The location of each gage was mapped and is noted with a blue X in Figure 3.2. At Olcott and Rochester, the gage house and intake pipes are located west of the harbor structures. Conversely, at Oswego and Cape Vincent, the instruments are located inside existing buildings within the harbor and somewhat sheltered from the open lake.

The intake pipes at Olcott, Rochester and Oswego are located offshore from the actual instruments that measure water levels in the wells, as noted in Table 3.1. For example, at Rochester the intake pipe is located 1,160 feet offshore from the gage house, which is located at the shoreline.

NOAA Gage	Intake Distance (ft)			
Olcott	900			
Rochester	1160			
Oswego	500			
Cape Vincent	0			

Table 3.1 NOAA Gage Intake Distances

Cape Vincent is the one exception for the US gages on Lake Ontario, as the instruments are located in the wharf and there is no pipe that extends into the lake (refer to Figure 3.2). The information in Table 3.1 will be used to extract water level information from the ADCIRC grid when calibrating the storm surge predictions in Section 5.0.

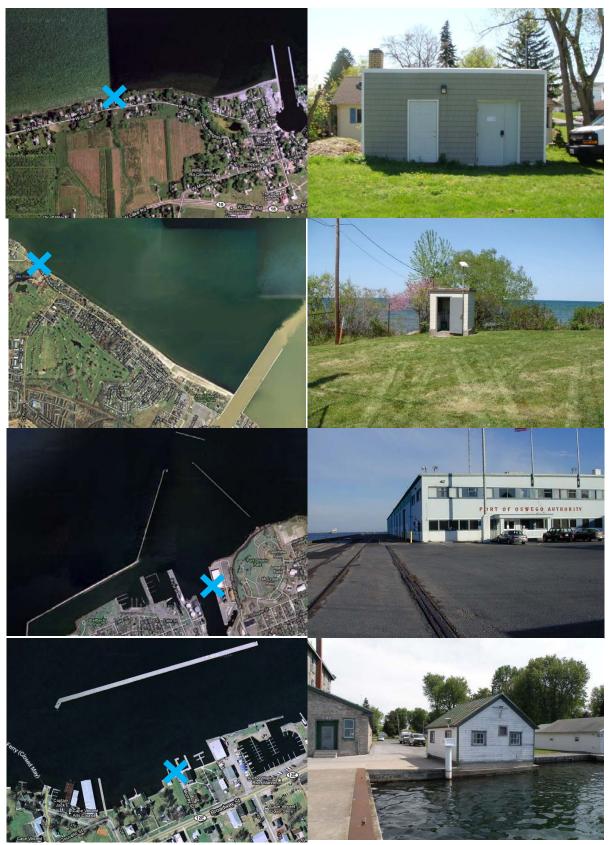


Figure 3.2 NOAA Gage Houses (from Top to Bottom: Olcott, Rochester, Oswego, Cape Vincent)

3.2 Long-Term Water Level Analysis

To assess the long-term water level trends on Lake Ontario since regulation (1960), the monthly means were collected and statistically analyzed. Table 3.2 presents the mean, maximum, minimum, and standard deviation for the water level gages on Lake Ontario, including the Canadian gages. The values are nearly identical for all gages, especially the mean water level. There are two exceptions, Burlington and Olcott, which featured shorter record lengths. Refer to Figure 2.3. Specifically, these two gauges were not collecting data for most of the 1960s when lake levels were low. Therefore, the long term mean level is slightly higher than the other gages in Table 3.2.

Station	Mean	Maximum	Minimum	Standard Deviation
Burlington	245.6	248.4	243.7	0.9
Cobourg	245.4	248.5	242.2	1.0
Kingston	245.4	248.4	242.3	0.9
Port Weller	245.4	248.5	242.1	1.0
Toronto	245.4	248.5	242.2	1.0
Cape Vincent	245.4	248.4	242.2	0.9
Oswego	245.4	248.4	242.3	0.9
Rochester	245.4	248.4	242.2	1.0
Olcott	245.5	248.4	243.7	0.9

Table 3.2 Long-Term Lake Level Statistics (by Gage) using the Monthly Means (ft, IGLD'85)

The Oswego gage has the longest operational history on Lake Ontario and is considered the 'benchmark' gage for lake. Refer to Figure 3.3 for a plot of the monthly means at Oswego from 1960 to 2010. Monthly mean plots for the other gages are in Appendix A.

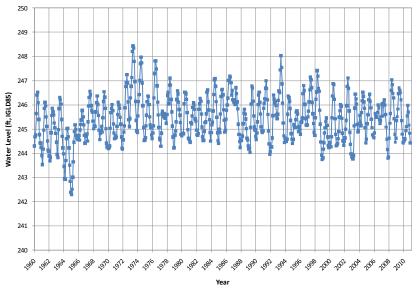


Figure 3.3 Monthly Means at the Oswego Gage (9052030) from 1960-2010

The most obvious trend in the long-term monthly mean data on Lake Ontario is the relatively narrow water level range (generally from 244 to 248 ft). This narrow range is due to the operating procedures for the Moses-Saunders Power Dam in Massena, New York, which attempt to keep the lake between 243.3 and 247.3 ft. In 1964 and 1965 the net basin supplies in the Great Lakes watershed were very low and the lake dropped below the desired operating range (243.3 ft). Shortly after these lows in the mid-1960's, very high net basin supplies resulted in several consecutive years of very high lake levels from 1973 to 1976. In 1993, the monthly mean level exceeded 248, which is above the desired operating range.

The long-term lakewide average monthly means were compiled and plotted in Figure 3.4 to assess how the maximum and minimum water levels vary by month. Note that the maxima and minima were determined by month, meaning the dashed red and blue lines do not represent a single year.

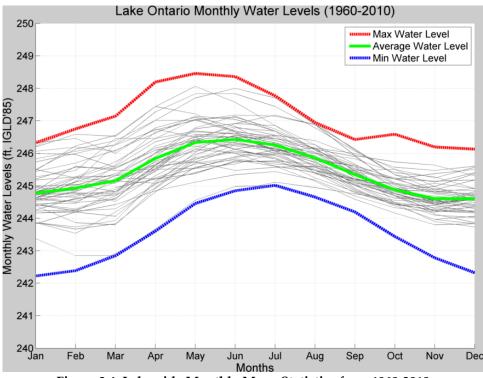


Figure 3.4 Lakewide Monthly Mean Statistics from 1960-2010

A statistical analysis was performed on the long-term monthly mean lake levels for each gage to identify extreme water levels. The annual maximum series (AMS) was assembled from the 51-year record of monthly means (1960 to 2010). This approach for determining extreme values was used in the USACE report on *Great Lakes Open-Coast Flood Levels* (1988). The 1988 results are included in Table 3.3 along with the statistics completed for this investigation. Both analyses used the Log Pearson III (LP3) distribution to predict both the 1% and 0.2% chance exceedance water levels. The only difference between the two results is that the USACE used an earlier temporal dataset, from 1935 to 1986.

Station		ceedance Water l (ft, IGLD'85)	0.2% Exceedance Water Level (ft, IGLD'85)		
	Baird	USACE (1988)	Baird	USACE (1988)	
Brockville	246.9	-	247.4	-	
Burlington	248.5	-	249.1	-	
Cobourg	248.4	-	249.0	-	
Kingston	248.4	-	249.0	-	
Port Weller	248.4	-	248.9	-	
Toronto	248.6	-	249.3	-	
Alexandria Bay	247.5	-	247.9	-	
Cape Vincent	248.4	-	249.0	-	
Oswego	248.4	248.4	249.0	249.1	
Rochester	248.4	248.3	248.9	249.0	
Olcott	248.6	248.1	249.2	248.8	

Table 3.3 Exceedance Events by Gage by Baird (1960 to 2010) and USACE (1935 to 1986). The US Gages areHighlighted in Bold Text

Interestingly, even though the temporal periods for the analysis are different for the present analysis and the USACE (1988) study, the 1% and 0.2% exceedance water levels are very similar for the Oswego, Rochester and Olcott gages.

3.3 Seasonal Scale Analysis of Lake Levels

Seasonality for lake levels is important for later steps in this study when selecting storm events for the surge and wave modeling. For example, very large storms can cause little to no flood damages if they occur during months that typically have low water levels (e.g. January). Figure 3.4 plots the general trend in monthly water levels for Lake Ontario. During the winter months of December and January, the lake typically reaches its seasonal low. During the spring freshet, runoff into the lake increases and the water level typically starts its seasonal rise. The operational rules for the dam also call for below average flow, which also increases the level of the lake. This increasing trend continues in the spring due to high precipitation levels and lower than average evaporation losses from the lake surface. By May or June, Lake Ontario typically reaches its seasonal peak.

In the late summer and fall, inflow to the lake from runoff and precipitation are lower than average, evaporation losses are high and thus the lake begins its seasonal decline. This decline is aided by the operational rules for the dam, which attempt to purposely lower the lake level to create storage capacity for the spring freshet in the coming year.

Monthly variability plots for the other gages are in Appendix A.

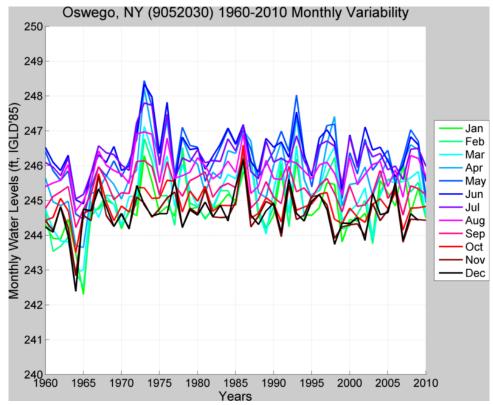


Figure 3.5 Monthly Time Series Water Levels at the Oswego Gage (9052030) from 1960-2010

Seasonal variability was also analyzed at each gage by plotting all 51 years of monthly means on a single plot, as shown in Figure 3.7 for Oswego. The 1% and 0.2% chance exceedance water levels were calculated for each month and included on the figure as red and blue diamonds, respectively. The AMS analysis presented in Table 3.3 was also added to evaluate the difference between long-term maximums and monthly maximums. The LP3 distribution was used (Figure 3.6) to predict the extreme monthly water levels to maintain consistency for the annual maximum analysis described in Section 3.2. This plot provides a clear picture of how much the lake can fluctuate in any given month and throughout the year. Seasonal exceedance plots for the other gages are provided in Appendix A.

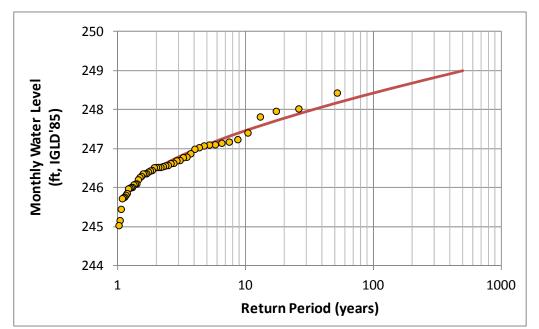


Figure 3.6 Extreme Monthly Water Levels at the Oswego Gage (9052030) using a Log Peason III (LP3) Distribution

This analysis highlights the importance of timing for large storm events. For example, a large storm event that happens in January when the lake is at 244 ft will not likely result in any flooding impacts. Conversely, if a storm of similar magnitude occurs in the late spring storm season in April, the water levels could be 4 ft higher. Previous analysis on the timing of historical flooding events in the Great Lakes (Baird, 2010) indicates that the most damaging storms are not in-phase with the June peak in lake levels; but rather occur during the shoulder months of March/April and September/October. These findings will influence the storm selection methodology developed in Section 4.0 of this report.

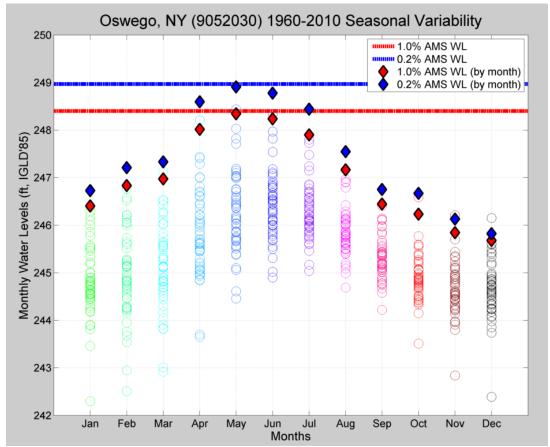


Figure 3.7 Monthly Means and Exceedance Levels at the Oswego Gage (9052030) from 1960-2010

3.4 Storm Surge Calculations (short-term water level fluctuations)

From 1960 to present, there are a variety of water level data available for Lake Ontario. Prior to 1970, only monthly statistics were available for the US gages. Post-1970 both monthly statistics and hourly water levels are available. Therefore, different methodologies for calculating storm surge were developed for the monthly and hourly data, as described in the following sections.

3.4.1 Storm Surge Calculations with Hourly Lake Levels

Historical storm surge events were extracted from the hourly water level data at the Lake Ontario water level gages. Specifically, the still water level (or static level) was subtracted from the individual hourly records, which are influenced by wind and waves. For example, the hourly lake levels at the Oswego gage from 1970 to 2010 are plotted in the top panel of Figure 3.8. A moving average of the hourly data was generated with a Gaussian smoothing algorithm, which was set at 30 days to remove the effects of storm surges on the static level. The 'smoothed' long-term still water lake level is plotted as the black line in the top panel of Figure 3.8. The difference between these two hourly records is the estimated storm surge, plotted as the red line in the bottom panel.

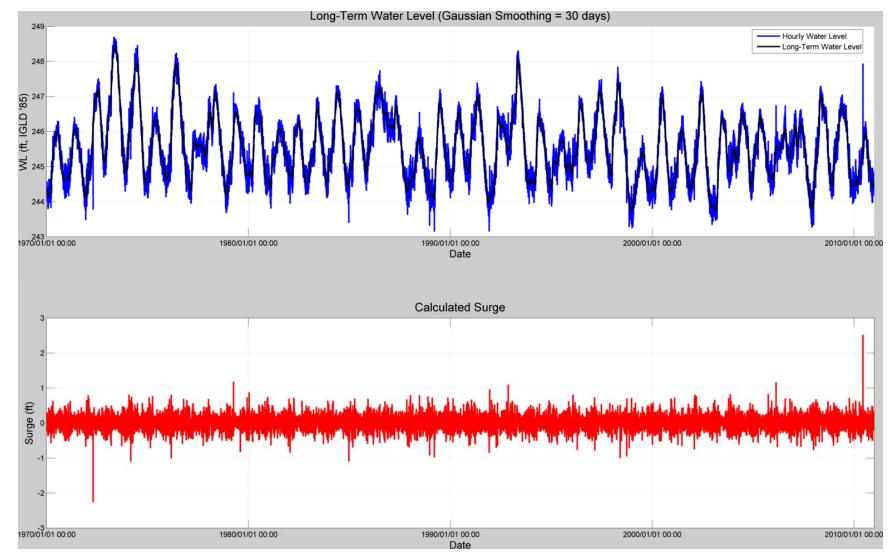


Figure 3.8 Hourly Water Levels and 30 Day Gaussian Average (top) and Calculated Hourly Storm Surge at the Oswego Gage (bottom)

A peak over threshold (POT) analysis was performed on the surge data to determine extreme events in the dataset. The POT analysis relies on the following user defined parameters to identify unique extreme events exceeding a specific threshold (values used in this analysis are in parentheses).

- *Lamda* number of selected events per year (10)
- *Threshold* based on z-score, number of standard deviations above the mean value (3)
- *Inter-event time lag* maximum time that a storm can temporarily drop below the threshold to still be considered a single unique storm (24 hours)
- *Minimum duration* final check to screen data of single hour spikes (2 hours)

The top 20 storm events from the POT analysis were plotted on the probability of exceedance (POE) curve for all of the hourly surge data. This step ensures that the top storms are selected from the 'tail' of the curve; where values are most extreme (large surge values) and least likely (low frequency). The POE curve is shown in Figure 3.9 for the Oswego Gage. The 2.5 ft surge event is a single hour event and thus was not selected since it did not satisfy the minimum duration requirement (i.e., all events must be > or = 2 hrs). This event is a significant outlier in the storm surge population, suggesting it is likely a sampling error.

Each storm was visually inspected to ensure it did not have two peaks occurring within the interevent time. It also provided a good check to make sure the blue dots in between the 1st and 20th red dots are either hourly records from single hour events or a part of a higher ranked surge event.

An example is presented in Figure 3.10, where the top storm's 2nd largest peak is the 4th largest record in the dataset (Figure 3.9). Since this surge value is not a part of the top 20 storm series (red), it means that it was not 'double counted' as an independent storm.

Refer to Appendix A for the POE plots for the remaining US gages on Lake Ontario.

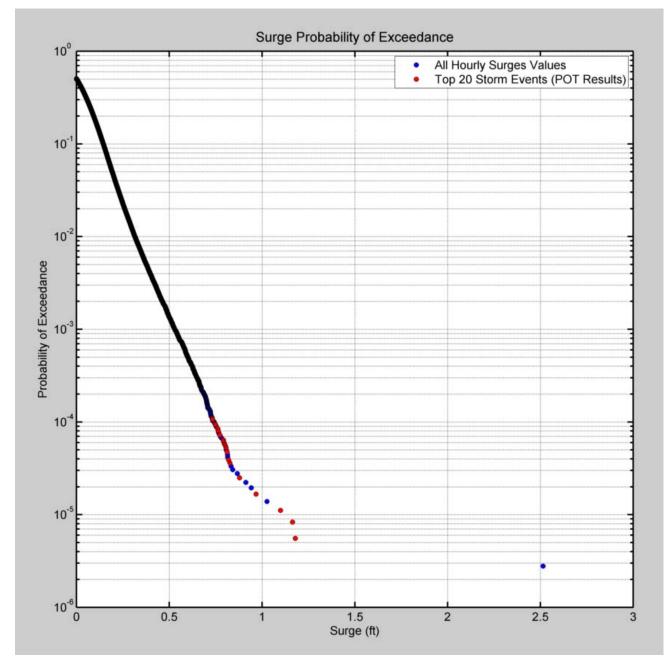


Figure 3.9 Probability of Exceedance (POE) Curve for the Oswego Gage (note: the 2.5 ft surge event is a bad data point and was not selected in the analysis)

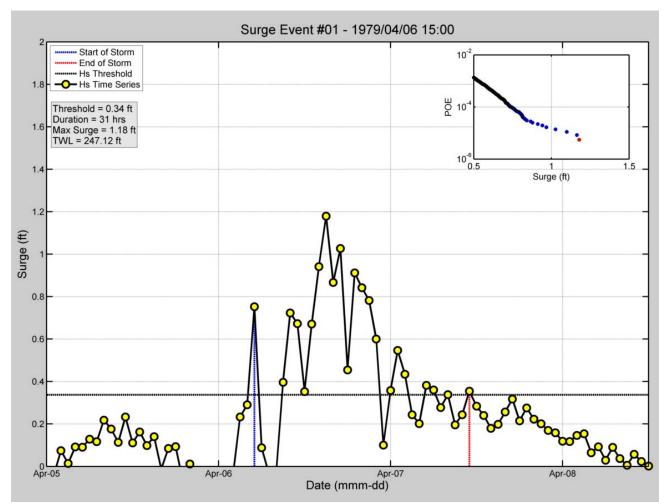


Figure 3.10 Largest Surge Event Recorded at the Oswego Gage

3.4.2 Storm Surge Calculations with Monthly Mean and Monthly Max Lake Levels

As stated previously, prior to 1970 only month statistics were available for the US gages on Lake Ontario, including the mean water level and the maximum water level for the month. Based on initial guidance received from the USACE/FEMA, a monthly storm surge value could be calculated by subtracting the monthly mean from the monthly max. The method assumes that the resulting difference is the largest storm surge on the lake for that month.

To test the validity of this approach, a series of calculations were completed using the hourly and monthly data from May 1974. The reported monthly mean and maximum for the Oswego gage in May 1974 are plotted in the top panel of Figure 3.11, along with the hourly records. Since the lake was in a rising trend in May 1974, the mean lake level (247.71 ft) intersects the hourly time series data roughly in the middle of the month. A large surge event also occurred mid-month and resulted in the highest hourly water level record for the month (248.24 ft), which also corresponds to the monthly maximum level.

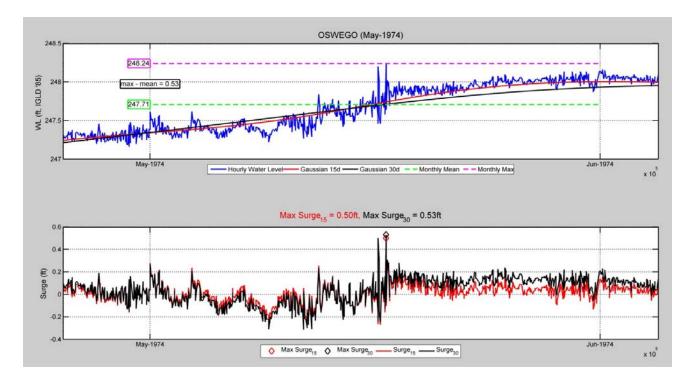


Figure 3.11 May 1974 Surge Analysis at the Oswego Gage

Hourly surge values for May 1974 were also calculated at the Oswego Gage following the procedures outlined in Section 3.4.1 and plotted in the bottom panel of Figure 3.11. With the 30 day Gaussian smoothing routine, which is plotted in the top panel as the black line, the largest hourly surge for May 1974 was 0.53 ft. Therefore, the two methods give the identical result. However, as will be shown, this is the exception not the norm for this method of calculating storm surge.

A second example for Oswego is presented in Figure 3.12 for April 1984. Again, the lake is in a rising trend which is typical for the spring season. The monthly mean of 246.43 occurs roughly in the middle of the month as in the previous example. The difference, however, in these two storms is the timing of the peak monthly surge calculated with the hourly data. If occurs right at the end of the month and was 0.31 ft based on the 30 day Gaussian filter. The peak surge for this event also represents the maximum monthly level. When the monthly mean is subtracted from the monthly maximum, a storm surge of 0.68 ft is estimated, which is more than twice the actual value calculated from the hourly data. The methodology breaks down in this example when the peak storm surge doesn't occur in the middle of the month.

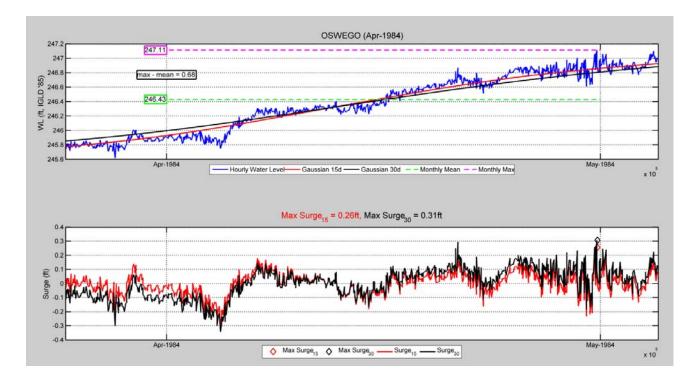


Figure 3.12 April 1984 Surge Analysis at the Oswego Gage

Additional examples of inaccurate surge calculations with the monthly mean minus the monthly maximum approach are presented in Appendix A.

The positive bias introduced by calculating storm surges with the monthly maximum minus the monthly mean approach is further demonstrated for the entire population of storm surges from 1960 to 2010 at the Oswego gage in Figure 3.13. The blue dots for the monthly maximum surge events are clearly higher than the red bars from 1970 to 2010 when estimating the same events. Further, the population of storm surges from1960 to 1969 are biased high relative to the population of storm surges from 1970 to 2010 calculated with the hourly water level records. This positive bias is further exemplified in the quantile-quantile plot in Figure 3.14, since the majority of the dots are located above the dashed black line. Based on these results, the storm selection approach described in Section 4.0 will focus only on the hourly water level data from 1970 to 2010 (41 years).

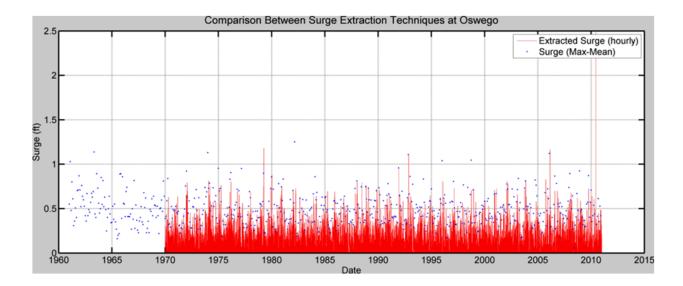


Figure 3.13 1960 to 2010 Comparison of Monthly Maximum minus Mean Lake Level versus Hourly Surge Calculations at Oswego

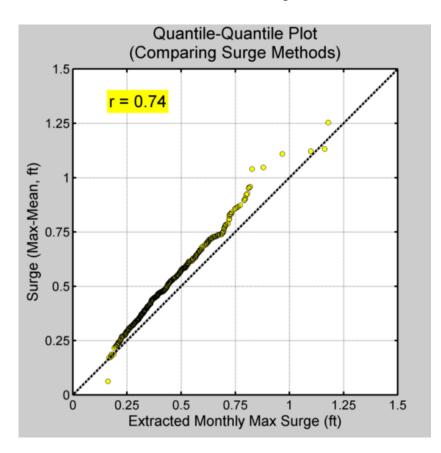


Figure 3.14 Quantile – Quantile Plot of Max-Mean Surge versus Maximum Hourly Surge per Month

4.0 STATISTICAL APPROACH FOR COMPOSITE STORM DATABASE

This section outlines the steps taken for creating a composite storm database for Lake Ontario, including investigating three storm selection techniques and testing the sensitivity of using or ignoring data from the 1960's. The end result of this section is a compiled list of the top 150 lakewide storms. The composite storm database will recreate extreme levels throughout the lake since it is a function of each gage's top storm events.

4.1 Spatial Distribution of Water Level Gages

The extents of the study area include the south shore of Lake Ontario, from the Niagara River to the St. Lawrence River. The closest US gages to either boundary are Olcott and Cape Vincent, respectively. To best represent storms near either boundary, the closest Canadian gages were also analyzed. Olcott was compared with Port Weller to see whether storms near the Niagara River (closer to the Canadian gage) are included at the US gage. Figure 4.1 shows a map of these gage locations.



Figure 4.1 Location of Closest US and CND Gages to Niagara River Boundary

The similarity of the measured water levels at the two gages near the Niagara River was quantified by plotting a direct comparison and a quantile-quantile plot, shown in Figure 4.2, for the period 1970 to 2010. The hourly water levels are very similar with a correlation coefficient of 1, while the surge does not show the same agreement (r = 0.57).

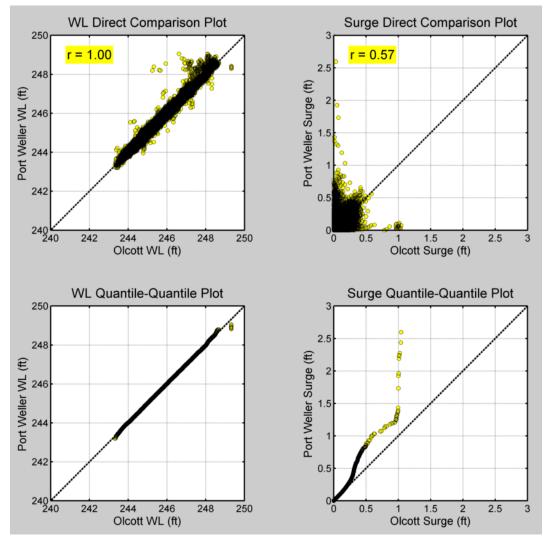


Figure 4.2 Direct Comparison and Quantile-Quantile Plots for Hourly Water Levels at the Olcott and Port Weller Gages (1970 to 2010)

The relationship is non-linear with a substantially lower correlation coefficient, mainly due to the top measured surge event recorded at the Olcott gage (see Figure 4.3). This event was not included in future analyses since the water level is fluctuating unrealistically (not identified at other gages), but is the main reason for the weak correlation between the Olcott and Port Weller gage (included all measured water levels in the QQ-plot).

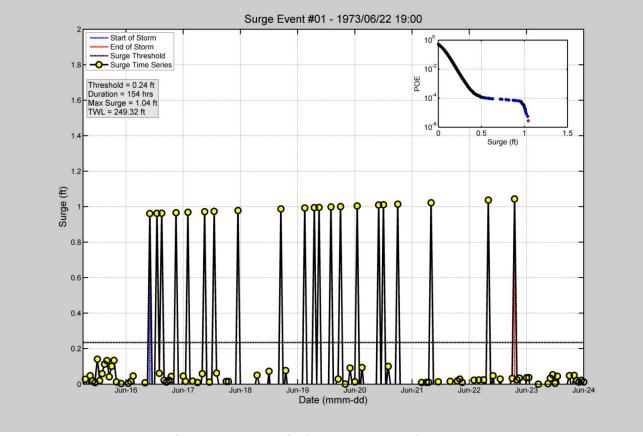


Figure 4.3 Top Ranked Surge Event at Olcott Gage

Essentially, the hourly water levels are similar at each gage, while the surges are much larger at Port Weller potentially due to the longer fetch for westward traveling storms. Therefore, we concluded it was prudent to select some storms from the Port Weller gage to ensure the extreme events near the mouth of the Niagara River are well represented.

The St Lawrence River drains Lake Ontario and is located between the Cape Vincent and Kingston gages. Refer to Figure 4.4. The same gage comparison was completed at this boundary to decide if some storms from Kingston should be included in the composite database. Unlike the Niagara River, the two gages showed a high correlation to each other for both hourly water levels and storm surges as illustrated by the water level and surge QQ-plots in Figure 4.5.



Figure 4.4 Location of Closest Gages to St. Lawrence River Boundary

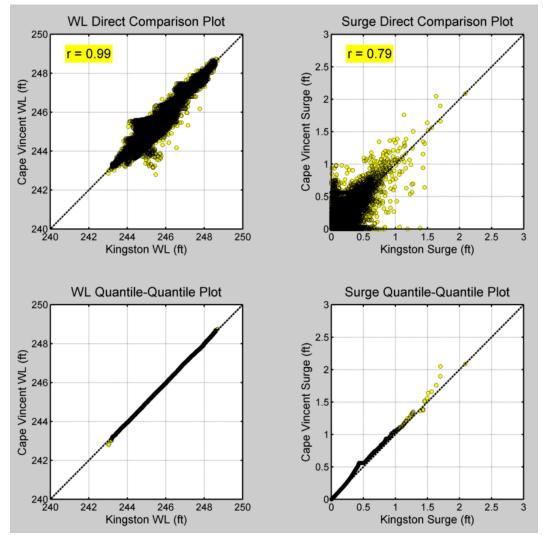


Figure 4.5 Direct Comparison and Quantile-Quantile Plots for Hourly Water Levels at the Kingston and Cape Vincent Gages (1970-2010)

Based on the comparison of gages near the study boundaries, it was deemed necessary to include some events from both Port Weller and Kingston. The composite storm database for Lake Ontario will be populated based on the distribution of storms in Table 4.1. A total of 10 storms are selected from the Kingston gage and 20 storms are selected from the Port Weller gage for inclusion in the composite database.

Gage	Number of Storms Selected
Port Weller	20
Olcott	30
Rochester	30
Oswego	30
Cape Vincent	30
Kingston	10
Total	150

Table 4.1 Distribution of the 150 Storms for the Lake Ontario Con	nposite Database
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4.2 Evaluation of Storm Selection Methodologies

For simplicity, all discussions in Section 4.2 and 4.3 are focused on the Cape Vincent gage to illustrate the differences between the three storm selection methodologies, while Section 4.4 contains the final approach. The three storm selection methodologies are as follows:

- Method A Extreme Storm Surge and Wave Height Events;
- *Method B Storm Surge, Wave Height and Storm Water Level;* and
- *Method C Total Water Level (including runup).*

In this initial assessment of storm selection techniques, the effect of ice cover was ignored. Also note that this work was completed prior to our findings outlined in Section 3.4.2, therefore monthly surges from the 1960's are included in these results.

4.2.1 Method A - Extreme Storm Surge and Wave Height Events

For Method A, 50% of the storms at a gage are selected based on the largest surges and 50% based on the largest wave height events.

Extreme surge events from a POT analysis were compiled for each gage. The same methodology explained in Section 3.4.1 was followed. For information purposes, the top 10 unique surge events at the Cape Vincent gage are shown in Table 4.2 (the actual list includes the top 100 events).

Rank	Maximum Time	Maximum Surge (ft)	Storm Water Level (ft, IGLD85)	Duration (hrs)
1	1992/11/13 02:00	2.09	247.52	13
2	2006/02/17 09:00	2.05	247.59	26
3	1979/04/06 06:00	1.90	247.77	44
4	2008/01/30 09:00	1.52	246.43	10
5	1991/12/14 19:00	1.50	245.50	15
6	2002/03/10 00:00	1.39	246.70	24
7	2004/12/23 16:00	1.39	246.02	3
8	2003/11/13 08:00	1.37	246.23	17
9	2002/02/01 15:00	1.35	246.13	9
10	1997/02/22 12:00	1.31	247.06	3

Table 4.2 Top 10 Surge Events at the Cape Vincent Gage (NOAA ID 9052000)

The most representative WAVAD node (see Section 2.3.2) for each NOAA water level gage was chosen to analyze the deep water wave climate from 1961 to 2010. Each white box indicates which WAVAD node (red triangles) was matched with which NOAA gage (yellow pushpin). A POT analysis was performed on each of the selected WAVAD points highlighted by a white box in Figure 4.6, plus the most representative point near the Kingston and Port Weller Canadian Gages.



Figure 4.6 Location of Extracted WAVAD Points (red triangle) for each Water Level Gage (yellow pushpin)

The POT analysis was completed on 50 years of hourly waves (1961-2010), with the top 10 unique wave heights presented in Table 4.3 for information purposes (the top 100 were analyzed). The

same POT technique used to extract surge events on the water levels was applied to the wave data. This ensures consistency throughout the analysis.

Rank	Maximum Time	Maximum H ₀ (ft)	Tp (s)	Direction (deg, from N)	Duration (hrs)
1	1971/02/28 17:00	18.64	10.15	241	23
2	2002/03/10 19:00	18.54	8.90	261	31
3	2000/12/18 08:00	17.81	10.15	255	22
4	2003/11/13 16:00	17.65	10.15	256	18
5	1975/02/26 18:00	17.62	10.15	248	46
6	1982/01/11 13:00	17.26	10.15	237	18
7	2009/12/11 08:00	17.09	10.15	254	44
8	1972/01/25 17:00	17.06	8.90	252	19
9	1992/11/13 16:00	16.73	10.15	256	22
10	1970/11/23 23:00	16.70	8.90	242	25

Table 4.3 Top 10 Storms by Wave Heights near Cape Vincent (WAVAD Pt 4641)

Once the individual surge and wave height events were isolated at each gage, the next step in developing the composite storm database is to compile the required number of unique storms at each gage, as identified in Table 4.1. A duplicate event occurs when both the surge and wave height storm listing identify a storm with the same date. A buffer on the date was implemented since it is unlikely that surge and waves will peak on the exact same hour during a storm due to differences between the two driving forces. The buffer was set at 48 hours, meaning that no two event peaks (i.e., surge or wave height) can fall within that time. If they do, the lesser ranked event within its respective storm listing is discarded. An example of a duplicate event is the 1st ranked surge and the 9th ranked wave height (highlighted in orange) in Tables 4.2 and 4.3 respectively. In this case the 9th ranked wave event is thrown out. After discarding any duplicate storms, the top events at each gage were assembled according to Method A. As mentioned previously, this method uses an even split between surge and wave events at each gage, as detailed in Table 4.4.

Gage	Number of Surge Events Selected	Number of Wave Height Events Selected
Port Weller	10	10
Olcott	15	15
Rochester	15	15
Oswego	15	15
Cape Vincent	15	15
Kingston	5	5
Total	75	75

Similar to the analysis at the individual gages, another buffer is necessary to ensure events from each gage are unique across the lake. The main difference in using the buffer of 48 hours for the composite storm database is that the lesser ranked event was discarded and replaced with the next highest ranked storm (from the same population as the discarded event – i.e., surge or waves). For example, if the 1st ranked surge event at Oswego is the same storm (within the buffer time) to the 2nd largest wave event at Cape Vincent, then the wave event is discarded and replaced with the next highest wave height event not previously selected. Following this example and referring to Table 4.4, Cape Vincent requires 15 wave height events meaning the 16th largest event needs to be included since it is the next highest ranked storm. This process is iterative in nature since a newly replaced wave height storm has the potential to be a duplicate with a surge event. The top 150 composite events were systematically screened for duplicates according to this methodology.

4.2.2 Method B - Storm Surge, Wave Height and Storm Water Level

Method B is a hybrid that allocates 1/3 of the events at a gage to storm surge, wave height events and extreme high lake levels. A secondary surge storm listing was completed with an extremely low threshold and sorted by storm water level (the max. hourly water level). This isolated surge events at high lake levels, as noted in Table 4.5, which lists the events by storm water level (SWL).

This is different than looking only at the largest surge events, which is done independently of the static lake level. The remaining 2/3 of the events at each gage were split between the largest storm surges and largest wave height events, as outlined for Method A.

Storm Water Level Rank	Surge Rank	Maximum Time	Maximum Surge (ft)	Storm Water Level (ft, IGLD85)	Duration (hrs)
1	374	1993/04/17 22:00	0.45	247.84	2
2	124	1972/08/09 16:00	0.69	247.82	3
3	360	1998/04/17 14:00	0.46	247.74	6
4	172	1986/05/01 14:00	0.62	247.66	13
5	209	2000/06/25 11:00	0.59	247.51	2
6	339	1986/04/21 12:00	0.47	247.49	3
7	349	1986/08/11 03:00	0.46	247.45	5
8	138	1984/04/30 19:00	0.67	247.44	18
9	202	1998/06/02 23:00	0.59	247.44	2
10	73	1976/03/27 23:00	0.8	247.43	7

Table 4.5 Top 10 Storm Water Level Events at the Cape Vincent Gage (NOAA ID 9052000)

The same technique explained in Method A was performed for distinguishing between duplicate events by gage and for the 150 storm composite database. However, the events were allocated differently. Method B introduces storm water level into the selection criteria for building the

composite storm database, as outlined in Table 4.6. The total number of events at each gage is now based on selecting events with three criteria.

Gage	Number of Surge Events Selected	Number of Wave Height Events Selected	Number of Storm Water Level Events Selected
Port Weller	7	7	6
Olcott	10	10	10
Rochester	10	10	10
Oswego	10	10	10
Cape Vincent	10	10	10
Kingston	3	3	4
Total	50	50	50

Table 4.6 Distribution of 150 Composite Storms from the Lake Ontario Gages for Method B

4.2.3 Method C - Total Water Level (including runup)

Method C is quite different than both A and B since it does not involve selecting storms based on a particular driving force (i.e., waves, surge, and storm water level). The concept with this method is to find events based on the peak total water level response. The following steps were completed.

The hourly total water level (TWL) was calculated over the entire temporal record (1961-2010) using the hourly wave record and the hourly water level record. Total water level is the combination of storm water level (SWL) which is the hourly recorded level at gage and runup, as shown in Figure 4.7. Hourly runup was calculated using a mild 1:30 beach slope and the Mase equation and superimposed atop the hourly water level at each gage. The offshore deep water waves were not transformed to the nearshore (i.e., through refraction, shoaling, etc.) since the mild 1:30 slope is assumed to extend directly to the WAVAD point. Lastly, wave direction was filtered (± 90° shore normal) to ensure waves propagating offshore were excluded from being selected as an event (at least by that gage).

A POT storm listing was completed on the total water level in the same fashion previously described for waves and surge; to find the events with the greatest flood risk. Instead of dividing the prescribed number of events based on a particular driving force, the top TWL events by gage were compiled as specified in Table 4.1. Prior to finalizing the composite database based on Method C, the same iterative approach for discarding duplicates was followed (discussed for Method A).

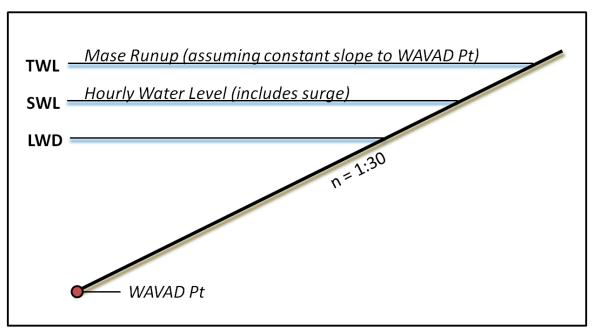


Figure 4.7 Schematic for Calculating Total Water Level for Method C

4.3 Preliminary Composite Storm Databases from 1961 to 2010 (50 years)

A preliminary composite storm database was generated for the three selection methods (A to C). The extreme distributions for SWL and TWL are compared in the following sections to evaluate the three methods for selecting storms.

For each of the three composite databases of 150 events, the appropriate maximum SWL and TWL for each event was calculated for each gage. Since a lag can exist between gages for the maximum response to each event, another buffer was implemented. For example, a lag occurs when a recorded storm in Olcott travels east and does not show a response at Cape Vincent until several hours later. The maximum hourly water levels were determined using a buffer time of 24 hours (i.e., 24 hours on either side of the event) and referred to as SWL. The TWL was determined in a similar fashion but included runup as explained in Method C. The maximum response of the TWL using the same 24 hr buffer was also found for all events by gage.

4.3.1 Method A to C Results for Storm Water Elevation

After compiling SWL and TWL for each storm database, several distinct differences between the three methods were noted. For example, the plot in Figure 4.8 provides a comparison between the top 50 storm water levels at Cape Vincent for Method A, B, and C. The shape of the Generalized Pareto Distribution (GPD) is quite different, especially for Method C. The GPD is used for all analysis given its concave down tendency (more representative of physical limits) and since it is used in ERDC's revision to Appendix D.3 (FEMA's Great Lakes Coastal Guidelines). Water levels from the USACE report on extreme lake levels (USACE, 1988) were also included in Figure 4.7. In

reality the two datasets are not the same, in that the SWL calculated for this study are merely the water level at the time of the top 50 events at the gage, while the USACE levels represent a multivariate extreme value analysis between surge and static monthly water levels. Therefore, it is not surprising that the USACE levels exceed the top 50 at the gage. The results also help determine whether the methods predict the same extreme values and whether they share the same distribution (i.e., GPD fit).

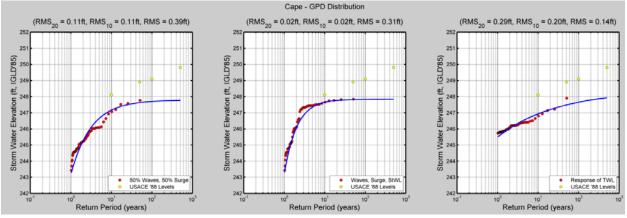


Figure 4.8 Storm Water Level Results for Method A (far left), B (middle) and C (far right) at Cape Vincent

The two main differences are that Method A and B vary in the number of high lake level events, (with Method B having more), while Method C does not match either A or B. The first observation is obvious and expected since Method B includes 1/3 of the events selected by storm water levels, therefore more events occurring at a high lake level are included. Method C does not match either since the events are being selected based on the response of TWL which tends to favor events at higher lake levels. To best compare the three methods, the Generalized Pareto Distribution fits were plotted together in Figure 4.9. Based on SWL, it is evident that the results for all three methods are very similar (based on the GPD fits) for the low frequency events (i.e., Return Period of 10²). Refer to Appendix B for the results at the other gages.

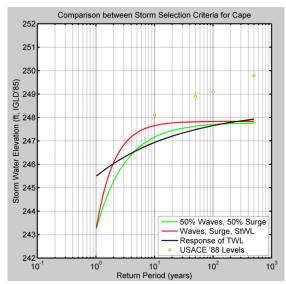


Figure 4.9 Storm Water Level Comparison between Method A to C for Cape Vincent

To better understand how the three methods are sampling storms, the temporal distribution of the top 50 events at the Cape Vincent gage are plotted in Figure 4.10. The plots for the other gages are provided in Appendix B. Method A (top pane) shows that most of its storms are being picked at average to low water levels. This is attributed to the fact that the largest surges and wave heights tend to happen between the fall and early spring when the lake levels are at their lowest point seasonally. Method B (middle pane) has more events at higher lake levels due to one third of the events being attributed to SWL. Method C (bottom pane) consists of a completely different selection process (TWL) and thus the temporal distribution of the events is different. Surprisingly, even though the three methods sample differently and the temporal distribution of the storms varies, the SWL for an event with a 100 year return period is basically identical.

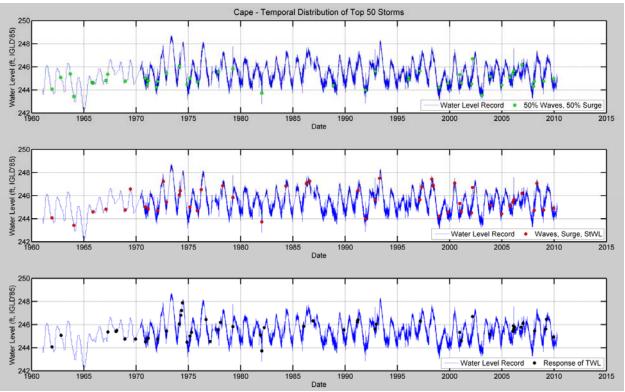


Figure 4.10 Temporal Distribution of Top 50 Storms at Cape Vincent (by Method)

4.3.2 Method A to C Results for Total Water Level (TWL)

The plot in Figure 4.11 presents the Top 50 TWLs for the Cape Vincent gage. The results are similar to the SWL results in the previous section. Regardless of the selection method, the GPD fits show good agreement with the data and with each other for events with a return period of one in ten to one in a hundred. It is worth noting that Method A and B are practically identical while their SWL distributions were slightly different (refer to Figure 4.7). TWL does a much better job at estimating actual flooding hazards when compared to the SWL for the event. For example, a storm selected by wave height can occur at a lower lake level. The SWL will under-predict potential flood damage (since it is simply the maximum hourly lake level at the time of the event), while TWL accounts for the increase in lake level associated with wave setup and wave runup (the true flood risk). Refer to Appendix B for the results at the other gages.

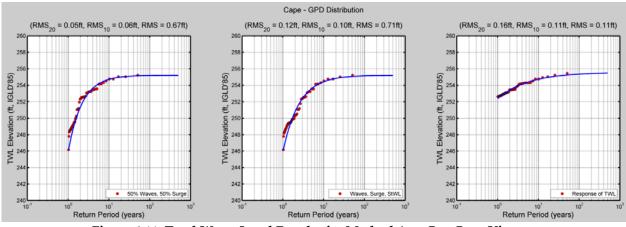


Figure 4.11 Total Water Level Results for Method A to C at Cape Vincent

4.3.3 Verification of Composite Database against the Top 50 at each Gage

It is apparent from the SWL and TWL results for Cape Vincent (and the other gages in Appendix B) that regardless of the selection technique (Method A, B or C), they all predict very similar results for the 100 year and 500 year lake level. The final verification is to check that the distribution for the top 50 by gage matches the top 50 from the composite storm database. This step is necessary to ensure the lakewide selection is representative of each gages' top events. The same procedure was followed to generate SWL and TWL results for the top 50 at each gage from the composite database. These results were compared to the top 50 events selected solely by the gage (presented previously in Figure 4.7). The top 50 from the gage and composite is presented in Figure 4.11 for Methods A to C. If the distributions match well, it suggests that the top storms at the gage are being well represented by the composite database.

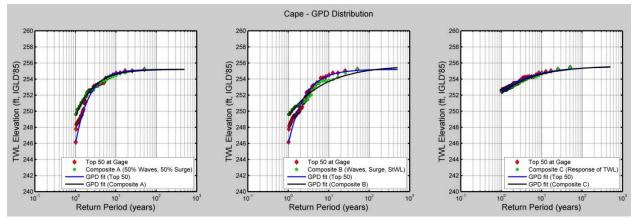


Figure 4.12 Verification of Composite Database Total Water Level at Cape Vincent

The verification shows that the Cape Vincent gage is being represented well by each of the lakewide storm databases for the extreme events (e.g. Return Period of 10 to 100 years). Based on

the above results and to remain consistent with the process followed on the other lakes, Method A was selected to generate the final composite storm database on Lake Ontario.

4.4 Final Composite Storm Database from 1970 to 2010 (41 years)

The methodology followed for the final storm selection is detailed in this section, and focuses on the results from the Cape Vincent gage. The rest of the Lake Ontario gages are included in Appendix B. Note that this final composite storm database was developed after investigating data quality issues with the monthly 1960s data. Therefore, only hourly data from 1970 to present was included in the analysis, as explained in Section 3.4.2.

All datasets were revised to only include hourly data from 1970 to 2010. The storm listings based on surge and wave heights were recreated by gage since the temporal length of the files had changed. Ice was included in this selection. The main role of ice in storm selection is to discard top events that occur during "ice-covered" periods. An ice-covered period is defined here as an ice polygon with 70% coverage. A more in-depth explanation is presented below.

The ice database described in Section 2.2.3, which consists of 51 years of ice data was used to define the ice coverage over Lake Ontario. A script was written to extract a defined polygon near each gage and build a daily time series of ice coverage. The spatial extent of the polygons are shown in Figure 4.13. Although the ice coverage maps are not daily, the extracted time series files were extrapolated. For days without coverage maps, the preceding coverage map was used (up to a maximum of 30 days since older maps were not as frequent). As a final check, the extracted time series files were filled with no ice cover (represented by zeros) between the months of April and November. The daily ice coverage time series was then used to determine whether surge and wave height events (from the previously mentioned storm listings) are real or "ice-covered" based on a set threshold. The ice threshold was set at 70% meaning that if the daily ice coverage (at peak time of event) exceeded the threshold – then the storm was removed from that particular gage. In case the ice cover is localized, the event can still be selected for the composite database assuming it is "ice-free" and highly ranked at another gage.

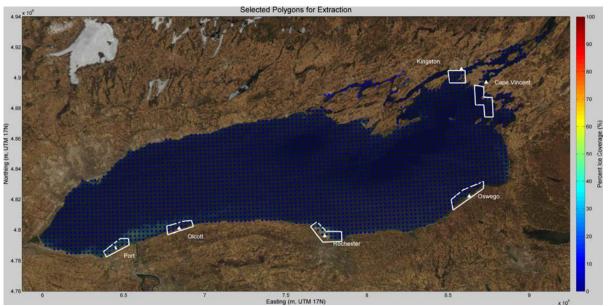


Figure 4.13 Defined Polygons for Extracting Ice Coverage

A sensitivity analysis was completed to investigate the selected threshold value and other potential percentages. The ice coverage threshold was tested from 0 to 100% using the top 50 events by both surge and wave heights for the six gages in our analysis; see Figure 4.14 and Figure 4.15 for the results.

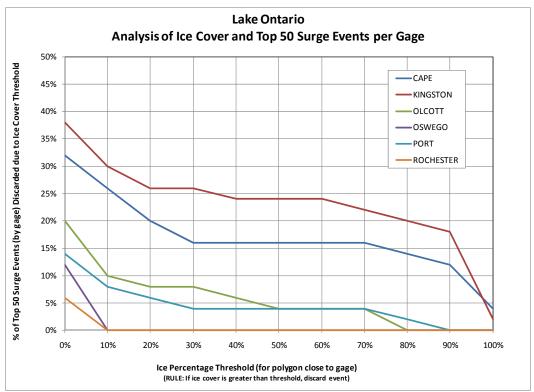


Figure 4.14 Sensitivity Analysis of Threshold Value and Number of Top 50 Surge Events Discarded due to Ice Cover by Gage

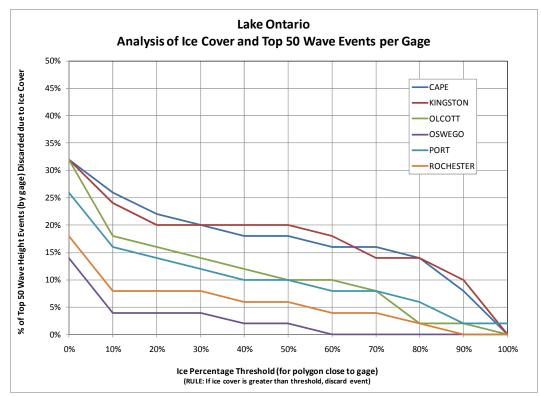


Figure 4.15 Sensitivity Analysis of Threshold Value and Number of Top 50 Wave Events Discarded due to Ice Cover by Gage

The sensitivity analysis shows that for the Cape Vincent and Kingston gages the slope of the line (primarily for surge) is quite flat between 30 and 70%. This suggests that the number of storms discarded from the gage is quite insensitive between those ice coverage threshold values. This trend is mainly due to the geographic location of Cape Vincent and Kingston. The shallow bathymetry and "narrowing" shoreline towards the St. Lawrence River influences the periodic ice coverage in this area. Ice coverage maps tend to show a binary result for ice coverage in this area; either 0 (ice-free) or 100% (ice-covered). This shows that the ice coverage threshold is not very influential on the number of storms discarded since regardless of the selection between 30 and 70%, approximately the same number of storms is dropped.

An example of a discarded event is shown below at the Olcott gage. Figure 4.16 is a plot of the 2nd largest wave event near Olcott occurring on January 14th, 1999. Two ice coverage maps are presented in Figure 4.17 and Figure 4.18. The average of the representative polygon near Olcott shows that on January 12th (just prior to the start of the storm) the ice coverage was at 100%, and remained ice covered on January 15th. Since this location is covered in ice and exceeds the set threshold value; this storm was dropped from the top 50 at the Olcott gage.

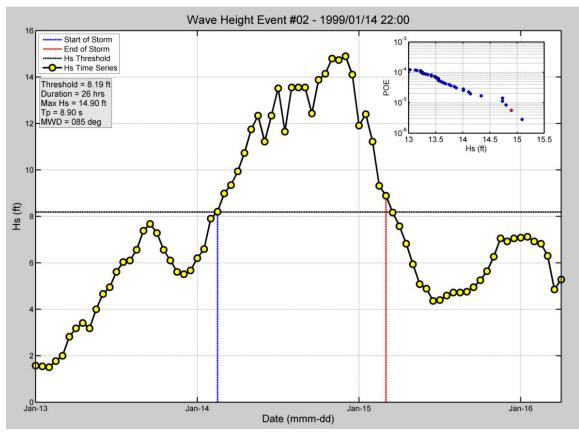


Figure 4.16 Example of Ice Covered Wave Event (2nd Ranked Wave Height Event at Olcott)

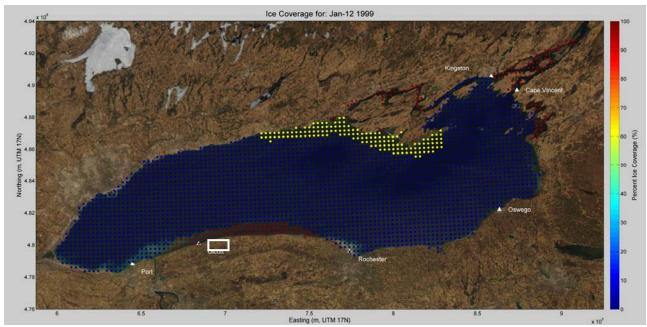


Figure 4.17 Ice Coverage Map for January 12th, 1999 (Note Olcott is 100% Ice Covered)

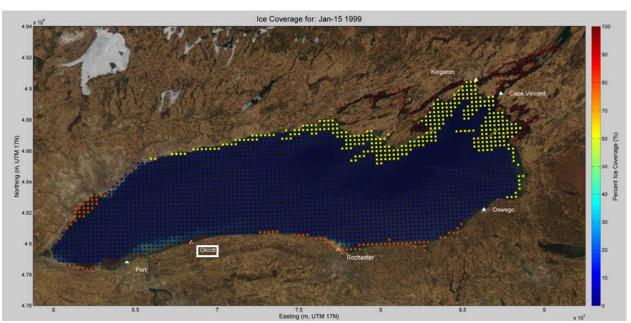


Figure 4.18 Ice Coverage Map for January 15th, 1999 (Note Olcott is 100% Ice Covered)

After removing the ice covered events, each individual gage was screened for duplicate surge and wave events as detailed in Method A and compiled into the lakewide composite storm database. To verify the accuracy of the composite database to this version of Method A, the same comparison of SWL and TWL completed previously was repeated. Figure 4.19 shows the resulting fit between the response at Cape Vincent to its own top 50 storms and to the selected composite storms. The results for the remaining gages are found in Appendix B.

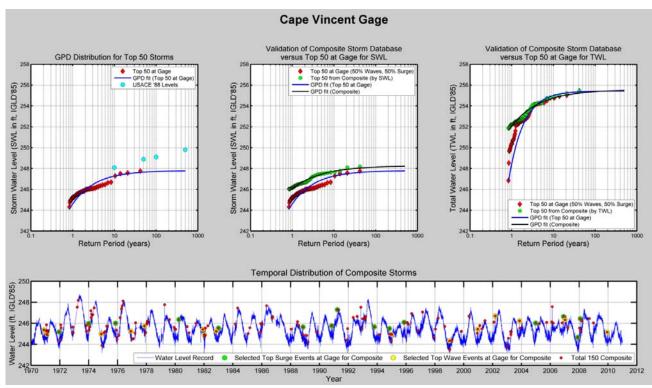


Figure 4.19 Validation of Composite Selection at the Cape Vincent Gage

The above plots all help to reinforce the validity of the selection method. The first plot (top left) acts as a visual for quickly comparing against the previously published USACE extreme levels. The top middle plot compares the SWL for the two storm populations. The top 50 at the gage (in red) were screened solely on the largest 25 surge events and the largest 25 wave height events.

Although storms during 70% ice cover were screened out of the gage record, the largest storms producing the largest waves often occur in the winter months – when the lake is at its annual low. This results in lower SWL. The composite series (in green) is the top SWL at the Cape Vincent gage for the top 50 events. The difference between the two SWL distributions is that it attributes to the fact that the top 50 SWL from the composite could be based on storms from other gages that have small waves and surges at Cape Vincent, but occurred during high lake levels. These high lake levels equate to high SWL. This is further demonstrated in Figure 4.20 and in Table 4.7. Essentially, the top 2 events in the composite database would not have been selected for the top 50 at the Cape Vincent gage (since the wave and surges are very low) but the SWL was quite high (248.12 and 248.18 ft.).

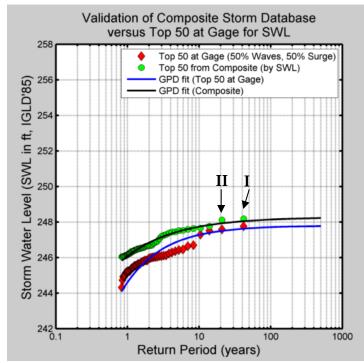


Figure 4.20 Top 2 Events from the Composite Series (identified as I and II)

Table 4.7 Difference between To	p Two Composit	e Storm Database Ever	nts & the Top 5	0 at Gage (by SWL)

Point	Date/Time	Composite SWL (ft, IGLD'85)	Hs near Gage (ft)	Surge at Gage (ft)
Ι	1973/04/11 00:00	248.18	6.20	0.09
II	1976/05/19 20:00	248.12	6.33	0.30

25th Ranked Hs and Surge at	14 11	1.05
Cape Vincent =	14.11	1.05

As explained earlier, comparing SWL does not necessarily depict how similar the two storm populations are due to the influence of waves on runup and ultimately TWL, which is a better indicator of flood risk than SWL. To better grasp whether the two storm populations feature the same external characteristics, the TWL distributions were evaluated and plotted. The proof that the lakewide composite method works to characterize the individual gages is seen in the top right panel of Figure 4.19. The two storm populations share nearly identical top events when plotting by TWL.

Finally, the bottom plot (of Figure 4.19) helps illustrate the temporal distribution of the composite events, noted by the red series. It is interesting to compare which of the top events at the gage were selected for the composite. In this case, Cape Vincent had most of its top storms replaced by other

gages since the duplication process is order sensitive and Cape Vincent was first. Although many of the top events at Cape Vincent were discarded when compiling the composite database (see Table 4.8), the TWL fit is still very good since the composite population still contains these top storms. They were just included in the composite population from another gage.

Top 15 Storm Surge Events at Gage Selected for Composite after Substitution (no duplicates at other gages)	Top 15 Wave Height Events at Gage Selected for Composite after Substitution (no duplicates at other gages)
4	1
6	2
8	5
13	7
14	8
15	9
19	10
20	12
23	13
24	15
25	17
27	21
28	22
29	23
30	25

Table 4.8 Final Top 15 Storm	Surge and Wave Hei	ght Storms at Cap	e Vincent after Substitution
		0 · · · · · · · · · · · · · · · · · · ·	

See Appendix B for the final composite storm database analysis for the rest of the Lake Ontario gages.

4.5 Implications for Omitting the 1960s Data from the Analysis

The implications of discarding the measured lake level and modeled wave data from 1962 to 1969 was investigated to ensure the population of storms from this period was not substantially different than the events from 1970 to 2010. Note that this analysis only extends back to 1962 (instead of 1961) since there is no earlier water level data for Canadian water level gages – which are crucial to filling the Olcott gage (only extends to 1967). In order to compare between the two temporal datasets, two independent extreme value analyses on hourly wave heights were performed. The comparison between the 1962 to 2010 period and the 1970 to 2010 period is presented in Figure 4.21 for Oswego, and for all gages in Table 4.9.

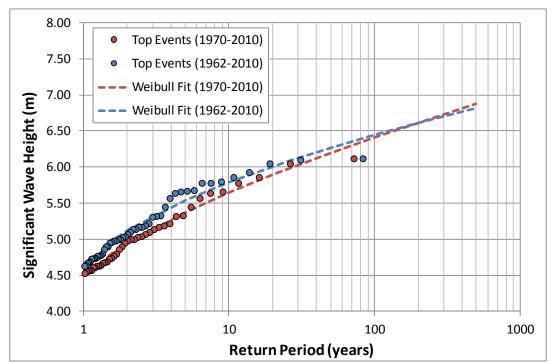


Figure 4.21 Significant Wave Height Return Period at Oswego (1962 to 2010 and 1970 to 2010)

Table 4.9 100 year Wave Height for all Gage Locations for both Datasets (1962 to 2010 and 1970 to 2010)

	100 year Significant Wave Height (m)							
	Cape Vincent	Kingston	Olcott	Oswego	Port Weller	Rochester		
1962 - 2010 Dataset	5.97	4.66	4.67	6.44	4.45	4.96		
1970 - 2010 Dataset	6.09	4.72	4.73	6.41	4.49	4.85		

The influence of selecting storms from the two temporal periods on the SWL and TWL distributions at Oswego were compared using Method A to select the storms. Storm surge events were extracted from 1970 to 2010 for both datasets for two reasons: 1) the max minus mean surge method for the data from 1962 to 1969 does not provide reliable information, and 2) we wanted to isolate the influence of the two temporal periods and the associated wave climate on TWL. The results are presented in Figure 4.22 below. The distributions for SWL are almost identical. When TWL was evaluated, only small variations occur for the low frequency events (e.g. the 100 year TWL was 0.2 ft higher for the Composite database that selected wave height events from 1962 to 2010). Given this minimal difference in the TWL and the uncertainty introduced into the analysis by relying on the max-mean surge estimates from 1962 to 1969, the temporal duration of our analysis will extend from 1970 to 2010.

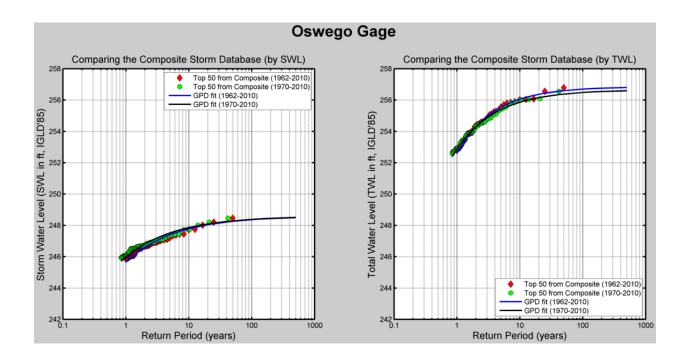


Figure 4.22 Comparison of Composite Storm Database from 1962 to 2010 and 1970 to 2010 for SWL & TWL

5.0 MODEL INPUTS

Section 5.0 introduces the primary model inputs, namely: the DEM, lake levels, wind and pressure time series, and historic ice coverage.

5.1 Digital Elevation Model

An unstructured mesh was generated in SMS using the scalar paving function. The mesh density was derived based on two main factors including, depth and location. For the open waters of Lake Ontario, the element length was based on the lake depth below Chart Datum (CD), as shown in Figure 5.1. An element length of 150 m was used for depths less than 2 m LWD and 3,000 m was used for depths greater than 150 m. Linear interpolation was used to determine the maximum element length for depths between 2 m and 150 m. A coarser mesh was applied to the Canadian shoreline, with a 500 m minimum element length, since detailed model output was not required from this portion of the grid.

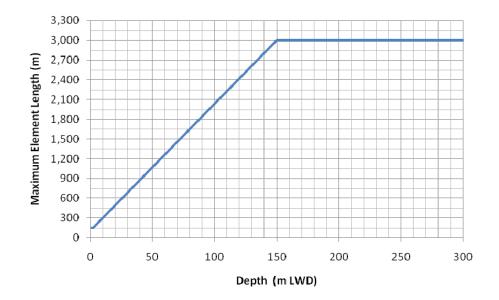


Figure 5.1 Scalar Paving Density Function by Depth

A much finer mesh was required for the embayments included in the modeling domain, such as Sedus Bay. The mesh density for these areas with much more complex bathymetry was also a function of depth, however with much smaller limits. For depths less than 2 m, an element size of 20 m was applied and for depths greater than 10 m, an element size of 50 m was applied. For depths between 2 m and 10 m a linear interpolation was applied. Further mesh modifications were conducted to include a minimum of three mesh elements across the width of all embayment entrances.

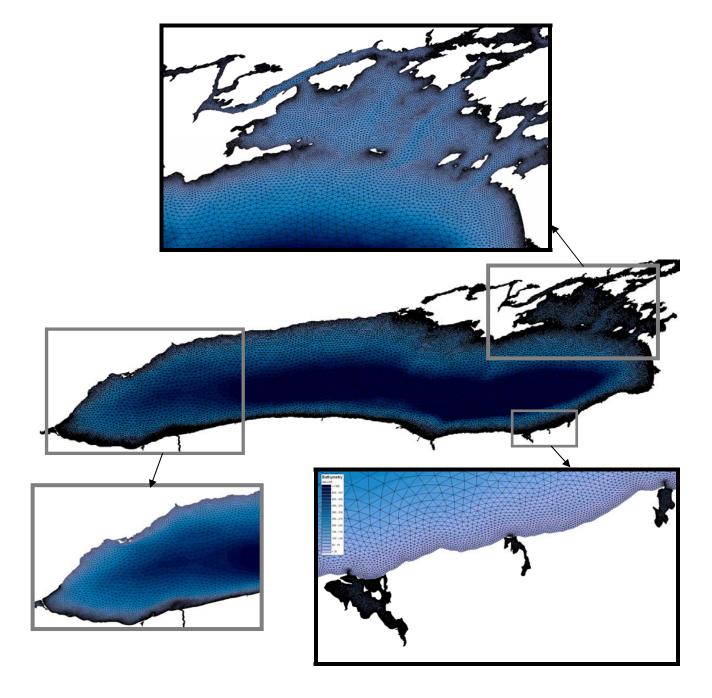


Figure 5.2 presents the mesh for various portions of the lake to visually evaluate the influence of the scalar function on mesh size.

Figure 5.2 Lake Ontario Mesh for SWAN and ADCIRC

The final digital elevation model (DEM) or mesh assembled for use in both ADCIRC and SWAN consists of 307,824 elements and 165,290 nodes.

5.2 Lake Levels

The starting water level for all simulations was set to the actual water level on Lake Ontario at the start of the storm. The lake level was calculated by taking the average of the four US water level gages used for the present study, as discussed in Section 2.2.1. The depth was adjusted in the bathymetry input file (fort.14) to account for the initial lake level in the models. The initial water level used for each simulation was documented in the metadata file (README.txt) generated for each simulation.

5.3 Wind and Pressure

The surge and wave conditions on Lake Ontario are largely dependent on the regional wind conditions. Therefore, accurate representation of the wind conditions will results in better wave and surge model results. As previously discussed in Section 2.2.2, two wind and pressure data sets were assessed for the present study, including:

- Natural Neighbor (NN) winds and pressure generated from meteorological stations and airports around Lake Ontario from 1961 to 2010; and
- The National Center for Environmental Prediction (NCEP) Climate Forecast System Reanalysis (CFSR) wind and pressure data from 1979 to 2010.

The two data sets were compared by simulating seven different storm events in ADCIRC and observing the difference in the surge predictions. Details pertaining to the calibrated ADCIRC model used to generate these results are discussed later in this report, in Section 6.3. The November 2003 storm event is shown below in Figure 5.3, while the rest can be found in Appendix C. In general, the effect on the modeled surge using either NN or CFSR wind is minor except for the largest winds. For example, the largest difference is observed during the storm peak, when the NN winds tend to under estimate the magnitude of the storm surge. As seen in Figure 5.3, the peak surge at Cape Vincent is under estimated for this particular storm.

The results for all six storms are summarized in Figure 5.4, where individual scatter plots are presented for the modeled versus measured data at the four US water level gages. The results with the CFSR winds tend to have less scatter, suggesting the predictions are more accurate.

In summary, the NN and CFSR winds generally result in similar estimates of surge, however the NN winds have a tendency to under estimate the storm peak based on an analysis involving seven different storms. Consequently, the production runs for the present study have been done primarily using CFSR winds, except prior to 1979, where CFSR data is not available.

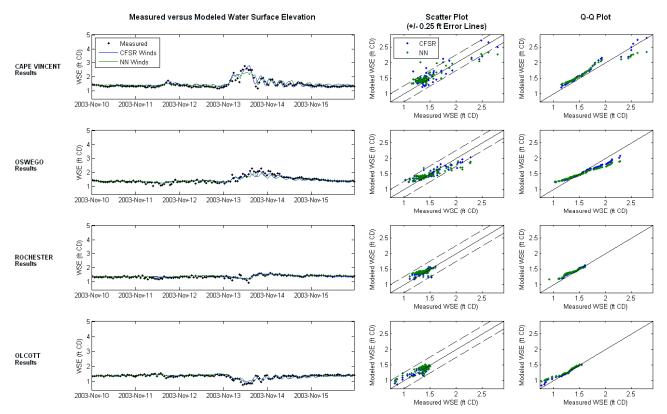


Figure 5.3 Water Surface Elevation at Gages using ADCIRC with NN Compared to CFSR Winds for a Storm in November 2003

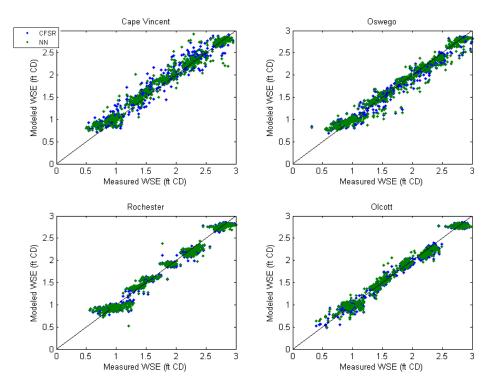


Figure 5.4 Scatter Plot of Water Surface Elevation Estimated at Gages using ADCIRC with NN Compared to CFSR Winds for 6 Storms (refer Appendix C for individual storm plots)

5.4 Ice Coverage

On Lake Ontario, ice tends to concentrate in the shallow nearshore areas and in sheltered areas. Historically, there has been some ice coverage on the lake between November to April (refer Section 2.2.3). The effect of ice on the generation of storm surge and waves is different. In terms of waves, ice can directly dampen the wave energy by means of a physical barrier or obstacle to both the generation and propagation of waves. Whereas, for the generation of storm surge, ice has the potential to increase the drag coefficient on the lake surface and increase the shear stress that the winds transfer to the water. As a result of these differences, ice has been incorporated into ADCIRC differently than in SWAN. The process by which ice has been incorporated into the modeling is discussed in detail in Sections 6.1.3 and 7.0, respectively.

Ice data were obtained from a variety of sources and were reduced to observed ice charts, while the interpolated ice charts were not considered. Comparisons were made between different data sets and showed that significant differences could exist between ice on the same day from two different agencies. Therefore the selected ice concentration on the lake was based on the National Ice Service data, unless the storm date was outside the period of record for this data set.

For both surge and wave modeling, ice was assumed to be stationary for the six day duration of the simulation as our review of the data indicated the ice coverage was generally not dynamic over a short six day period. In other words, it was not necessary to incorporate dynamic ice coverage within one six day model simulation. The ice date closest to the peak of the storm was considered representative for the duration of the storm. In addition, with only limited ice information for the old storms, there is insufficient data to change the ice coverage. Finally, much of the ice in Lake Ontario is limited to a narrow shore-fast band and therefore, consistent in its coverage for longer periods of time.

Ice coverage in the SWAN and ADCIRC inputs was defined by treating the ice chart data as a triangular mesh, and interpolating the ice value at each node in the computational mesh.

6.0 SURGE MODELING

Storm surge on Lake Ontario was estimated using the ADvanced CIRCulation model (ADCIRC). ADCIRC is a finite element hydrodynamic model used to simulate coastal circulation and storm surge in two and three dimensions.

6.1 Implementation of Input Parameters

The input parameters used in ADCIRC are those discussed in Section 5.0. Details specific to the implementation in ADCIRC are discussed below.

6.1.1 Initial Water Level

The initial water level in the model domain, set to the average lake level at the start of the storm (refer Section 5.2) was implemented in ADCIRC by adjusting the depth in the bathymetry file (fort.14). The initial water level used for each storm was documented in the metadata file, which can be found in each storm folder, labeled as README.txt.

6.1.2 Wind and Pressure Field Generation

The CFSR and NN winds are gridded wind fields on a coarser grid than the computational mesh. Custom tools were developed using FORTRAN to interpolate the CFSR or NN wind and pressure data for each mesh node for the duration of the storm simulation. Input files for the custom tools include a bathymetry file (fort.14) and start and end dates defined in a stormdate.in text file. The wind databases and the ice database were also required to define the input winds.

For storms prior to 1979, the tool developed for NN wind and pressure was applied. For all other storms (1979 to 2010), the tool developed for CFSR wind and pressure was applied.

6.1.3 Ice Coverage Implementation

Wind drag coefficients are defined in ADCRIC V49.64 as the greater of the standard Garrett ice formulation (C_{DN}) and the ice dependent (wind independent) relationship (C_{DF}), which is a function of the fraction of ice coverage (IC) shown below:

$$C_{DN} = (0.75 + 0.067 U_{10}) 10^{-3}$$

 $C_{DF} = [0.125 + 0.5 IC (1.0 - IC)] 10^{-2}$

These formulations were implemented by ERDC based on data from sea ice in regions such as the Beaufort. However, the majority of the ice on Lake Ontario is shore-fast ice, rather than ice that floats in the middle of the Lake and moves easily with the wind. To accommodate the specific condition of shore-fast ice, the effects of ice on the drag coefficient were considered in a

pre-processor outside ADCIRC. The pre-processor used these equations to define a wind correction that was applied as needed in ice covered areas of the wind file. Where the ice coverage was greater than 99%, the wind speed (and hence the wind friction) was set to zero.

Review of the ice data from the American and Canadian sources showed significant discrepancies in the coverage values, and highlighted the fact that the ice coverage charts represent a best approximation of the ice conditions on the lake. Therefore, the influence of the ice sheet on the lake was extracted from the ice database for the period of time that was closest to the peak of the storm. These ice conditions were held constant throughout the ADCIRC simulation.

6.2 Boundary Conditions

Boundary conditions were applied in ADCIRC to define the internal and external land and water interaction and the inflow and outflow in Lake Ontario. In ADCIRC the boundaries are defined through the variable IBTYPE defined in the bathymetry file (fort.14).

The external and internal land boundaries were defined using the following conditions:

• External land (shoreline):

"IBTYPE = 10, external boundary with no normal and no tangential flow as essential boundary conditions. This is applied by zeroing the normal boundary flux integral in the continuity equation and by setting the velocity = 0 rather than solving momentum equations along the boundary. This boundary condition should satisfy no normal flow in a global sense and zero velocity at each boundary node. This type of boundary represents a mainland boundary with strong no normal flow and no tangential slip conditions." (Luettich and Westerink, 2010)

• Internal land (islands):

"IBTYPE = 11 internal boundary with no normal and no tangential flow as essential boundary conditions. This is applied by zeroing the normal boundary flux integral in the continuity equation and by setting the velocity = 0 rather than solving momentum equations along the boundary. This boundary condition should correctly satisfy no normal flow in a global sense and zero velocity at each boundary node. This type of boundary represents an island boundary with strong no normal flow and no tangential slip conditions." (Luettich and Westerink, 2010)

• The Niagara River, which flows north from Lake Erie is the largest source of water entering Lake Ontario. Flow from Lake Ontario is discharged through the St. Lawrence River to the Gulf of St. Lawrence and ultimately the North Atlantic Ocean. These two rivers were included in the model domain as flow boundaries. The flow that is discharged through the St. Lawrence River is a combination of the flow entering from the Niagara River combined with other gauged and un-gauged tributaries, and rainfall over the lake. Therefore, the discharge flow through the St. Lawrence River exceeds the flow from the Niagara River.

For the purpose of the surge modeling and not introducing a bias in the lake surface elevation, the flow entering through the Niagara River was set equal to the discharge through the St. Lawrence River. The consequence of this assumption is higher flows through the Niagara River than actually occur, which cause larger velocities in and around the river mouth. However, considering the Niagara River is located along the long axis of the lake, it was considered more important to accurately represent the flow through the St. Lawrence River where significant surges occur at the end of the lake. Details of the data used to define the flow boundaries were discussed in Section 2.2.4. The specific boundary type used in ADCIRC to define the flow boundaries is defined below:

"IBTYPE = 12 external boundary with non-zero normal and zero tangential flow as an essential boundary condition. This is applied by specifying the non-zero contribution to the normal boundary flux integral in the continuity equation and by setting the non-zero normal velocity and zero tangential velocity rather than solving momentum equations along the boundary. This boundary condition should correctly satisfy the flux balance in a global sense and the specified normal/zero tangential velocity at each boundary node. This type of boundary represents a river inflow or open ocean boundary in which strong normal flow is specified with no tangential slip." (Luettich and Westerink, 2010)

It is important to note that the boundary used to define the flow through the St. Lawrence River was a main factor in the model calibration and therefore is discussed in more detail in the following section (Section 6.3).

6.3 Model Calibration and Verification

The ADCIRC model was calibrated using measured water level data at Cape Vincent, Oswego, Rochester and Olcott. Details pertaining to the data used from these stations were provided earlier in this report in Section 2.2.1.

The model calibration process was an iterative procedure whereby input parameters were adjusted until reasonably consistent results were obtained. The main challenge on Lake Ontario was modeling a portion of the St. Lawrence River to capture the Cape Vincent water level gauge. The hydrodynamics in the St. Lawrence River are driven by the large outflows through the St. Lawrence River, which can range from 150,000 - 350,000 ft³/s. ADCIRC includes two different flow boundary conditions in ADCIRC, including IBTYPE of 12 (for strong flow conditions) and 22 (for weak flow conditions), the model would cause significant set-down in the St. Lawrence River. This is consistent with modeling challenges with ADCIRC applied to other strong river flows. ADCIRC was developed as an ocean model and the application in a river environment has limitations. When using a numerical model, it is not un-common to have effects from the boundary conditions. Therefore the objective is to mitigate these effects on the portion of the model that is of interest. For the present study, model results upstream of Cape Vincent are of interest. To mitigate this

phenomenon affecting the model results at Cape Vincent, located at the north east end of the lake, various modifications to the model were tested, including:

- Using a water level boundary instead of a flow boundary. However, the water level boundary resulted in model instabilities;
- Extending the model domain incrementally, eventually to the levee at Iroquois, located over 80 miles downstream;
- Exaggerating the depth at the downstream end of the model domain to decrease the velocity of the flow;
- Decreasing the timestep;
- Decreasing the mesh size;
- Decreasing the flow through the St. Lawrence River; and
- Creating a large pool of water at the end of the domain to decrease the velocity of the flow even further.

After testing the above model modifications, the latter two attempts were successful at decreasing the velocity through the boundary to reduce the set-down in the lower part of the river and to accurately simulate the water levels at Cape Vincent. Physically decreasing the flow through the boundary is a simple solution, however adopting this modification would also alter the velocities at the Niagara River, since the inflow has to remain equal to the outflow to avoid changing the mean water level in the lake. As a result, creating a large pool of water at the end of the domain was adopted to mitigate the set-down at Cape Vincent from the large outflow boundary. The final model domain is shown in Figure 6.1, including the artificial lake.

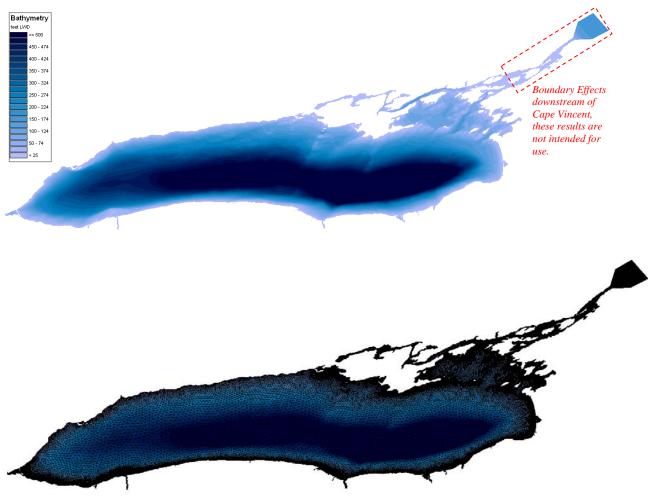


Figure 6.1 ADCIRC Model Domain (Top) and Final Mesh (Bottom)

It is important to note, that model results downstream of Cape Vincent are **not** intended for use and post processing should include a routine to remove these results prior to further distribution to the floodplain mapping contractors.

A number of pilot storms were used to verify the calibrated ADCIRC model under various storm conditions taking into account directionality (easterly and westerly storm events), magnitude (small and large storms) and during ice conditions. Standard plots for all pilot storms are provided in Appendix D. Examples of the results are shown below in Figure 6.2 and Figure 6.3 for one of the largest surge events on Lake Ontario that tracked towards Cape Vincent, located in the north-east of the lake. Figure 6.4 and Figure 6.5 are example results for a storm travelling from west to east.

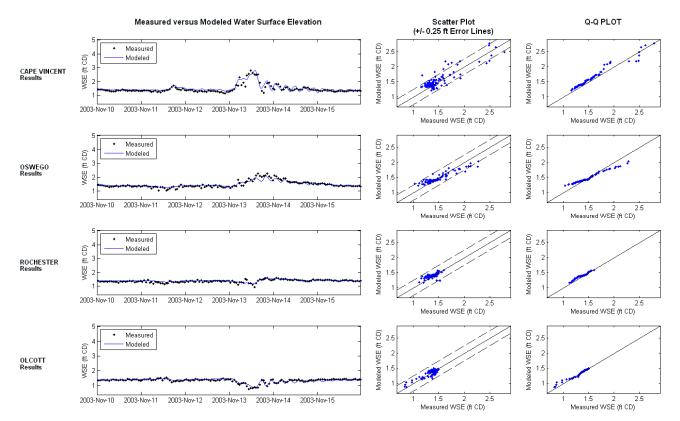


Figure 6.2 Time Series ADCIRC Water Surface Elevation Results During a Storm on November 13, 2003 Compared to Measured Data at Cape Vincent, Oswego, Rochester and Olcott Water Level Gages

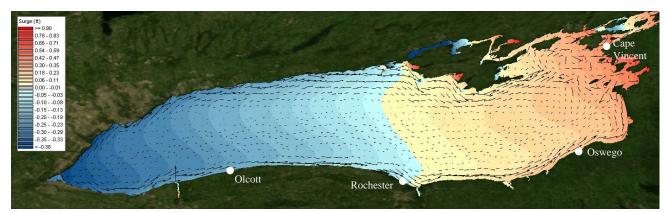


Figure 6.3 ADCIRC Surge Results during Storm Peak on 13 November 2003

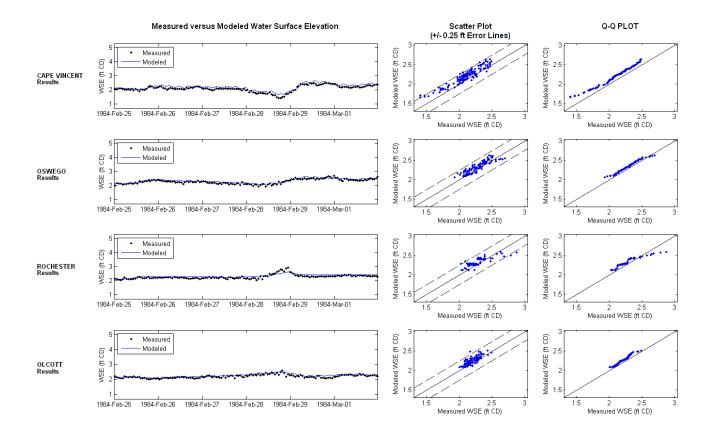


Figure 6.4 Time Series ADCIRC Water Surface Elevation Results During a Storm on February 28, 1984 Compared to Measured Data at Cape Vincent, Oswego, Rochester and Olcott Water Level Gages

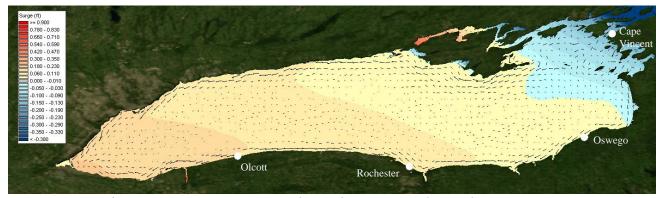


Figure 6.5 ADCIRC Surge Results During Storm Peak on February 28, 1984

6.4 **Production Storms**

ADCIRC was run for the productions storms discussed in Section 4.0 for six day durations, three days before midnight on the day of the storm peak and three days after. Input files for the production storms were generated using a custom MATLAB program, specifically developed to provide consistent file formats for the model results so they can be incorporated into the USACE's CSTORM database. Details pertaining to the ADCIRC input and output file structure are provided in Sections 6.4.1 and 6.4.2, respectively.

All 150 storms were compared to available measured data at Cape Vincent, Oswego, Rochester and Olcott and show relatively good agreement as shown in Figure 6.6. Comparison plots for each individual production storm similar to those shown in Figure 6.2 and Figure 6.4 are provided in Appendix D.

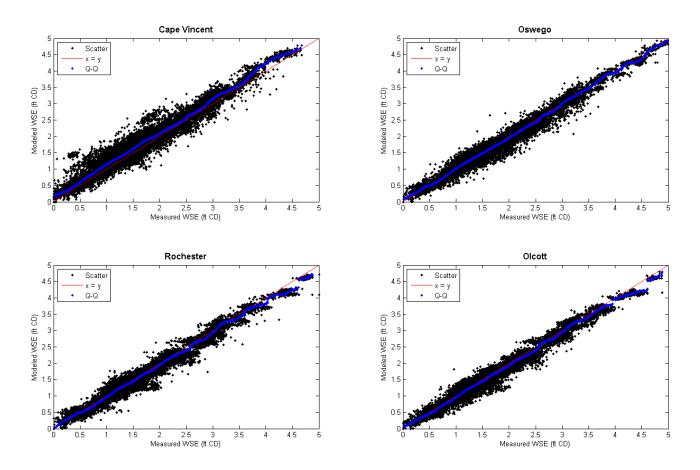


Figure 6.6 Scatter Plot Comparing Measured versus Modeled Water Surface Elevation for all 150 Production Storms

6.4.1 Input File Structure

Input files required for ADCIRC include:

- Fort.15: ADCIRC steering file;
- Fort.14: Bathymetry and boundary file;
- Fort.20: Flow boundary file; and
- Fort.22: Wind file.

Additional input files required for Baird custom tools included:

- Stormdate.in: Input file required to generate wind file (fort.22); and
- LOntarioADCIRC.bat ADCIRC execution program.

Information pertaining to each run has been documented in the ADCIRC steering file (fort.15) in the first two lines, with the first line including the lake name (Lake Ontario), followed by the storm number. In the second line, the year, month, day, and time of the identified storm peak, as requested by the USACE in a document titled Great Lakes Model Data received on September 28, 2011.

6.4.2 Output File Structure

Output files generated by ADCIRC include:

- Fort.16: General Diagnostic Output;
- Fort.61: Timeseries water surface elevations at Cape Vincent, Oswego, Rochester and Olcott water level gage locations used for model calibration and verification;
- Fort.63: Area water surface elevations;
- Fort.64: Area depth averaged water velocity components;
- Fort.73: Pressure;
- Fort.74: Wind velocity components; and
- Fort.33: Iterative solver diagnostic output file.

Additional output files generated by Baird custom tools included:

- README.txt: Metadata file containing information pertaining to the details of each storm;
- LOntario.log: Run information file with start and end times of simulation;
- Fort_NoIce.22: Wind before adjustments for ice;

- CapeVincent_DATA.txt: Measured and Modeled Water Surface Elevation at Cape Vincent water level gages in FEET interpolated to a common time series based on available measured data;
- Oswego_DATA.txt: Measured and Modeled Water Surface Elevation at Oswego water level gages in FEET interpolated to a common time series based on available measured data;
- Rochester_DATA.txt: Measured and Modeled Water Surface Elevation at Rochester water level gages in FEET interpolated to a common time series based on available measured data;
- Olcott_DATA.txt: Measured and Modeled Water Surface Elevation at Olcott water level gages in FEET interpolated to a common time series based on available measured data; and
- Measured_vs_ADCIRC.bmp: Model verification image comparing model results to four water level gages.

7.0 WAVE MODELING

The SWAN wave model was used to simulate wind generated wave conditions on Lake Ontario for the events selected as part of the storm selection analysis. Developed by Delft University of Technology, SWAN (Simulating WAves Nearshore) is a physics based third-generation wave model that can simulate the propagation and decay of short-crested wind generated waves in coastal regions and inland waters. SWAN uses an unstructured mesh to discretize the bathymetry and is able to simulate various physical phenomena, including:

- wave propagation in time and space
- wave growth due to wind
- non linear wave interaction
- wave dissipation due to white capping and bottom friction
- wave refraction
- wave shoaling
- wave breaking

Diffraction is not explicitly modeled in SWAN but diffraction effects can be simulated by applying directional spreading of the waves. Reflections are not included in SWAN and are not considered a critical process for the purposes of this study.

7.1 Model Setup

Key components of the SWAN model setup included the development of a model mesh, generation of the wind fields, and the definition of numerical parameters to describe the physical processes. These are discussed below.

The SWAN model utilized the ADCIRC mesh that was developed for the surge modeling component of the study (refer to Figure 6.1). Use of the same mesh for both models provided a level of consistency with respect to the output locations and allowed for more detailed wave information near shore and in embayment's.

Wind is the dominant forcing mechanism driving the wave model. Test simulations conducted during model calibration showed that both the CFSR and NN wind fields generated similar results

at the three wave buoy locations in the lake. This provides a level of confidence in the wave model during the production run phase, as the CFSR winds will be used for those storm events between 1979 and 2010; the NN wind fields will be used for those events which occurred prior to 1979.

Lake Ontario is approximately 193 miles (344 km) in length with the long axis of the lake oriented east-west, which is similar to the general synoptic scale weather patterns. The average depth of Lake Ontario is approximately 283 ft (86m) with a maximum depth of 802 ft (244 m). The Long fetch lengths and deep water can generate significant sea state conditions. With respect to the model setup, the above considerations imply that the deepwater source terms for wind, whitecapping dissipation and non-linear wave interactions should be considered. In shallow regions near shore and in embayments, shallow water effects will play a role in the evolution of the wave field, as a result, shallow water dissipation source terms such as bottom friction and breaking should also be activated. These parameters were considered during model calibration.

7.2 Model Calibration

Calibration of the SWAN model involved several steps. Test simulations were initially carried out to examine the difference in predicted wave conditions using both the CFSR and NN wind fields; these sensitivity runs were completed early on in the study using a coarser mesh and second generation physics in the SWAN model. The model was then calibrated against six independent storm events using the fine mesh and third generation physics; these results are presented below.

The model results were compared against three wave buoys as shown in Figure 7.1. The buoys are deployed at various locations in the lake and provide a comprehensive cross-section of deepwater wave information at select locations. Both C45139 and C45135 are owned and maintained by Environment Canada's Department of Fisheries and Oceans (DFO); these buoys are non-directional and their deployment locations have changed over the years. Buoy 45012 is a directional buoy owned and maintained by NOAA's National Data Buoy Center (NDBC). Measured data extends back as far as 1989 (at Buoy 45135) and the period of coverage typically ranges from spring to late fall as the buoys are removed during the winter months.

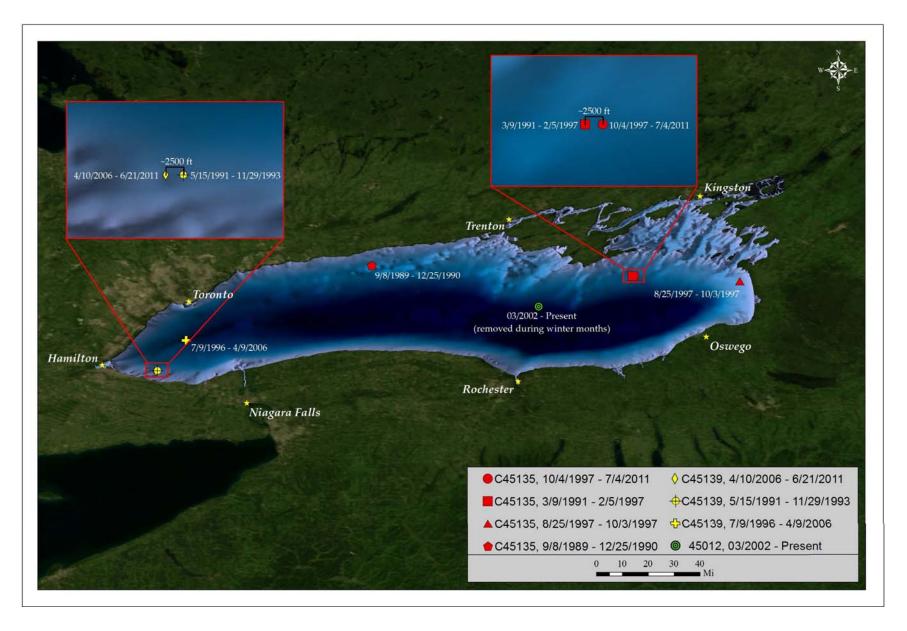


Figure 7.1 Wave Buoy Locations on Lake Ontario

7.2.1 Assessment of CFSR and NN Winds on Waves

The SWAN model was used to examine the difference in wave conditions generated by both the CFSR and NN wind fields. The results from the surge modeling showed that the CFSR winds produced a better comparison with measured water level data; as a result, the objective of this analysis was to determine if the (same) corrected CFSR winds are appropriate to use for the wave model simulations as well.

Three storm events were used in the analysis; two of the wind events are from the (prevailing) west and one is from the east. Figure 7.2 provides a statistical summary in the form of scatter and quantile plots of the predicted wave heights using the corrected CFSR and NN winds. Note that a quantile plot is a technique for determining if two data sets come from populations with a common distribution. Quantile plots are constructed using the inverse of the cumulative distribution function (or exceedence). Timeseries comparisons of predicted and measured wave heights for all three storm events are presented in Appendix E. Note that these early SWAN model runs were based on second generation physics, however, this should not influence the relative trends observed between the wind fields.

In general, similar trends were observed in the wave conditions predicted by both the CFSR and NN wind datasets as the correlation coefficients were greater than 0.9 at all three buoy locations. Figure 7.2 shows that the CFSR winds tend to produce slightly larger wave heights; this was particularly evident in the west end of the lake at Buoy C45139 as peak wave heights were approximately 44% larger than those predicted using the NN wind fields. The average difference at Buoys 45135 and 45012 were determined to be 13% and 4%, respectively.

A review of the statistical summary provided in Figure 7.2 shows that the CFSR winds generated larger waves in the west end of the lake at Buoy C45139 (by as much as 25% for more extreme storms). Wave conditions were more similar at the other buoy locations. The findings from the assessment provide a level of confidence in both datasets, which is important as the CFSR wind fields only extend back to 1979, therefore, the NN winds will be required for those storm events that occurred prior to 1979.

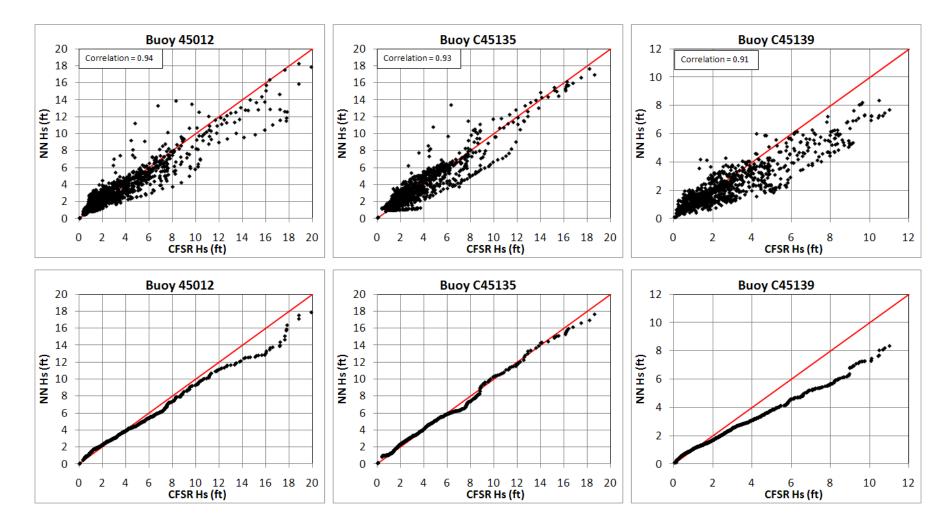


Figure 7.2 Statistical Summary of Predicted Wave Heights using CFSR and NN Winds

7.2.2 Calibration of the Wave Model

The SWAN model was calibrated against six storm events using the corrected CFSR wind fields; these are summarized in Table 7.1. With the exception of the September 2003 event, all storms were from the west and occurred in the late fall or early winter. The calibration was carried out using the fine mesh which uses a variable resolution ranging from approximately 3 km in the middle of the lake to 180 m along the shore and 30 m in embayments. Figure 7.3 shows the model mesh.

			Peak Wave Height (ft) of Storm event			
			Buoy 45139 Buoy 45135 Buoy		Buoy 45012	
Start Date	End Date	Time of Peak Event	Measured	Measured	Measured	
2000/12/15 00:00	2000/12/22 00:00	2000/12/18 05:00	ND	16.70	ND	
2003/09/16 00:00	2003/09/23 00:00	2003/09/19 12:00	13.02	5.28	9.55	
2003/11/10 00:00	2003/11/17 00:00	2003/11/13 16:00	9.42	16.54	24.84	
2006/10/26 00:00	2006/11/02 00:00	2006/10/29 10:00	4.82	17.42	19.23	
2007/10/25 00:00	2007/11/01 00:00	2007/10/28 05:00	4.43	10.10	11.91	
2009/10/04 00:00	2009/10/11 00:00	2009/10/07 17:00	3.77	13.39	14.11	

Table 7.1 Summary of Storm Events used for Model Calibration

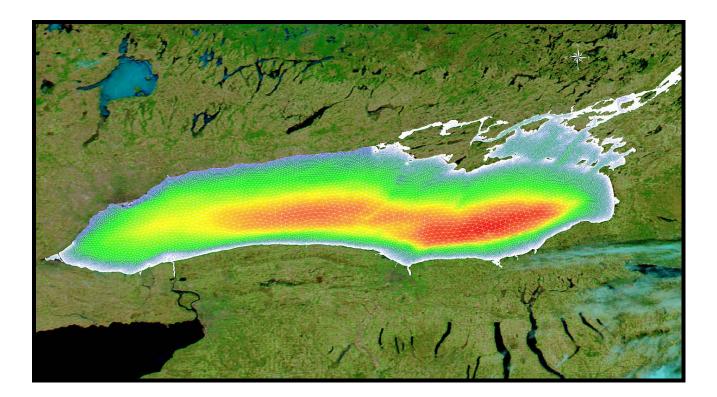


Figure 7.3 Overview of SWAN Model Mesh for Lake Ontario

The calibration process considered second and third generation physics as well as other processes such as wave breaking, friction, and white capping. Model results were compared against measured data recorded at the three buoy locations around the lake. Ultimately, the third generation physics were used for final calibration along with breaking and friction, although these parameters did not have a significant impact on the waves at the buoy locations, due to their location in deeper water. Note that correcting the winds (to represent conditions overwater) generated the most significant improvement to the model calibration. Table 7.2 provides a summary of the predicted and measured peak wave heights for each storm event; timeseries comparisons for the six storms are shown in Appendix F. A statistical summary of the model's ability to predict wave heights is provided in Figure 7.4.

			Peak Wave Height (ft) of Storm event					
			Buoy 45139		Buoy 45135		Buoy 45012	
Start Date	End Date	Time of Peak Event	Measured	Modeled	Measured	Modeled	Measured	Modeled
2000/12/15 00:00	2000/12/22 00:00	2000/12/18 05:00	ND	8.46	16.70	17.72	ND	17.70
2003/09/16 00:00	2003/09/23 00:00	2003/09/19 12:00	13.02	10.31	5.28	5.99	9.55	7.00
2003/11/10 00:00	2003/11/17 00:00	2003/11/13 16:00	9.42	9.85	16.54	20.21	24.84	21.48
2006/10/26 00:00	2006/11/02 00:00	2006/10/29 10:00	4.82	5.20	17.42	15.02	19.23	15.50
2007/10/25 00:00	2007/11/01 00:00	2007/10/28 05:00	4.43	4.22	10.10	9.48	11.91	10.06
2009/10/04 00:00	2009/10/11 00:00	2009/10/07 17:00	3.77	4.57	13.39	11.25	14.11	10.92
Maximum Relative Difference			21%		22%		-14%	
Minimum Relative Difference			-21%		-16%		-27%	
Mean Relative Difference			2%		1%		-20%	

Table 7.2 Comparison of Peak Wave Heights for Six Storm Events used in Model Calibration

ND - No data available

Percent Relative Difference = (Modeled - Measured)/Measured x 100

The results in Table 7.2 showed that the model overestimated some peaks and underestimated others as the relative difference ranged from 21% to -27%. At Buoys C45139 and C45135, the model overestimated peak wave heights approximately 50% of the time. At Buoy 45012, the model consistently underestimated the wave heights by 20% on average. However, the results in Figure 7.4 show a strong relationship between the predicted and measured wave heights for the entire duration of the storm.

Note that the SWAN model runs are computationally intensive due to the size and resolution of the mesh used to resolve the bathymetry in Lake Ontario, especially since all the large navigation channels and embayments were included in the model domain. It takes approximately 72 hours to complete a six day simulation on a dedicated modeling computer.

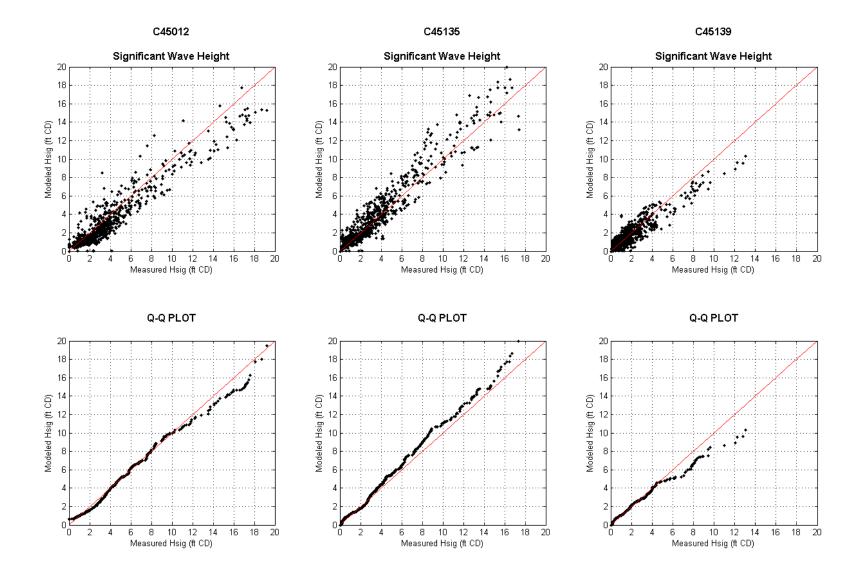


Figure 7.4 Statistical Summary of Model Performance based on Six Calibration Runs

Figure 7.5 shows a typical 2D plot of the predicted wave field under an easterly and westerly wind condition. The vectors show wave direction and have been filtered in order to see the wave height map more clearly, particularly in the near shore.

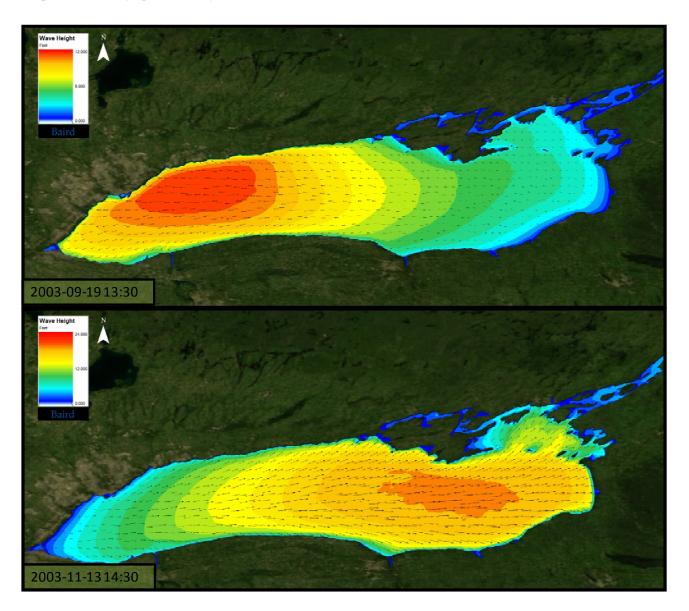


Figure 7.5 Map of Predicted Wave Heights for an East (top) and West (bottom) Storm Event

A review of the timeseries comparisons in Appendix F showed that the model does capture the trends observed in the measured data, which again provides a level of confidence in the wind fields that are used to drive the model estimates. Note that the wave periods compared well throughout the simulation and in particular during the peak of the storm event when the energy is typically well defined in the frequency spectrum.

7.2.3 Impact of Ice on Waves

Model calibration was carried out on storm events that occurred during ice free periods. This represents the majority of the 150 storm events that have been selected for production simulations. Typically, the wave buoys are removed from the lake during the winter months to avoid damage and thus none of the calibration storms were selected from the winter (since there are no measurements in the winter). For reference, Lake Ontario does not experience the same ice coverage patterns as the other Great Lakes, such as Lake Erie which historically has been completely ice covered in the winter. However, some of the storms in the composite database were selected from the winter when ice was present on the lake and thus a methodology was required to account for ice.

For this study, an OBSTACLE was defined in the SWAN model to represent the historical ice cover conditions. An obstacle is a polygon that defines the perimeter of the ice field, which for this study is any region that experienced at least 70% ice coverage. As waves cross any point along the obstacle, wave energy is reduced to zero. Re-generation does occur within the polygon itself; but this energy is removed during a post-processing step once the simulation is complete. It should be noted that although wave growth does occur within the OBSTACLE, no energy can cross the barrier and it does simulate the sheltering effects on the leeward side of a mobile ice sheet (if one were to occur). Figure 7.6 provides an example of a regulation ice-free SWAN simulation and the same storm with the inclusion of an ice OBSTACLE. The corresponding influence on adjacent wave conditions is clearly seen in the lower panel with the ice OBSTACLE.

Figure 7.7 shows the spatial extent of the ice coverage for the January 10, 1988 storm, which is one of the most severe ice conditions in the 150 storm composite database. The maximum wave height for the peak of the storm is also plotted in Figure 7.7 for this east to west tracking event. Wave heights are zero where the ice concentration exceeds 70%.

7.2.4 Production Runs

Model simulations are now complete for the 150 storm composite database. Approximately 110 storms were complete at the time this report was originally issued. For those storm events with available measured data at the buoys, the predicted wave heights were compared to the measured data in order to assess the overall performance of the model. A total of twenty storms featured measured data and were available for the analysis. A statistical comparison in the form of scatter and quantile-quantile plots is provided in Figure 7.8. In general, the model compares well against measured data as a strong relationship was observed in the scatter data. A review of the quantile plots showed that the model tends to underestimate the largest waves at Buoy 45012 slightly and marginally overestimates wave heights at C45135 and C45139. These findings provide a level of confidence in the wind fields and with the model's ability to predict wave conditions on the lake.

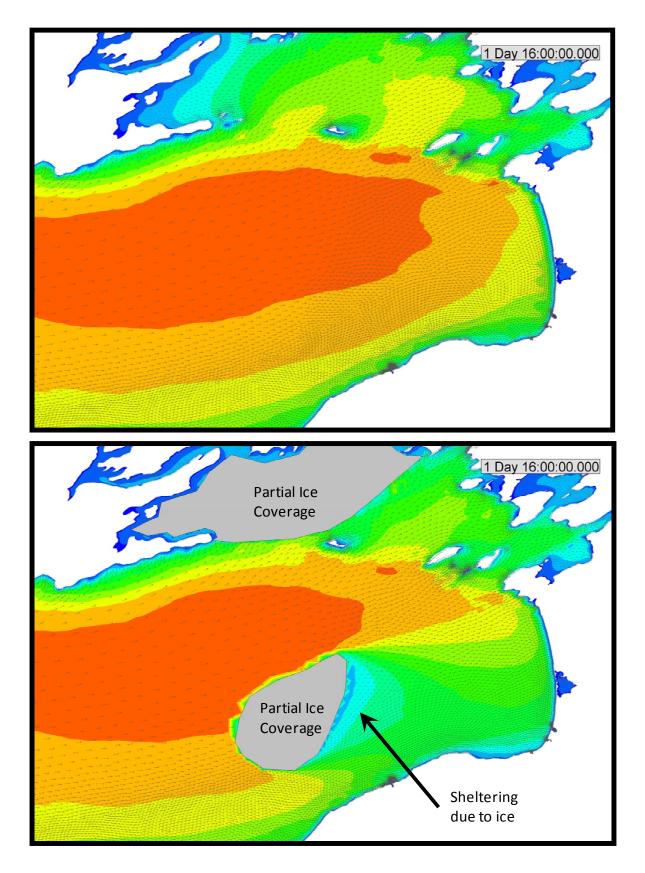


Figure 7.6 Example of Wave Predictions for an Ice Free Condition and Ice Cover Obstacle in SWAN

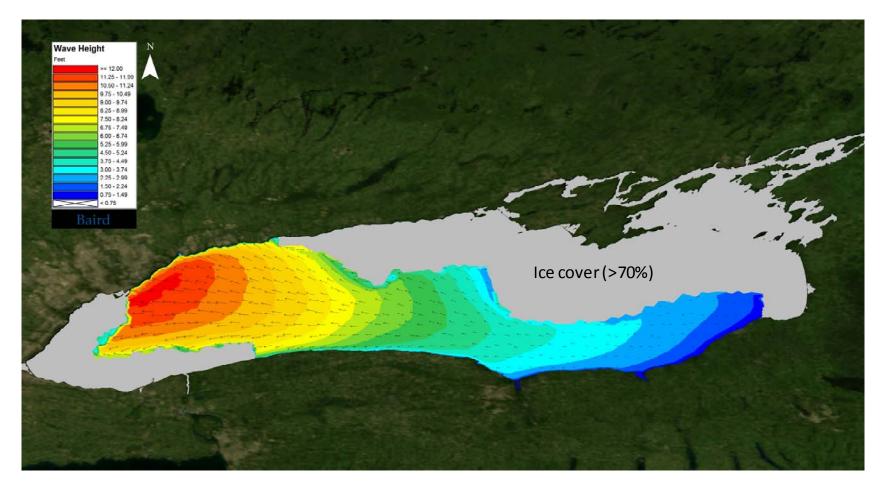


Figure 7.7 Predicted Wave Field and Extent of 70% Ice Coverage for the Storm Event on January 10, 1988

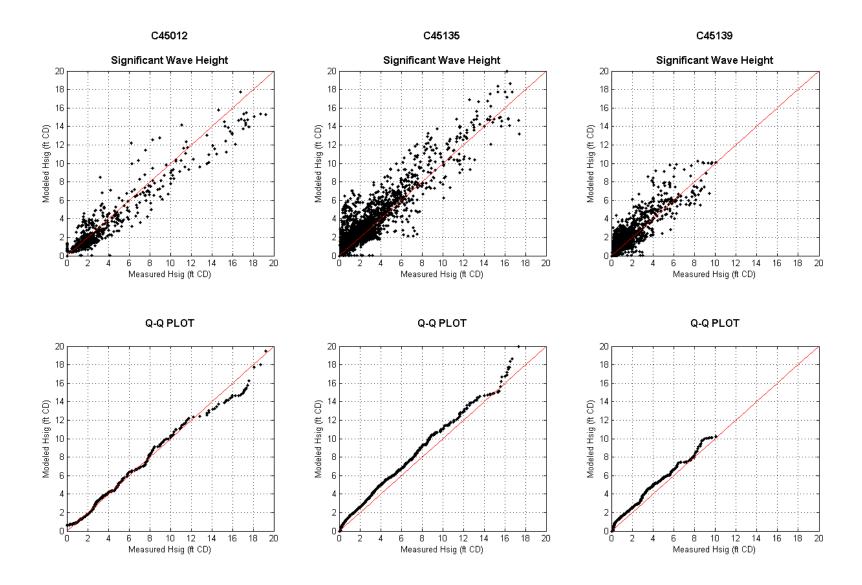


Figure 7.8 Statistical Summary of Model Performance based on Production Storm Events

8.0 PRODUCTION RUNS AND FILE TRANSFER

Section 8.0 of the report describes the production runs and the file transfer protocol.

8.1 150 Production Runs

The 150 production storms selected for the composite database are summarized in Table 8.1. Refer to Section 4.4 of this report for a discussion of the storm selection methodology. ADCIRC and SWAN simulations where completed for all of these storms.

Storm Number	Date of Storm Peak	Storm Number	Date of Storm Peak
1	1979/04/06 18:00	76	1998/03/21 14:00
2	1980/01/12 09:00	77	1998/09/07 00:00
3	1981/06/09 00:00	78	1999/01/04 19:00
4	1982/01/11 10:00	79	2000/05/13 11:00
5	1982/02/01 01:00	80	2000/12/06 03:00
6	1984/02/28 20:00	81	2001/02/10 19:00
7	1984/04/30 16:00	82	2001/04/07 18:00
8	1985/01/21 04:00	83	2003/01/02 03:00
9	1985/11/28 20:00	84	2003/04/04 15:00
10	1985/12/02 17:00	85	2003/04/07 20:00
11	1986/05/01 18:00	86	2003/04/17 13:00
12	1991/04/30 16:00	87	2003/11/28 08:00
13	1991/12/03 03:00	88	2005/04/02 18:00
14	1991/12/14 19:00	89	2005/09/29 09:00
15	1992/05/02 22:00	90	2006/02/06 23:00
16	1992/08/11 01:00	91	2006/03/15 20:00
17	1992/11/13 02:00	92	2006/10/29 13:00
18	1992/12/11 18:00	93	2006/12/02 01:00
19	1993/03/04 20:00	94	2007/01/09 02:00
20	1993/03/14 02:00	95	2007/03/18 18:00
20	1993/10/18 00:00	96	2007/11/27 19:00
21	1996/05/21 04:00	97	2008/01/09 10:00
22		97	
23	1997/02/22 12:00 1999/01/14 22:00	98	2008/03/08 22:00 2008/09/15 05:00
25	1999/03/06 18:00	100	2008/12/28 12:00
26	1999/11/04 01:00	101	1970/11/23 23:00
27	2000/12/18 08:00	102	1971/01/27 19:00
28	2001/06/20 05:00	103	1971/01/30 04:00
29	2002/02/01 15:00	104	1971/02/06 12:00
30	2002/03/10 19:00	105	1971/02/13 23:00
31	2003/02/05 06:00	106	1971/02/28 17:00
32	2003/11/13 16:00	107	1971/03/04 22:00
33	2004/12/23 16:00	108	1971/12/11 08:00
34	2006/02/17 10:00	109	1971/12/30 15:00
35	2008/01/30 09:00	110	1972/01/25 20:00
36	2008/02/06 22:00	111	1972/02/04 22:00
37	2009/12/11 08:00	112	1972/11/15 02:00
38	1979/08/07 13:00	113	1972/11/27 18:00
39	1979/12/08 07:00	114	1972/12/05 01:00
40	1974/03/24 21:00	115	1973/03/18 06:00
41	1980/10/26 19:00	116	1973/04/11 00:00
42	1980/12/14 14:00	117	1973/11/02 02:00
43	1981/11/28 03:00	118	1973/11/06 19:00
44	1982/01/05 09:00	110	1973/12/29 11:00
45	1982/01/23 10:00	120	1974/01/11 13:00
46	1982/04/06 04:00	120	1974/01/31 17:00
40		121	
	1982/11/06 06:00		1974/02/23 17:00
48	1982/12/29 00:00	123	1974/03/05 07:00
49	1985/03/04 19:00	124	1974/03/17 16:00
50	1986/01/09 14:00	125	1974/04/14 20:00
51	1986/09/15 22:00	126	1974/05/18 09:00
52	1986/10/04 17:00	127	1974/11/15 23:00
53	1988/01/13 08:00	128	1974/12/02 14:00
54	1988/06/22 12:00	129	1975/01/26 16:00
55	1988/07/17 05:00	130	1975/02/26 18:00
56	1988/11/10 15:00	131	1975/04/03 15:00
57	1988/11/20 21:00	132	1975/11/10 16:00
58	1989/02/08 17:00	133	1975/12/01 20:00
59	1989/03/18 06:00	134	1975/12/21 03:00
60	1989/10/14 18:00	135	1976/02/02 18:00
61	1990/11/06 08:00	136	1976/03/05 12:00
62	1991/03/28 08:00	137	1976/04/11 06:00
63	1992/12/26 13:00	138	1976/04/27 04:00
64	1993/02/12 02:00	139	1976/05/19 20:00
65	1994/02/23 19:00	140	1976/11/30 20:00
66	1994/11/06 18:00	141	1977/01/10 11:00
67	1994/11/22 21:00	141	1977/01/29 07:00
68	1994/12/24 07:00	142	1977/03/18 20:00
69	1995/01/06 05:00	144	1977/04/02 16:00
70	1995/11/11 22:00	145	1977/11/12 02:00
71	1996/01/28 02:00	146	1977/12/06 02:00
72	1996/03/04 01:00	147	1977/12/09 22:00
73	1996/11/08 16:00	148	1978/01/14 17:00
74	1997/12/11 03:00	149	1978/01/20 15:00
75	1998/01/15 16:00	150	1978/01/26 06:00

Table 8.1 List of 150 Lake Ontario Production Storms

8.2 File Transfer Protocol

As part of the scope of work, all input and output data files from both ADCIRC and SWAN production simulations were ultimately delivered to the USACE on an external hard disk. The purpose of this report section is to summarize to the file organization and naming convention.

The hard disk contains 150 folders, one for each production storm. Storm number and date are listed in Table 8.1. Within each Storm folder are two sub-folders, ADCIRC and SWAN. The input and output files for both ADCIRC and SWAN are provided within the corresponding folders. A sample of this folder structure is illustrated below:

LAKE ONTARIO \Production Runs \Storm001_1979040300 \ADCIRC \SWAN \Storm150_1979012300 \ADCIRC \SWAN

9.0 QUALITY ASSURANCE / QUALITY CONTROL

The production run phase included an extensive QA/QC process. The modeling team for Lake Ontario was responsible for verifying basic run completion and generation of appropriate files. The team then created a collection of files and plots useful in assessing run performance. Specifically, plots of modeled versus measured water levels and waves were generated (similar to the outputs in Section 6.0 and 7.0). Wave conditions at the time of peak wave height were calculated and plotted. Selected output files and the plots were then forwarded to an independent RAMPP contractor for a technical review. This review process consisted of analyzing model outputs from both the ADCIRC and SWAN models, including:

- Input files for all models;
- ADCIRC output:
 - o maxele.63 peak water surface elevation
 - o maxvel.63 peak water velocity
 - o maxwvel.63 peak wind velocity
 - o minpr.63 minimum atmospheric pressure
 - o measured vs. modeled water surface elevation time series plots
- SWAN output:
 - o swan_HS_max.63 peak zero moment wave height
 - o swan_TM01_atHSmax.63 spectral mean wave period at peak wave height
 - o swan_TPS_atHSmax.63 spectral peak wave period at peak wave height
 - o swan_DIR_atHSmax.63 spectral peak wave direction at peak wave height
 - o measured vs. modeled wave height time series plots

Other specific enquires were addressed as required following the review of the standard plots for each of the 150 storms and additional analysis was completed as necessary. Any issues identified by the independent reviewers were logged in standardized QC forms, as shown in Figure 9.1. The forms were then passed back to Baird to review and respond to the issues identified. Once both the independent review team and Baird were satisfied, the QC forms were signed by the review team. Refer to Appendix G for a copy of the completed forms.

ADCIRC REVIEW							
Storm:							
Reviewer:	viewer:						
Organization:		Choose an item.					
Date Checked:							
Was the max water su	rface elevatio	n file checked for anomalie	n file checked for anomalies?			Choose an item.	
Was the max current v	elocity file cl	necked for anomalies?			Choose an item.		
Was the max wind vel	ocity file che	cked for anomalies?			Choo	Choose an item.	
Was the minimum pre	ssure file che	cked for anomalies?			Choo	se an item.	
-		s checked for anomalies?			Choo	se an item.	
		Issues					
File Comment			Resolution			Verification	
Animations generated	for selected s	toms					
		mation show any anomalies?			Choose an item.		
Additional Comments							
Comment			Resolution			Verification	
Reviewer Signature:		I					
-							
Date:							
Date:							

SWAN REVIEW								
Storm:								
Reviewer:								
Organization:		Choose an item.						
Date Checked:								
Was the max wave he	ight file check	ted for anomalies?				Choose an item.		
Was the wave period :	at max wave ł	neight file checked for anor	nalies?		Choose an item.			
Was the wave directio	n at max wav	e height file checked for an	omalies?		Choose an item.			
		Issues						
File		Comment		Resolution	ı	Verification		
Animations generated								
Does the wave height animation show any anomalies?				Choo				
Additional Comments	on Detailed (Check						
Comment			Res	Resolution				
Reviewer Signature:								
Date:								
2410.								

Figure 9.1 Standard ADCIRC and SWAN QC Forms

10.0 REFERENCES

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APPENDIX A - WATER LEVEL VARIATION ANALYSIS

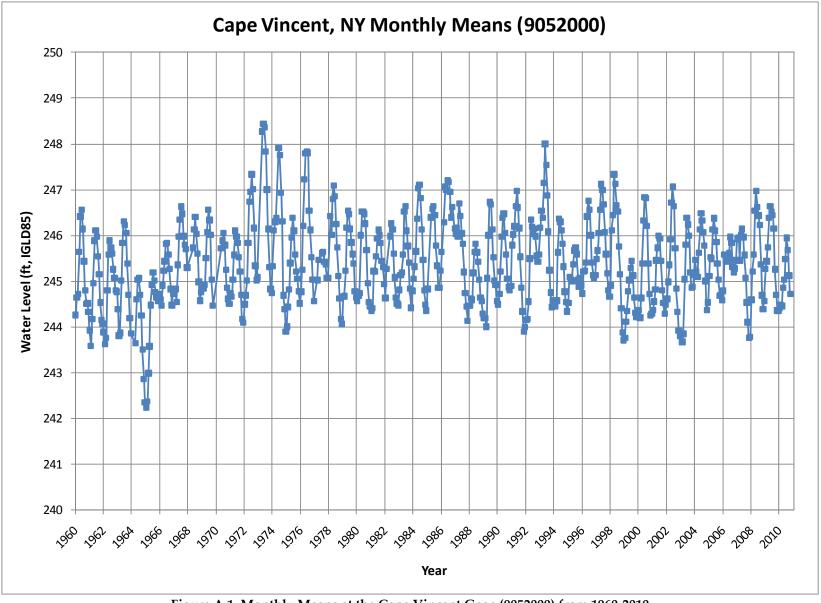


Figure A.1 Monthly Means at the Cape Vincent Gage (9052000) from 1960-2010

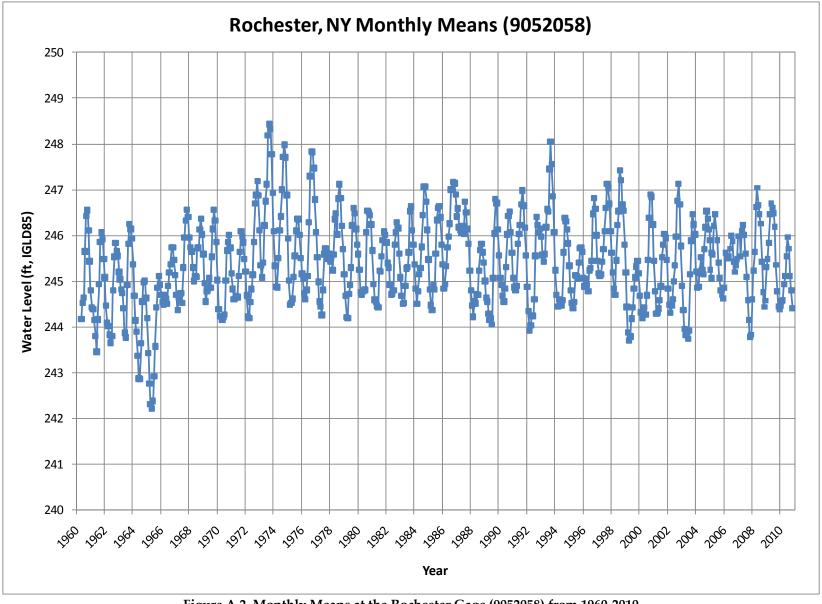


Figure A.2 Monthly Means at the Rochester Gage (9052058) from 1960-2010

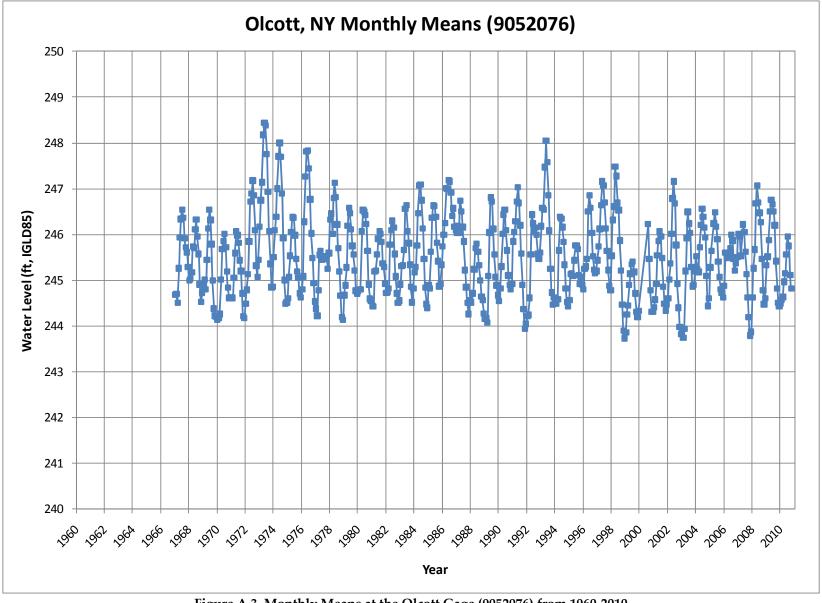


Figure A.3 Monthly Means at the Olcott Gage (9052076) from 1960-2010

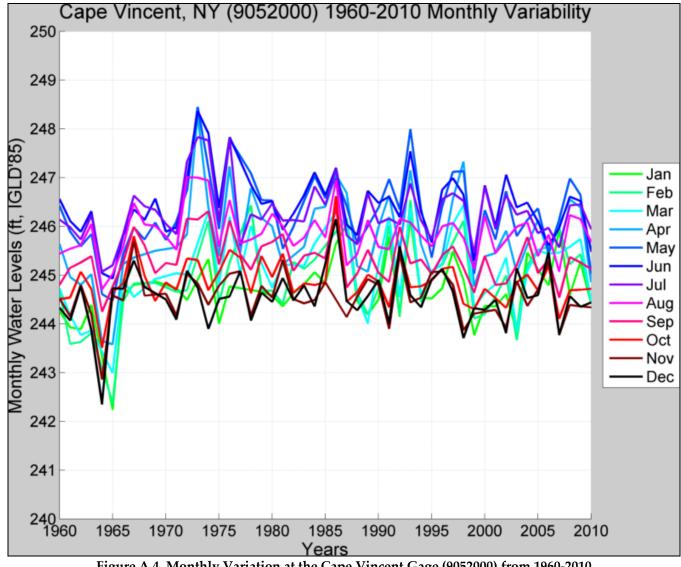


Figure A.4 Monthly Variation at the Cape Vincent Gage (9052000) from 1960-2010

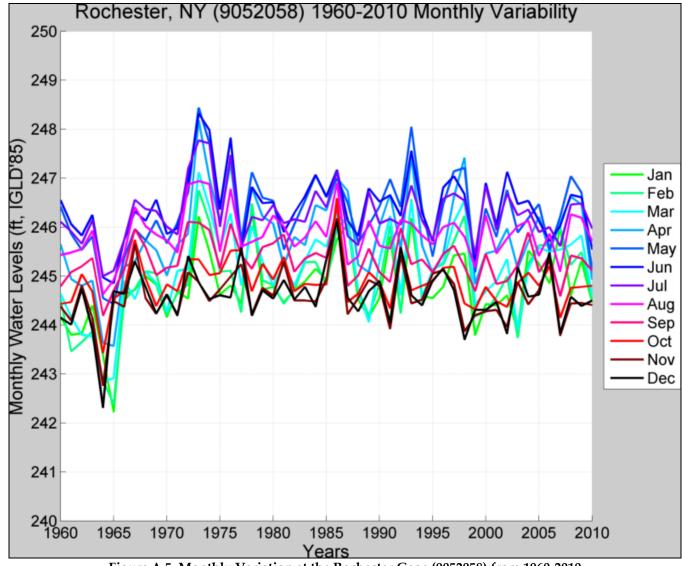


Figure A.5 Monthly Variation at the Rochester Gage (9052058) from 1960-2010

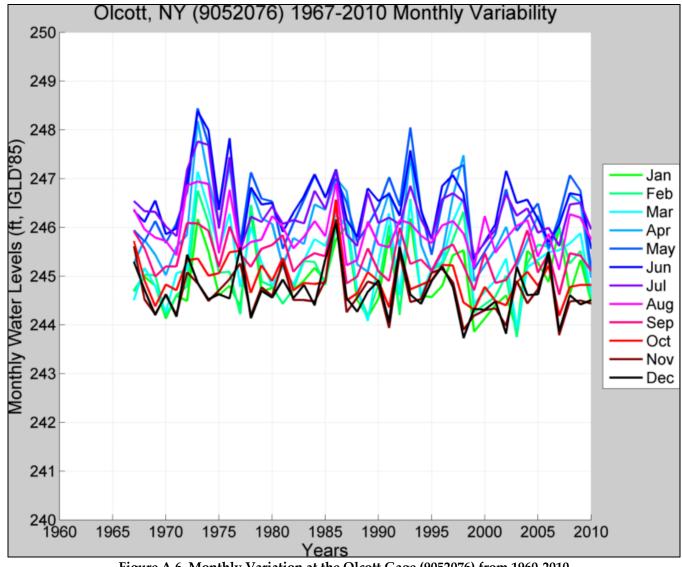


Figure A.6 Monthly Variation at the Olcott Gage (9052076) from 1960-2010

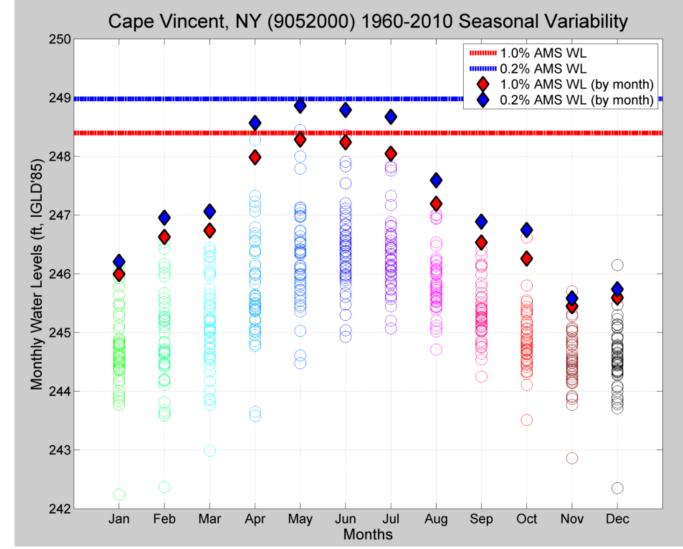


Figure A.7 Seasonal Exceedance Events at the Cape Vincent Gage (9052000) from 1960-2010

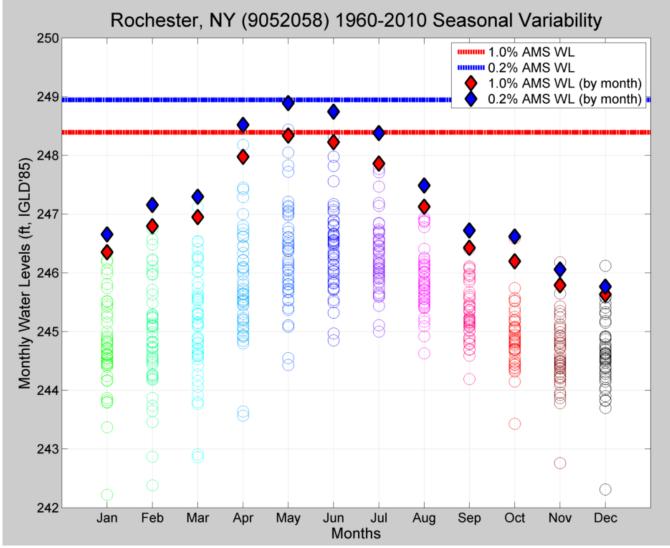


Figure A.8 Seasonal Exceedance Events at the Rochester Gage (9052058) from 1960-2010

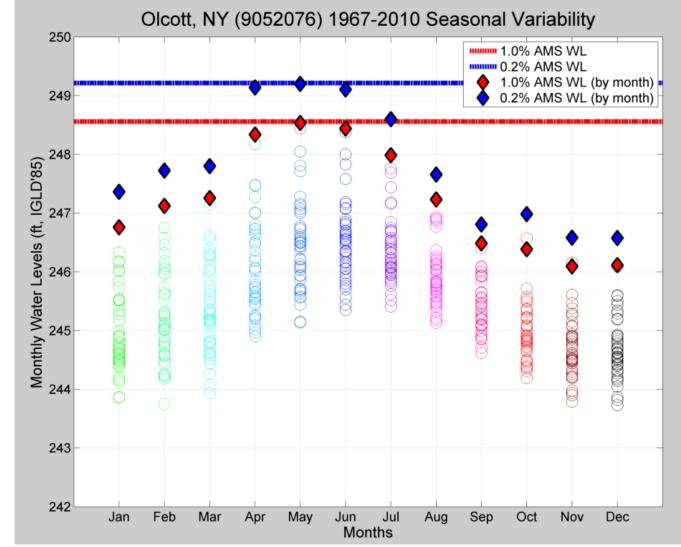


Figure A.9 Seasonal Exceedance Events at the Olcott Gage (9052076) from 1960-2010

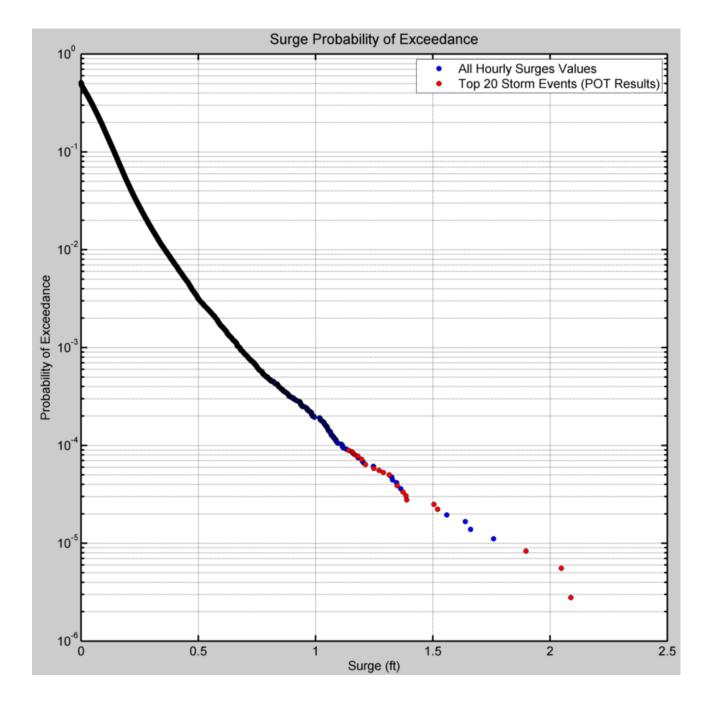


Figure A.10 Probability of Exceedance Curve for the Cape Vincent Gage from 1970-2010

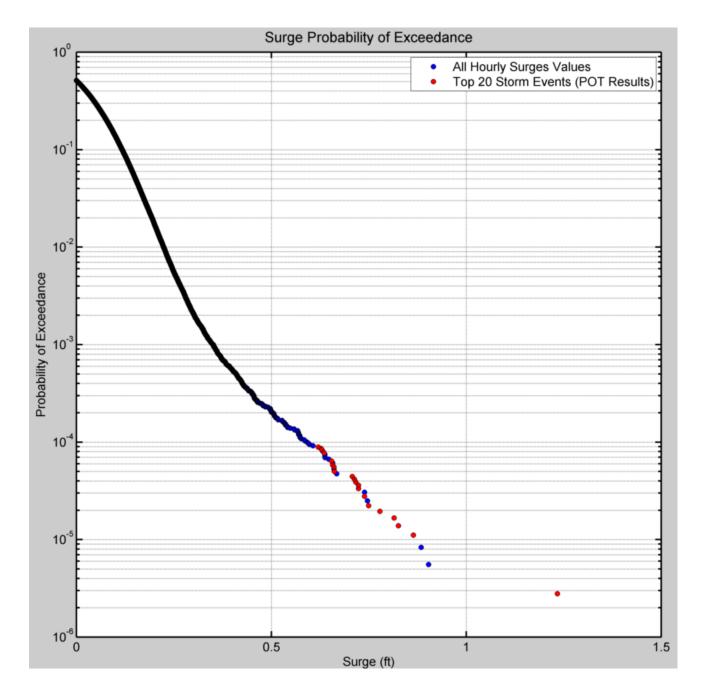


Figure A.11 Probability of Exceedance Curve for the Rochester Gage from 1970-2010

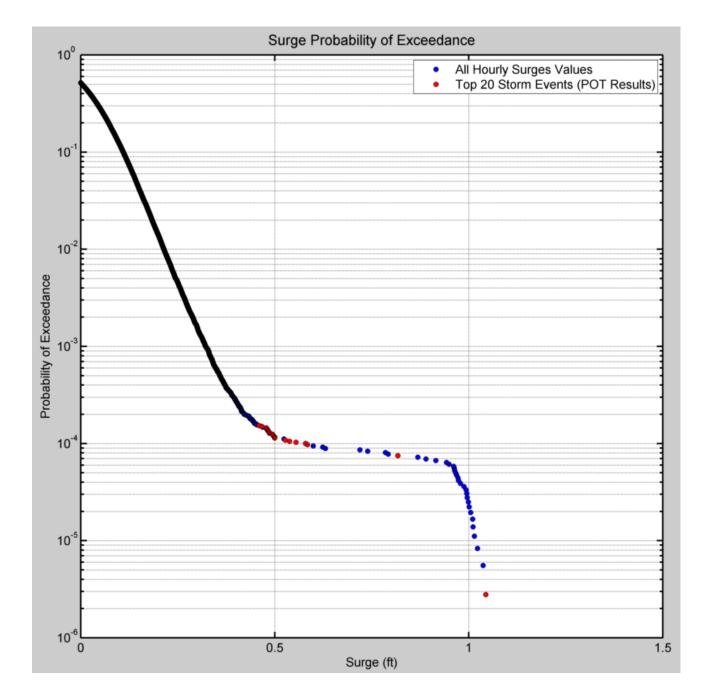


Figure A.12 Probability of Exceedance Curve for the Olcott Gage from 1970-2010

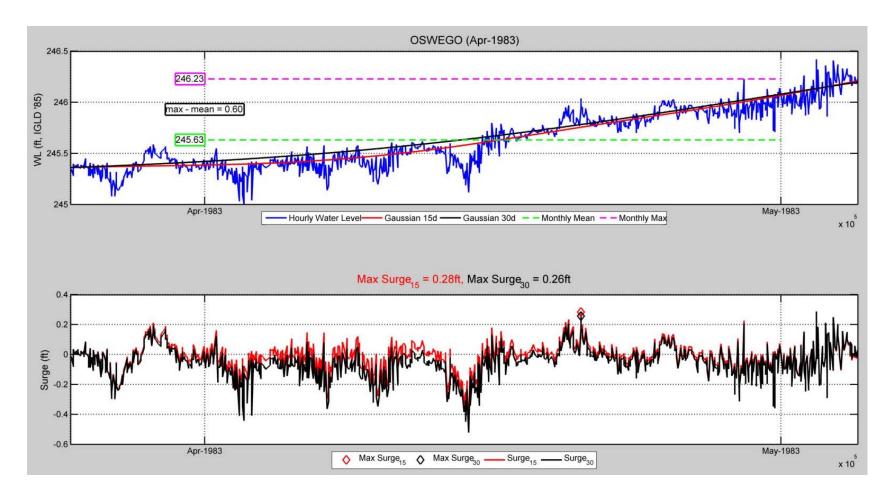


Figure A.13 Monthly Maximum minus Mean versus Hourly Surge Calculations for April 1983

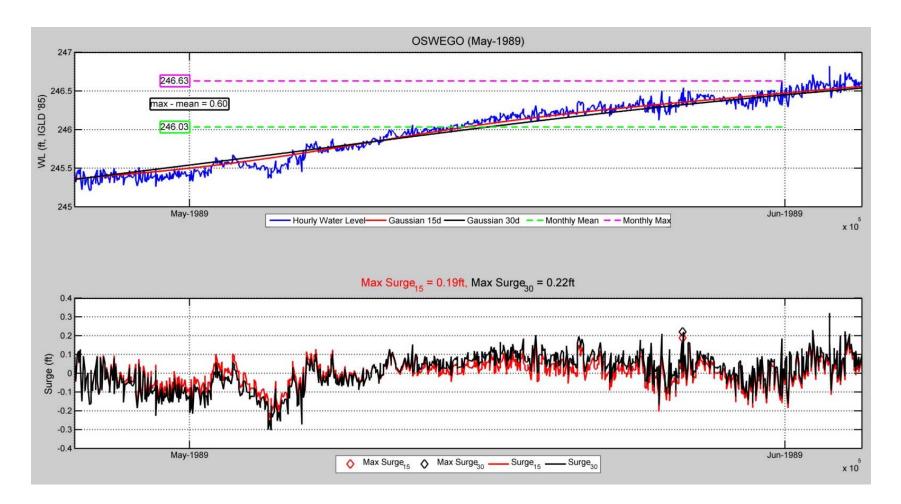


Figure A.14 Monthly Maximum minus Mean versus Hourly Surge Calculations for May 1989

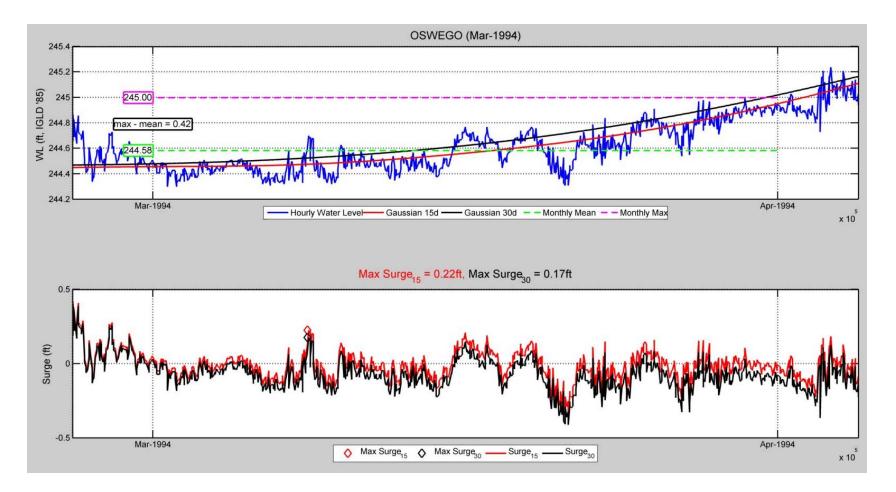
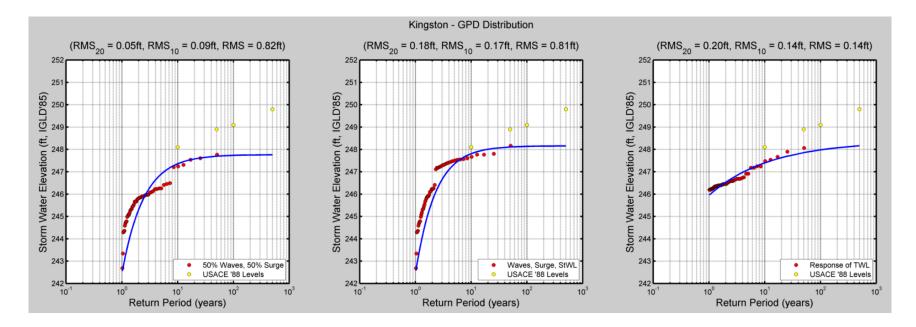
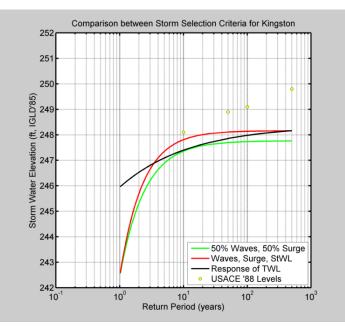
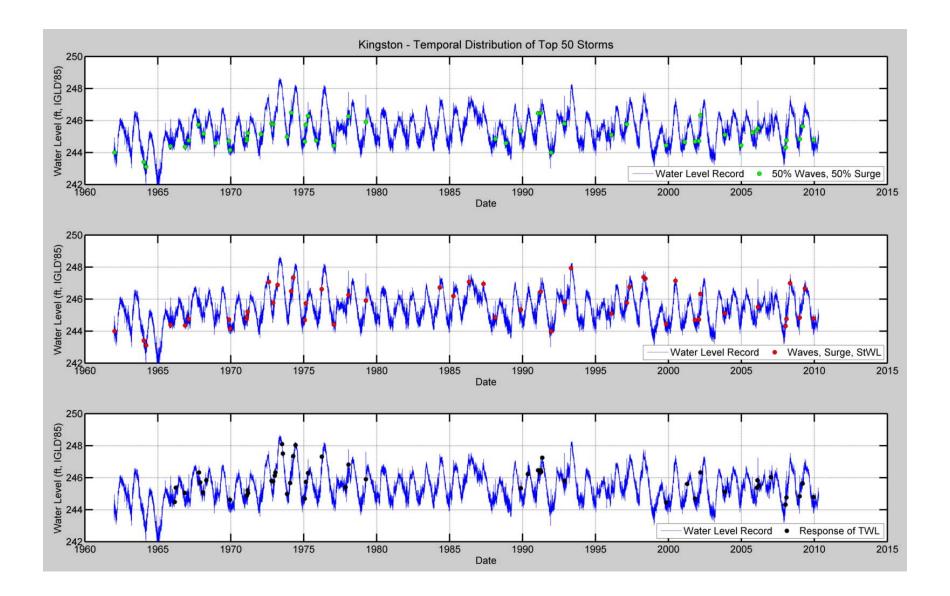


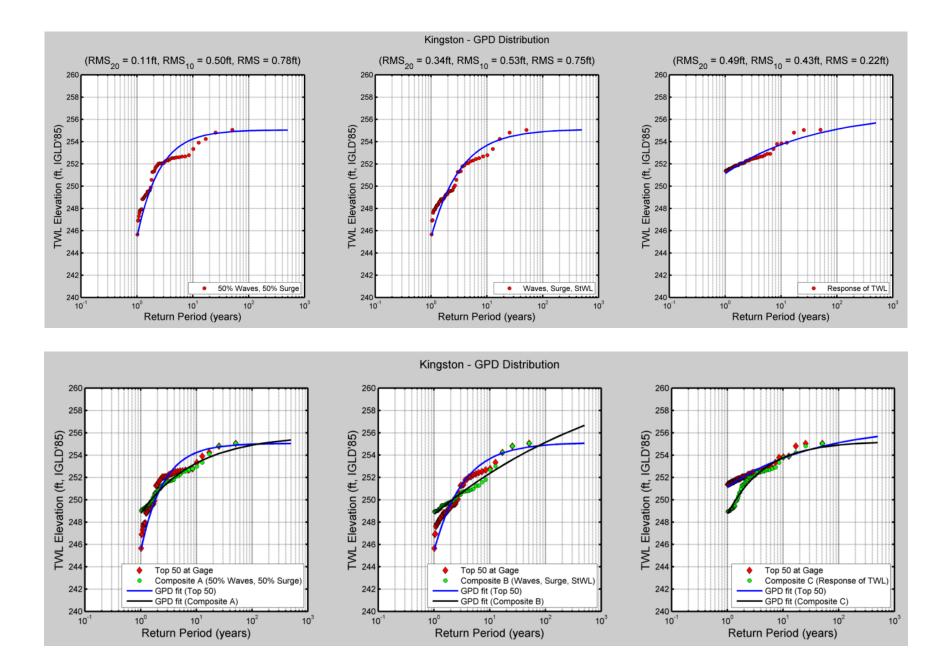
Figure A.15 Monthly Maximum minus Mean versus Hourly Surge Calculations for March 1994

APPENDIX B - STORM SELECTION ANALYSIS

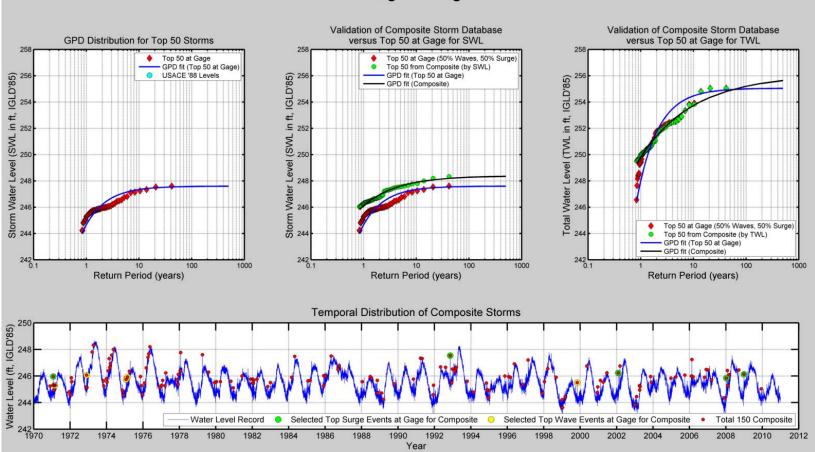




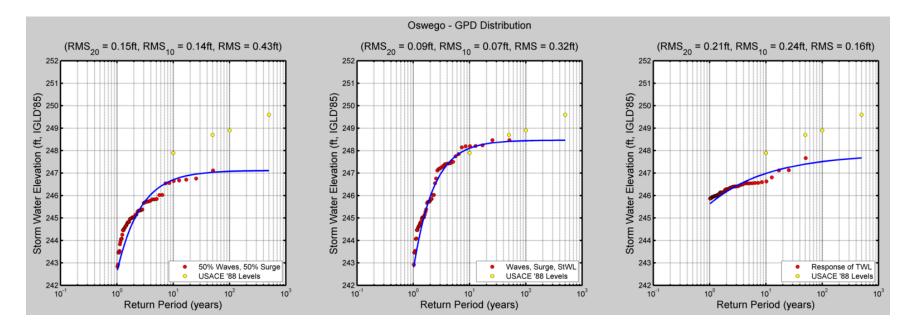


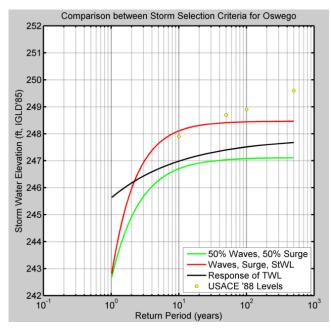


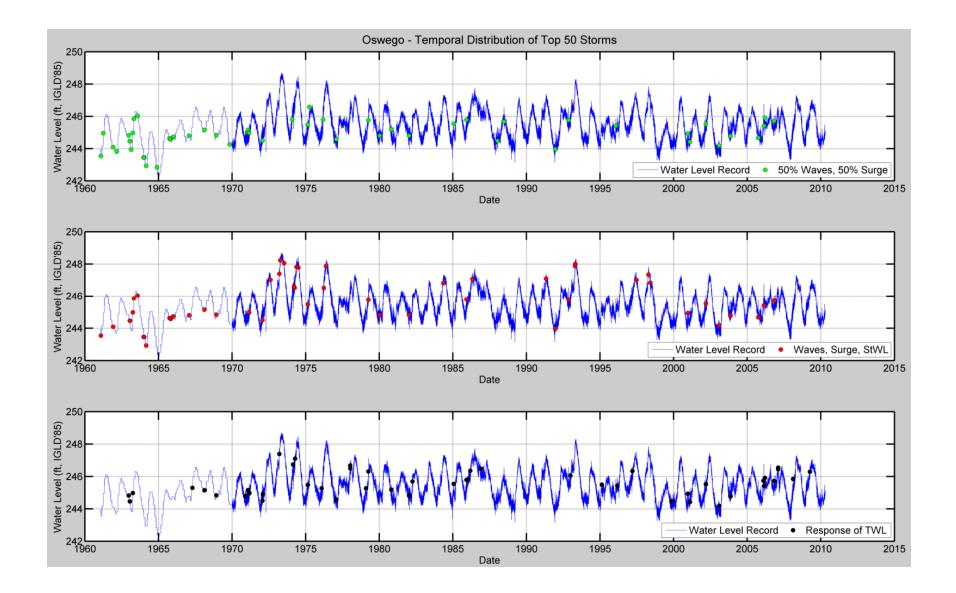
Final Analysis at Kingston

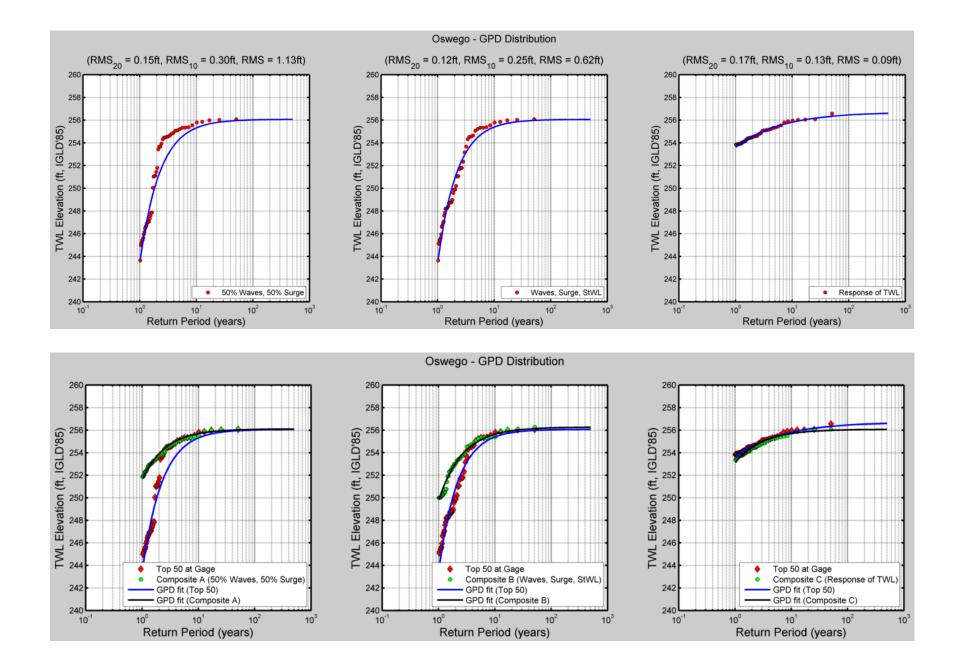


Kingston Gage

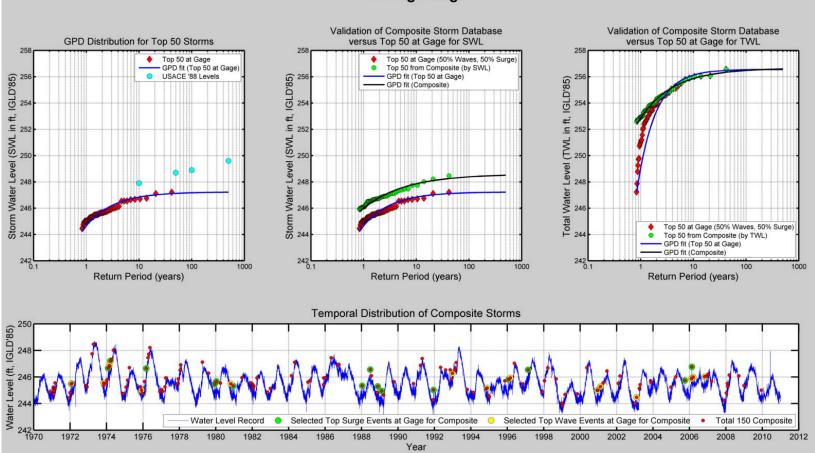




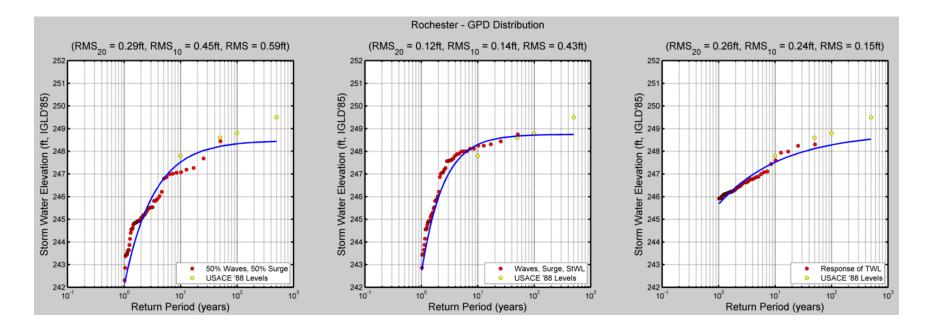


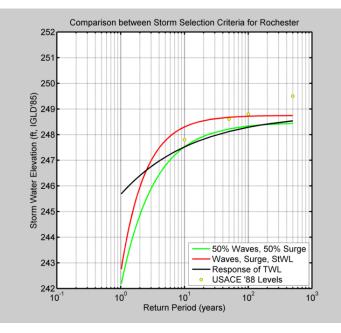


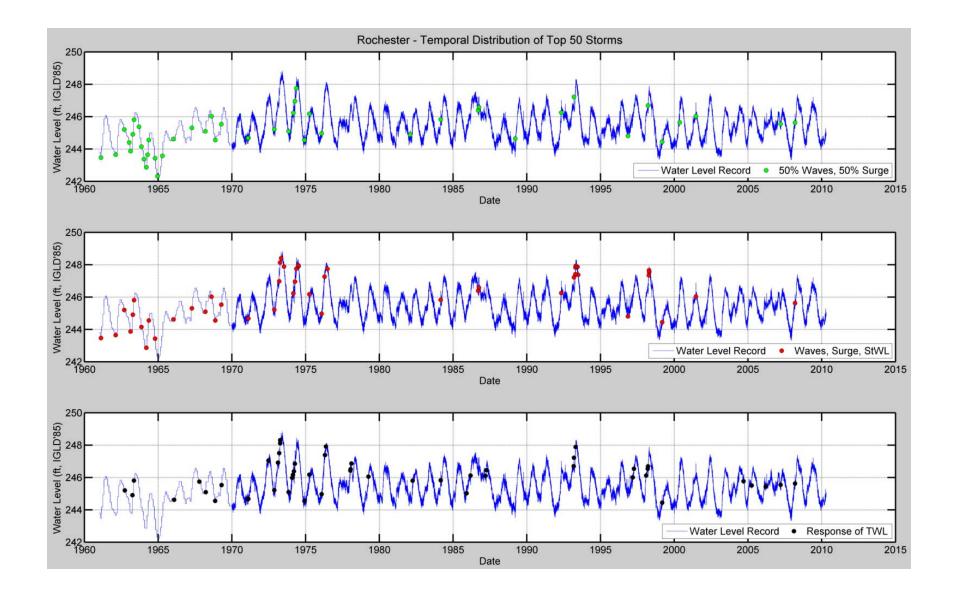
Final Analysis at Oswego

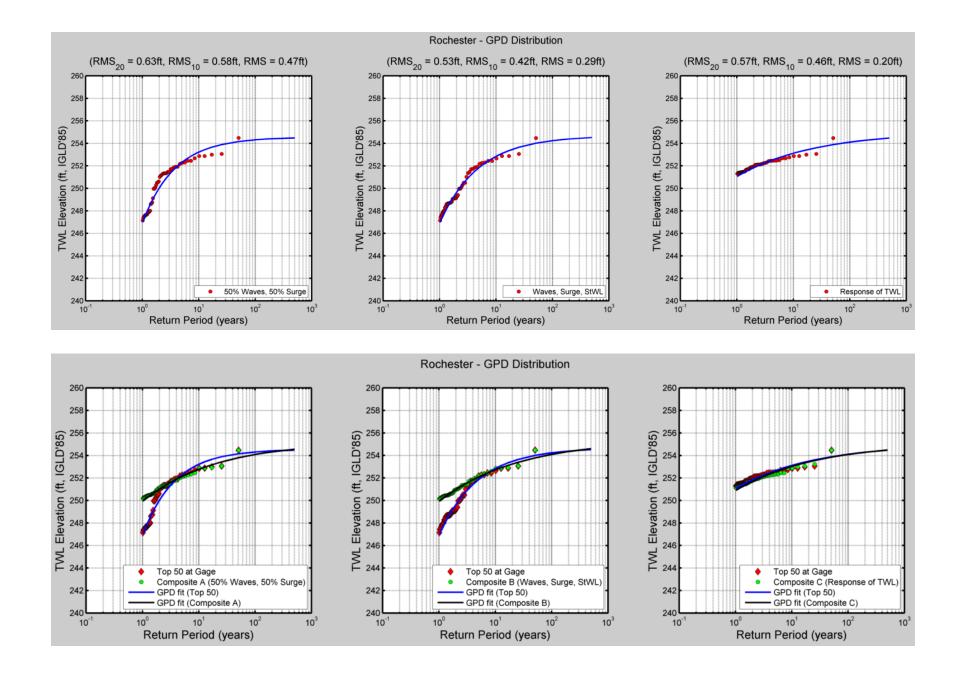


Oswego Gage

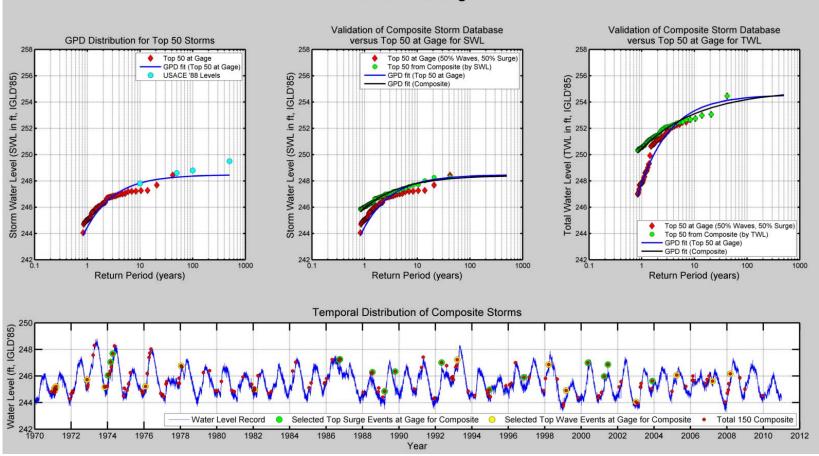




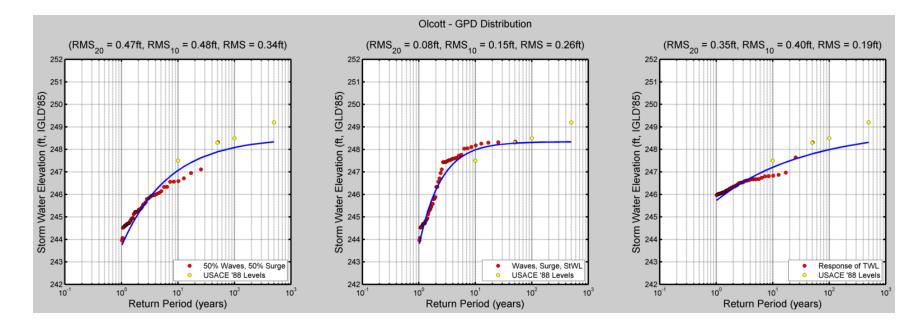


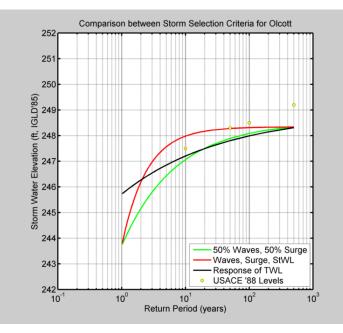


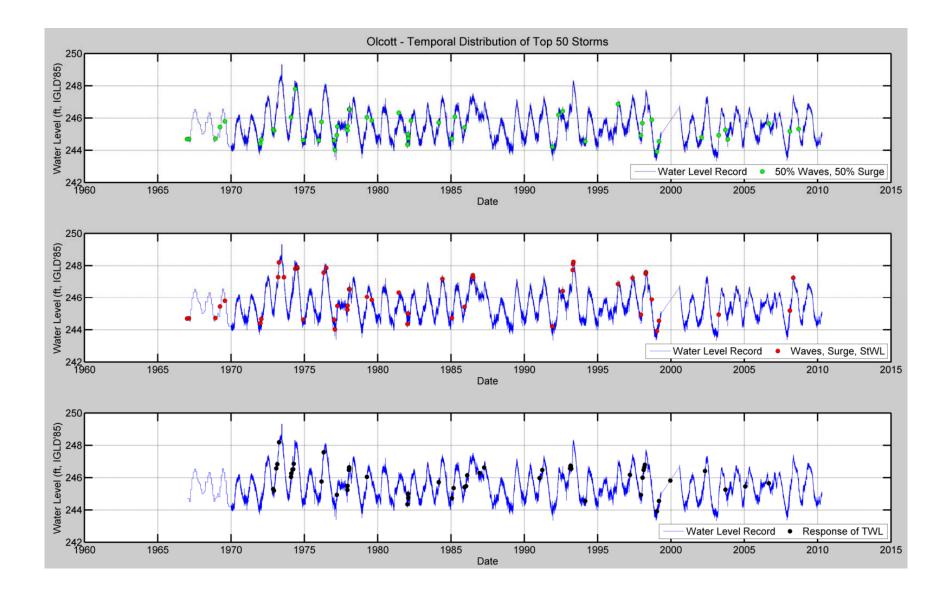
Final Analysis at Rochester



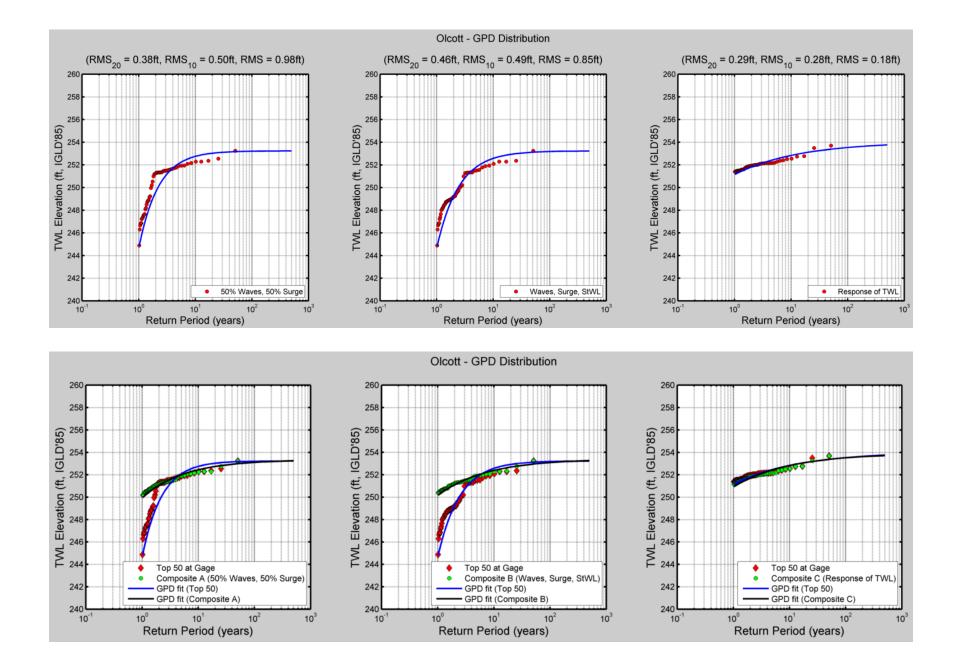
Rochester Gage



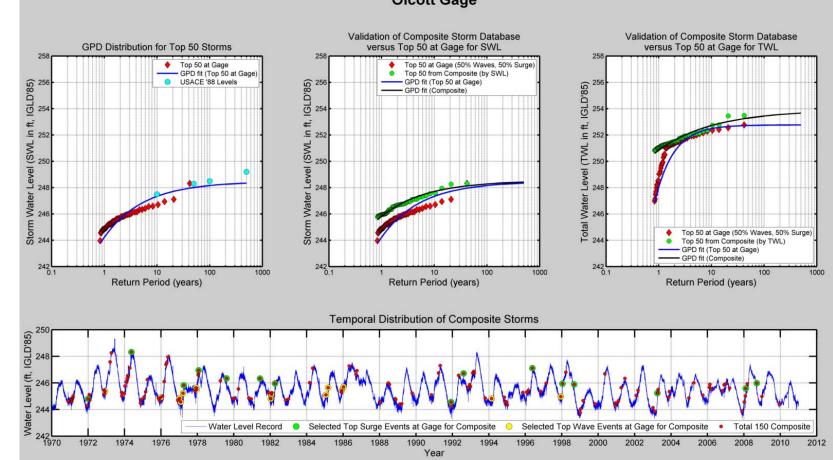




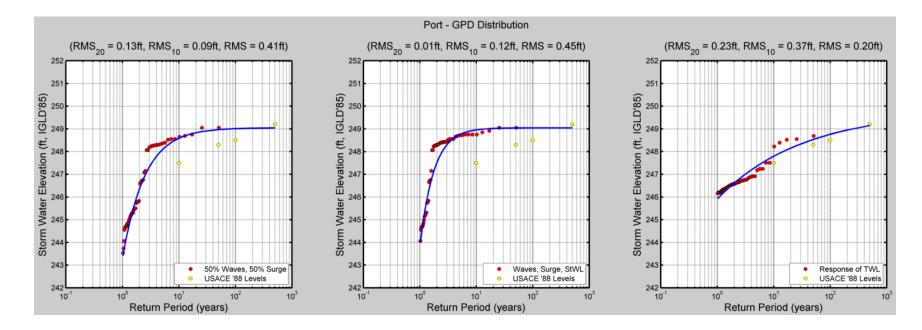
FEMA Lake Ontario Wave and Surge Modeling 11338.201

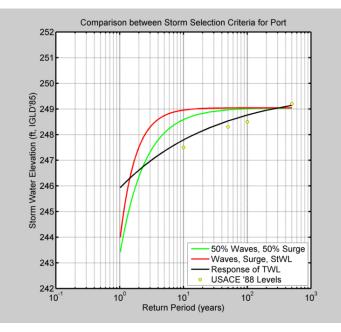


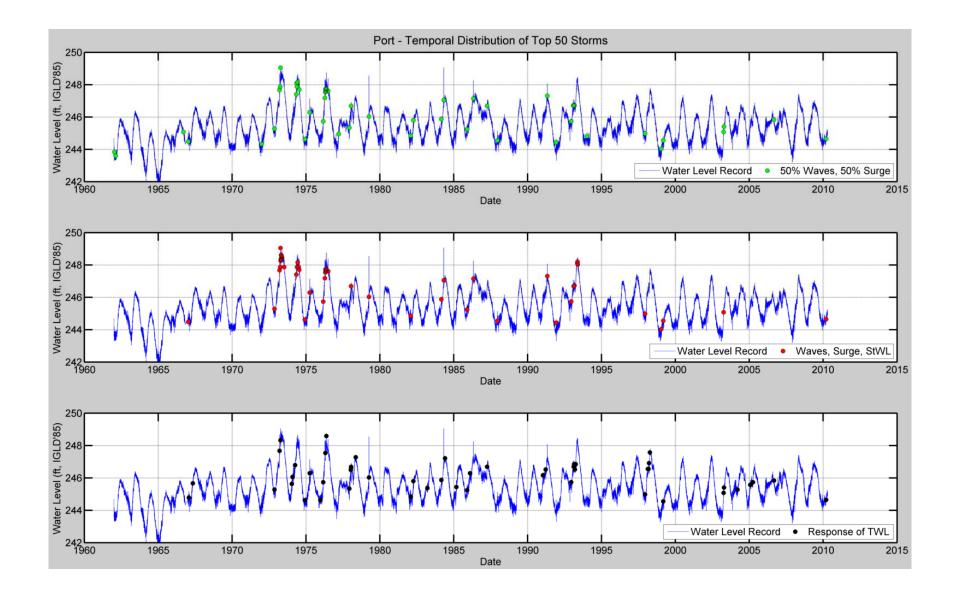
Final Analysis at Olcott

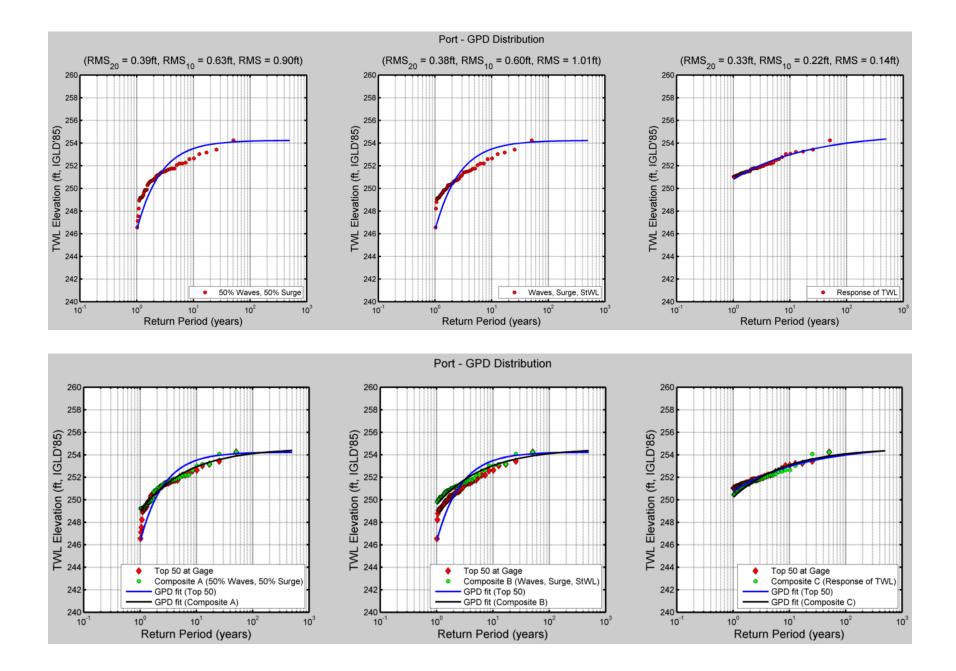


Olcott Gage

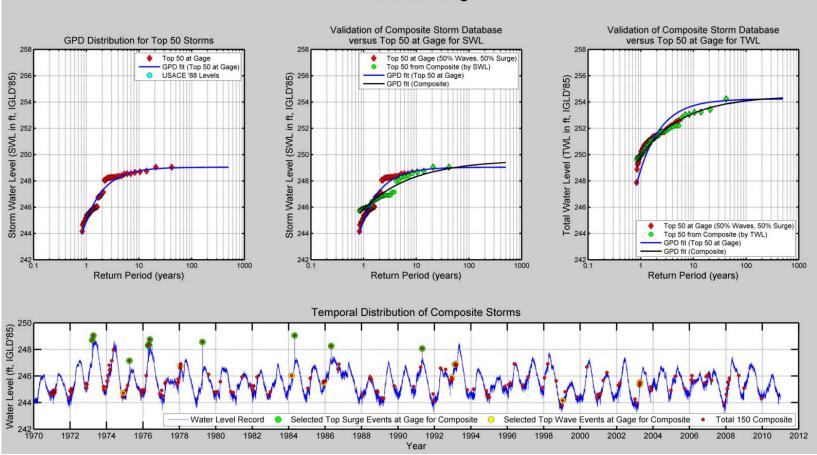






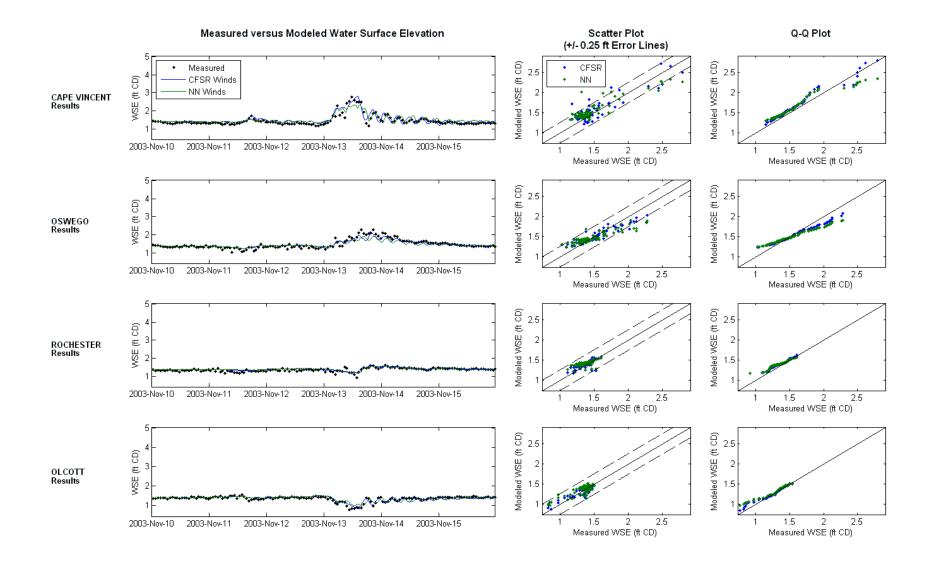


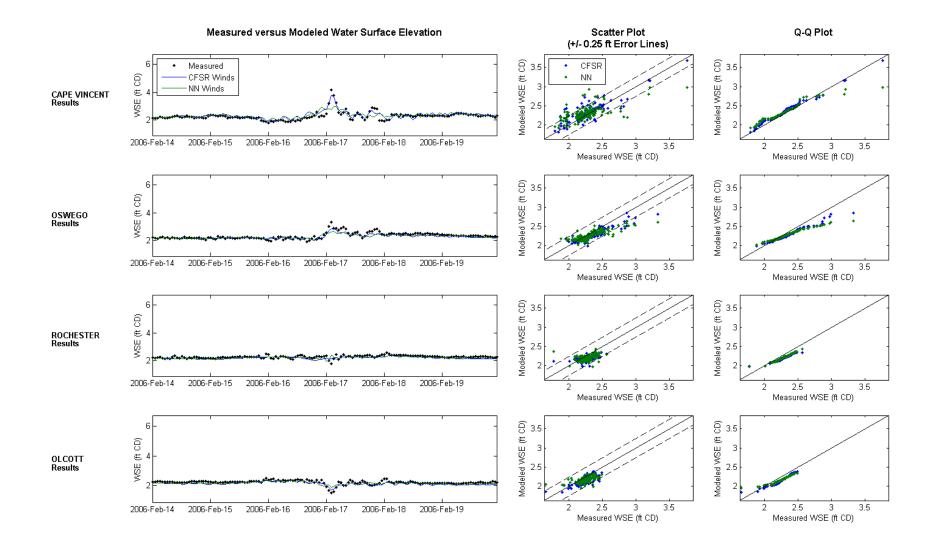
Final Analysis at Port Weller

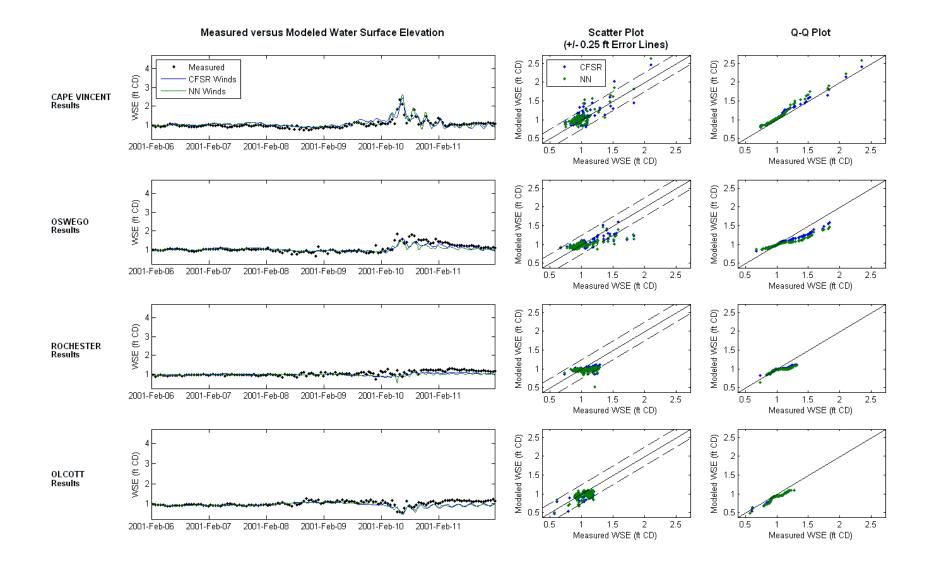


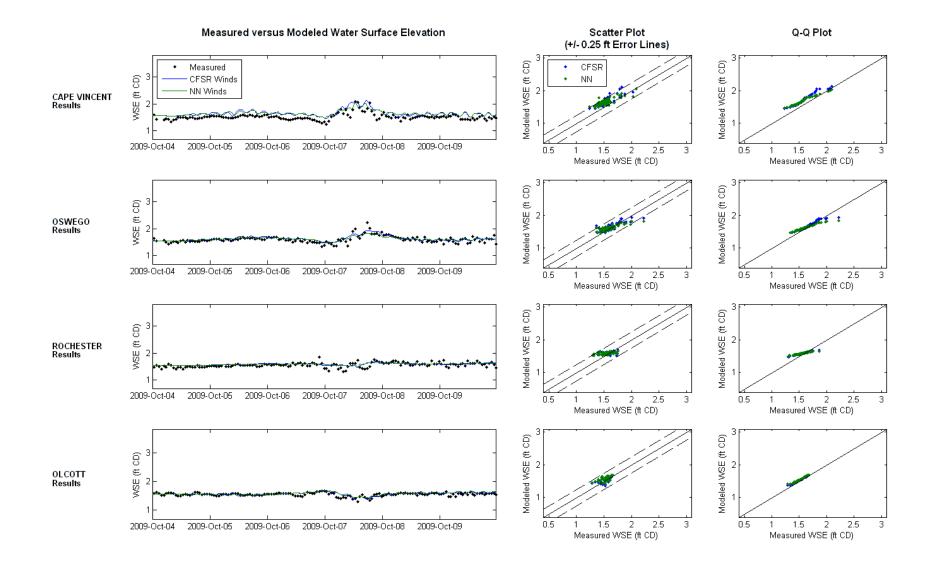
Port Weller Gage

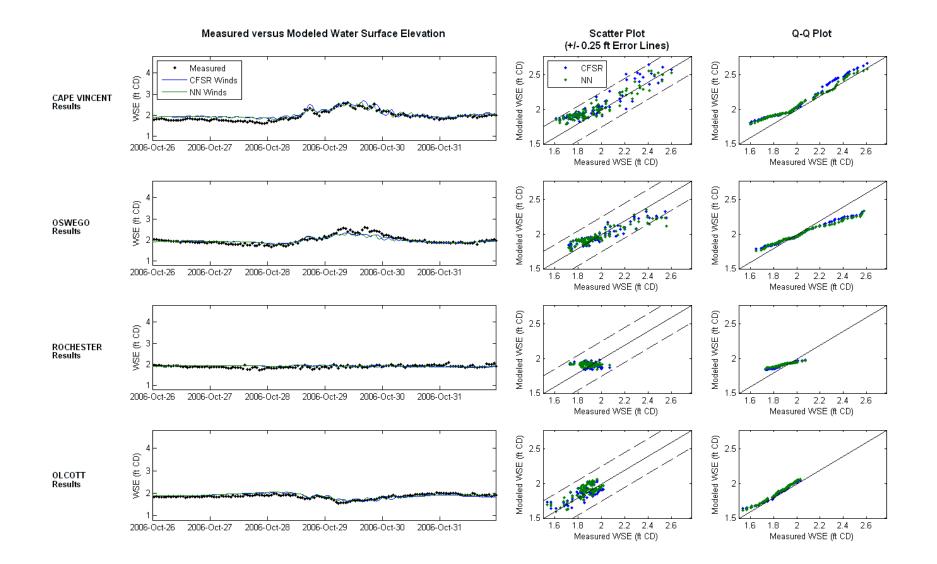
APPENDIX C - NATURAL NEIHBOR COMPARED TO CFSR WIND DATA

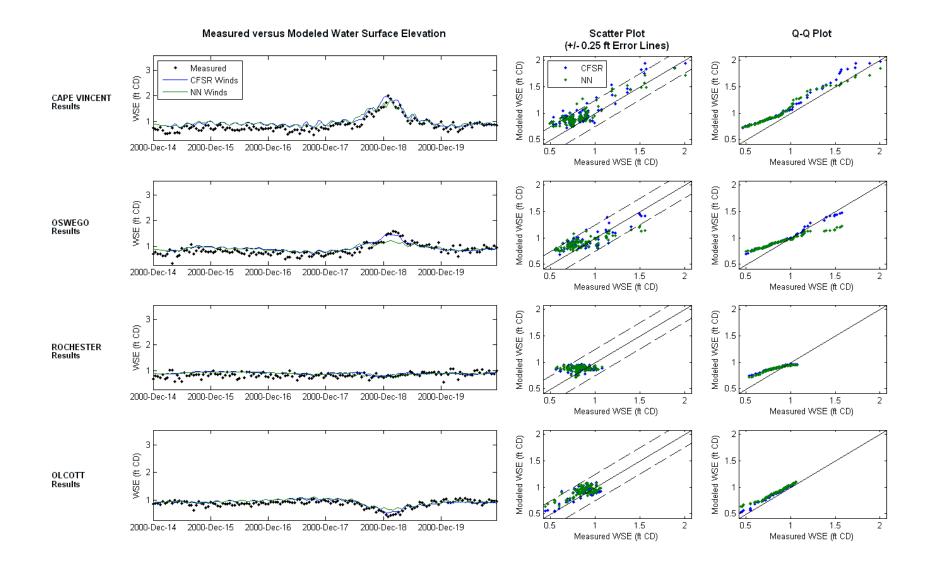






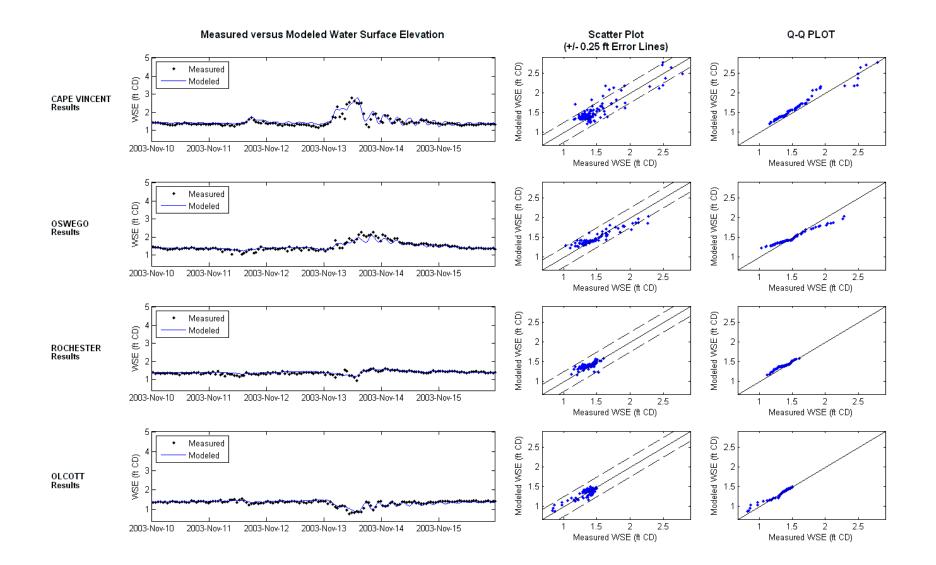


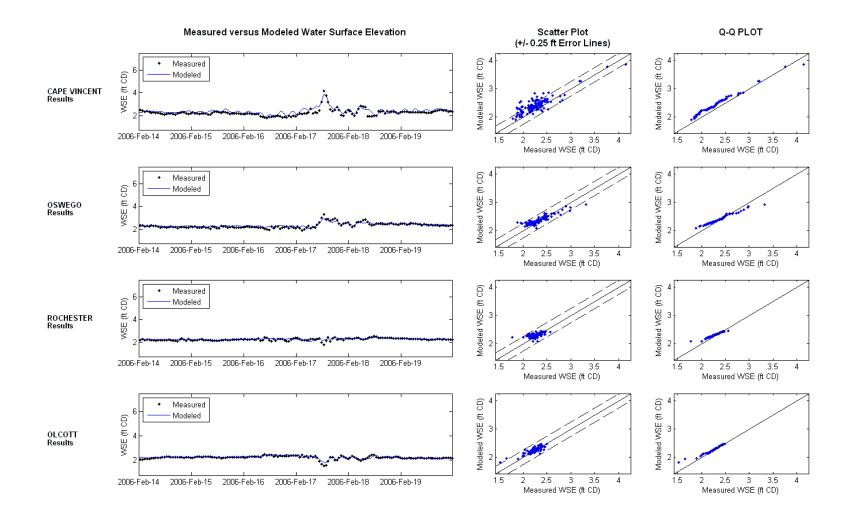


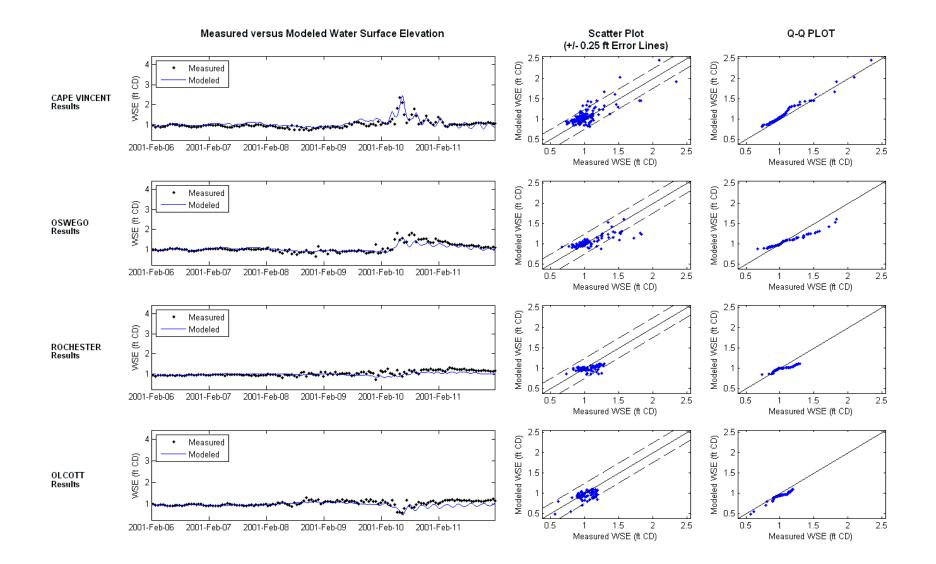


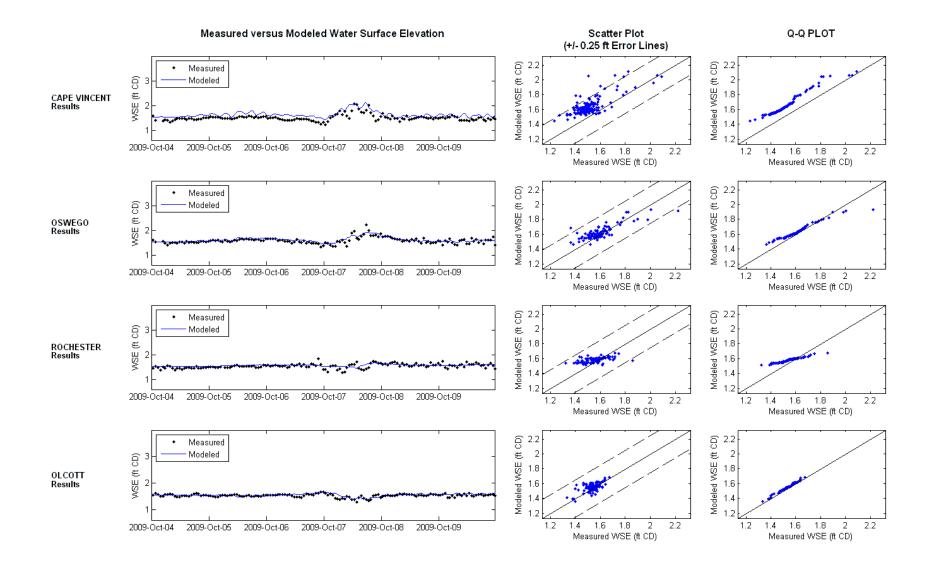
Baird & Associates

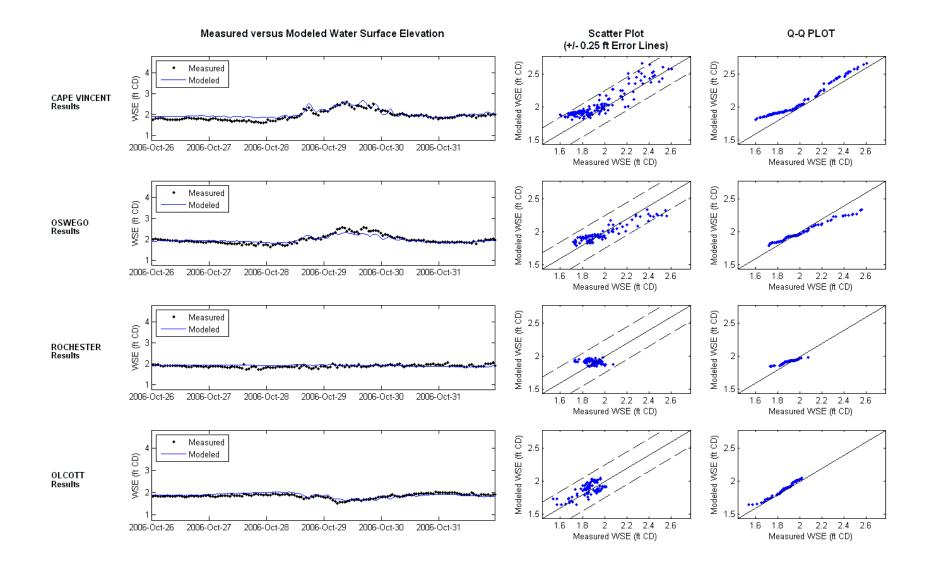
APPENDIX D - ADCIRC RESULTS

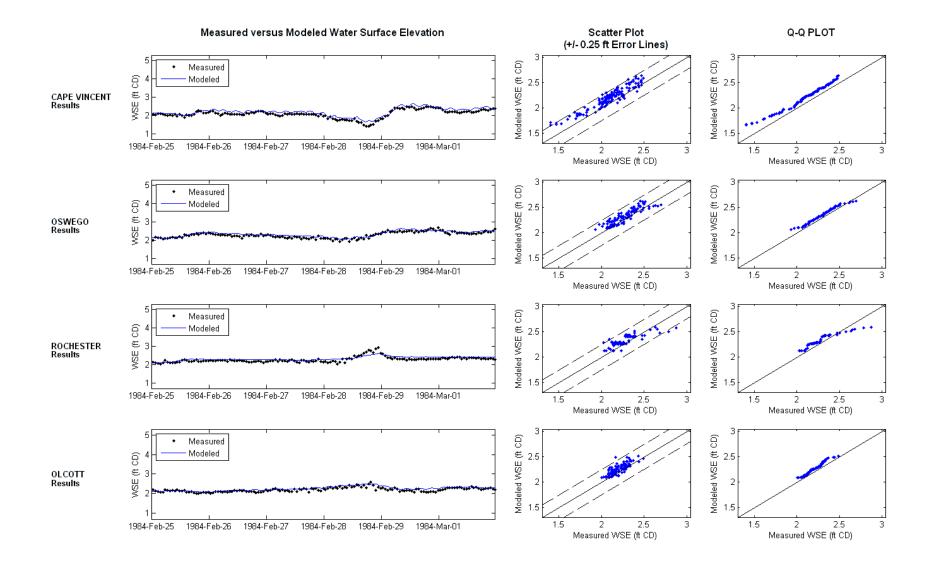












APPENDIX E – SWAN MODEL RESULTS USING CFSR AND NN WINDS

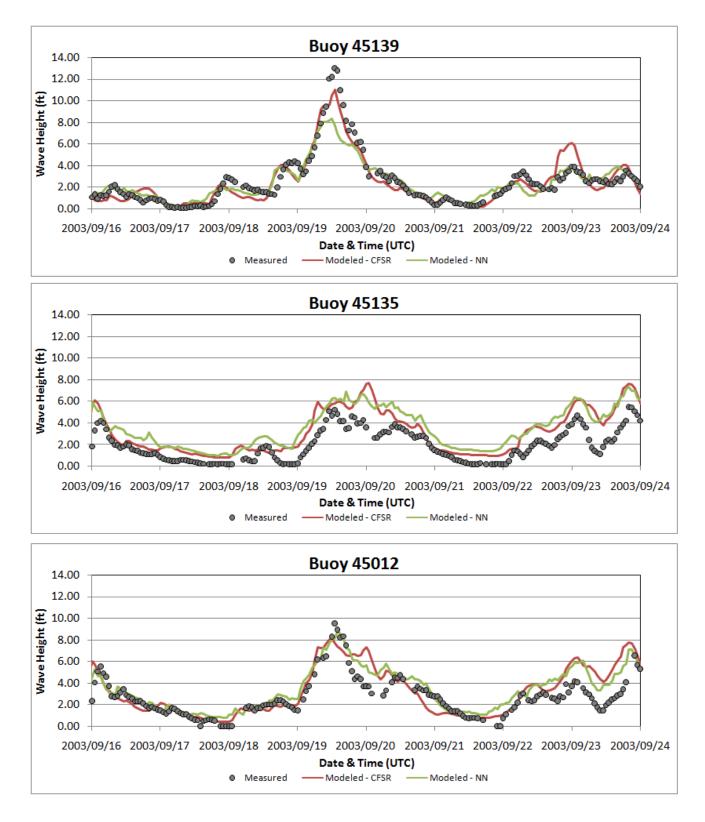


Figure A.1 Comparison of Predicted and Measured Wave Heights for the September 19, 2003 Storm Event

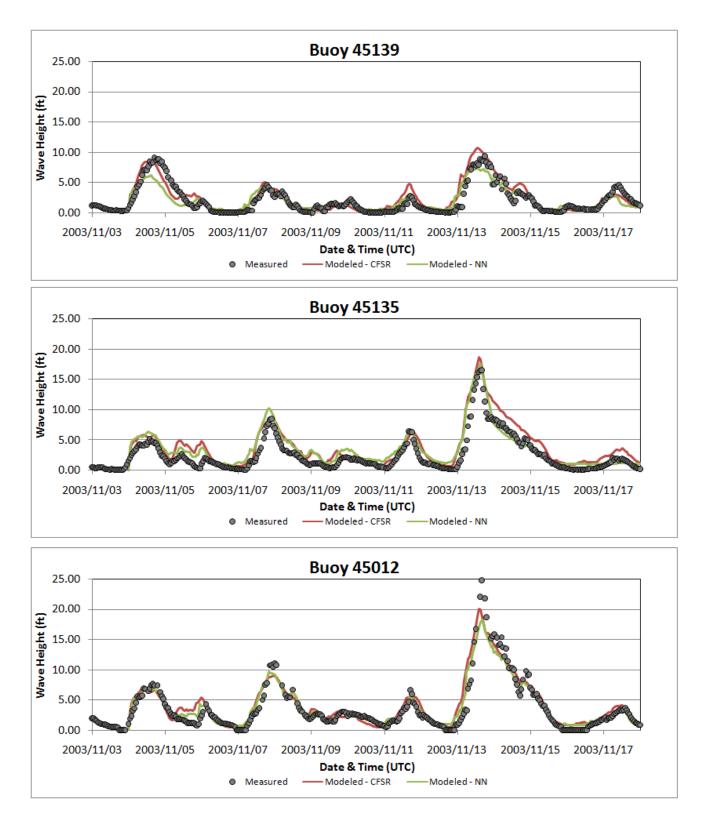


Figure A.2 Comparison of Predicted and Measured Wave Heights for the November 13, 2003 Storm Event

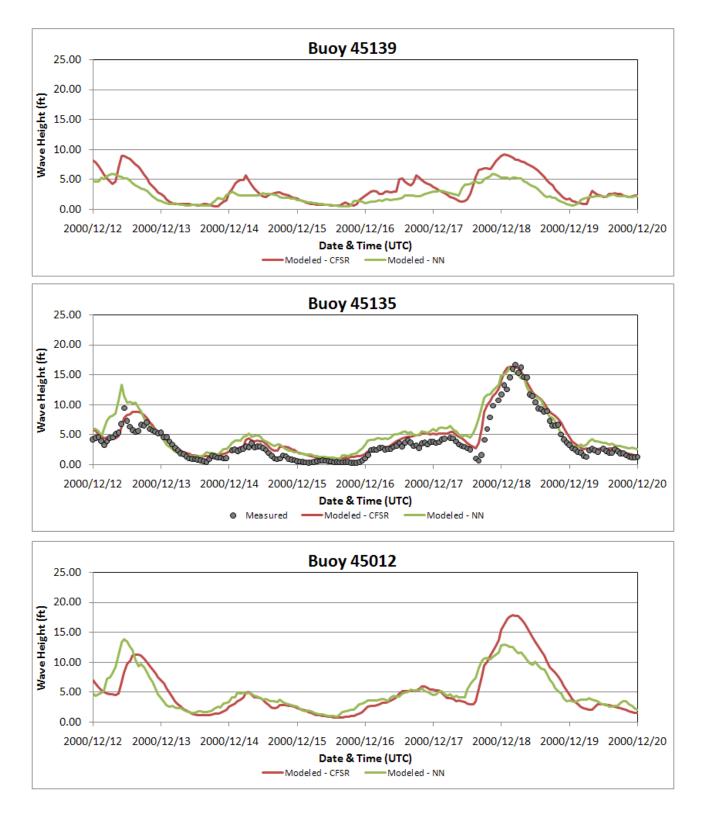


Figure A.3 Comparison of Predicted and Measured Wave Heights for the December 18, 2000 Storm Event

APPENDIX F - SWAN MODEL CALIBRATION PLOTS

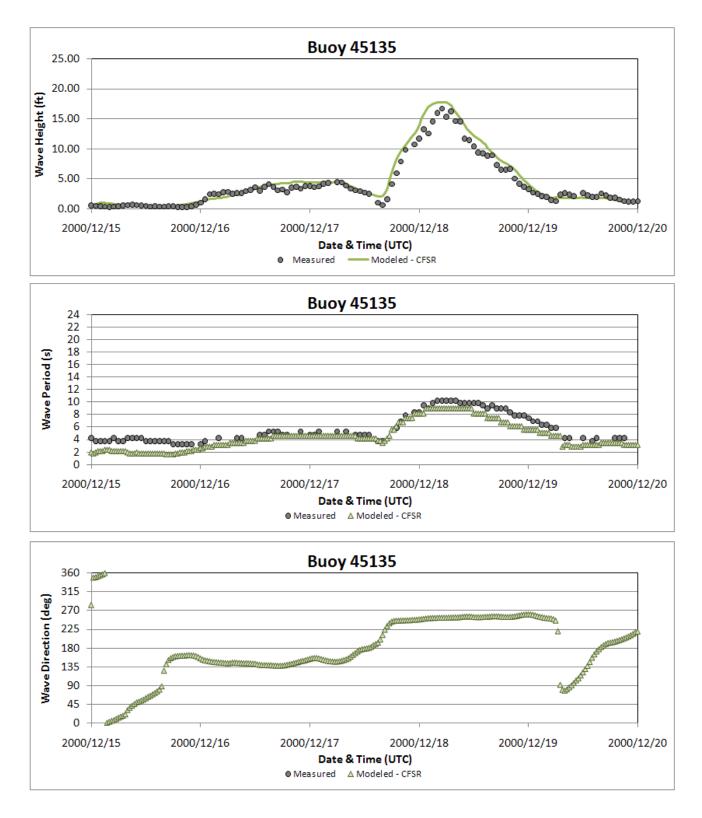


Figure B.1 Timeseries Comparison of Predicted and Measured Wave Conditions at Buoy 45135 (Storm Event: December 18, 2000)

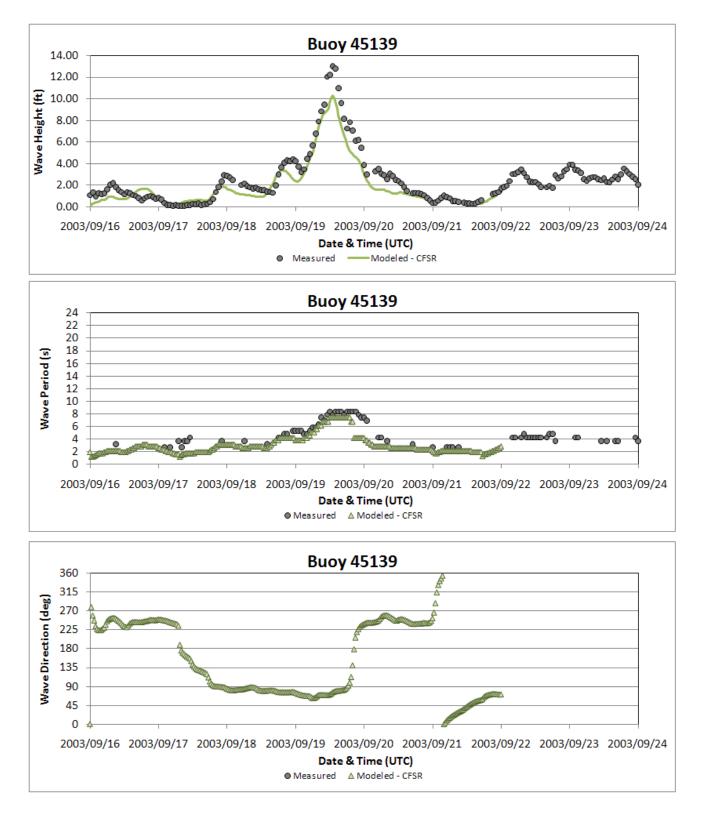


Figure B.2 Timeseries Comparison of Predicted and Measured Wave Conditions at Buoy 45139 (Storm Event: September 19, 2003)

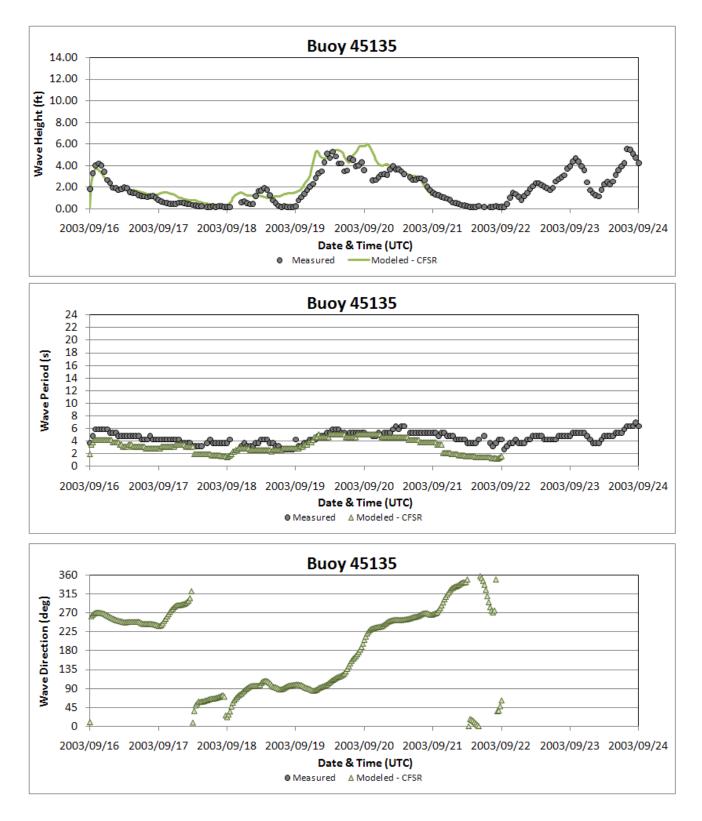


Figure B.3 Timeseries Comparison of Predicted and Measured Wave Conditions at Buoy 45135 (Storm Event: September 19, 2003)

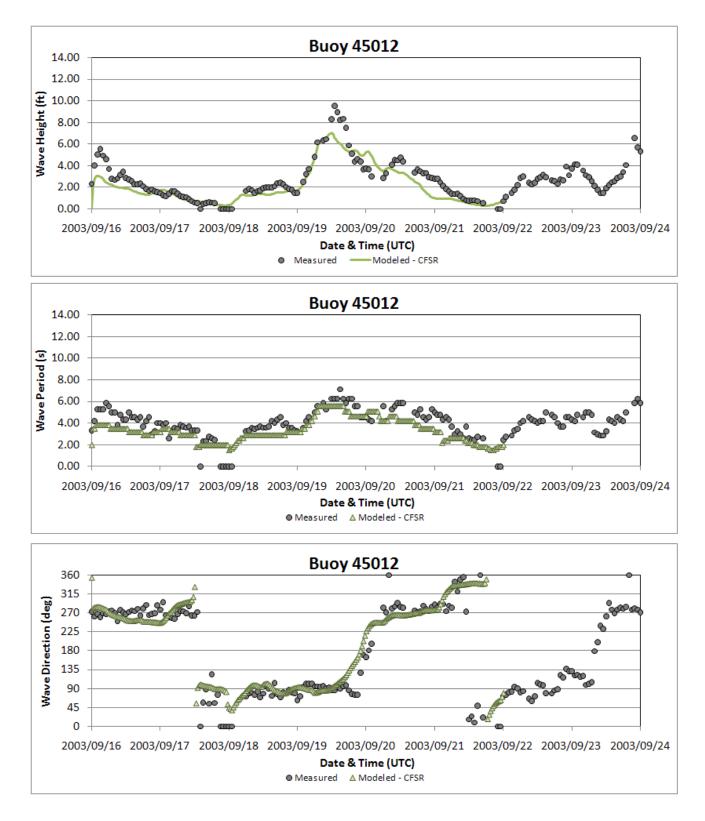


Figure B.4 Timeseries Comparison of Predicted and Measured Wave Conditions at Buoy 45012 (Storm Event: September 19, 2003)

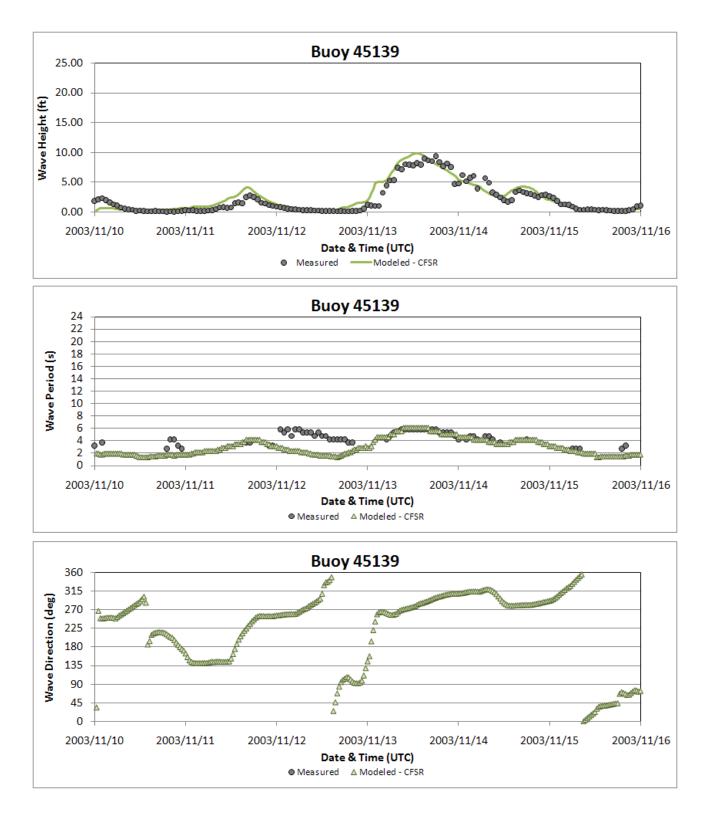


Figure B.5 Timeseries Comparison of Predicted and Measured Wave Conditions at Buoy 45139 (Storm Event: November 13, 2003)

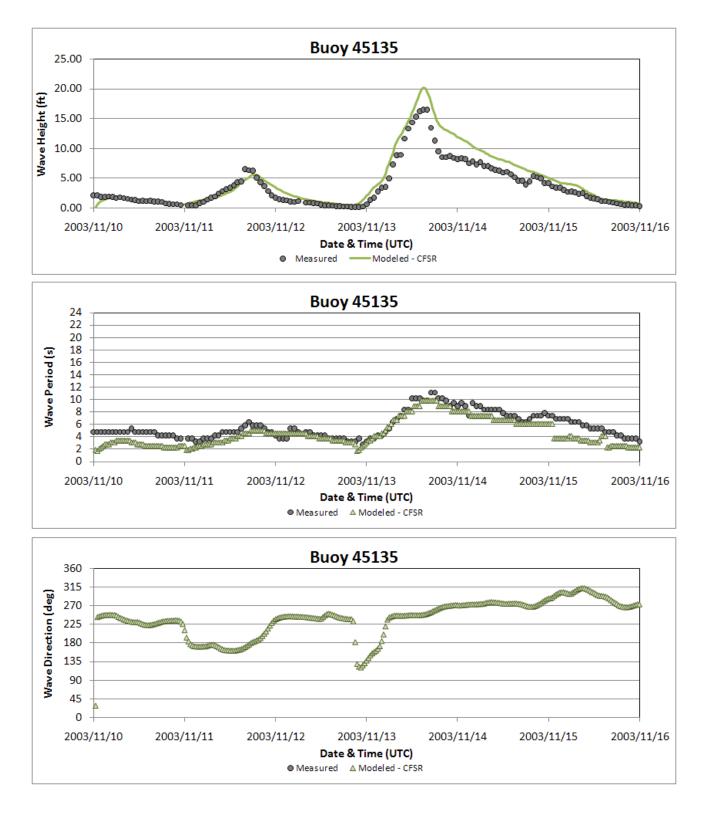


Figure B.6 Timeseries Comparison of Predicted and Measured Wave Conditions at Buoy 45135 (Storm Event: November 13, 2003)

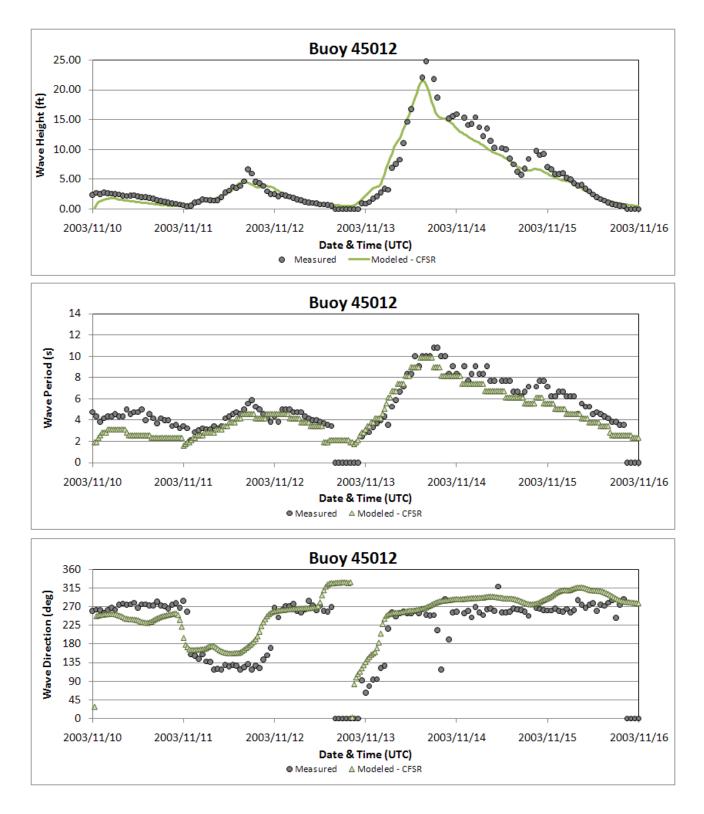


Figure B.7 Timeseries Comparison of Predicted and Measured Wave Conditions at Buoy 45012 (Storm Event: November 13, 2003)

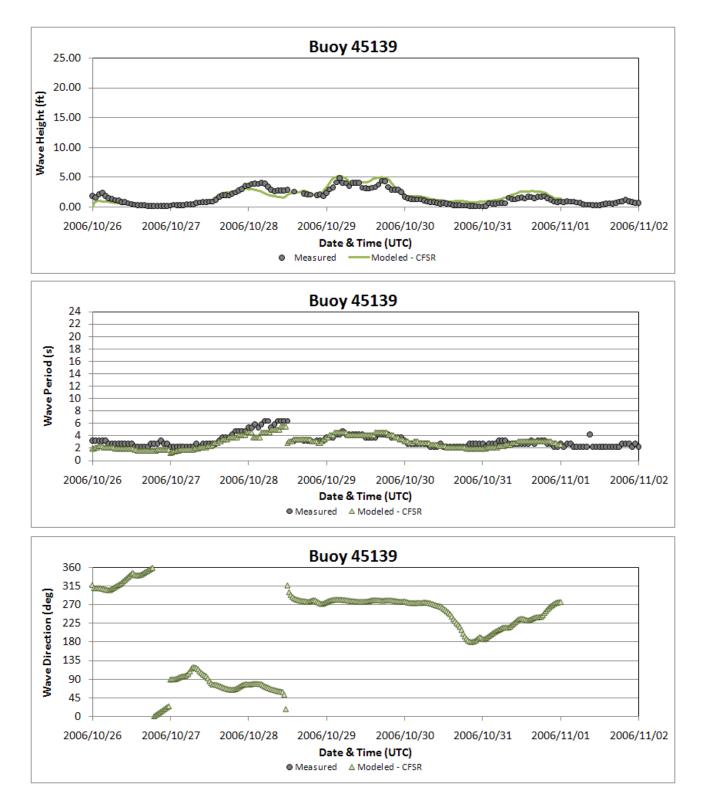


Figure B.8 Timeseries Comparison of Predicted and Measured Wave Conditions at Buoy 45139 (Storm Event: October 29, 2006)

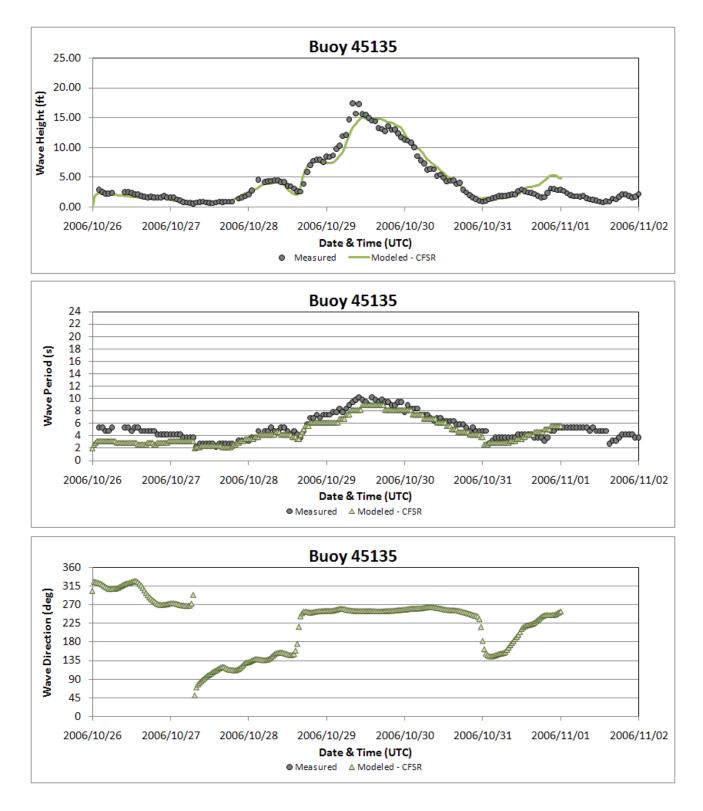


Figure B.9 Timeseries Comparison of Predicted and Measured Wave Conditions at Buoy 45135 (Storm Event: October 29, 2006)

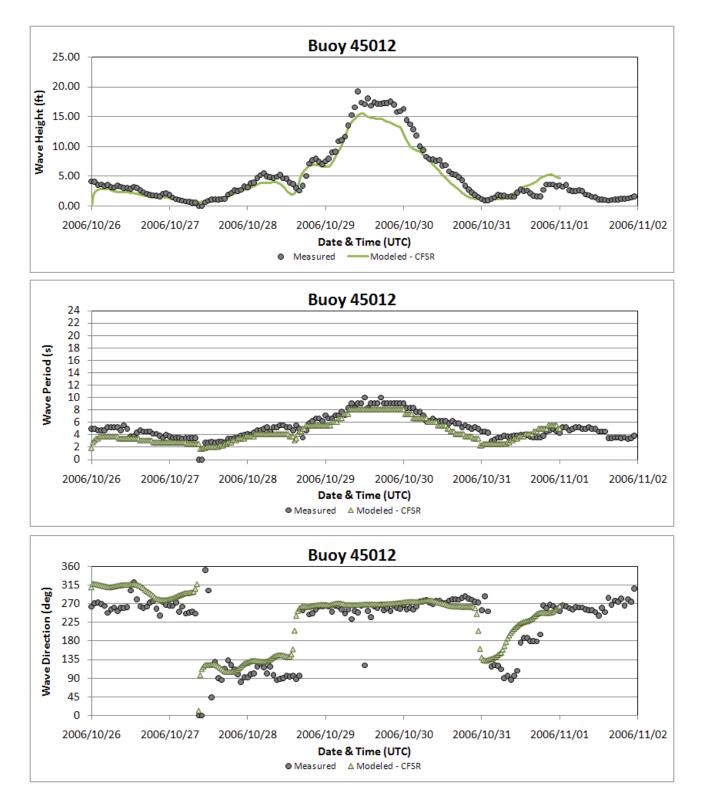


Figure B.10 Timeseries Comparison of Predicted and Measured Wave Conditions at Buoy 45012 (Storm Event: October 29, 2006)

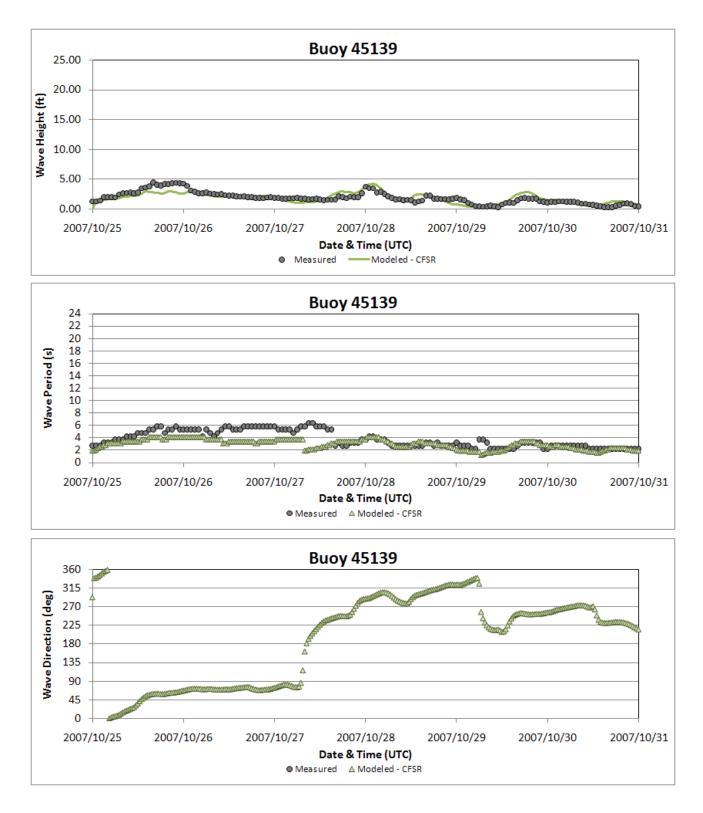


Figure B.11 Timeseries Comparison of Predicted and Measured Wave Conditions at Buoy 45139 (Storm Event: October 28, 2007)

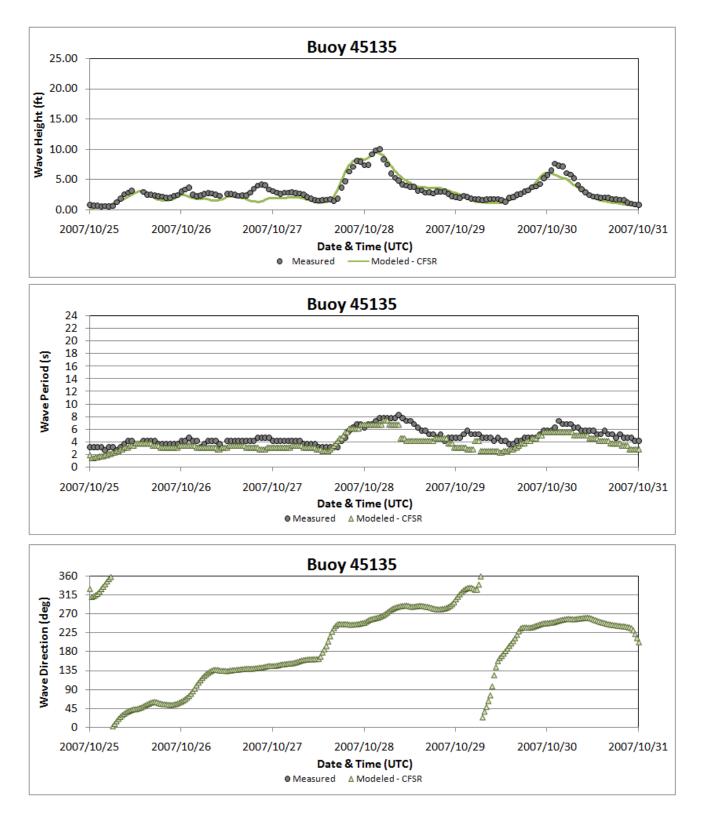


Figure B.12 Timeseries Comparison of Predicted and Measured Wave Conditions at Buoy 45135 (Storm Event: October 28, 2007)

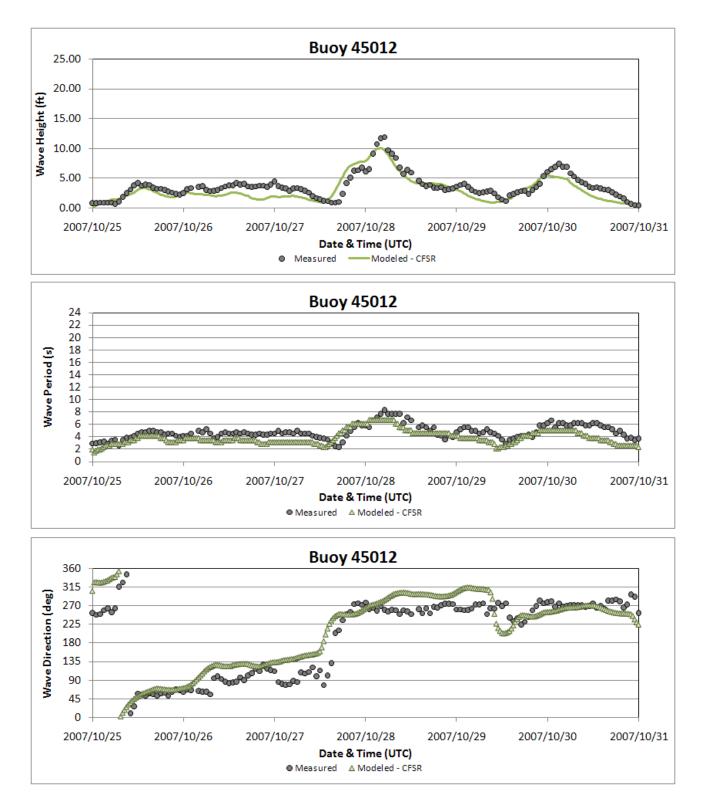


Figure B.13 Timeseries Comparison of Predicted and Measured Wave Conditions at Buoy 45012 (Storm Event: October 28, 2007)

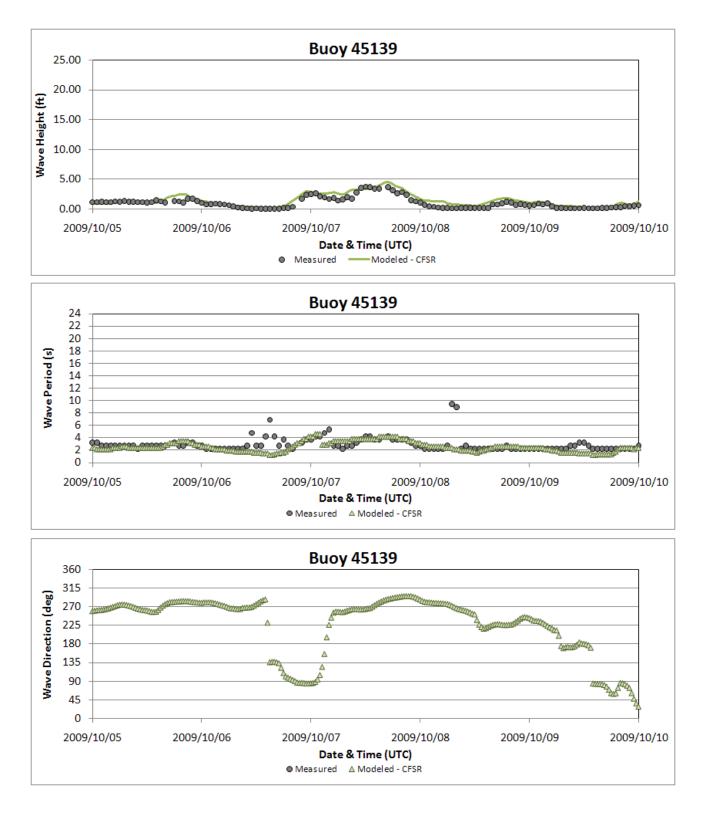


Figure B.14 Timeseries Comparison of Predicted and Measured Wave Conditions at Buoy 45139 (Storm Event: October 7, 2009)

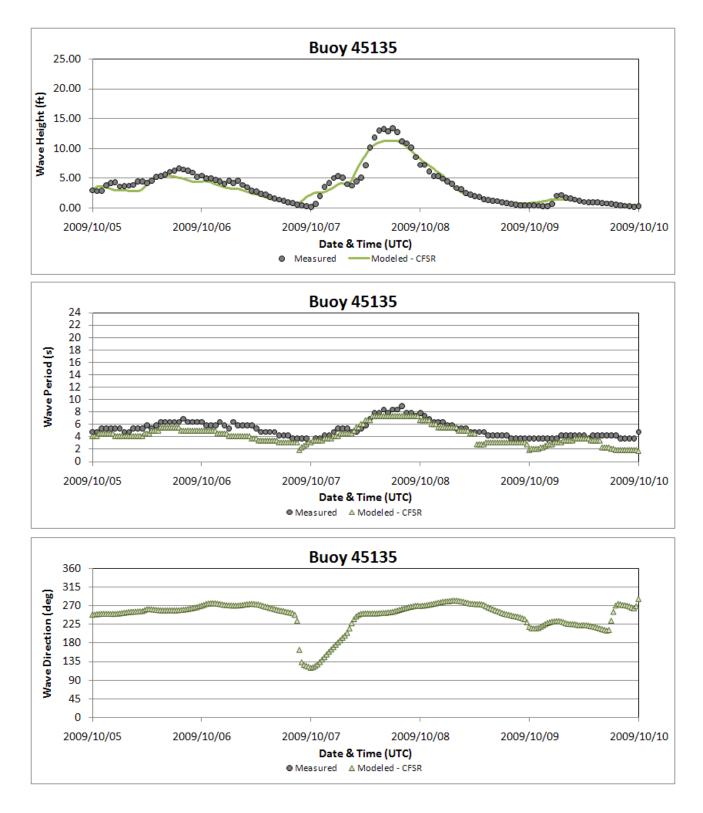


Figure B.15 Timeseries Comparison of Predicted and Measured Wave Conditions at Buoy 45135 (Storm Event: October 7, 2009)

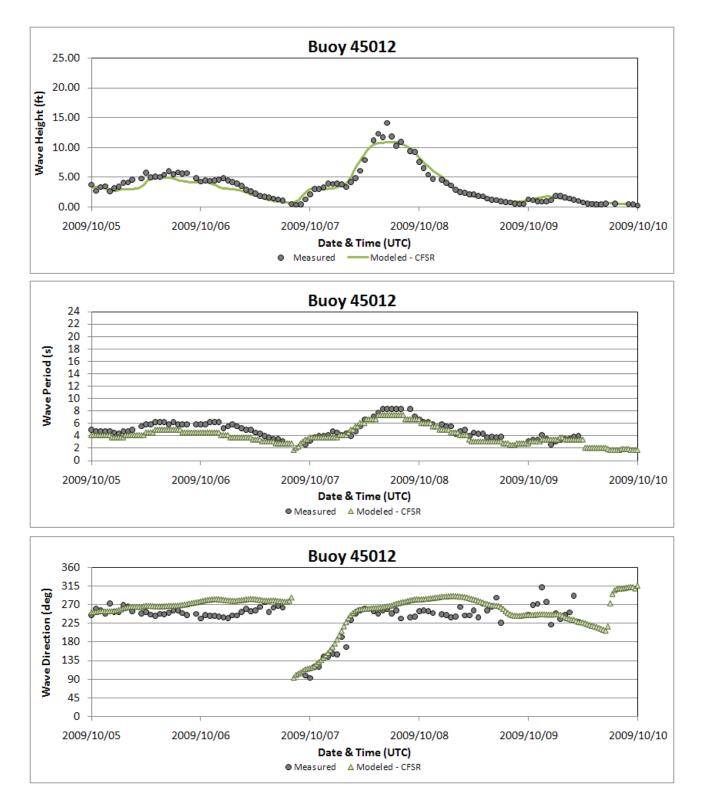


Figure B.16 Timeseries Comparison of Predicted and Measured Wave Conditions at Buoy 45012 (Storm Event: October 7, 2009)

APPENDIX G – QAQC FORMS

ADCIRC RE	VIEW					
Storm:		Storm001	_197904030	0		
Reviewer:		Betsy Hic				
Organization:		RAMPP				
Date Checked:	:	4/4/2012				
Was the max water surface elevation file c			ecked for and	omalies?		Yes
Was the max c	current velocity	file checked f	or anomalies'	?		Yes
Was the max w	vind velocity f	ile checked for	anomalies?			Yes
Was the minin	num pressure f	ile checked for	anomalies?			Yes
Was the model	l time series ou	tput compared	to the measu	red gage data?		Yes
			Is	sues		
File		ment		Resolution		Verification
Maxele.63	High surface elevation/vel the Niagara I	ocity along	resolved ba surge level levels in th support flo outside the	e to model boundary effects and j athymetry. This effect does not is in the lake. Note that predicted he Niagara River are not to be use bod mapping in the river as it fall e scope of work and the model is solve the river in detail.	impact d surge ed to s	BSH
Maxele.63	Noisy at the shoreline along Wayne and Monroe Counties (New York)		The variations in SE along the shore are the result of changes in the velocity head that are due to variations in the bathymetry under strong shore parallel wind conditions.			BSH
Maxwvel.63	Sharp gradien velocity alon edge of the la	g the eastern	-			BSH
Maxwvel.63	Anomalous g west of the N – not as pron other storms	gradient just liagara River	Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email		hat this r surface	BSH
Maxwvel.63, minpr.63	Sharp gradien Irondequoit a Bays	and Sodus	correspond	lence titled Run QC dated May 2	2012.	BSH
Additional Con						
	Comn	nent		Resolution		Verification
Reviewer Sign	ature:	Biti	y His			1
Date:		6/5/2012				

ADCIRC REVI	EW				
Storm:	S	torm002_1980010900			
Reviewer:		etsy Hicks			
Organization:	R	RAMPP			
Date Checked:		/5/2012			
		e checked for anomalies?	Yes		
	rrent velocity file check		Yes		
	nd velocity file checked		Yes		
	m pressure file checked		Yes		
Was the model ti	ime series output comp	ared to the measured gage data?	Yes		
T '1	Gumment	Issues	XI		
File Maxele.63	Comment	Resolution	Verification BSH		
Maxele.05	High surface elevation/velocity along the Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	БЭП		
Maxele.63	Some noise at the shoreline, appears to be low at "headlands" and higher in embayments	The variations in SE along the shore are the result of changes in the velocity head that are due to variations in the bathymetry under strong shore parallel wind conditions.	BSH		
Maxwvel.63	Area with zero wind	Ice fields of 100% are represented by areas of zero wind. Refer to Section 6.1.3 in Baird Lake Ontario report, which describes ice implementation methodology.	BSH		
Maxwvel.63	Horizontally oriented gradient in the western end of the lake	Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH		
Maxwvel.63	Node 92161 higher than adjacent nodes	This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.	BSH		
Meas v model	Model appears to be over predicting in the Cape Vincent area	The starting water surface elevation in the model is set to the average of all four gauges. In this storm it appears that the water level at Cape Vincent at the start of the storm was lower than the other gauges causing an overprediction in SE. Note that, Cape	BSH		

	water levels can be infl conditions that are not Discrepancy between n be expected when com events. When analyzed storms, the Q-Q plots a agreement between me	e St. Lawrence River where uenced by downstream included in the model. nodeled and measured data is to paring against numerous storm d statistically as a population of the Cape Vincent showed good asured and modeled surface 6.6 of Baird Lake Ontario	
Additional Comments on Deta	ailed Check		
C	omment	Resolution	Verification
D			
Reviewer Signature:	Bitry Hick	2	
Date:	6/5/2012		

ADCIRC REV	TEW					
Storm:		Storm00	3_1981060600			
Reviewer:		Betsy Hi		cks		
Organization:		RAMPP				
Date Checked:		4/5/2012				
Was the max w	ater surface elev	vation file ch	ecked for anomalies?		Yes	
Was the max cu	arrent velocity fi	le checked f	for anomalies?		Yes	
Was the max w	ind velocity file	checked for	anomalies?		Yes	
Was the minim	Was the minimum pressure file checked for anomalies?			Yes		
Was the model	time series outp	ut compared	to the measured gage data?		Yes	
	Issues					
File	Comm	ent	Resolutio	n	Verification	
Maxele.63	High values ir River	ı Niagara	This is due to model boundar resolved bathymetry. This ef surge levels in the lake. Note levels in the Niagara River ar support flood mapping in the outside the scope of work and setup to resolve the river in d	ffect does not impact e that predicted surge re not to be used to river as it falls d the model is not	BSH	
Maxele.63	Some noise at shoreline in th		The variations in SE along th of changes in the velocity hea variations in the bathymetry of parallel wind conditions.	e shore are the result ad that are due to	BSH	
Maxwvel.63, minpr.63	Sharp gradients in the Irondequoit and Sodus Bays		Gradient in wind is caused by extrapolation routine; the difference is about 4% in Irondequoit Bay and 2% in Sodus Bay. The gradient has been found to have negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.		BSH	
Maxwvel.63, minpr.63	Sharp gradien of Niagara Riv			a is caused by	BSH	
Maxwvel.63	Sharp, very vertically oriented gradient at the east end of Lake:		Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.		BSH	
Additional Con	nments on Detai	led Check			•	
		Comment		Resolution	Verification	
Reviewer Signature: Bitry Wirks						
Date:	6/5	/2012				

ADCIRC REVI	EW				
Storm:		Storm004_1982	2010800		
Reviewer:		Betsy Hicks			
Organization:		RAMPP			
Date Checked:		4/5/2012			
		vation file checked for			Yes
	-	ile checked for anomal			Yes
		checked for anomalies			Yes
	-	e checked for anomalies			Yes
Was the model t	ime series outp	out compared to the me			Yes
	T		Issues		
File		Comment	Resolution		Verification
Maxele.63		in the Niagara River	This is due to model boundary effect poorly resolved bathymetry. This eff does not impact surge levels in the la Note that predicted surge levels in th Niagara River are not to be used to su flood mapping in the river as it falls the scope of work and the model is n to resolve the river in detail.	fect ike. ie upport outside	BSH
Maxele.63	Some noise at the shoreline, appears to be low at "headlands" and higher in embayments		The variations in SE along the shore are the result of changes in the velocity head that are due to variations in the bathymetry under strong shore parallel wind conditions.		BSH
Maxwvel.63	Area with zero wind in the north:		Ice fields of 100% are represented by areas of zero wind. Refer to Section 6.1.3 in Baird Lake Ontario report, which describes ice implementation methodology		BSH
Maxwvel.63, minpr.63	the Niagara	Anomalous gradient just west of the Niagara River – not as pronounced as other stormsThis is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup		BSH	
Maxwvel.63	Artificial gradient at the Irondequoit Bay		to resolve the river in detail.BSHGradient in wind is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.BSH		BSH
Additional Com	ments on Detai	iled Check			
		Comment	Re	esolution	Verification
Reviewer Signat	ure:	Betry D	ficks		
Date:		6/5/2012			

ADCIRC RE	VIEW			
Storm:	S	torm005_1982012900		
Reviewer:		etsy Hicks		
Organization:		AMPP		
Date Checked	: 4	/5/12		
Was the max y	water surface elevation	file checked for anomali	ies?	Yes
Was the max of	current velocity file ch	ecked for anomalies?		Yes
Was the max	Was the max wind velocity file checked for anomalies?			Yes
Was the minir	num pressure file chec	ked for anomalies?		Yes
Was the mode	l time series output co	mpared to the measured g	gage data?	Yes
		Issues	3	
File	Co	mment	Resolution	Verification
Maxele.63	Anomalous values in	n the Niagara River	This is due to model boundary	BSH
			effects and poorly resolved	
			bathymetry. This effect does not	
			impact surge levels in the lake.	
			Note that predicted surge levels in	
			the Niagara River are not to be	
			used to support flood mapping in	
			the river as it falls outside the	
			scope of work and the model is not	
			setup to resolve the river in detail.	
Maxwvel.63	Node 92161 higher t	han adjacent nodes	This is an isolated anomaly in the	BSH
			wind dataset at Node 92161, which	
			is located in the middle of	
			Irondequoit Bay. This anomaly	
			occurs periodically throughout the	
			simulation and is relative to the	
			surrounding winds, so that the	
			maximum difference observed in	
			the maxwvel.63 plot occurs only at	
			one time step. A review of the	
			results has shown that the anomaly	
			has a localized influence on the	
			neighboring grid cells only and has	
			negligible impact on surge results	
Maxele.63	A small amount of n	aiga at tha ghamaling	in Irondequoit Bay.	BSH
iviaxele.03		"headlands" and higher	The variations in SE along the	
	in embayments	neautanus anu ingilet	shore are the result of changes in the velocity head that are due to	
	in eniougniento		the velocity head that are due to	
			variations in the bathymetry under	
			strong shore parallel wind conditions.	
Maxwvel.63	Very sharp gradient	where the wind goes to		BSH
1v1ax w ve1.03	zero in the northeast		Ice fields of 100% are represented by areas of zero wind Refer to	1160
	Leto in the northeast	Var	by areas of zero wind. Refer to Section 6.1.3 in Baird Lake	
		200 B		
			Ontario report, which describes ice implementation methodology.	
Maxwvel.63	Another sharp gradie	ent in the southwest	The Modified Garratt Formulation	BSH
1v1aA w VC1.03	Another sharp gradie	an in the southwest	The Moumen Garran Formulation	1160

	(see screen	shot above)	(MGF) was	used to define wind		
			speeds over	ice fields. Using this		
			parabolic fu	nction, the largest		
			•	ccurs at 50% ice		
			•	Given the coarse		
				f the ice data relative		
			to the mode	l grid, the winds were		
				between neighboring		
			·	different percent		
			coverage; ir	n some cases, this		
			results in re	gions of ice with 50%		
			coverage, w	hich generates the		
				inds drag coefficient		
			under the M	IGF. Refer to Section		
				rd Lake Ontario report,		
			which descr	ribes ice		
			implementa	tion methodology.		
Maxwvel.63		gradient in the west	Gradient in	wind and pressure is	BSH	
Maxwvel.63	Ŭ	adient in the east	caused by extrapolation routine.		BSH	
Maxwvel.63,	Anomalou	s in the Irondequoit Bay	Testing has	shown that this	BSH	
minpr.63			gradient has	a negligible effect on		
			the water su	rface elevation. Refer		
			to Baird/RA	MPP email		
			corresponde	ence titled Run QC		
			dated May 2	2012.		
Additional Co	mments on I	Detailed Check	· · ·			
		Comment		Resolution	Verification	
Reviewer Sigr	Reviewer Signature: Bitry Hicks					
		\mathcal{I}				
Date:		6/5/2012				

ADCIRC RE	VIEW			
Storm:		Storm006_19	84022500	
Reviewer:		Betsy Hicks		
Organization:		RAMPP		
Date Checked:	:	4/11/2012		
Was the max w	water surface elev	ation file check	ted for anomalies?	Yes
Was the max c	current velocity fil	le checked for a	anomalies?	Yes
	wind velocity file			Yes
Was the minin	num pressure file	checked for an	omalies?	Yes
	-		the measured gage data?	Yes
	1	1	Issues	
File	Comn	nent	Resolution	Verification
Maxwvel.63	Line of anomalo	ous high data	The Modified Garratt Formulation (MGF) was	BSH
	near the west en		used to define wind speeds over ice fields.	
			Using this parabolic function, the largest wind	
			drag occurs at 50% ice coverage. Given the	
			coarse resolution of the ice data relative to the	
		man	model grid, the winds were interpolated	
	and the second s		between neighboring ice fields of different	
			percent coverage; in some cases, this results in	1
			regions of ice with 50% coverage, which	
			generates the strongest winds drag coefficient	
			under the MGF. Refer to Section 6.1.3 in Bai	rd
			Lake Ontario report, which describes ice	
			implementation methodology.	
Maxwvel.63,	Horizontal gradi		Gradient in wind and pressure is caused by	BSH
minpr.63	appeared in othe		extrapolation routine. Testing has shown that	
	west end of lake		this gradient has a negligible effect on the wat	
			surface elevation. Refer to Baird/RAMPP em	ail
			correspondence titled Run QC dated May 201	
Maxwvel.63	Area with zero v		Ice fields of 100% are represented by areas of	BSH
	sharp line of hig	gh data	zero wind.	
	adjacent to it			
		and the second	The Modified Garratt Formulation (MGF) was	5
	TO EA		used to define wind speeds over ice fields.	
			Using this parabolic function, the largest wind	
			drag occurs at 50% ice coverage. Given the	
			coarse resolution of the ice data relative to the	
			model grid, the winds were interpolated	
			between neighboring ice fields of different	
			percent coverage; in some cases, this results in	1
			regions of ice with 50% coverage, which	
			generates the strongest winds drag coefficient	
			under the MGF. Refer to Section 6.1.3 in Bai	a
			Lake Ontario report, which describes ice	
Manal (2	III als and the second	h . Ni	implementation methodology.	DCI
Maxele.63	High values in the River	ne magara	This is due to model boundary effects and	BSH
			poorly resolved bathymetry. This effect does	
			not impact surge levels in the lake. Note that	

		predicted surge levels in the Niagara River are	
		not to be used to support flood mapping in the	
		river as it falls outside the scope of work and the	
		model is not setup to resolve the river in detail.	
Maxwyel.63	Node 92161 higher than	This is an isolated anomaly in the wind dataset	BSH
Widx w vel.03	adjacent nodes	5	DSII
	adjacent nodes	at Node 92161, which is located in the middle	
		of Irondequoit Bay. This anomaly occurs	
		periodically throughout the simulation and is	
		relative to the surrounding winds, so that the	
		maximum difference observed in the	
		maxwvel.63 plot occurs only at one time step.	
		A review of the results has shown that the	
		anomaly has a localized influence on the	
		neighboring grid cells only and has negligible	
		impact on surge results in Irondequoit Bay.	
Maxwvel.63	Anomalous in the	Gradient in wind and pressure is caused by	BSH
minpr.63	Irondequoit and Sodus Bays	extrapolation routine. Testing has shown that	
		this gradient has a negligible effect on the water	
		surface elevation. Refer to Baird/RAMPP email	
	correspondence titled Run QC dated May 20		
Meas v	Model is slightly	Cape Vincent is located in the St. Lawrence	BSH
model	overpredicting in the Cape	River where water levels can be influenced by	
	Vincent area plots	downstream conditions that are not included in	
		the model. However, discrepancy between	
		modeled and measured data is to be expected	
		when comparing against numerous storm	
		events. When analyzed statistically as a	
		population of storms, the Q-Q plots at Cape	
		Vincent showed good agreement between	
		measured and modeled surface elevations. See	
		Figure 6.6 of Baird Lake Ontario report.	
Additional Co	mments on Detailed Check		•
	Comment	Resolution	Verification
Reviewer Sign	nature:	41.	
	Bitry	Aucks	
	0		
Date:	6/5/2012		

ADCIRC REV	/IEW				
Storm:		rm007_1984042700			
Reviewer:	Bet	sy Hicks			
Organization:		MPP			
Date Checked:		1/2012			
Was the max w	vater surface elevation file c	hecked for anomalies?		Yes	
Was the max cu	urrent velocity file checked	for anomalies?		Yes	
Was the max w	vind velocity file checked fo	r anomalies?		Yes	
Was the minim	um pressure file checked fo	r anomalies?		Yes	
	-	d to the measured gage data?		Yes	
		Issues			
File	Comment	Resolut	ion	Verification	
Maxwvel.63	Vertical gradient visible			BSH	
	in the eastern end of lake				
Maxwvel.63	Horizontal gradient that			BSH	
	has appeared in other	Gradient in wind and pressure is			
	runs on west end of lake	routine. Testing has shown that	this gradient has a		
Minpr.63	Sharp gradients that	negligible effect on the water su	rface elevation. Refer to		
	match up with gradient	Baird/RAMPP email correspond	lence titled Run QC dated		
	in wind velocity:	May 2012.			
				BSH	
Maxele.63	High values in the				
	Niagara river	bathymetry. This effect does not			
		lake. Note that predicted surge			
		are not to be used to support flo	it		
		falls outside the scope of work a			
		to resolve the river in detail.	-		
Maxwvel.63	Node 92151 higher than	This is an isolated anomaly in the	BSH		
	adjacent nodes	92161 (not 92151), which is loc			
	-	Irondequoit Bay. This anomaly			
		throughout the simulation and is	· ·	ø	
		winds, so that the maximum diff		.8	
		maxwel.63 plot occurs only at		of	
		the results has shown that the ar			
		influence on the neighboring gri	•		
		0 00	•		
Maxwvel.63	Anomalous in the	negligible impact on surge resul		BSH	
Maxwvel.05	Irondequoit and Sodus	Gradient in wind and pressure is	•	БЭП	
	Bays	routine. Testing has shown that			
Minpr.63	Anomalous in the	negligible effect on the water su		BSH	
winipi.05	Irondequoit bay	Baird/RAMPP email correspond	dence titled Run QC dated	DSII	
		May 2012.			
Additional Con	nments on Detailed Check				
	Commer	t	Resolution	Verification	
Reviewer Signa	ature: Br	try Hicks			
		-			
	6/5/2012				

ADCIRC REV	VIEW				
Storm:		Storm008_1985011800			
Reviewer:		Betsy Hicks			
Organization:		RAMPP			
Date Checked:		4/11/2012			
Was the max w	vater surface elev	ation file checked for anoma	lies?	Yes	
Was the max c	urrent velocity fil	e checked for anomalies?		Yes	
Was the max w	vind velocity file	checked for anomalies?		Yes	
Was the minim	um pressure file	checked for anomalies?		Yes	
Was the model	time series output	it compared to the measured	gage data?	Yes	
		Issue	es		
File		Comment	Resolution	Verification	
Maxele.63	low at "headlar	the shoreline, appears to be ads" and higher in most noticeable on the SE	The variations in SE along the she are the result of changes in the velocity head that are due to variations in the bathymetry unde strong shore parallel wind conditions.		
Maxele.63	Anomalous dat	a in the Niagara river	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be us to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	of	
Maxwvel.63	Large area with	n zero wind – ice?	Ice fields of 100% are represented by areas of zero wind. Refer to Section 6.1.3 in Baird Lake Ontar report, which describes ice implementation methodology.		
Maxwvel.63	lake with wind than adjacent n	a line of nodes circling the velocity 1-2 units higher odes, the rest is very gradient set to exaggerate w:	This line circling the lake occurs storms with shore fast ice around the perimeter of the lake. The Modified Garratt Formulation (MGF) was used to define wind speeds over ice fields. Using this parabolic function, the largest wind drag occurs at 50% ice coverage. Given the coarse resolution of the ice data relative to the model grid the winds were interpolated between neighboring ice fields of different percent coverage; in som cases, this results in regions of ice with 50% coverage, which generates the strongest winds drag	nd e , , ne e	

Maxwvel.63, minpr.63 Maxwvel.63 Maxwvel.63	Horizontally oriented gradient in the west Vertically oriented gradient in the east Node 92161 higher than adjacent nodes	to Section 6. Ontario repor implementati Gradient in v caused by ex Testing has s has a negligil surface eleva Baird/RAMP corresponder May 2012. This is an iso wind dataset is located in t Irondequoit I occurs period	lated anomaly in the at Node 92161, which the middle of Bay. This anomaly lically throughout the	BSH BSH BSH
		surrounding y maximum dif the maxwvel one time step results has sh has a localize neighboring g	ad is relative to the winds, so that the fference observed in .63 plot occurs only at b. A review of the sown that the anomaly ed influence on the grid cells only and has pact on surge results in Bay.	
Additional Con	nments on Detailed Check		D 1 d	XX CL
Reviewer Signa	Comment		Resolution	Verification
Date:	6/5/2012	~		
Duto.	0.072012			

ADCIRC REV	IEW		
Storm:	S	torm009_1985112500	
		y Hicks	
		AMPP	
Date Checked: 4/11/2012			
Was the max water surface elevation file checked for anomalies?			Yes
Was the max current velocity file checked for anomalies?			Yes
Was the max wind velocity file checked for anomalies?			Yes
Was the minimum pressure file checked for anomalies?			Yes
Was the model time series output compared to the measured gage data?			Yes
	1	Issues	
File	Comment	Resolution	Verification
Maxwvel.63,	Horizontally	Gradient in wind and pressure is caused by	BSH
minpr.63	oriented gradient		
	the west	gradient has a negligible effect on the water surface	
Maxwvel.63	Vertically oriented	d elevation Refer to Baird/RAMPP email	BSH
	gradient in the eas	correspondence titled Run QC dated May 2012.	
Maxwvel.63	Node 92161 high		le BSH
	than adjacent nod		
		Bay. This anomaly occurs periodically throughout th	e
		simulation and is relative to the surrounding winds, so	
		that the maximum difference observed in the	
		maxwvel.63 plot occurs only at one time step. A	
		review of the results has shown that the anomaly has	a
		localized influence on the neighboring grid cells only	
		and has negligible impact on surge results in	
		Irondequoit Bay.	
Maxwvel.63	Anomalous in the Irondequoit Bay and		BSH
	Sodus Bay	effect on the water surface elevation. Refer to	
		Baird/RAMPP email correspondence titled Run QC	
		dated May 2012.	
Maxele.63	Anomalous data i	ⁿ This is due to model boundary effects and poorly	BSH
	the Niagara river	resolved bathymetry. This effect does not impact sur	ge
		levels in the lake. Note that predicted surge levels in	
		the Niagara River are not to be used to support flood	
		mapping in the river as it falls outside the scope of	
		work and the model is not setup to resolve the river in	1
		detail.	
Minpr.63	Anomalous in the	Gradient in pressure is caused by extrapolation routin	e. BSH
	Irondequoit Bay	Testing has shown that this gradient has a negligible	
		effect on the water surface elevation. Refer to	
		Baird/RAMPP email correspondence titled Run QC	
		dated May 2012.	
Meas v model	Model is	Discrepancies between modeled and measured data and	re BSH
	overpredicting	expected, particularly when comparing against	
	slightly in the Cap	numerous storm events. These discrepancies are mos	t
	Vincent and	likely a limitation of the modeled wind fields.	
	OLCOTT plots	Recognizing this, one of the goals of the comparative	

Additional Comments on	analysis is to ensure a balance is observed between the measured and modeled results; that is the model under- predicts some storms and over-predicts others. When analyzed statistically as a population of storms, the Q- Q plots showed good agreement between measured and modeled wave heights. See Figure 6.6 of Baird Lake Ontario report.				
Comment Resolution					
Reviewer Signature:	Bit	ny Hicks			
Date:	6/5/2012				

ADCIRC REV	VIEW			
Storm:		Storm010_1985	112900	
Reviewer:		Betsy Hicks		
Organization:		RAMPP		
Date Checked:		4/11/2012		
Was the max w	vater surface elev	ation file checked	for anomalies?	Yes
Was the max c	urrent velocity fil	e checked for ano	malies?	Yes
Was the max w	vind velocity file	checked for anoma	alies?	Yes
		checked for anom		Yes
Was the model	time series output	at compared to the	e measured gage data?	Yes
			Issues	
File			Resolution	Verification
Maxwvel.63	Horizontally of in the west	riented gradient		BSH
Maxwvel.63	Vertically orient the east	nted gradient in	Gradient in wind is caused by extrapolation routine. Testing has shown that this gradient	BSH
Maxwvel.63	the east Horizontally oriented gradient in the northeast:		has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH
Maxwvel.63	Node 92161 hi adjacent nodes		This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.	BSH
Maxwvel.63, minpr.63	Anomalous in the Irondequoit bay		Gradient in wind is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH
Maxele.63	Anomalous dat river	a in the Niagara	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH
Maxele.63	Slightly noisy shoreline in the		The variations in SE along the shore are the	BSH

Meas v model	Model is underpredicting in the OSWEGO plots	due to variations in the bathymetry under strong shore parallel wind conditions. Discrepancies between modeled and measured data are expected, particularly when comparing against numerous storm events. These discrepancies are most likely a limitation of the modeled wind fields. Recognizing this, one of the goals of the comparative analysis is to ensure a balance is observed between the measured and modeled results; that is the model under-predicts some storms and over-predicts others. When analyzed statistically as a population of storms, the Q-Q plots showed good agreement between measured and modeled wave heights. See Figure 6.6 of Baird Lake Ontario report.		BSH
Additional Con	ments on Detailed Check	• •		•
	Comment		Resolution	Verificatio n
Reviewer Signa	ture: Bitry B	ficks		
Date:	6/5/2012			

ADCIRC REV	IEW				
Storm:		Storm011_1	986042800		
Reviewer:		Betsy Hicks			
Organization:		RAMPP			
Date Checked:		4/11/2012			
Was the max w	ater surface elev	ation file chec	ked for anomalies?		Yes
Was the max cu	urrent velocity fil	e checked for	anomalies?		Yes
Was the max w	ind velocity file	checked for a	nomalies?		Yes
Was the minim	um pressure file	checked for a	nomalies?		Yes
Was the model	time series output	it compared to	the measured gage data?		Yes
			Issues		
File	Comm	nent	Resolution		Verification
Maxwvel.63,	Horizontally of	riented	Gradient in wind and pressure is caused by		BSH
minpr.63	gradient in the	west	extrapolation routine. Testing has shown that	t	
			this gradient has a negligible effect on the wa	ter	
			surface elevation. Refer to Baird/RAMPP en		
			correspondence titled Run QC dated May 201	12.	
Maxele.63	Anomalous dat	a in the	This is due to model boundary effects and po	orly	BSH
	Niagara river		resolved bathymetry. This effect does not im	pact	
			surge levels in the lake. Note that predicted	-	
			surge levels in the Niagara River are not to be	e	
			used to support flood mapping in the river as	it	
			falls outside the scope of work and the model	is	
		not setup to resolve the river in detail.			
Maxele.63,	Anomalous in		Gradient in wind and pressure is caused by		BSH
Minpr.63	Irondequoit and	d Sodus	extrapolation routine. Testing has shown that	t	
	Bays		this gradient has a negligible effect on the wa	ter	
			surface elevation. Refer to Baird/RAMPP en	nail	
			correspondence titled Run QC dated May 201	12.	
Maxwvel.63	Node 92161 hi		This is an isolated anomaly in the wind datase	et at	BSH
	adjacent nodes		Node 92161, which is located in the middle o	of	
			Irondequoit Bay. This anomaly occurs		
			periodically throughout the simulation and is		
			relative to the surrounding winds, so that the		
			maximum difference observed in the		
			maxwvel.63 plot occurs only at one time step		
			review of the results has shown that the anom		
			has a localized influence on the neighboring g		
			cells only and has negligible impact on surge		
			results in Irondequoit Bay.		
Meas v model	Model is slight		Discrepancies between modeled and measure		BSH
	overpredicting	in all plots	data are expected, particularly when comparin	ng	
			against numerous storm events. These	.	
			discrepancies are most likely a limitation of the		
			modeled wind fields. Recognizing this, one of		
			the goals of the comparative analysis is to ens		
			a balance is observed between the measured a		
			modeled results; that is the model under-pred		
			some storms and over-predicts others. When		

	the Q-Q plots showed goo measured and modeled w	analyzed statistically as a population of storms, the Q-Q plots showed good agreement between measured and modeled wave heights. See Figure 6.6 of Baird Lake Ontario report.				
Additional Comment	s on Detailed Check					
	Comment	Resolution	Verification			
Reviewer Signature:	Bitry Hicks					
Date:	6/5/2012					

ADCIRC REV	VIEW				
Storm:		Storm012_1991042700			
Reviewer:		Betsy Hicks			
Organization:		RAMPP			
Date Checked:		4/11/2012		Yes	
Was the max water surface elevation file checked for anomalies?					
Was the max c	urrent velocity fil	e checked for anomalies	?	Yes	
Was the max w	vind velocity file	checked for anomalies?		Yes	
Was the minim	um pressure file	checked for anomalies?		Yes	
Was the model	time series output	it compared to the measu	red gage data?	Yes	
		Is	sues		
File		Comment	Resolution	Verification	
Maxwvel.63	Vertically ories	nted gradient in the east	Gradient in wind is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC	BSH	
Maxele.63	Anomalous dat	a in the Niagara river	dated May 2012. This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH	
Maxwvel.63		al oriented gradient in as pronounced as other	Gradient in wind is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH	
Maxwvel.63	Node 92161 hi nodes	gher than adjacent	This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.	BSH	

Maxwvel.63, minpr.63	Anomale and sodu	ous data in the Irondequoit us bays	caused by extrap Testing has show has a negligible surface elevation	wn that this gradient effect on the water n. Refer to	BSH
				email correspondence	
titled Run QC dated May 2012. Additional Comments on Detailed Check					
		Comment		Resolution	Verificatio
					n
		r			
Reviewer Signa	iture:	Bitry His	ks		
Date:		6/5/2012			

ADCIRC REV	IEW					
Storm:		Storm(013_1991113000			
Reviewer:		Betsy l	Hicks			
Organization:		RAMP				
Date Checked:		4/11/20		1		
			e checked for anomalies?		Yes	
			ed for anomalies?		Yes	
Was the max w	ind velocity file c	checked	for anomalies?		Yes	
Was the minim	um pressure file c	checked	for anomalies?		Yes	
Was the model	time series outpu	t compa	ared to the measured gage data?		Yes	
			Issues			
File	Comment		Resolution	Verific	ation	
Maxwvel.63, minpr.63	horizontally origination of the second secon		Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH		
Maxwvel.63	Node 92161 mu higher than adja nodes		This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.	BSH		
Maxele.63	Anomalous data in the Niagara river Anomalous data in the sodus bay		This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH		
Maxwvel.63, minpr.63			Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.			
Additional Con	nments on Detaile	ed Chec				
		Comme			Verificatio n	
Reviewer Signa	E	•	y Hicks			
Date:	6/5/20)12				

RUN NAME:

ADCIRC REV	IEW					
Storm:		Storm014_	1991121100			
Reviewer:		Betsy Hick	S			
Organization:		RAMPP				
Date Checked:		4/12Stor/20				
			cked for anomalies?		Yes	
		file checked fo			Yes Yes	
	Was the max wind velocity file checked for anomalies?					
Was the minim	um pressure fi	ile checked for a	anomalies?		Yes	
Was the model	time series ou	tput compared	to the measured gage data?		Yes	
			Issues			
File		nment	Resolutio		Verification	
Maxwvel.63	horizontally gradient in t		Gradient in wind is caused routine. Testing has shown has a negligible effect on the elevation. Refer to Baird/R	that this gradient ne water surface	BSH	
Maxwvel.63	Vertically or gradient in t		correspondence titled Run (2012.		BSH	
Maxele.63	Anomalous data in the Niagara river		This is due to model bound poorly resolved bathymetry not impact surge levels in the predicted surge levels in the not to be used to support fle river as it falls outside the s the model is not setup to re detail.	y. This effect does he lake. Note that e Niagara River are bod mapping in the scope of work and	BSH	
Maxele.63	Some noise shoreline, ap low at "head higher in em	ppears to be llands" and	The variations in SE along the shore are the result of changes in the velocity head that are due to variations in the bathymetry under		BSH	
Maxwvel.63, minpr.63	Anomalous data in the Irondequoit bay		strong shore parallel wind conditions. Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.		BSH	
Additional Con	nments on Det	tailed Check Comment		Resolution	Verifica	ati
					on	
Reviewer Signa	ature:	Bitry	Hicks			
Date:	6/.	5/2012				

ADCIRC REV	IEW				
Storm:		Storm015_1992042900			
Reviewer:		Betsy Hicks			
Organization:		RAMPP			
Date Checked:		4/12/2012			
Was the max wa	ater surface elevation	file checked for anomalies?	Yes		
Was the max cu	rrent velocity file cho	ecked for anomalies?	Yes		
Was the max w	ind velocity file chec	ked for anomalies?	Yes		
Was the minimu	um pressure file chec	ked for anomalies?	Yes		
Was the model	time series output co	mpared to the measured gage data?	Yes		
	*	Issues			
File	Comment	Resolution	Verification		
Maxwvel.63, minpr.63	horizontally oriented gradient in the west	Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMP email correspondence titled Run QC dated May 2012.	BSH		
Maxele.63	Anomalous data in the Niagara river	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH		
Maxwvel.63	Anomalous data in the Irondequoit and sodus bays	Gradient in wind is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH		
Maxwvel.63	Node 92161 higher than adjacent nodes	This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.	n BSH		
Minpr.63	Anomalous data in the Irondequoit bay	Gradient in pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect o the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	n BSH		
Additional Com	ments on Detailed C				
	С	omment Resolution	Verification		
Reviewer Signa		Bitry Hicks			

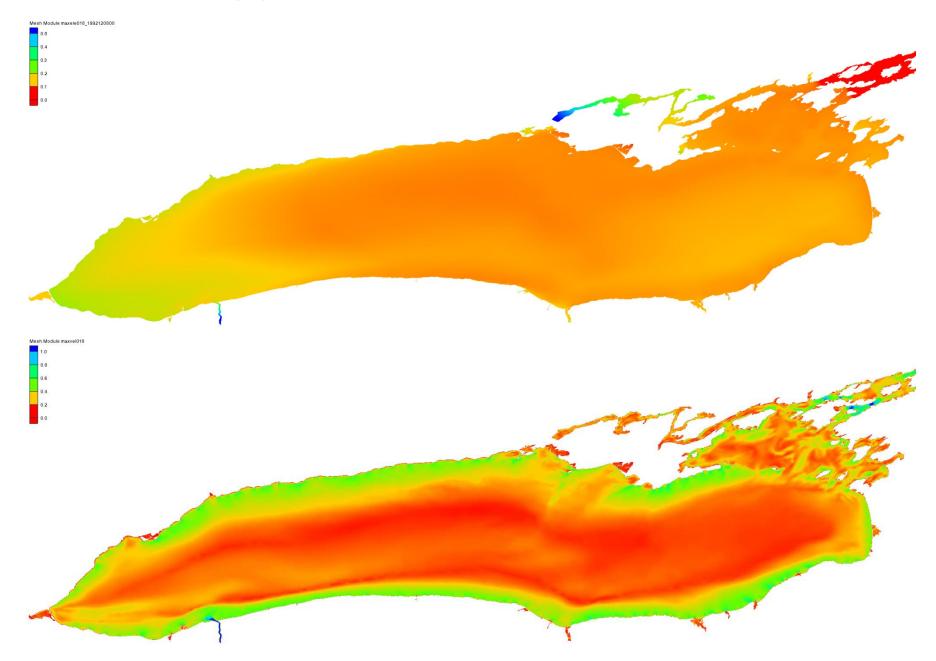
RUN NAME:

ADCIRC REV	IEW				
Storm:	Sto	rm016_1992080800			
Reviewer:		sy Hicks			
Organization:		MPP			
Date Checked:		2/2012			
Was the max w	ater surface elevatior	file checked for anomalies?		Yes	
	arrent velocity file ch			Yes	
Was the max w	ind velocity file chec	ked for anomalies?		Yes	
Was the minim	um pressure file chec	ked for anomalies?		Yes	
Was the model	time series output co	mpared to the measured gage data?	Cho	ose an item.	
		Issues			
File	Comment	Resolution		Verification	
Maxwvel.63, minpr.63	horizontally oriented gradient in the west	Gradient in wind and pressure is caused by extrapol routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Re-		BSH	
Maxwvel.63	vertically oriented gradient in the east	to Baird/RAMPP email correspondence titled Run (dated May 2012.		BSH	
Maxele.63	Anomalous data in the Niagara river	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact su levels in the lake. Note that predicted surge levels i Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of v and the model is not setup to resolve the river in det	n the work	BSH	
Maxwvel.63, minpr.63	Anomalous data in the Irondequoit and sodus bays	Gradient in wind and pressure is caused by extrapol routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Re to Baird/RAMPP email correspondence titled Run (dated May 2012.	fer	BSH	
Maxwvel.63	Node 92161 higher than adjacent nodes	Bay. This anomaly occurs periodically throughout simulation and is relative to the surrounding winds, that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A re of the results has shown that the anomaly has a loca influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Ba	it the so view llized	BSH	
Additional Con	nments on Detailed C				
	Cor	nment Resolution		Verificatio n	
Reviewer Signa	iture: B	try Hicks		1	
Date:	6/5/2012				

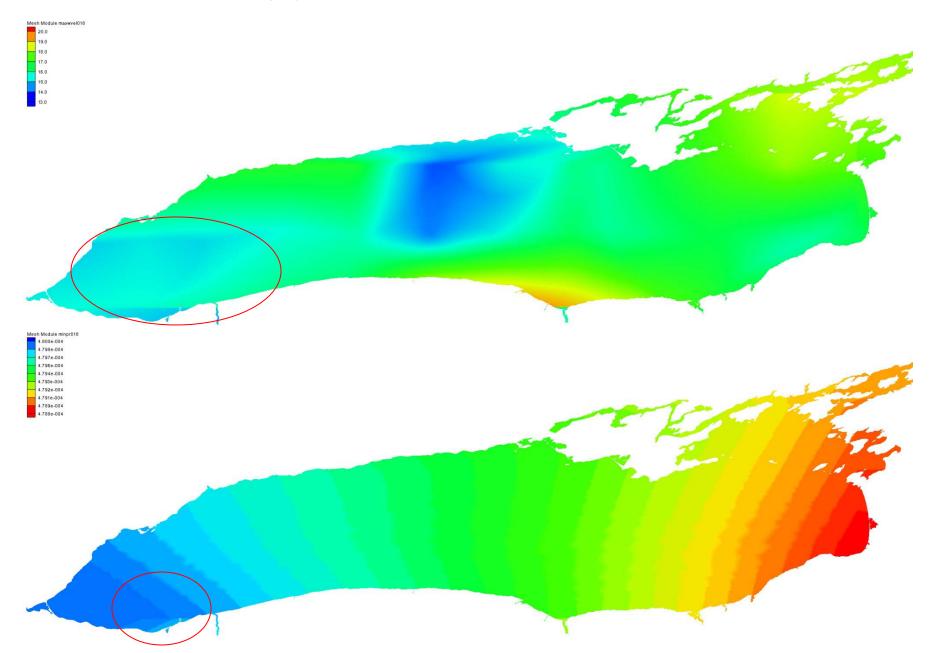
RUN NAME:

ADCIRC RE	VIEW					
Storm:			Storm017_1992111000			
Reviewer:			Betsy Hicks			
Organization:			RAMPP			
Date Checked			4/12/2012			
Was the max w	water surface ele	evatio	n file checked for anomalies?			Yes
Was the max of	current velocity	file ch	necked for anomalies?			Yes
Was the max wind velocity file checked for anomalies?						Yes
Was the minimum pressure file checked for anomalies?						Yes
Was the model time series output compared to the measured gage data?						Yes
		1	Issues			
File	Comment		Resolution			Verification
Maxele.63	Anomalous da in the Niagara river		This is due to model boundary effects and bathymetry. This effect does not impact lake. Note that predicted surge levels in a not to be used to support flood mapping i outside the scope of work and the model the river in detail.	surge levels in the the Niagara River a n the river as it fal is not setup to reso	ls olve	BSH
Maxele.63	the shoreline i the southeast	Slightly noisy at the shoreline in the southeastThe variations in SE along the shore are the result of changes in the velocity head that are due to variations in the bathymetry under strong shore parallel wind conditions.			es	BSH
Maxwvel.63 , Minpr.63	Horizontally oriented gradient in the west		Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.			BSH
Maxwvel.63	Node 92161 has very high wind velocity ~118.5		This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.			BSH
Maxele.63	Anomalous da in the Irondeq and Sodus bay	uoit	No anomalies in Irondequoit or Sodus Bay id file. More information is required to commen	entified in Maxele.6		BSH
Minpr.63	Anomalous da	Anomalous data in the IrondequoitGradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible			BSH	
Additional Co	mments on Deta	ailed (Check			
		C	Comment	Resolution	1	Verification
Reviewer Sigr	nature:	K	Bitry Hicks			
Date: 6/5/2			2012			

ADCIRC REVIEW	W				
Storm:			Storm018 1992120800		
Reviewer:			Sara C. Davis		
Organization:			RAMPP		
Date Checked:			04/11/2012		
Was the max water	surface elevation file checked for anomalies?				Yes
Was the max curren	nt velocity file checked for anomalies?				Yes
Was the max wind	Yes				
Was the minimum	pressure file checked for anomalies?				Yes
Was the model time	e series output compared to the measured gage data?				Yes
		Issues		-1	
File	Comment		Resolution		Verification
maxele	Niagara River anomalous	This effect does not impact s surge levels in the Niagara R	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail		
maxwvel maxwvel minpr minpr minpr	Abnormal wind gradient on western lakeAnomalous in Irondequoit BayAbnormal pressure gradient on western lakeAnomalous in Irondequoit BayAnomalous in Sodus Bay	Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the wate surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.			
1	nts on Detailed Check	4			ļ
	Comment		Reso	olution	Verification
Reviewer Signature	2:	Ja	ap Dani		
Date:		\bigcirc	\bigcup		



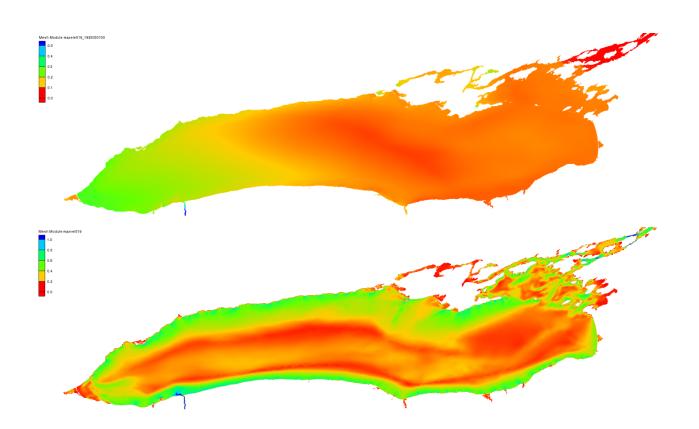
RUN NAME: Storm018_1992120800

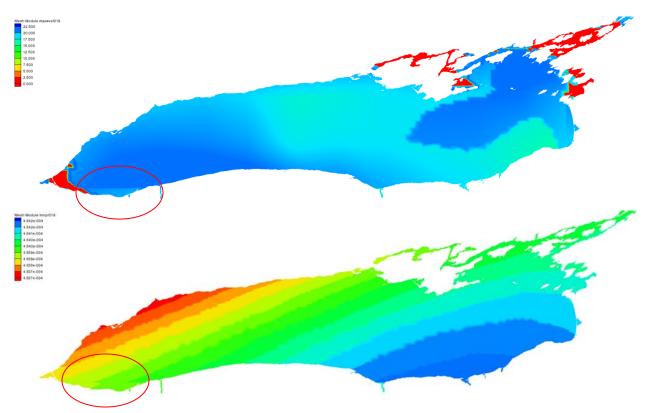


RUN NAME: Storm018_1992120800

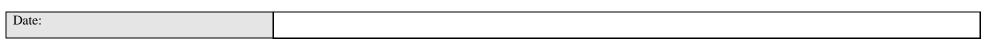
ADCIRC REVIEW					
Storm:	Storm019_1993030	100			
Reviewer:	Sara C. Davis				
Organization:	RAMPP				
Date Checked:	04/13/2012				
	elevation file checked for anomalies?			Yes	
	ity file checked for anomalies?			Yes	
Was the max wind velocity	file checked for anomalies?			Yes	
Was the minimum pressure	e file checked for anomalies?			Yes	
Was the model time series output compared to the measured gage data?					
		Issues			
File	Comment		Resolution	Verification	
maxele	Niagara River anomalous	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.			
maxwvel	Abnormal wind gradient on western lake				
maxwvel	Vertical gradient in the east	Cas diant in arias	and measures is sourced by surface alotion months.		
maxwvel	Anomalous in Irondequoit Bay		and pressure is caused by extrapolation routine.		
maxwvel	Slightly anomalous in Sodus Bay		on that this gradient has a negligible effect on the evotion. Refer to Baird/RAMPP email correspondence		
minpr	Abnormal pressure gradient on western lake	titled Run QC da			
minpr	Anomalous in Irondequoit Bay				
minpr	Anomalous in Sodus Bay]			
Additional Comments on D	Detailed Check				
	Comment		Resolution	Verification	
				<u> </u>	

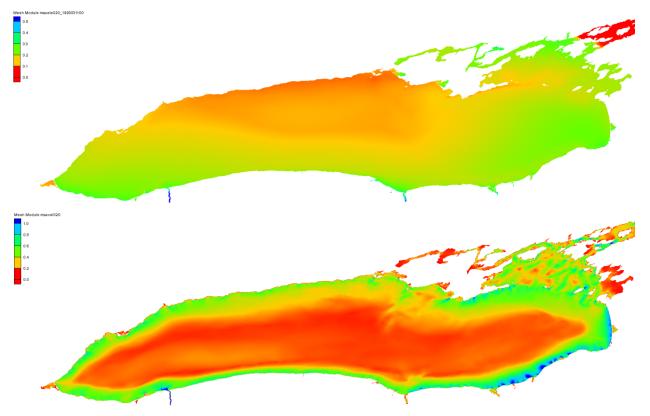
Reviewer Signature:	Jara Marin
Date:	

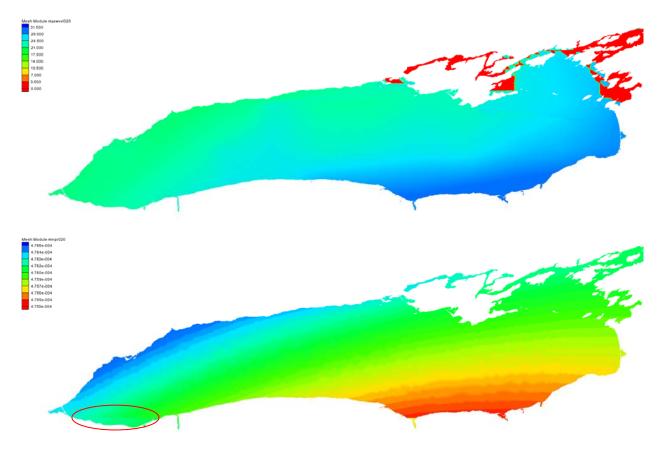




ADCIRC REV	IEW						
Storm:		Storm020 19	993031100				
Reviewer:		Sara C. Davi					
Organization:		RAMPP					
Date Checked:		04/13/2012					
Was the max wa		Yes					
Was the max cu	rrent velocity file checked for anomalie	s?				Yes	
	ind velocity file checked for anomalies?					Yes	
	Im pressure file checked for anomalies?					Yes	
	time series output compared to the meas		a?			Yes	
	and series output compared to the meas	urea gage aua	Issues			105	
File	Comment		200400	Resolution		Verification	
maxele	Niagara River anomalous		This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.				
maxwvel	Slight horizontal gradient in the w	est					
maxwvel	Vertical gradient in the east						
maxwvel	Slightly anomalous in Irondequoit	Bay	Gradient in wind and pr	ressure is caused by extrapolation routine.	Testing has		
minpr	Slightly abnormal pressure gradie western lake	nt on		has a negligible effect on the water surface email correspondence titled Run QC dated			
minpr	Anomalous in Irondequoit Bay						
minpr	Anomalous in Sodus Bay						
Additional Com	ments on Detailed Check	•					
	Comment			Resolution		Verification	
Reviewer Signa	ture:	Jara	Marin	-			



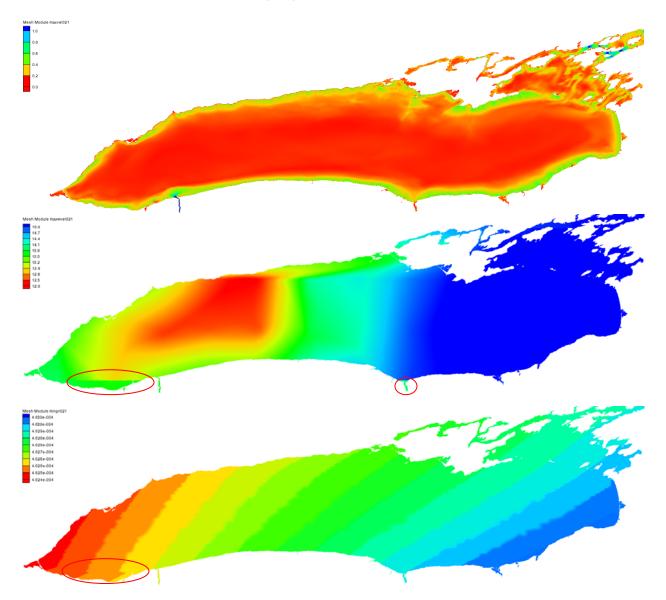


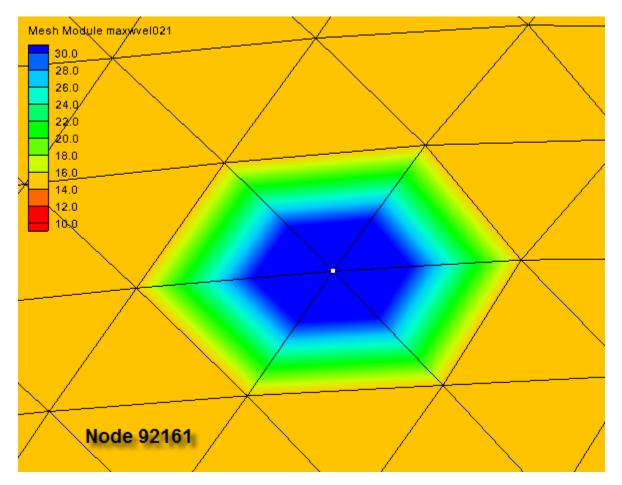


ADCIRC REVIEW				
Storm:		Storm021_1993101500		
Reviewer:		Sara C. Davis		
Organization:		RAMPP		
Date Checked:		04/13/2012		
Was the max water sur	rface elevation file checked for a		Yes	
Was the max current v	elocity file checked for anomalie	s?		Yes
Was the max wind velo	ocity file checked for anomalies?			Yes
Was the minimum pres	ssure file checked for anomalies?			Yes
Was the model time se	eries output compared to the meas	sured gage data?		Yes
	* *	Issues		
File	Comment	Resolution	Verification	
maxele	Niagara River anomalous	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.		
maxwvel	Abnormal wind gradient on western lake	Gradient in wind is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect		
maxwvel	Vertical gradient in the east	on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.		
maxwvel	Node 92161 abnormal max wind vel	This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.		
maxwvel	Anomalous in Irondequoit Bay	Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a		
maxwvel	Anomalous in Sodus Bay	negligible effect on the water surface elevation. Refer to		
minpr	Abnormal pressure gradient on western lake	Baird/RAMPP email correspondence titled Run QC dated May 2012.		

Additional Comments on Detailed Check							
Commer	ıt	Resolution	Verification				
		<u> </u>					
Reviewer Signature:	Jara Man	·					
Date:							



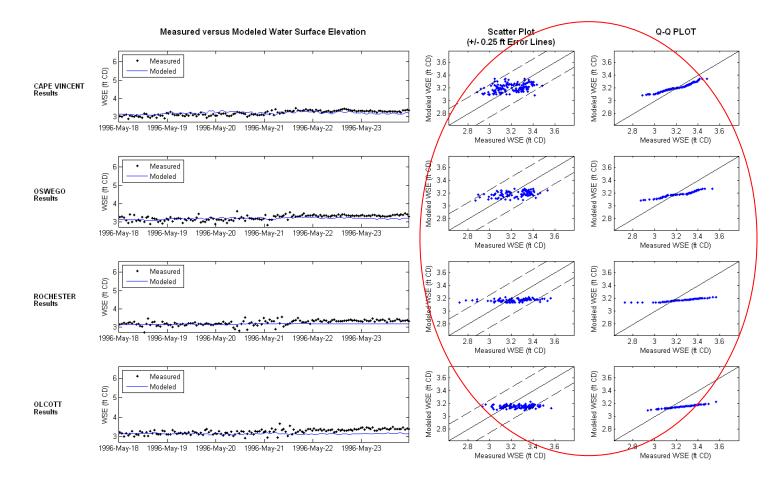




Storm:		S	orm022_1996051800				
Reviewer:			ara C. Davis				
Organization:			AMPP				
Date Checked:			4/13/2012				
Was the max wa	ater surface elevation file	checked for anon	nalies?		Yes		
Was the max cu	arrent velocity file checked	for anomalies?			Yes		
Was the max wi	rind velocity file checked f	or anomalies?			Yes		
	um pressure file checked f				Yes		
	time series output compar		d gage data?		Yes		
	1 1		Issues				
File	Comme	ent	Resolution		Verification		
maxele	Niagara River anomal		This is due to model boundary effects and poorly resolved ba This effect does not impact surge levels in the lake. Note tha surge levels in the Niagara River are not to be used to suppor mapping in the river as it falls outside the scope of work and not setup to resolve the river in detail.	t predicted t flood			
maxwvel	Abnormal wind gradie lake	ent on western	Gradient in wind and pressure is caused by extrapolation rout Testing has shown that this gradient has a negligible effect or surface elevation. Refer to Baird/RAMPP email corresponde Run QC dated May 2012.	n the water			
maxwvel	Node 92161 abnormal	max wind vel	This is an isolated anomaly in the wind dataset at Node 9216 located in the middle of Irondequoit Bay. This anomaly occu periodically throughout the simulation and is relative to the si- winds, so that the maximum difference observed in the maxw occurs only at one time step. A review of the results has show anomaly has a localized influence on the neighboring grid cel- has negligible impact on surge results in Irondequoit Bay.	ars urrounding vvel.63 plot wn that the			
maxwvel	Anomalous in Irondec	uoit Bay					
maxwvel	Anomalous in Sodus I		Gradient in wind and pressure is caused by extrapolation rout				
minpr	Abnormal pressure grawestern lake	adient on	Testing has shown that this gradient has a negligible effect or surface elevation. Refer to Baird/RAMPP email corresponde				
minpr	Anomalous in Irondec	uoit Bay	Run QC dated May 2012.	Γ			
minpr	Anomalous in Sodus I	Bay					
Additional Com	nments on Detailed Check						
	Comment		Resolution Verific	cation			
Abnormal Maar	sured vs. ADCIRC plots	Disensessies	between modeled and measured data are expected,				

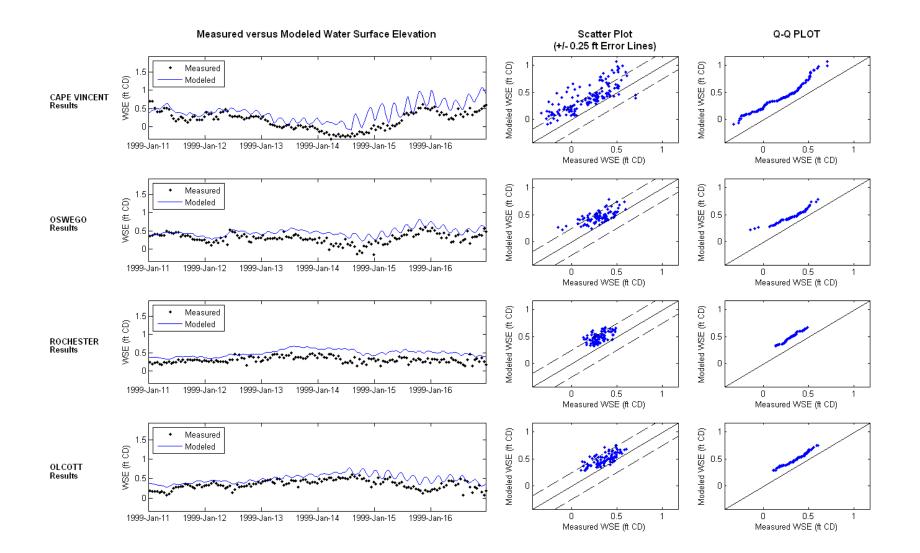
RUN NAME: Storm022_1996051800

	particularly when comparing against numerous storm events. These discrepancies are most likely a limitation of the modeled wind fields. Recognizing this, one of the goals of the comparative analysis is to ensure a balance is observed between the measured and modeled results; that is the model under-predicts some storms and over- predicts others. When analyzed statistically as a population of storms, the Q-Q plots showed good agreement between measured and modeled wave heights. See Figure 6.6 of Baird Lake Ontario report.
Reviewer Signature: Date:	Jara Marin



ADCIRC REV	IEW							
Storm:		Storm02	23 1997021900	23 1997021900				
Reviewer:		Sara C.	—					
Organization:		RAMPI						
Date Checked:		04/13/2	012					
Was the max wa	ater surface elevation file checked	l for anomalies?	?			Yes		
Was the max cu	rrent velocity file checked for an	omalies?				Yes		
Was the max wi	ind velocity file checked for anon	nalies?				Yes		
Was the minimu	Im pressure file checked for anon	nalies?				Yes		
Was the model t	time series output compared to th	e measured gage	e data?			Yes		
			Issues					
File	Comment			Resolution		Verification		
maxele	Niagara River anomalous	lous This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels ir the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.		rge levels in iver as it				
maxwvel	Node 92161 abnormal max wind vel		This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.					
maxwvel	Anomalous in Irondequoit B	ay	Gradient in wind and press	ent in wind and pressure is caused by extrapolation routine. Testing has				
maxwvel	Anomalous in Sodus Bay		shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.					
Additional Com	ments on Detailed Check		• •					
	Comm	nent		Resolution		Verification		
Reviewer Signa	ture:	Jara	Chanin					
Date:								

ADCIRC I	REVIEW								
Storm:				Storm024_1999011100					
Reviewer:				Sara C. Davis					
Organizatio	on:			RAMPP					
Date Check				04/13/2012					
Was the ma	ax water surfa	ce elevation file che	cked for anoma	lies?	Yes				
Was the ma	ax current vel	ocity file checked fo	r anomalies?		Yes				
Was the ma	ax wind veloc	ity file checked for a	nomalies?		Yes				
Was the mi	inimum press	ure file checked for a	nomalies?		Yes				
	-	es output compared		gage data?	Yes				
		1 1		Issues					
File	C	Comment		Resolution		Verification			
maxele	Niagara Riv	er anomalous	the lake. No	o model boundary effects and poorly resolved bathymetry. This effect does not i te that predicted surge levels in the Niagara River are not to be used to support fl ls outside the scope of work and the model is not setup to resolve the river in det	lood mapping in the				
maxwvel	Horizontal g	gradient in the west		Gradient in wind is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.					
maxwvel	Node 92161 max wind v	slightly abnormal el	This anomaly maximum di shown that th	an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. omaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the um difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on esults in Irondequoit Bay.					
minpr	Horizontal g	gradient in the west	Gradient in p	pressure is caused by extrapolation routine. Testing has shown that this gradient	has a negligible effect				
minpr	Anomalous	in Irondequoit Bay		surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC					
Additional	Comments on	n Detailed Check							
Com	nment			Resolution		Verification			
Abnormal Measured vs. ADCIRC plotsDiscrepancies between modeled and measured data are expected, particularly when comparing against numerous storm events. These discrepancies are most likely a limitation of the modeled wind fields. Recognizing this, one of the goals of the comparative analysis is to ensure a balance is observed between the measured and modeled results; that is the model under-predicts some storms and over-predicts others. When analyzed statistically as a population of storms, the Q-Q plots showed good agreement between measured and modeled wave heights. See Figure 6.6 of Baird Lake Ontario report.					of the comparative predicts some storms				
Reviewer Signature: Jara Mani									
Date:				DUN NAME: Storm024 1000011100		and 1 of 2			

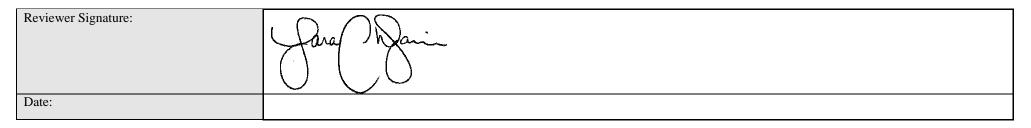


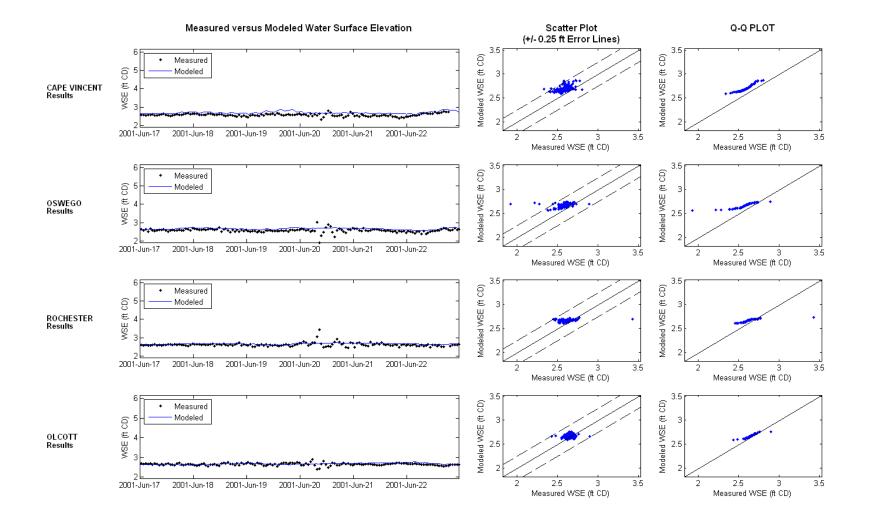
ADCIRC REVI	EW						
Storm:		Storm025_1	999030300				
Reviewer:		Sara C. Davi	is				
Organization:		RAMPP					
Date Checked:		04/13/2012					
Was the max wate	er surface elevation file checked for	anomalies?				Yes	
Was the max curr	ent velocity file checked for anomal	lies?				Yes	
Was the max win	d velocity file checked for anomalie	es?				Yes	
Was the minimum	n pressure file checked for anomalie	es?				Yes	
Was the model tin	me series output compared to the me	easured gage dat	a?			Yes	
			Issues				
File	Comment			Resolution		Verification	
maxele	Niagara River anomalous		This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.				
maxwvel	Node 92161 slightly abnormal max wind vel		This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.				
maxwvel	Anomalous in Irondequoit Bay		Gradient in wind and n	Testing has			
maxwvel	Anomalous in Sodus Bay		 Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. 				
minpr	Anomalous in Irondequoit Bay			email correspondence titled Run QC dated			
minpr	Abnormal pressure gradient west	tlake					
Additional Comm	nents on Detailed Check					XX 101 .1	
	Comment			Resolution		Verification	
Reviewer Signatu	ire:	Jara) Danin	1			
Date:		~ \	NAME: Storm025 100			Dage 1 of 2	

ADCIRC REV	IEW					
Storm:		Storm026_1999110100				
Reviewer:		Sara C. Davis				
Organization:		RAMPP				
Date Checked:		04/13/2012				
Was the max w	ater surface elevation file checked for ano	omalies?		Yes		
Was the max cu	urrent velocity file checked for anomalies?	2		Yes		
Was the max w	vind velocity file checked for anomalies?			Yes		
Was the minim	um pressure file checked for anomalies?			Yes		
Was the model	time series output compared to the measu	red gage data?		Yes		
		Issues				
File	Comment		Resolution	Verification		
maxele	Niagara River anomalous	not impact surge levels in the lake River are not to be used to support	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.			
maxwvel	Abnormal wind gradient west lake					
maxwvel	Vertical gradient in the east	Gradiant in wind and pressure is a	aused by extrapolation routine. Testing has	a abown		
maxwvel	Anomalous in Irondequoit Bay		effect on the water surface elevation. Refer			
maxwvel	Slightly anomalous in Sodus Bay	0 0 0	nce titled Run QC dated May 2012.	10		
minpr	Slight horizontal gradient in the west	Band/KAWFF email corresponder	ice thied Kull QC dated May 2012.			
minpr	Anomalous in Irondequoit Bay					
Additional Con	nments on Detailed Check					
	Comment		Resolution	Verification		
Reviewer Signa	ature:	Jara Marin	•			
Date:						

ADCIRC R	REVIEW				
Storm:		Storm027_2000121500			
Reviewer:		Sara C. Davis			
Organization	n:	RAMPP			
Date Checke		04/16/2012			
Was the max	x water surface elevation file checked f		Yes		
Was the max	Yes				
Was the max wind velocity file checked for anomalies?					
Was the minimum pressure file checked for anomalies?					
Was the mo	Yes				
		Issues			
File	Comment		Resolution	Verification	
maxele	Niagara River anomalous	This is due to model boundary effects impact surge levels in the lake. Note to to be used to support flood mapping in model is not setup to resolve the river	River are not		
maxele	Slightly noisy at shoreline	The variations in SE along the shore a due to variations in the bathymetry un	d that are		
maxwvel	Horizontal gradient in the west	Candiant in usind and amount is source	arrent that		
minpr	Horizontal gradient in the west	Gradient in wind and pressure is cause			
minpr	Anomalous in Sodus Bay	this gradient has a negligible effect on the water surface elevation. Refer to Baird email correspondence titled Run QC dated May 2012.		u/RAMFF	
minpr	Anomalous in Irondequoit Bay	eman correspondence titled Kun QC u			
Additional O	Comments on Detailed Check				
	Comme	nt	Resolution	Verification	
Reviewer Si	ignature:	Jara Marin	~		
Date:					

ADCIRC REVIEW							
Storm:			Storm028_2001061700				
Reviewer:			Sara C. Davis				
Organization:			RAMPP				
			04/16/2012				
Was the m	ax water surface elevation file che	ecked for anoma	lies?	Yes			
Was the max current velocity file checked for anomalies?							
Was the max wind velocity file checked for anomalies?							
Was the minimum pressure file checked for anomalies?							
Was the model time series output compared to the measured gage data?							
Issues							
File	Comment	Resolution		Verification			
maxele	Niagara River anomalous	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.					
maxwvel	Horizontal gradient in the west	Gradient in wind is caused by extrapolation routine. Testing has shown that this gradient has a negligible					
maxwvel	Vertical gradient in the east	effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.					
maxwvel	Node 92161 abnormal max wind vel	This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.					
maxwvel	Anomalous in Sodus Bay	Gradient in v	vind is caused by extrapolation routine. Testing has shown that this gradient has a negligible				
maxwvel	Anomalous in Irondequoit Bay		water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May				
minpr	Horizontal gradient in the west	2012.					
Additional Comments on Detailed Check							
Comment		Resolution		Verification			
Abnormal	Measured vs. ADCIRC plots	numerous sto Recognizing measured and analyzed stat	s between modeled and measured data are expected, particularly when comparing against orm events. These discrepancies are most likely a limitation of the modeled wind fields. this, one of the goals of the comparative analysis is to ensure a balance is observed between the d modeled results; that is the model under-predicts some storms and over-predicts others. When istically as a population of storms, the Q-Q plots showed good agreement between measured and ve heights. See Figure 6.6 of Baird Lake Ontario report.				





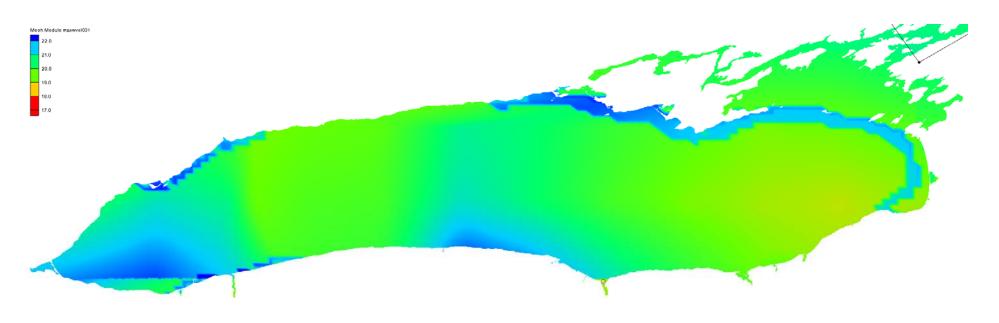
: 2 of 2

ADCIRC REVI	EW					
Storm:		Storm02	9 2002012900			
Reviewer:		Sara C. I				
Organization:		RAMPP				
Date Checked:		04/16/20				
Was the max wa	ter surface elevation file checked for an	nomalies?			Yes	
Was the max cur	rrent velocity file checked for anomalie	es?			Yes	
Was the max win	nd velocity file checked for anomalies?	?			Yes	
Was the minimu	m pressure file checked for anomalies?	?			Yes	
Was the model t	ime series output compared to the meas	sured gage	data?		Yes	
	* *		Issues			
File	Comment		Resolution		Verification	
maxele	Niagara River anomalous		This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.			
maxwvel	Horizontal gradient in the west					
maxwvel	Anomalous in Sodus Bay		Gradient in wind and pressure is caused by extrapolation routine. Tes	ting has		
maxwvel	Anomalous in Irondequoit Bay		shown that this gradient has a negligible effect on the water surface ele			
minpr	Horizontal gradient in the west		Refer to Baird/RAMPP email correspondence titled Run QC dated Ma	ay 2012.		
minpr	Slightly anomalous in Irondequoit B	Зау	-	-		
Additional Com	ments on Detailed Check	-				
	Comment		Resolution		Verification	
Reviewer Signat	ure:	Jar	a Marin			
Date:			×			

ADCIRC I	REVIEW						
Storm:			Storm030_2002030700				
Reviewer:			Sara C. Davis				
Organizatio	on:		RAMPP				
Date Check	xed:		04/16/2012				
Was the ma	ax water surface elevation file chec	cked for ano	omalies?		Yes		
Was the ma	Was the max current velocity file checked for anomalies?						
Was the ma	ax wind velocity file checked for a	nomalies?			Yes		
Was the mi	nimum pressure file checked for a	nomalies?			Yes		
Was the mo	odel time series output compared t	o the measu	red gage data?		Yes		
			Issues				
File	Comment			Resolution	Verification		
maxele	Niagara River anomalous	surge leve support fl	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.				
maxwvel	Horizontal gradient in the west	negligible	Gradient in wind is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.				
maxwvel	Node 92161 slightly abnormal max wind vel	Irondeque surroundi one time s	This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.				
maxwvel minpr	Anomalous in Irondequoit Bay Anomalous in Irondequoit Bay	Gradient i gradient h	in wind and pressure is caused by ex	trapolation routine. Testing has shown that this urface elevation. Refer to Baird/RAMPP email			
Additional	Comments on Detailed Check		`		•		
	C	omment		Resolution	Verification		
Reviewer S	Signature:		Jara Marin				
Date:							

ADCIRC F					
Storm:		Storm031_2003020200			
Reviewer:		Sara C. Davis			
Organizatio		RAMPP			
Date Check		04/16/2012			
	ax water surface elevation file checked for a		Yes		
	ax current velocity file checked for anomalie		Yes		
Was the ma	Yes				
Was the min	nimum pressure file checked for anomalies		Yes		
Was the mo	odel time series output compared to the mea	sured gage data?	Yes		
		Issues			
File	Comment	Resolution	Verification		
maxele	Niagara River anomalous	This is due to model boundary effects and poorly resolved bathym	etry. This		
		effect does not impact surge levels in the lake. Note that predicted			
		levels in the Niagara River are not to be used to support flood map			
		the river as it falls outside the scope of work and the model is not s			
		resolve the river in detail.	1		
maxwvel	Horizontal gradient in the west	Gradient in wind and pressure is caused by extrapolation routine.	Testing		
	C	has shown that this gradient has a negligible effect on the water su			
		elevation. Refer to Baird/RAMPP email correspondence titled Ru			
		dated May 2012.			
maxwvel	Very odd wind gradient near shoreline	The Modified Garratt Formulation (MGF) was used to define wind	Ispeeds		
		over ice fields. Using this parabolic function, the largest wind drag	A		
		50% ice coverage. Given the coarse resolution of the ice data relation			
		model grid, the winds were interpolated between neighboring ice f			
		different percent coverage; in some cases, this results in regions of			
		50% coverage, which generates the strongest winds drag coefficien			
		the MGF. Refer to Section 6.1.3 in Baird Lake Ontario report, wh			
		describes ice implementation methodology.			
maxwvel	Anomalous in Irondequoit Bay	Gradient in wind and pressure is caused by extrapolation routine.	Testing		
minpr	Slightly anomalous in Irondequoit Bay				
minpr	Horizontal gradient in the west	has shown that this gradient has a negligible effect on the water surelevation. Refer to Baird/RAMPP email correspondence titled Rur			
mmpi	rionzontai gradient in the west	L			
Additional	Comments on Detailed Check	dated May 2012.			
Auditional	Comments on Detailed Crieck Comment	Resolut	ion Verification		
	Comment	Kesolut	verification		
		RUN NAME: Storm031_2003020200	Page 1		

Reviewer Signature:	Jara Marin	
Date:		



^(-79.324, 43.9331) Node if (s: 1 selected; id = 6205. Very odd wind gradient near shoreline in east and west.

ADCIRC F	REVIEW					
Storm:		Storm032_2003111000				
Reviewer:		Sara C. Davis				
Organizatio	on:	RAMPP				
Date Check	red:	04/16/2012				
Was the ma	x water surface elevation file checked	d for anomalies?		Yes		
Was the ma	ax current velocity file checked for an	omalies?		Yes		
Was the ma	ax wind velocity file checked for anon	nalies?		Yes		
Was the min	nimum pressure file checked for anon	nalies?		Yes		
	odel time series output compared to th			Yes		
	real real real real real real real real	Issues				
File	Comment		Resolution	Verification		
maxele	Niagara River anomalous	impact surge levels in the lake. Note that	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail			
maxwvel	Horizontal gradient in the west					
maxwvel	Vertical gradient in the east					
maxwvel	Anomalous in Irondequoit Bay		by extrapolation routine. Testing has shown that this			
maxwvel	Anomalous in Sodus Bay		ter surface elevation. Refer to Baird/RAMPP email			
minpr	Anomalous in Irondequoit Bay	correspondence titled Run QC dated May	y 2012.			
minpr	Anomalous in Sodus Bay					
Additional	Comments on Detailed Check					
	Comn	nent	Resolution	Verification		
Reviewer S	ignature:	Jara Mari	~			
Date:						

ADCIRC REVIEW					
Storm:	Storm033 2004122000				
Reviewer:	Sara C. Davis				
Organization:	RAMPP				
Date Checked:	04/16/2012				
Was the max water surface elevation file checked	for anomalies?	Yes			
Was the max current velocity file checked for and	Was the max current velocity file checked for anomalies?				
Was the max wind velocity file checked for anomalies?					
Was the minimum pressure file checked for anom	nalies?	Yes			
Was the model time series output compared to the	e measured gage data?	Yes			
	Issues				
File Comment	Resolution	Verification			
maxele Niagara River anomalous	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.				
maxwvel Horizontal gradient in the west					
maxwvel Vertical gradient in the east					
maxwvel Anomalous in Irondequoit Bay	Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that				
maxwvel Slightly anomalous in Sodus Bay	this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP				
minpr Anomalous in Irondequoit Bay	email correspondence titled Run QC dated May 2012.				
minpr Anomalous in Sodus Bay					
minpr Horizontal gradient in the west					
Additional Comments on Detailed Check					
Comment	Resolution	Verification			
Reviewer Signature:					
	Jara man				
Date:					

ADCIRC R	REVIEW					
Storm:		Storm034 2006021400				
Reviewer:		Sara C. Davis				
Organizatio	n:	RAMPP				
Date Check	ed:	04/16/2012				
Was the ma	x water surface elevation file checked for a	nomalies?	Yes			
Was the ma	x current velocity file checked for anomalie	es?	Yes			
Was the ma	x wind velocity file checked for anomalies?		Yes			
Was the min	nimum pressure file checked for anomalies?		Yes			
Was the mo	del time series output compared to the meas	sured gage data?	Yes			
		Issues				
File	Comment	Resolution	Verification			
maxele	Niagara River anomalous	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.				
maxele	Slightly noisy at shoreline	The variations in SE along the shore are the result of changes in the velocity head that are due to variations in the bathymetry under strong shore parallel wind conditions.				
maxwvel	Horizontal gradient in the west					
maxwvel	Vertical gradient in the east	Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that				
maxwvel	Slightly anomalous in Irondequoit Bay	this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP				
minpr	Anomalous in Irondequoit Bay	email correspondence titled Run QC dated May 2012.				
minpr	Anomalous in Sodus Bay					
Additional (Comments on Detailed Check					
	Comment	Resolution	Verification			
Reviewer Signature:		Jara Marin	<u>.</u>			
Date:						

ADCIRC RE	VIEW				
Storm:		Storm035_19820	12900		
Reviewer:		Amelia Vincent			
Organization:		RAMPP			
Date Checked	;	4/6/12			
Was the max w	vater surface eleva	ion file checked for	r anomalies?		Yes
	· · · ·	checked for anoma			Yes
		hecked for anomali			Yes
	-	hecked for anomali			Yes Yes
Was the model time series output compared to the measured gage data?					
			Issues		-
File		iment		lution	Verification
Maxele.63	Anomalous values in the Niagara River		This is due to model boundary effects AV and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.		
Maxwvel.63	Anomalous wind Irondequoit Bay surrounding value	(52 compared to es of 24)	difference observed plot occurs only at o review of the results	61, which is located indequoit Bay. This odically throughout is relative to the so that the maximum in the maxwvel.63 one time step. A has shown that the ized influence on the ls only and has	AV
Additional Co	mments on Detaile			D 1	XX C
	(Comment		Resolution	Verification
Reviewer Sign	ature: Am	chia Vincent			
Date:	6/19/	12			

ADCIRC RE	VIEW					
Storm:		Storm036_200802	0300			
Reviewer:		Betsy Hicks				
Organization:		RAMPP				
Date Checked	:	4/16/12				
Was the max w	water surface elevat	ion file checked for	anomalies?		Yes	
Was the max of	current velocity file		Yes			
Was the max w	wind velocity file ch	necked for anomalies	s?		Yes	
Was the minimum pressure file checked for anomalies?						
Was the mode	Was the model time series output compared to the measured gage data?					
			Issues			
File	Com	nment	Re	solution	Verification	
maxele.63	high values in the	Niagara River		el boundary effects and		
				hymetry. This effect		
			_	rge levels in the lake.		
			Note that predicted			
			Niagara River are r			
				oing in the river as it		
			falls outside the scope of work and the			
		model is not setup to resolve the river in				
			detail.			
maxwvel.63		ted gradient line in				
	the western side o		Gradient in wind an			
maxwvel.63	vertically oriented		by extrapolation ro			
	the eastern side of		shown that this gra	dient has a negligible		
maxwvel.63	anomalous data in and Sodus Bays	the frondequoit	effect on the water	surface elevation.		
maxwvel.63		ted gradient line in	Refer to Baird/RAM	MPP email		
maxwvci.05	the northeastern s		correspondence titl	ed Run QC dated May		
minpr.63	anomalous data in		2012.			
minpilos	Bay	i ile fionaequoit				
Additional Co	mments on Detailed	l Check	•		•	
	(Comment		Resolution	Verification	
Reviewer Sign	nature:					
Date:						

ADCIRC RE	VIEW						
Storm:		5	Storm037_2009120800				
Reviewer:			Betsy Hicks				
Organization:		F	RAMPP				
Date Checked:			4/12/12				
Was the max w	vater surface	elevation	n file checked for anomalies?	Yes			
Was the max c	urrent veloc	ity file cł	necked for anomalies?	Yes			
Was the max w	vind velocity	file cheo	cked for anomalies?	Yes			
Was the minin	num pressure	e file che	cked for anomalies?	Yes			
Was the model	l time series	output co	ompared to the measured gage data?	Yes			
			Issues				
File	Comm	ent	Resolution	Verification			
maxele.63			This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH			
maxwvel.63, minpr.63	horizontally oriented gradient line in the western side of the lake		Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH			
maxwvel.63	node 92161 is considerable higher than adjacent nodes		This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.				
maxwvel.63	area with z winds	ero	Ice fields of 100% are represented by areas of zero wind. Refer to Section 6.1.3 in Baird Lake Ontario report, which describes ice implementation methodology.	BSH			
maxwvel.63	anomalous data in the Irondequoit and Sodus Bays		Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.				
Additional Con	mments on I	Detailed (
		Co	mment Resolution	Verification			
Reviewer Sign	ature:	B	ity Kicks				
Date: 6/5/20			2				

ADCIRC RE	VIEW						
Storm:			Storm038_1979080400				
Reviewer:		Betsy Hicks	5				
Organization:		RAMPP					
Date Checked			4/12/12				
Was the max y	water surface elevation	file checked for anon	nalies?		Y	es	
Was the max of	current velocity file che	cked for anomalies?			Y	es	
Was the max y	wind velocity file check	ted for anomalies?			Y	es	
Was the minin	num pressure file chec	ed for anomalies?			Y	es	
Was the mode	l time series output con	npared to the measure	ed gage data?		Y	es	
			Issues				
File	Comment		Resolution			Verification BSH	
maxele.63	high values in the Niagara River	effect does not imp in the Niagara Rive	his is due to model boundary effects and poorly resolved bathymetry. This fect does not impact surge levels in the lake. Note that predicted surge levels the Niagara River are not to be used to support flood mapping in the river as it lls outside the scope of work and the model is not setup to resolve the river in tail				
maxwvel.63	horizontally oriented gradient line in the western side of the lake	Gradient in wind a shown that this gra	Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.				
maxwvel.63	vertically oriented gradient line in the eastern side of the lake						
maxwvel.63	node 92161 is considerable higher than adjacent nodes	This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.				BSH	
minpr.63	anomalous data in the Irondequoit Bay	this gradient has a	re is caused by extrapolatio negligible effect on the wa ail correspondence titled R	ter surface elevation.	Refer to	BSH	
measure vs. model	model over predicts the WSE in comparison with the measured data in all areas	Discrepancies betw when comparing a likely a limitation of of the comparative measured and mod over-predicts other Q-Q plots showed	Baird/RAMPP email correspondence titled Run QC dated May 2012. Discrepancies between modeled and measured data are expected, particularly when comparing against numerous storm events. These discrepancies are most likely a limitation of the modeled wind fields. Recognizing this, one of the goals of the comparative analysis is to ensure a balance is observed between the measured and modeled results; that is the model under-predicts some storms and over-predicts others. When analyzed statistically as a population of storms, the Q-Q plots showed good agreement between measured and modeled wave heights. See Figure 6.6 of Baird Lake Ontario report.				
Additional Co	mments on Detailed C	<u> </u>		•			
		Comment		Resolution	Verification		
Reviewer Sigr	nature:	Betry V.	ficks				
Date:		6/5/2012					

ADCIRC RE	VIEW				
Storm:		Storm	039_1979120500		
Reviewer:		Betsy	Hicks		
Organization:		RAME			
Date Checked:		4/12/1			
			checked for anomalies?		Yes
			l for anomalies?		Yes
Was the max v					Yes
Was the minim	num pressure	file checked f	for anomalies?		Yes
Was the model	l time series c	output compar	ed to the measured gage data?		Yes
			Issues		
File	Com	iment	Resolution	L	Verification
maxele.63	high values in the Niagara River		This is due to model boundary resolved bathymetry. This effective surge levels in the lake. Note levels in the Niagara River are support flood mapping in the r outside the scope of work and setup to resolve the river in der	BSH	
maxwvel.63, minpr.63	horizontally oriented gradient line in the western side of the lake		Gradient in wind and pressure extrapolation routine. Testing gradient has a negligible effect elevation. Refer to Baird/RAM correspondence titled Run QC	BSH	
maxwvel.63	node 92161 is considerable higher than adjacent nodes		This is an isolated anomaly in Node 92161, which is located Irondequoit Bay. This anomal throughout the simulation and surrounding winds, so that the observed in the maxwvel.63 pl time step. A review of the resu the anomaly has a localized int neighboring grid cells only and impact on surge results in Iron	BSH	
maxwvel.63, minpr.63	anomalous o		Gradient in wind and pressure	is caused by	BSH
maxwvel.63	Irondequoit Bay anomalous data in the Sodus Bay		extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.		BSH
Additional Con	mments on D	etailed Check			
		Commen	t	Resolution	Verification
			y Hicks		
Date:		6/5/2012			

ADCIRC RE	VIEW					
Storm:		Storm040_197	orm040_1974032100			
Reviewer:		Betsy Hicks				
Organization:		RAMPP				
Date Checked		4/12/12				
	water surface elevation		nalies?	Yes		
	current velocity file che			Yes		
	wind velocity file check			Yes		
Was the minin	num pressure file check	ed for anomalies?		Yes		
Was the mode	l time series output con	npared to the measur	ed gage data?	Yes		
			Issues	•		
File	Comment		Resolution	Verification		
maxele.63	high values in the Nia River	bathymetry the lake. N River are n river as it f	to model boundary effects and poorly resolved 7. This effect does not impact surge levels in Note that predicted surge levels in the Niagara not to be used to support flood mapping in the falls outside the scope of work and the model is to resolve the river in detail.	BSH		
maxwvel.63	file looks very coarse/gridded in comparison with other wind files	For storms p therefore na	prior to 1979 CFSR winds are not available and tural neighbor winds are used. Refer to Section ird Lake Ontario report.	BSH		
minpr.63	file looks very smooth comparison with other minimum pressure file	r		BSH		
meas v model	Vincent and underpredicts in Rochester limita one o balan result over- popu agree		cies between modeled and measured data are particularly when comparing against numerous its. These discrepancies are most likely a of the modeled wind fields. Recognizing this, goals of the comparative analysis is to ensure a observed between the measured and modeled it is the model under-predicts some storms and cts others. When analyzed statistically as a of storms, the Q-Q plots showed good between measured and modeled wave heights. 6.6 of Baird Lake Ontario report.	BSH		
Additional Co	mments on Detailed Ch					
	Comment		Resolution	Verification		
Reviewer Sigr Date:		Bity b	Ficks	1		

ADCIRC REV	/IEW					
Storm:		Storm041_1980102300				
Reviewer:		Betsy Hicks				
Organization:		RAMPP				
Date Checked:		4/12/12				
Was the max w	ater surface elevation	file checked for anomalies?		Yes		
Was the max current velocity file checked for anomalies?				Yes		
Was the max wind velocity file checked for anomalies?				Yes		
Was the minim	um pressure file check	ed for anomalies?		Yes		
		pared to the measured gage data?		Yes		
		Issues				
File	Comment	Resolution		Verification		
maxele.63	high values in the Niagara River	This is due to model boundary effects at bathymetry. This effect does not impact lake. Note that predicted surge levels in not to be used to support flood mapping outside the scope of work and the mode the river in detail.	t surge levels in the the Niagara River are in the river as it falls	BSH		
maxwvel.63, minpr.63	horizontally oriented gradient line in the western side of the lake	Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.		BSH		
maxwvel.63	vertically oriented gradient line in the eastern side of the lake	eman correspondence tried Kun QC da	BSH			
maxwvel.63	node 92161 is considerable higher than adjacent nodes	which is located in the middle of Ironde anomaly occurs periodically throughout relative to the surrounding winds, so tha difference observed in the maxwvel.63 time step. A review of the results has sh	This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only			
maxwvel.63	anomalous data in the Irondequoit Bay	Gradient in wind and pressure is caused routine. Testing has shown that this gra effect on the water surface elevation. R	by extrapolation dient has a negligible	BSH		
maxwvel.63, minpr.63	anomalous data in the Sodus Bay	email correspondence titled Run QC dat		BSH		
Additional Cor	nments on Detailed Ch					
	C	omment	Resolution	Verification		
Reviewer Signa	ature:	Bitry Hicks				
Date:	6/5	/2012				

ADCIRC RE	VIEW			
Storm:		Storm042_1980121	1100	
Reviewer:		Betsy Hicks		
Organization:		RAMPP		
Date Checked		4/12/12		
Was the max y	water surface elevat	on file checked for a	anomalies?	Yes
Was the max of	current velocity file	checked for anomali	es?	Yes
Was the max y	wind velocity file ch	ecked for anomalies	?	Yes
Was the minin	num pressure file cl	ecked for anomalies	?	Yes
Was the mode	l time series output	compared to the mea	asured gage data?	Yes
			Issues	
File	Con	nment	Resolution	Verification
maxele.63	high values in the	Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This	BSH
			effect does not impact surge levels in	
			the lake. Note that predicted surge	
			levels in the Niagara River are not to	
			be used to support flood mapping in	
			the river as it falls outside the scope of	
			work and the model is not setup to	
			resolve the river in detail.	
maxwvel.63,	horizontally orien	ted gradient line in	Gradient in wind and pressure is	BSH
minpr.63	the western side o		caused by extrapolation routine.	
			Testing has shown that this gradient	
			has a negligible effect on the water	
			surface elevation. Refer to	
			Baird/RAMPP email correspondence	
			titled Run QC dated May 2012.	
maxwvel.63	node 92161 is con	siderable higher	This is an isolated anomaly in the wind	BSH
	than adjacent nod	-	dataset at Node 92161, which is	
	-		located in the middle of Irondequoit	
			Bay. This anomaly occurs periodically	
			throughout the simulation and is	
			relative to the surrounding winds, so	
			that the maximum difference observed	
			in the maxwvel.63 plot occurs only at	
			one time step. A review of the results	
			has shown that the anomaly has a	
			localized influence on the neighboring	
			grid cells only and has negligible	
			impact on surge results in Irondequoit	
			Bay.	
maxwvel.63	anomalous data in	the Irondequoit	Gradient in wind and pressure is	BSH
	Bay		caused by extrapolation routine.	
maxwvel.63	slightly anomalou	s data in the Sodus	Testing has shown that this gradient	BSH
	Bay		has a negligible effect on the water	
			surface elevation. Refer to	
			Baird/RAMPP email correspondence	
			titled Run QC dated May 2012.	

meas v model	model over predicts the WSE in comparison with the measured data in all areas		Discrepancies between modeled and measured data are expected, particularly when comparing against numerous storm events. These discrepancies are most likely a limitation of the modeled wind fields. Recognizing this, one of the goals of the comparative analysis is to ensure a balance is observed between the measured and modeled results; that is 		BSH
				n measured and ghts. See Figure 6.6	
			of Baird Lake Ont	ario report.	
Additional Con	mments on I	Detailed Check			
		Comment		Resolution	Verification
Reviewer Sign	ature:	Bitry H	icks		
Date:		6/5/2012			

ADCIRC RE	VIEW					
Storm:		Storm043_1981112500				
Reviewer:		Betsy Hicks				
Organization:		RAMPP	RAMPP			
Date Checked		4/12/12				
Was the max y	water surface elevation	file checked for anomalies?		Yes		
Was the max of	current velocity file che	ecked for anomalies?		Yes		
Was the max y	wind velocity file check	ked for anomalies?		Yes		
Was the minin	num pressure file chec	ked for anomalies?		Yes		
Was the mode	l time series output con	mpared to the measured gage data?		Yes		
		Issues				
File	Comment	Resolution		Verification		
maxele.63	high values in the Niagara River	This is due to model boundary effects a bathymetry. This effect does not impace lake. Note that predicted surge levels i are not to be used to support flood map falls outside the scope of work and the resolve the river in detail.	ct surge levels in the n the Niagara River ping in the river as it	BSH		
maxwvel.63	horizontally oriented gradient line in the western side of the lake	Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.		BSH		
maxwvel.63	vertically oriented gradient line in the eastern side of the lake	emain correspondence inted itali Qe di	BSH			
maxwvel.63	node 92161 is considerable higher than adjacent nodes	This is an isolated anomaly in the wind 92161, which is located in the middle of This anomaly occurs periodically throu and is relative to the surrounding winds difference observed in the maxwvel.63 one time step. A review of the results I anomaly has a localized influence on th cells only and has negligible impact on Irondequoit Bay.	BSH			
maxwvel.63	slightly anomalous data in the Irondequoit Bay	Gradient in wind and pressure is caused routine. Testing has shown that this gr effect on the water surface elevation. F	adient has a negligible	BSH		
maxwvel.63, minpr.63	anomalous data in the Sodus Bay	email correspondence titled Run QC da		BSH		
Additional Co	mments on Detailed C		D 1.1	XX C		
	C	omment	Resolution	Verification		
Reviewer Sigr	nature:	Betry Hicks		1		
Date:	6/5/2	2012				

CVIEW			
	Storm044 1982010200		
	RAMPP		
	4/12/12		
	le checked for anomalies?	Yes	
current velocity file checl	ked for anomalies?	Yes	
wind velocity file checke	d for anomalies?	Yes	
mum pressure file checke	d for anomalies?	Yes	
el time series output comp	pared to the measured gage data?	Yes	
	Issues		
Comment	Resolution	Verification	
high values in the Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH	
horizontally oriented gradient line in the western side of the lake	Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH	
node 92161 is considerable higher than adjacent nodes	This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.	BSH	
anomalous data in the Irondequoit Bay	Gradient in wind and pressure is caused by extrapolation	BSH	
slightly anomalous data in the Sodus Bay	negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH	
omments on Detailed Che			
		Verification	
nature:	Sitry Hicks		
	I: water surface elevation ficurrent velocity file checkemum pressure file checkemum pressure file checkeel time series output composition of the lake I: Comment high values in the Niagara River horizontally oriented gradient line in the western side of the lake node 92161 is considerable higher than adjacent nodes anomalous data in the Irondequoit Bay slightly anomalous data in the Sodus Bay omments on Detailed Che Contact of the Con	Storm044_1982010200 Betsy Hicks RAMPP i: 4/12/12 water surface elevation file checked for anomalies? current velocity file checked for anomalies? mum pressure file checked for anomalies? el time series output compared to the measured gage data? Issues Comment high values in the Niagara River high values in the Niagara River horizontally oriented gradient line in the western side of the lake horizontally oriented gradient line in the western side of the lake 10 horizontally oriented gradient line in the western side of the lake 11 12 13 14 14 14 15 15 16 16 16 17 18 18 19 10 10 10 10 10 10 10 10	

ADCIRC RE	VIEW				
Storm:	St	torm045_	1982012000		
Reviewer:		etsy Hick	S		
Organization:		AMPP			
Date Checked	: 4/	/12/12			
Was the max w	water surface elevation	file check	ked for anomalies?	Yes	
Was the max of	current velocity file che	ecked for	anomalies?	Yes	
Was the max w	wind velocity file check	ked for an	iomalies?	Yes	
Was the minin	num pressure file check	ked for an	nomalies?	Yes	
Was the mode	l time series output cor	mpared to	the measured gage data?	Yes	
		1	Issues		
File	Comment		Resolution	Verification	
maxele.63	high values in the Nia River	agara	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH	
maxwvel.63, minpr.63	horizontally oriented gradient line in the western side of the lake		Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH	
maxwvel.63	node 92161 is considerably higher than adjacent nodes		This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.	BSH	
maxwvel.63	large area with zero winds		Ice fields of 100% are represented by areas of zero wind. Refer to Section 6.1.3 in Baird Lake Ontario report, which describes ice implementation methodology.	BSH	
maxwvel.63,	anomalous data in the	e	Gradient in wind and pressure is caused by	BSH	
minpr.63 minpr.63	Irondequoit Bay anomalous data in the Bay	e Sodus	extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH	
maxwvel.63	two lines of anomalou towards the west end		The Modified Garratt Formulation (MGF) was used to define wind speeds over ice fields.	BSH	

	Using this parabolic funct drag occurs at 50% ice co coarse resolution of the ic model grid, the winds wer between neighboring ice f percent coverage; in some regions of ice with 50% co generates the strongest wi under the MGF. Refer to Baird Lake Ontario report implementation methodol	verage. Given the e data relative to the re interpolated fields of different cases, this results in overage, which nds drag coefficient Section 6.1.3 in , which describes ice	
Additional Comments on	Comment	Resolution	Verification
	Common	resolution	venneuron
	1		
Reviewer Signature:	Bitry Hicks		
Date:	6/5/2012		

ADCIRC REV	VIEW			
Storm:		Storm046_1982040	0300	
Reviewer:		Betsy Hicks		
Organization:		RAMPP		
Date Checked:		4/12/12		
Was the max v	vater surface elevati	on file checked for a	nomalies?	Yes
Was the max c	urrent velocity file	checked for anomalie	es?	Yes
Was the max wind velocity file checked for anomalies?				Yes
Was the minimum pressure file checked for anomalies?				Yes
		compared to the mea		Yes
	1	1	Issues	L
File	Con	nment	Resolution	Verification
maxele.63 maxwvel.63, minpr.63	high values in the	Niagara River ted gradient line in	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail. Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to	BSH
maxwvel.63	node 92161 is considerably higher than adjacent nodes		Baird/RAMPP email correspondence titled Run QC dated May 2012. This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwel.63 plot occurs only at	BSH
maxwvel.63	area with zero wir	ıds	one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay. Ice fields of 100% are represented by areas of zero wind. Refer to Section 6.1.3 in Baird Lake Ontario report, which describes ice implementation methodology.	BSH
maxwvel.63, minpr.63	anomalous data in Bay	the Irondequoit	Gradient in wind and pressure is	BSH

			1		
maxwvel.63,	anomalous	data in the Sodus Bay	caused by extrapo		BSH
minpr.63			Testing has shown	that this gradient	
			has a negligible ef	fect on the water	
			surface elevation.	Refer to	
			Baird/RAMPP em	ail correspondence	
			titled Run QC date	ed May 2012.	
maxwvel.63	Bands of h	igher winds in the	The Modified Gar	•	BSH
	northeast:		(MGF) was used t	o define wind speeds	
			over ice fields. U		
		and the second second		st wind drag occurs	
	-To			ge. Given the coarse	
	E.			ce data relative to the	
	1 2	20 C	model grid, the wi		
	a series		0	en neighboring ice	
				percent coverage; in	
				esults in regions of	
			ice with 50% cove		
			generates the stron	0	
				he MGF. Refer to	
			Section 6.1.3 in B		
			report, which desc		
A 111/1 1 C	 		implementation m	ethodology.	
Additional Co	mments on I	Detailed Check		Decal dan	Mariff and an
		Comment		Resolution	Verification
Reviewer Sign	ature:	10 11			
		Bitry A	uks		
Date:		6/5/2012			
Date.		0/3/2012			

ADCIRC RE	VIEW					
Storm:		Storm047_1982	110300			
Reviewer:		Betsy Hicks				
Organization:		RAMPP				
Date Checked		4/12/12				
	water surface elevat			Yes Yes		
	Was the max current velocity file checked for anomalies?					
	Was the max wind velocity file checked for anomalies?					
	Was the minimum pressure file checked for anomalies?					
Was the mode	Was the model time series output compared to the measured gage data?					
Issues						
File	Comr		Resolution	Verification		
maxele.63	high values in the	Niagara Kiver	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH		
maxwvel.63, minpr.63	horizontally oriented gradient line in the western side of the lake		Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH		
maxwvel.63	node 92161 is considerably higher than adjacent nodes		This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.	BSH		
maxwvel.63, minpr.63	anomalous data in Bay	the Irondequoit	Gradient in wind and pressure is caused by extrapolation routine. Testing has	BSH		
maxwvel.63, minpr.63	anomalous data in	·	shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH		
meas v	model under predi	icts the WSE in	The average difference between all	BSH		

model	comparison data in all	n with the measured areas	gauges measured vs. The maximum instan was at Cape Vincent Discrepancies betwee measured data are ex when comparing again events. These discrep likely a limitation of fields. Recognizing to of the comparative ar balance is observed b and modeled results; under-predicts some a predicts others. Whe statistically as a popu	taneous difference with 5 inches. en modeled and pected, particularly inst numerous storm pancies are most the modeled wind his, one of the goals nalysis is to ensure a between the measured that is the model storms and over- n analyzed	
			between measured an heights. See Figure 6 Ontario report.		
Additional Con	mments on I	Detailed Check	onuno reporti		
		Comment		Resolution	Verification
Reviewer Sign	ature:	Bitry K	ficks		
Date:		6/5/2012			

ADCIRC RE	VIEW					
Storm:		Storm048_1982122600				
Reviewer:		Betsy Hicks				
Organization:		RAMPP				
Date Checked:		4/12/12				
		vation file checked for anomalies?	Yes			
	· · · ·	ile checked for anomalies?	Yes			
Was the max wind velocity file checked for anomalies?			Yes			
Was the minin	num pressure file	e checked for anomalies?	Yes			
Was the model	l time series out	put compared to the measured gage data?	Yes			
		Issues	-			
File	Comment	Resolution	Verification			
maxele.63	high values in the Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH			
maxwvel.63, minpr.63	horizontally oriented gradie line in the western side of the lake	Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a	BSH			
maxwvel.63	vertically oriented gradie line in the eastern side of the lake	Run QC dated May 2012.	BSH			
maxwvel.63	node 92161 is higher than adjacent nodes	This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.				
maxwvel.63, minpr.63	anomalous dat in the Irondequoit Ba	a Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a	BSH			
Additional Con	mments on Deta		•			
		Comment Resolution	Verification			
Reviewer Sign	ature:	Bitry Hicks				
Date:	6/5	5/2012				

ADCIRC RE	VIEW			
Storm:		Storm049_19850301	100	
Reviewer:		Betsy Hicks		
Organization:		RAMPP		
Date Checked		4/12/12		
Was the max	water surface elevat	ion file checked for an	nomalies?	Yes
Was the max	current velocity file	checked for anomalie	s?	Yes
Was the max	wind velocity file ch	necked for anomalies?		Yes
Was the minin	num pressure file cl	necked for anomalies?		Yes
Was the mode	el time series output	compared to the meas	sured gage data?	Yes
			Issues	
File	Co	mment	Resolution	Verification
maxele.63	high values in the	Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH
maxwvel.63	horizontally oriented gradient line in the western side of the lake		Gradient in wind is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH
maxwvel.63	node 92161 is cor than adjacent nod	es	This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.	BSH
maxwvel.63	large area with ze		Ice fields of 100% are represented by areas of zero wind. Refer to Section 6.1.3 in Baird Lake Ontario report, which describes ice implementation methodology.	BSH
maxwvel.63, minpr.63	anomalous data ir	the Irondequoit Bay	Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible	BSH

maxwvel.63		ce is not very smooth or nany instances of strange	Refer to Baird/RA correspondence t May 2012. Ice fields of 100% areas of zero win The Modified Ga (MGF) was used over ice fields. U function, the larg 50% ice coverage resolution of the model grid, the w between neighbo different percent cases, this results 50% coverage, w strongest winds d the MGF. Refer	itled Run QC dated 6 are represented by d. rratt Formulation to define wind speeds Using this parabolic est wind drag occurs at e. Given the coarse ice data relative to the rinds were interpolated ring ice fields of coverage; in some in regions of ice with hich generates the lrag coefficient under to Section 6.1.3 in	BSH
			Baird Lake Ontar describes ice imp methodology.		
Additional Co	mments on I	Detailed Check	memodology		
		Comment		Resolution	Verification
Reviewer Sign	ature:	Bitry Hi	cks		
Date:		6/5/2012			

ADCIRC RE	VIEW			
Storm:		Storm050_1986010	600	
Reviewer:		Betsy Hicks		
Organization:		RAMPP		
Date Checked:		4/12/12		
Was the max w	vater surface elevati	on file checked for a	nomalies?	Yes
Was the max current velocity file checked for anomalies?			es?	Yes
Was the max wind velocity file checked for anomalies)	Yes
Was the minimum pressure file checked for anomalies?			Yes	
	-	compared to the meas		Yes
	1	-	Issues	
File	Cor	nment	Resolution	Verification
maxele.63	high values in the	Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH
maxwvel.63, minpr.63	horizontally oriented gradient line in the western side of the lake		Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH
maxwvel.63	node 92161 is considerably higher than adjacent nodes		This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.	BSH
maxwvel.63	area with zero wir	ıds	Ice fields of 100% are represented by areas of zero wind. Refer to Section 6.1.3 in Baird Lake Ontario report, which describes ice implementation methodology.	BSH

RUN NAME: Storm050_2008012700

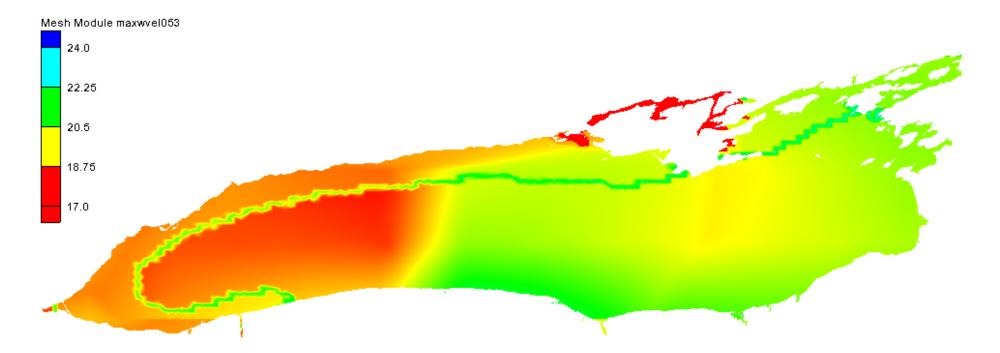
Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.maxwvel.63bands of nodes with higher wind velocities in the northeast:The Modified Garratt Formulation (MGF) was used to define wind speeds over ice fields. Using this parabolic function, the largest wind drag occurs at 50% ice coverage. Given the coarse resolution of the ice data relative to the model grid, the winds were interpolated between neighboring ice fields of different percent coverage; in some cases, this results in regions of ice with 50% coverage, which generates the strongest winds drag coefficient under the MGF. Refer to Section 6.1.3 in Baird Lake Ontario report, which describes ice implementation methodology.BSH	-			
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Additional Comments on Detailed Check Comment Comment Reviewer Signature: Buty Winks				
Comment Resolution Verification Reviewer Signature: Buty Winks	Additional Co	mments on Detailed Check	0.0 01 Dand Lake Ontario report.	
Reviewer Signature: Buty Hicks			Resolution	Verification
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Ditry Arcks	Reviewer Sign	ature: 10 . Al.		
~	6	Bity Au	cks	
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Date: 6/5/2012				
	Dete	6/5/2012		
	Date:			

RUN NAME: Storm050_2008012700

ADCIRC RE	VIEW					
Storm:	S	torm051_1986091200				
Reviewer:	H	tsy Hicks				
Organization:	F	RAMPP				
Date Checked	: 5	/21/12				
Was the max w	water surface elevation	n file checked for anomalies?	Yes			
Was the max of	current velocity file ch	ecked for anomalies?	Yes			
Was the max w	Was the max wind velocity file checked for anomalies?					
Was the minin	Was the minimum pressure file checked for anomalies?					
Was the mode	l time series output co	mpared to the measured gage data?	Yes			
		Issues	-			
File	Comment	Resolution	Verification			
maxele.63	high values in the Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH			
maxwvel.63	horizontally oriented gradient line in the western side of the lake		BSH			
maxwvel.63	slight vertically oriented gradient line in the eastern side of the lake	dated May 2012	BSH			
maxwvel.63	anomalous data in the Irondequoit Bay		BSH			
maxele.63, maxwvel.63	node 92161 is considerably higher than adjacent nodes (wvel=302) creates a 0.1 increase in the SWEL surface in the same location	maxwel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.	BSH			
Additional Co	mments on Detailed (Check Resolution	Verification			
	Cu	Infort Kesofution	v enneation			
Reviewer Sigr	nature: B	itry Hicks	L			
Date:	6/7/2012	2				

ADCIRC RE	VIEW					
Storm:		Storm	052_1986100100			
Reviewer:		Betsy				
Organization:		RAMI				
Date Checked		5/21/1				
			checked for anomalies?		Yes	
	current velocity file				Yes	
	wind velocity file c				Yes	
	num pressure file c				Yes	
Was the mode	l time series outpu	t compar	ed to the measured gage data?		Yes	
			Issues			
File	Comment		Resolution		Verification	
maxele.63	high values in the Niagara River	3	This is due to model boundary or resolved bathymetry. This effe surge levels in the lake. Note the levels in the Niagara River are support flood mapping in the ri- the scope of work and the model resolve the river in detail.	ct does not impact hat predicted surge not to be used to ver as it falls outside	BSH	
maxwvel.63	slight horizontally oriented gradient line in the western side of the lake slight vertically oriented gradient line in the eastern side of the lake		Gradient in wind is caused by extrapolation routine. Testing has shown that this gradient has a negligible		BSH	
maxwvel.63					BSH	
maxwvel.63	anomalous data i Irondequoit Bay	n the		BSH		
maxwvel.63	node 92161 is sli higher than adjac nodes		This is an isolated anomaly in t Node 92161, which is located in Irondequoit Bay. This anomaly throughout the simulation and i surrounding winds, so that the r observed in the maxwel.63 plot time step. A review of the resu anomaly has a localized influen grid cells only and has negligib results in Irondequoit Bay.	n the middle of y occurs periodically is relative to the maximum difference ot occurs only at one ilts has shown that the nce on the neighboring	BSH	
Additional Co	mments on Detaile	d Check	<u> </u>			
		Commer	it	Resolution	Verification	
Reviewer Sign	ature: 12	3.t	y Hicks			
Date:	6/7/2	012				

ADCIRC REV	VIEW				
Storm:			Storm053_1988011000		
Reviewer:			Sara C. Davis		
Organization:			RAMPP		
Date Checked:	Date Checked: 06/22/2012				
Was the max v	vater surface elevation	file checked for ano	malies?		Yes
Was the max c	urrent velocity file che	cked for anomalies?			Yes
Was the max v	vind velocity file check	ed for anomalies?			Yes
Was the minim	um pressure file check	ed for anomalies?			Yes
Was the model	time series output con	npared to the measur	red gage data?		Yes
			Issues		
File	Comment		Resolution		Verification
maxwvel	node 92161middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.wvelAbnormalThis band in the wind data is caused by the transition in ice coverage from 80% to 10%.				SCD SCD
gradient across lakeThe Modified Garratt Formulation (MGF) was used to define wind speeds over ice fields. Using this parabolic function, the largest wind drag occurs at 50% ice coverage. Given the coarse resolution of the ice data relative to the model grid, the winds were interpolated 					
Additional Con	nments on Detailed Ch				
		Comment		Resolution	Verification
Reviewer Sign	ature:	F	dre Jani	1	1
Date:		6/26/	2012		
					D 1 0



ADCIRC RE	VIEW					
Storm:	S	torm054_1988061900				
Reviewer:		etsy Hicks				
Organization:		AMPP				
Date Checked		/21/12				
		file checked for anomalies?		Yes		
Was the max of	current velocity file che	ecked for anomalies?		Yes		
Was the max	wind velocity file chec	ked for anomalies?		Yes		
Was the minir	num pressure file chec	ked for anomalies?		Yes		
Was the mode	l time series output con	mpared to the measured gage data?		Yes		
	I	Issues				
File	Comment	Resolution		Verification		
maxele.63	high values in the Niagara River	This is due to model boundary eff resolved bathymetry. This effect surge levels in the lake. Note that surge levels in the Niagara River a used to support flood mapping in falls outside the scope of work an not setup to resolve the river in de	does not impact predicted are not to be the river as it d the model is	BSH		
maxwvel.63 maxwvel.63	slight vertically oriented gradient line in the eastern side of the lake anomalous data in the Irondequoit and	Gradient in wind is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence		BSH		
	Sodus Bays	titled Run QC dated May 2012.				
Additional Co	mments on Detailed C	heck				
		nment	Resolution	Verification		
Reviewer Sigr	nature: B	itry Hicks				
Date:	6/7/2012	2				

ADCIRC RE	VIEW						
Storm:	S	Storm055_1988071400					
Reviewer:	H	Betsy Hicks					
Organization:	H	RAMPP					
Date Checked	: 5	5/21/12					
Was the max y	water surface elevation	n file checked for anomalies?		Yes			
Was the max of	current velocity file ch	necked for anomalies?		Yes			
Was the max	wind velocity file cheo	cked for anomalies?		Yes			
Was the minir	num pressure file che	cked for anomalies?		Yes			
		ompared to the measured gage data?		Yes			
		Issues					
File	Comment	Resolution	Verification				
maxele.63	high values in the Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.					
maxwvel.63	vertically oriented gradient line in the eastern side of the lake	Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH				
Additional Co	mments on Detailed O	Check					
00	~	mment	Resolution	Verification			
Reviewer Sigi	nature: B	ity Hicks					
Date:	6/7/201	2					

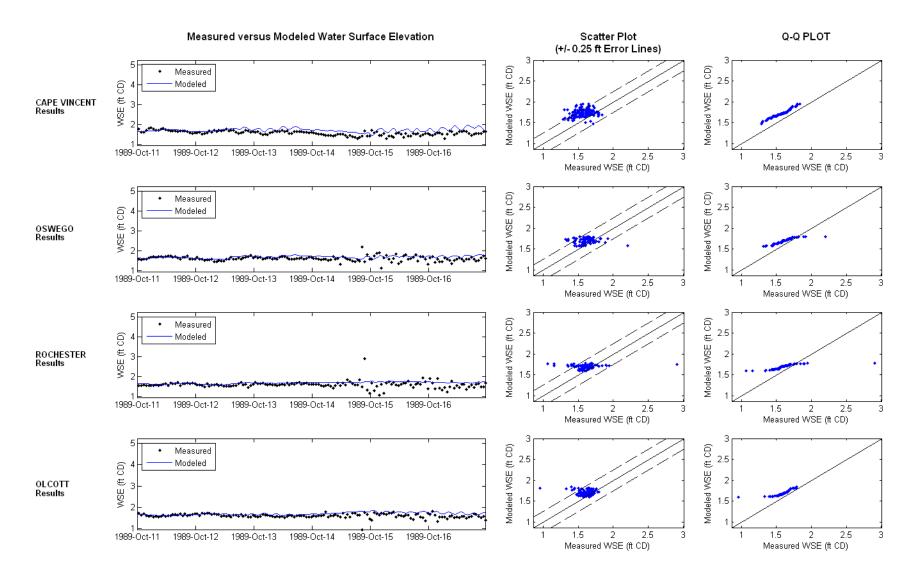
ADCIRC RE	VIEW				
Storm:		Storm056_1988	8110700		
Reviewer:		Betsy Hicks			
Organization:		RAMPP			
Date Checked		5/21/12			
Was the max w	vater surface elevat	ion file checked	for anomalies?		Yes
Was the max c	current velocity file	checked for anot	malies?		Yes
Was the max w	vind velocity file cl	necked for anoma	alies?		Yes
Was the minin	num pressure file cl	necked for anoma	alies?		Yes
Was the mode	l time series output	compared to the	measured gage data?		Yes
			Issues		
File	Comm	nent	Reso	lution	Verification
maxele.63	high values in the	Niagara River	This is due to model b	oundary effects and	BSH
				upport flood mapping outside the scope of	
maxwvel.63	slight horizontally gradient line in th of the lake		Ū.	hown that this gradient	BSH
maxwvel.63	vertically oriented in the eastern side		has a negligible effect elevation. Refer to Ba	aird/RAMPP email	BSH
maxwvel.63	anomalous data in Irondequoit and S		correspondence titled 2012.	Run QC dated May	BSH
Additional Ca	mments on Detailed	Chaolt			
Auditional Co		Comment		Resolution	Verification
				Kesofution	v critication
Reviewer Sign	ature: 12	Sitry &	ficks		
Date:	6/7/20)12			

ADCIRC REV	VIEW				
Storm:		Storm057_1	988111700		
Reviewer:		Betsy Hicks			
Organization:		RAMPP			
Date Checked:		5/21/12			
		elevation file check			Yes
		ty file checked for a			Yes
	-	file checked for and			Yes
Was the minim	num pressure	file checked for and	omalies?		Yes
Was the model	l time series o	output compared to	the measured gage data?		Yes
			Issues		
File	С	omment	Resolu	ition	Verification
maxele.63	high values in the Niagara River		This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.		BSH
maxwvel.63		ontally oriented e in the western ake	Gradient in wind and pre-	BSH	
maxwvel.63	vertically oriented gradient line in the eastern side of the lake anomalous data in the Irondequoit and Sodus Bays		extrapolation routine. Te this gradient has a neglig surface elevation. Refer	BSH	
maxwvel.63			correspondence titled Ru	BSH	
maxwvel.63	node 92161 is considerably higher than adjacent nodes		This is an isolated anoma at Node 92161, which is of Irondequoit Bay. This periodically throughout the relative to the surroundin maximum difference obse maxwvel.63 plot occurs of A review of the results has anomaly has a localized in neighboring grid cells on impact on surge results in	BSH	
Additional Con	mments on D	etailed Check			
		Comment		Resolution	Verification
Reviewer Sign	ature:	Bitry	Hicks		
Date:		6/7/2012			

ADCIRC RE	VIEW					
Storm:		Storm05	8_1989020500			
Reviewer:		Betsy Hi				
Organization:		RAMPP				
Date Checked:		5/21/12				
Was the max w	vater surface	elevation file ch	ecked for anomalies?		Yes	
Was the max c	urrent veloci	ty file checked for	or anomalies?		Yes	
Was the max w	vind velocity	file checked for	anomalies?		Yes	
Was the minin	num pressure	file checked for	anomalies?		Yes	
Was the model	time series of	output compared	to the measured gage data?		Yes	
			Issues			
File	Cor	mment	Resolutio	n	Verification	
maxele.63	high values in the Niagara River		This is due to model bounda resolved bathymetry. This e surge levels in the lake. Not surge levels in the Niagara R used to support flood mappin falls outside the scope of wo not setup to resolve the river	ffect does not impact e that predicted liver are not to be ng in the river as it rk and the model is	BSH	
maxwvel.63	horizontally gradient line western side		Gradient in wind is caused b	BSH		
maxwvel.63	vertically or gradient line side of the l	e in the eastern	routine. Testing has shown t a negligible effect on the wa Refer to Baird/RAMPP emai	BSH		
maxwvel.63	anomalous Irondequoit Bays		titled Run QC dated May 20	BSH		
Additional Con	mments on D					
		Comment		Resolution	Verification	
Reviewer Sign	ature:	Bitu	Kicks		<u> </u>	
Date:		6/7/2012				

ADCIRC RE	VIEW					
Storm:		Storm059_1989031500				
Reviewer:		Betsy Hicks				
Organization:		RAMPP				
Date Checked		5/21/12				
Was the max y	water surface elev	vation file checked for anomalies?	Yes			
Was the max of	current velocity fi	le checked for anomalies?	Yes			
Was the max wind velocity file checked for anomalies?						
Was the minimum pressure file checked for anomalies?						
Was the mode	l time series outp	ut compared to the measured gage data?	Yes			
		Issues				
File	Comment	Resolution	Verification			
maxele.63	high values in the Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH			
maxwvel.63	anomalous data in the Sodus Bay	Gradient in wind is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH			
maxwvel.63	band of high wind nodes in the NE	The Modified Garratt Formulation (MGF) was used to define wind speeds over ice fields. Using this parabolic function, the largest wind drag occurs at 50% ice coverage. Given the coarse resolution of the ice data relative to the model grid, the winds were interpolated between neighboring ice fields of different percent coverage; in some cases, this results in regions of ice with 50% coverage, which generates the strongest winds drag coefficient under the MGF. Refer to Section 6.1.3 in Baird Lake Ontario report, which describes ice implementation methodology.	BSH			
Additional Co	mments on Detai		XX : C			
		Comment Resolution	Verification			
Reviewer Sign	nature:	Bitry Hicks	1			
Date:	6/7/	/2012				

ADCIRC REVIEW						
Storm:	Storm060_1989101100					
Reviewer:	Sara C. Davis					
Organization:	RAMPP					
Date Checked:	05/22/2012					
Was the max water surface elevation file checked	for anomalies?			Yes		
Was the max current velocity file checked for and	malies?			Yes		
Was the max wind velocity file checked for anom	alies?			Yes		
Was the minimum pressure file checked for anom	alies?			Yes		
Was the model time series output compared to the	e measured gage data?			Yes		
	Issues					
File	Comment	Resolution		Verification		
Additional Comments on Detailed Check						
Comment	Resolution			Verification		
	Discrepancies between modeled and measured data are against numerous storm events. These discrepancies are wind fields. Recognizing this, one of the goals of the co- is observed between the measured and modeled results; storms and over-predicts others. When analyzed statisti- plots showed good agreement between measured and m Baird Lake Ontario report.	SCD				
Reviewer Signature:	Jara Rain					
Date:						

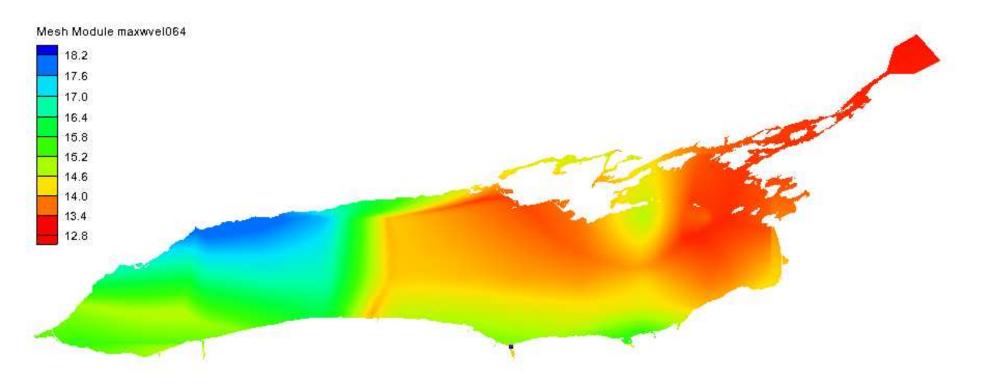


ADCIRC RE	VIEW						
Storm:							
Reviewer:		Sara C. Davis					
Organization:		RAMPP					
Date Checked		05/22/2012					
Was the max w	water surface elevation file checked for	anomalies?			Yes		
Was the max c	current velocity file checked for anomal	ies?			Yes		
Was the max w	wind velocity file checked for anomalie	s?			Yes		
Was the minin	num pressure file checked for anomalie	s?			Yes		
Was the mode	l time series output compared to the me	asured gage data?			Yes		
		Issues					
File	Comment	Resolu	tion	Verificat	ion		
	Horizontal gradient in the west	Gradient in wind and pressure is cau Testing has shown that this gradient water surface elevation. Refer to Ba correspondence titled Run QC dated					
Additional Co	mments on Detailed Check						
<u>ridditional co</u>	Comment		Resolution		Verification		
Reviewer Sigr	nature:	Jara Marin	L				
Date:							

Storm: Storm062_1991032500 Reviewer: Sara C. Davis Organization: RAMPP Date Checked: 05/22/2012 Was the max water surface elevation file checked for anomalies? Was the max current velocity file checked for anomalies? Was the max wind velocity file checked for anomalies? Was the model time series output compared to the measured gage data? Was the model time series output compared to the measured gage data? Issues File Comment Resol maxwvel Anomalous maximum of 45.9 at node 6205 This is an isolated anomaly in the wind datase downstream in the St. Lawrence River. This simulation and is relative to the surrounding voltable of the second of the St. Law and fort.64 files as the results are influenced be explained in the README file. Mathematical Comments on Detailed Check Comment	t at Node 6205, which is located far anomaly occurs periodically throughout the vinds, so that the maximum difference at one time step. vrence River was removed from the fort.63
Reviewer: Sara C. Davis Organization: RAMPP Date Checked: 05/22/2012 Was the max water surface elevation file checked for anomalies? Was the max current velocity file checked for anomalies? Was the max wind velocity file checked for anomalies? Was the minimum pressure file checked for anomalies? Was the model time series output compared to the measured gage data? Issues File Comment Resol maxwvel Anomalous maximum of 45.9 at node 6205 This is an isolated anomaly in the wind datase downstream in the St. Lawrence River. This simulation and is relative to the surrounding voltage observed in the maxwel.63 plot occurs only The data in the downstream end of the St. Law and fort.64 files as the results are influenced be explained in the README file. Additional Comments on Detailed Check Image: Check of the surrounding the check of the surround	Yes Yes Yes Yes Yes Yes Yes Ution Verification t at Node 6205, which is located far anomaly occurs periodically throughout the vinds, so that the maximum difference at one time step. vrence River was removed from the fort.63
Date Checked: 05/22/2012 Was the max water surface elevation file checked for anomalies? Was the max current velocity file checked for anomalies? Was the max wind velocity file checked for anomalies? Was the minimum pressure file checked for anomalies? Was the model time series output compared to the measured gage data? Issues File Comment Resol maxwvel Anomalous maximum of 45.9 at node 6205 Anomalous maximum of 45.9 at node 6205 This is an isolated anomaly in the wind datase downstream in the St. Lawrence River. This simulation and is relative to the surrounding voltage observed in the maxwvel.63 plot occurs only The data in the downstream end of the St. Law and fort.64 files as the results are influenced to explained in the README file. Additional Comments on Detailed Check	Yes Yes Yes Yes Yes Yes Yes Ution Verification t at Node 6205, which is located far anomaly occurs periodically throughout the vinds, so that the maximum difference at one time step. vrence River was removed from the fort.63
Was the max water surface elevation file checked for anomalies? Was the max current velocity file checked for anomalies? Was the max wind velocity file checked for anomalies? Was the minimum pressure file checked for anomalies? Was the model time series output compared to the measured gage data? Issues File Comment Resol maxwvel Anomalous maximum of 45.9 at node 6205 This is an isolated anomaly in the wind datase downstream in the St. Lawrence River. This simulation and is relative to the surrounding voltable observed in the maxwel.63 plot occurs only The data in the downstream end of the St. Law and fort.64 files as the results are influenced be explained in the README file. Additional Comments on Detailed Check Head the check	Yes Yes Yes Yes Yes Yes Yes Ution Verification t at Node 6205, which is located far anomaly occurs periodically throughout the vinds, so that the maximum difference at one time step. vrence River was removed from the fort.63
Was the max current velocity file checked for anomalies? Was the max wind velocity file checked for anomalies? Was the minimum pressure file checked for anomalies? Was the model time series output compared to the measured gage data? Issues File Comment Anomalous maximum of 45.9 at node 6205 This is an isolated anomaly in the wind datase downstream in the St. Lawrence River. This simulation and is relative to the surrounding work observed in the maxwel.63 plot occurs only The data in the downstream end of the St. Law and fort.64 files as the results are influenced be explained in the README file. Additional Comments on Detailed Check Image: Comment work of the check of the chec	Yes Yes Yes Yes Yes Yes Yes Ution Verification t at Node 6205, which is located far anomaly occurs periodically throughout the vinds, so that the maximum difference at one time step. vrence River was removed from the fort.63
Was the max wind velocity file checked for anomalies? Was the minimum pressure file checked for anomalies? Was the model time series output compared to the measured gage data? Was the model time series output compared to the measured gage data? Issues File Comment Resol maxwvel Anomalous maximum of 45.9 at node 6205 This is an isolated anomaly in the wind datased downstream in the St. Lawrence River. This simulation and is relative to the surrounding work observed in the maxwvel.63 plot occurs only The data in the downstream end of the St. Law and fort.64 files as the results are influenced to explained in the README file. Additional Comments on Detailed Check Image: Comment of the st. Comment of the st.	Yes Y
Was the minimum pressure file checked for anomalies? Was the model time series output compared to the measured gage data? Issues Issues File Comment Resol maxwvel Anomalous maximum of 45.9 at node 6205 This is an isolated anomaly in the wind datase downstream in the St. Lawrence River. This simulation and is relative to the surrounding work observed in the maxwvel.63 plot occurs only The data in the downstream end of the St. Law and fort.64 files as the results are influenced be explained in the README file. Image: text of the stere	Yes Yes Yes Yes Verification t at Node 6205, which is located far anomaly occurs periodically throughout the vinds, so that the maximum difference at one time step. SCD vrence River was removed from the fort.63 SCD
Was the model time series output compared to the measured gage data? Issues File Comment Resol maxwvel Anomalous maximum of 45.9 at node 6205 This is an isolated anomaly in the wind datase downstream in the St. Lawrence River. This simulation and is relative to the surrounding works observed in the maxwvel.63 plot occurs only The data in the downstream end of the St. Law and fort.64 files as the results are influenced to explained in the README file. Additional Comments on Detailed Check	ution Yes ution Verification t at Node 6205, which is located far anomaly occurs periodically throughout the vinds, so that the maximum difference at one time step. SCD
Was the model time series output compared to the measured gage data? Issues File Comment Resol maxwvel Anomalous maximum of 45.9 at node 6205 This is an isolated anomaly in the wind datase downstream in the St. Lawrence River. This simulation and is relative to the surrounding works observed in the maxwvel.63 plot occurs only The data in the downstream end of the St. Law and fort.64 files as the results are influenced to explained in the README file. Additional Comments on Detailed Check	utionVerificationt at Node 6205, which is located far anomaly occurs periodically throughout the vinds, so that the maximum difference at one time step.SCDvrence River was removed from the fort.63SCD
File Comment Issues maxwvel Anomalous maximum of 45.9 at node 6205 This is an isolated anomaly in the wind datase downstream in the St. Lawrence River. This simulation and is relative to the surrounding volserved in the maxwvel.63 plot occurs only The data in the downstream end of the St. Law and fort.64 files as the results are influenced be explained in the README file. Additional Comments on Detailed Check	t at Node 6205, which is located far anomaly occurs periodically throughout the vinds, so that the maximum difference at one time step. vrence River was removed from the fort.63
maxwvel Anomalous maximum of 45.9 at node 6205 This is an isolated anomaly in the wind datase downstream in the St. Lawrence River. This simulation and is relative to the surrounding voltage observed in the maxwvel.63 plot occurs only The data in the downstream end of the St. Law and fort.64 files as the results are influenced be explained in the README file. Additional Comments on Detailed Check	t at Node 6205, which is located far anomaly occurs periodically throughout the vinds, so that the maximum difference at one time step. vrence River was removed from the fort.63
node 6205 Initial to the bound of the St. Lawrence River. This simulation and is relative to the surrounding wobserved in the maxwvel.63 plot occurs only The data in the downstream end of the St. Law and fort.64 files as the results are influenced to explained in the README file. Additional Comments on Detailed Check	anomaly occurs periodically throughout the vinds, so that the maximum difference at one time step. vrence River was removed from the fort.63
Comment	
	Resolution Verification
Reviewer Signature: Aara Marin Aara Marin	
Date:	

ADCIRC RE	EVIEW			
Storm:		Storm063_1992122300		
Reviewer:		Sara C. Davis		
Organization:		RAMPP		
Date Checked		05/22/2012		
Was the max	water surface elevation file checked for an	nomalies?		Yes
Was the max	current velocity file checked for anomalies	s?		Yes
Was the max	wind velocity file checked for anomalies?			Yes
Was the minin	mum pressure file checked for anomalies?			Yes
Was the mode	el time series output compared to the meas	sured gage data?		Yes
		Issues		
File	Comment		Resolution	Verification
Maxwvel	Anomalous maximum of 150 at node 9	the middle of Irondequoit Bay simulation and is relative to the observed in the maxwvel.63 presults has shown that the and	This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring gr cells only and has negligible impact on surge results in Irondequoit Bay.	
Maxwvel	Horizontal gradient in the west	gradient has a negligible effect	extrapolation routine. Testing has shown of on the water surface elevation. Refer to ondence titled Run QC dated May 2012.	that this SCD
Additional Co	omments on Detailed Check			
	Comment		Resolution	Verification
Reviewer Sig	nature:	Jara Dani	L	I
Date.				

Storm:	5	torm064 19	993020900			
Reviewer:		ara C. Davi				
Organization:		RAMPP	3			
Date Checked:		6/13/2012				
Was the max water su			for anomalie	\$?		Yes
Was the max current	velocity file chec	ked for anot	malies?			Yes
Was the max wind ve						Yes
Was the minimum pre	•					Yes
Was the model time s				ge data?		Yes
			Issues			
File	Comm	ient		Resolution		Verification
	Horizontal gradient in east, vertical gradient in west, abnormal pattern across lake.		a negligib elevation. correspon The spatia (fort.22) v were obse particular therefore	ient in wind is caused by extrapolation ne. Testing has shown that this gradient has ligible effect on the water surface tion. Refer to Baird/RAMPP email spondence titled Run QC dated May 2012. patially and time varying wind file 22) was checked and no abnormal patterns observed across the Lake. However, this cular storm does change direction and is fore the cause of the pattern seen across the in the maximum wind speed file.		
Additional Comments		eck				
	Comment			Resolution		Verification
Reviewer Signature:	A	Para	Dani			

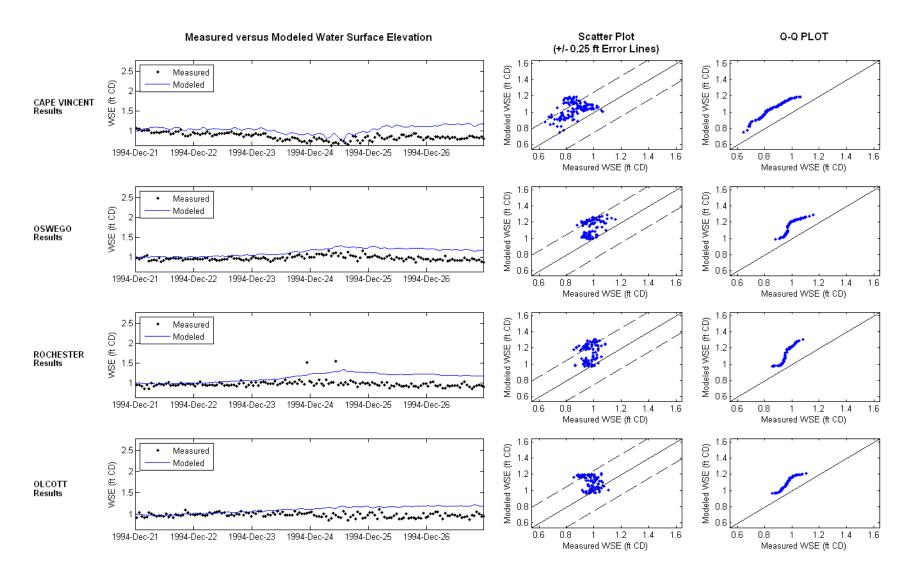


ADCIRC REVIEW						
Storm: Storm065_1994022000						
Reviewer:		Sara C. Davi	is			
Organization:		RAMPP				
Date Checked:		05/22/2012				
Was the max water surface elevati						Yes
Was the max current velocity file of						Yes
Was the max wind velocity file ch						Yes
Was the minimum pressure file ch						Yes
Was the model time series output of	compared to the meas	sured gage dat	a?			Yes
			Issues			
File	Comme	nt		Resolution		Verification
Maxwvel	th			Gradient in wind is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.		
Additional Comments on Detailed	Check					
Additional Comments on Detailed	Comment			Resolution		Verification
Reviewer Signature:	Y	Para (h	Janin			
Date:						

ADCIRC REVIEW						
Storm:		Storm06	66_1994110300			
Reviewer:	Sara C. Davis					
Organization:		RAMPP				
Date Checked:		05/22/20	012			
Was the max water surface elevat	ion file checked for an	omalies?				Yes
Was the max current velocity file	checked for anomalies	s?				Yes
Was the max wind velocity file ch	necked for anomalies?					Yes
Was the minimum pressure file ch	hecked for anomalies?					Yes
Was the model time series output			e data?			Yes
	1	00	Issues			
File	Comment			Resolution		Verification
Maxwvel	Horizontal gradient west	in the	shown that this gradient has	sure is caused by extrapolation routine. Testing has as a negligible effect on the water surface elevation. nail correspondence titled Run QC dated May 2012.		SCD
Maxwvel	Anomalous maximum of 40.7 at node 92161		the middle of Irondequoit B simulation and is relative to difference observed in the r review of the results has sho	aly in the wind dataset at Node 92161, which is located in t Bay. This anomaly occurs periodically throughout the to the surrounding winds, so that the maximum e maxwvel.63 plot occurs only at one time step. A shown that the anomaly has a localized influence on the ly and has negligible impact on surge results in		SCD
Additional Comments on Detailed				Devilière		X7 * ⁰
	Comment			Resolution		Verification
Reviewer Signature:	A	dra () Danin			
Date:						

ADCIRC REVIEW					
Storm: Storm067_1994111900					
Reviewer: Sara C. Davis					
Organization:		RAMPP			
Date Checked:		05/22/2012			
Was the max water surface elevat	ion file checked for a	nomalies?			Yes
Was the max current velocity file	checked for anomalie	s?			Yes
Was the max wind velocity file ch					Yes
Was the minimum pressure file ch	necked for anomalies?	•			Yes
Was the model time series output	compared to the measured	sured gage data?			Yes
			Issues		
File	Co	omment		Resolution	Verification
Maxwvel Additional Comments on Detailed	Horizontal gradient	in the west	Testing has si water surface	ind and pressure is caused by extrapolation nown that this gradient has a negligible effe elevation. Refer to Baird/RAMPP email ce titled Run QC dated May 2012.	SCD
	Comment			Resolution	Verification
Reviewer Signature:	4	Para Chilliani			
Date.					

ADCIRC REVIEW						
Storm:		Storm068_1994122100				
Reviewer:		Sara C. Davis				
Organization:		RAMPP				
Date Checked:		05/22/2012				
Was the max water surface elevation	on file checked for	anomalies?		Yes		
Was the max current velocity file c	checked for anomal	ies?		Yes		
Was the max wind velocity file che	ecked for anomalies	s?		Yes		
Was the minimum pressure file che	ecked for anomalies	s?		Yes		
Was the model time series output of	compared to the me	asured gage data?		Yes		
* 	*		Issues			
File	Co	mment	Resolution	Verification		
Maxwvel	Horizontal gradies	nt in the west	in the westGradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.			
Additional Comments on Detailed	Check					
Comment			Resolution	Verification		
anomalous (see below). comparing against model wind is to ensure a balance model under-predicts a population of storm			veen modeled and measured data are expected, particularly when numerous storm events. These discrepancies are most likely a lin ad fields. Recognizing this, one of the goals of the comparative ar- ice is observed between the measured and modeled results; that is cts some storms and over-predicts others. When analyzed statistic rms, the Q-Q plots showed good agreement between measured an ghts. See Figure 6.6 of Baird Lake Ontario report.	nalysis s the cally as		
Reviewer Signature:	(Jara Dani	~	I		
Date:						



ADCIRC REVI	ADCIRC REVIEW					
Storm:			Storm069_1995010300			
Reviewer:			Sara C. Davis			
Organization:			RAMPP			
Date Checked:			05/22/2012			
	ter surface elevation fi					Yes
Was the max cur	rent velocity file check	ked for anomalie	es?			Yes
	nd velocity file checked					Yes
	m pressure file checke					Yes
Was the model ti	me series output comp	pared to the mea	sured gage data?			Yes
			Issues			
File	Comment		Resolution		Verification	
MaxwvelAnomalous maximum of 49.4 at node 92161This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible				eriodically throughout the simulation maximum difference observed in the eview of the results has shown that the	SCD	
Maxwvel	Maxwvel Horizontal gradient in the west Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012. Image: Construction of the state of the st			SCD		
Additional Com	ments on Detailed Che	<u>ck</u>				•
		Comment		Resolution		Verification
De la classificación						
Reviewer Signature:						
Date:						

ADCIRC RE	VIEW				
Storm:		Storm07	0_1995110800		
Reviewer:		Betsy Hi	icks		
Organization:		RAMPP			
Date Checked		5/22/12			
			ecked for anomalies?	Yes Yes	
	Was the max current velocity file checked for anomalies?				
	wind velocity file ch			Yes	
Was the minir	num pressure file ch	ecked for	anomalies?	Yes	
Was the mode	el time series output o	compared	to the measured gage data?	Yes	
	T		Issues	1	
File	Comment		Resolution	Verification	
maxele.63	high values in the River	i i agara	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH	
maxwvel.63	horizontally orient gradient line in the western side of the	,	Gradient in wind is caused by extrapolation routine. Testing has shown that this gradient has a	BSH	
maxwvel.63	anomalous data in the Irondequoit and Sodus Bays		negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH	
maxwvel.63	node 92161 is considerably highe adjacent nodes	er than	This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.	BSH	
meas v model	model over predict WSE in compariso the measured data Vincent, Rochester Olcott	on with in Cape	Discrepancies between modeled and measured data are expected, particularly when comparing against numerous storm events. These discrepancies are most likely a limitation of the modeled wind fields. Recognizing this, one of the goals of the comparative analysis is to ensure a balance is observed between the measured and modeled results; that is the model under-predicts some storms and over-predicts others. When analyzed statistically as a population of storms, the Q-Q plots showed good agreement between measured and modeled wave heights. See Figure 6.6 of Baird Lake Ontario report.	BSH	
Additional Co	mments on Detailed	Check			
	С	omment	Resolution	Verification	

Reviewer Signature:	Bitry Hicks	
Date:	6/7/2012	

ADCIRC RE	VIEW					
Storm:		Storm071	1996012500			
Reviewer:		Betsy Hick	S S			
Organization:		RAMPP				
Date Checked:		5/22/12				
			ked for anomalies?			Yes
	current velocity file					Yes
	wind velocity file c					Yes
Was the minin	num pressure file c	hecked for a	nomalies?			Yes
Was the model	l time series output	compared to	the measured gage data?			Yes
	1		Issues			
File maxele.63	Comme		Resolution		Verificat BSH	tion
	high values in the River		This is due to model bound poorly resolved bathymetr does not impact surge leve Note that predicted surge l Niagara River are not to be flood mapping in the river the scope of work and the setup to resolve the river in	y. This effect els in the lake. evels in the e used to support as it falls outside model is not		
maxwvel.63	slight horizontall gradient line in the side of the lake		Gradient in wind is caused routine. Testing has show	by extrapolation hat this	BSH	
maxwvel.63	anomalous data in Irondequoit and S		surface elevation. Refer to email correspondence title May 2012.	Baird/RAMPP	BSH	
maxwvel.63	band of anomalou the northeast betw zero wind/ice are unfrozen portion	veen the a and the	The Modified Garratt Forr was used to define wind sp fields. Using this paraboli largest wind drag occurs at coverage. Given the coars the ice data relative to the winds were interpolated be neighboring ice fields of d coverage; in some cases, th regions of ice with 50% co generates the strongest win coefficient under the MGF Section 6.1.3 in Baird Lak which describes ice implet methodology.	beeds over ice c function, the t 50% ice e resolution of model grid, the etween ifferent percent his results in overage, which hds drag C. Refer to e Ontario report,	BSH	
Additional Con	mments on Detaile	d Check				
	(Comment		Resolution	Veri	fication
Reviewer Sign	ature:	Sitry	Hicks			
Date:	6/7/2	012				

ADCIRC RE	VIEW			
Storm:	Sto	orm072_	_1996030100	
Reviewer:	Be	etsy Hick	κs	
Organization:		AMPP		
Date Checked: 5/22/12				
Was the max	water surface elevation	file chec	cked for anomalies?	Yes
	current velocity file che			Yes
Was the max wind velocity file checked for		ked for a	nomalies?	Yes
Was the minir	num pressure file check	ked for a	nomalies?	Yes
Was the mode	el time series output com	npared to	o the measured gage data?	Yes
			Issues	
File	Comment		Resolution	Verification
maxele.63	high values in the Nia River	agara	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH
maxwvel.63	node 92161 is conside higher than adjacent n	nodes	This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.	BSH
maxwvel.63	slightly anomalous da the Sodus Bay	ata in	Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH
maxwvel.63	band of anomalous no in the northeast	odes	Ice fields of 100% are represented by areas of zero wind. Refer to Section 6.1.3 in Baird Lake Ontario report, which describes ice implementation methodology. The Modified Garratt Formulation (MGF) was used to define wind speeds over ice fields. Using this parabolic function, the largest wind drag occurs at 50% ice coverage. Given the coarse resolution of the ice data relative to the model grid, the winds were interpolated between neighboring ice fields of different percent coverage; in some cases, this results in regions of ice with 50% coverage, which generates the	BSH

			strongest winds drag coeffic Refer to Section 6.1.3 in Ba report, which describes ice i methodology.	ird Lake Ontario implementation	
meas v model	Vincent	e WSE in	Discrepancies between mod data are expected, particular against numerous storm eve discrepancies are most likel modeled wind fields. Recog goals of the comparative and balance is observed between modeled results; that is the some storms and over-predi analyzed statistically as a po the Q-Q plots showed good measured and modeled wav 6.6 of Baird Lake Ontario re	rly when comparing ents. These y a limitation of the gnizing this, one of the alysis is to ensure a in the measured and model under-predicts cts others. When opulation of storms, agreement between e heights. See Figure	BSH
<u>ridditional Co</u>	Similents on L	Comment		Resolution	Verification
		Comment		Resolution	vermeation
Reviewer Sig	nature:	Bitu	y Hicks		
Date:		6/7/2012			

ADCIRC RE	VIEW				
Storm:		Storm073_199	96110500		
Reviewer:		Betsy Hicks			
Organization:		RAMPP			
Date Checked		5/22/12			
Was the max	water surface elevat	ion file checked	for anomalies?		Yes
Was the max of	current velocity file	checked for and	omalies?		Yes
Was the max y	wind velocity file ch	ecked for anom	nalies?		Yes
Was the minir	num pressure file ch	ecked for anon	nalies?		Yes
Was the mode	l time series output	compared to the	e measured gage data?		Yes
			Issues		
File	Comm	ent	Reso	lution	Verification
maxele.63	high values in the River	Niagara	This is due to model be poorly resolved bathym not impact surge levels predicted surge levels i not to be used to suppo river as it falls outside t the model is not setup t detail.	hetry. This effect does in the lake. Note that n the Niagara River are rt flood mapping in the the scope of work and	BSH
maxwvel.63	slight horizontally oriented gradient line in the western side of the lake slight vertically oriented gradient line in the eastern side of the lake		Gradient in wind is cau routine. Testing has sh		BSH
maxwvel.63			has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May	BSH	
maxwvel.63	anomalous data in the Irondequoit and Sodus Bays		2012.		BSH
maxwvel.63	node 92161 is con higher than adjace	siderably	This is an isolated anor dataset at Node 92161, middle of Irondequoit I occurs periodically thro and is relative to the su that the maximum diffe maxwvel.63 plot occurs A review of the results anomaly has a localized neighboring grid cells of impact on surge results	which is located in the Bay. This anomaly oughout the simulation rrounding winds, so erence observed in the s only at one time step. has shown that the d influence on the only and has negligible	BSH
meas v model	model over predic comparison with t data in Cape Vinc	he measured	numerous storm events statistically as a popula	when comparing against . When analyzed tion of storms, the Q-Q howed good agreement modeled surface	BSH
Additional Co	mments on Detailed	l Check			
		Comment		Resolution	Verification

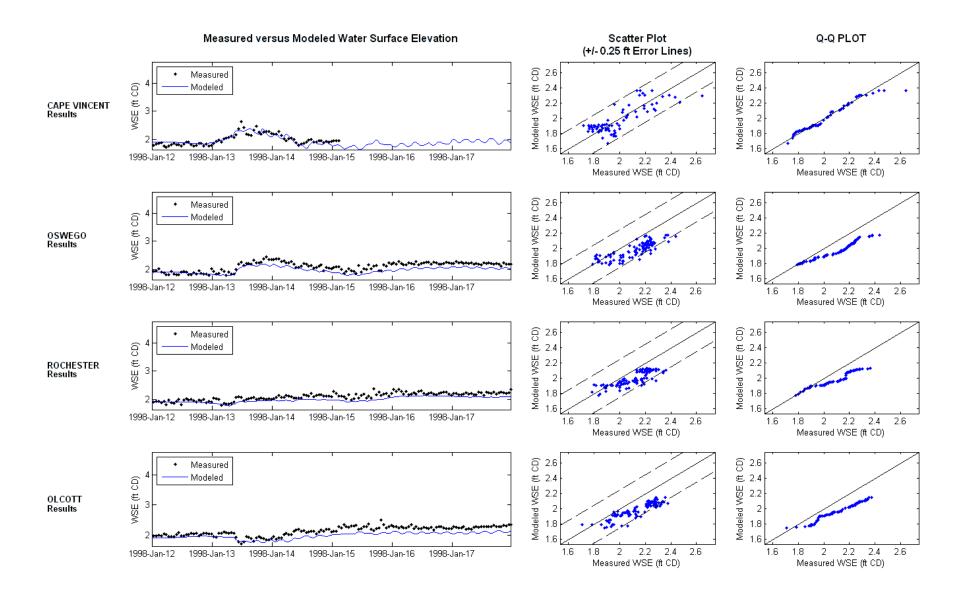
Reviewer Signature:	Bitry Hicks
Date:	6/7/2012

ADCIRC RE	VIEW				
Storm:	Ste	orm074_1997120800			
Reviewer:		y Hicks			
Organization:		AMPP			
Date Checked		22/12			
Was the max	water surface elevation	file checked for anomalies?	Yes		
Was the max of	current velocity file che	cked for anomalies?	Yes		
Was the max y	wind velocity file check	ted for anomalies?	Yes		
Was the minimum pressure file checked for anomalies?			Yes		
Was the mode	el time series output con	npared to the measured gage data?	Yes		
		Issues	Γ		
File	Comment	Resolution	Verification		
maxele.63	high values in the Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH		
maxwvel.63	horizontally oriented gradient line in the western side of the lake	Gradient in wind is caused by extrapolation	BSH		
maxwvel.63	slight vertically oriented gradient line in the eastern side of the lake	routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH		
maxwvel.63	anomalous data in the Irondequoit and Sodu Bays		BSH		
maxwvel.63	node 92161 is considerably higher than adjacent nodes	This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.	BSH		
meas v model	model over predicts the WSE in comparison with the measured data in all areas	Discrepancies between modeled and measured data are expected, particularly when comparing against numerous storm events. These discrepancies are most likely a limitation of the modeled wind fields. Recognizing this, one of the goals of the comparative analysis is to ensure a balance is observed between the measured and modeled results; that is the model under-predicts some storms and over-predicts others. When analyzed statistically as a population of storms,	BSH		

the Q-Q plots showed good agreement between measured and modeled wave heights. See Figure 6.6 of Baird Lake Ontario report. Additional Comments on Detailed Check					
	Comment	Resolution	Verification		
Reviewer Signature:	Bitry Hicks				
Date:	6/7/2012				

ADCIRC REVI	EW			
Storm:	Stor	rm075_1998011200		
Reviewer:	Bet	y Hicks		
Organization:	RA	MPP		
Date Checked:		2/12		
Was the max wat	Was the max water surface elevation file checked for anomalies?			
Was the max cur	rent velocity file checked for anom	alies?	Yes	
Was the max win	nd velocity file checked for anomal	es?	Yes	
Was the minimum	m pressure file checked for anomal	les?	Yes	
Was the model ti	me series output compared to the n	neasured gage data?	No	
		Issues		
File	Comment	Resolution	Verification	
maxele.63	high values in the Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH	
maxwvel.63	horizontally oriented gradient line in the western side of the lake	- Gradient in wind is caused by extrapolation routine. Testing has shown that	BSH	
maxwvel.63	vertically oriented gradient line in the eastern side of the lake	this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH	
maxwvel.63	anomalous data in the Irondequoit and Sodus Bays		BSH	
maxwvel.63	node 92161 is considerably higher than adjacent nodes	This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.	BSH	
maxwvel.63	noisy data in the northeast	The Modified Garratt Formulation (MGF) was used to define wind speeds over ice fields. Using this parabolic function, the largest wind drag occurs at 50% ice coverage. Given the coarse resolution of the ice data relative to the model grid, the winds were interpolated between neighboring ice fields of different percent coverage; in some cases, this results in regions of ice	BSH	

		with 50% coverage, which generates the stro under the MGF. Refer to Section 6.1.3 in Ba describes ice implementation methodology.		
meas v model	no plot available for QC	Provide below		BSH
Additional Commen	ts on Detailed Check			
	C	Comment	Resolution	Verification
Reviewer Signature:	B	try Hicks		
Date:	6/7/2012			



Storm: Storm076_1998031800 Reviewer: Betsy Hicks Organization: RAMPP Date Checked: 5/22/12 Was the max water surface elevation file checked for anomalies? Was the max wind velocity file checked for anomalies? Was the max wind velocity file checked for anomalies? Was the model time series output compared to the measured gage data? Issues File Comment Maxele.63 high values in the Niagara River Niagara River This is due to model boundary effects a resolved bathymetry. This effect does a surge levels in the lake. Note that pred levels in the Niagara River are not to be suport flood mapping in the river as it the scope of work and the model is not resolve the river in detail. maxwvel.63 slight horizontally oriented gradient line in the western side of the lake maxwvel.63 anomalous data in the Irondequoit and Sodus Bays maxwvel.63 node 92161 is slightly higher than adjacent nodes This is an isolated anomaly in the wind Node 92161, which is located in the mi Irondequoit Bay. maxwvel.63 model over predicts the WSE in comparison with the measured data in Comparison with the measured data in Comparison with the measured, particularly when comparison with the measured, particularly when comparison with the measured, particularly when comparison with the meas	
Reviewer: Betsy Hicks Organization: RAMPP Date Checked: 5/22/12 Was the max water surface elevation file checked for anomalies? Was the max current velocity file checked for anomalies? Was the max wind velocity file checked for anomalies? Was the max wind velocity file checked for anomalies? Was the model time series output compared to the measured gage data? Issues File Comment Resolution maxele.63 high values in the Niagara River This is due to model boundary effects a resolved bathymetry. This effect does a surge levels in the Niagara River are not to be support flood mapping in the river as it the scope of work and the model is not resolve the river in detail. maxwvel.63 slight horizontally oriented gradient line in the western side of the lake Gradient in wind is caused by extrapola Testing has shown that this gradient has effect on the water surface elevation. Fe Baird/RAMPP email correspondence ti dated May 2012. maxwvel.63 node 92161 is slightly higher than adjacent nodes This is an isolated anomaly in the wind Node 92161, which is located in the mainum observed in the maximum observed in the maxwel.63 plot occurs throughout the simulation and is relativ surrounding winds, so that the maximum observed in the maxwel.63 plot occurs throughout the simulation and is relativ surrounding winds, so that the maximum obs	
Date Checked: 5/22/12 Was the max water surface elevation file checked for anomalies? Was the max current velocity file checked for anomalies? Was the max wind velocity file checked for anomalies? Was the max wind velocity file checked for anomalies? Was the model time series output compared to the measured gage data? Issues File Comment Resolution Resolution maxele.63 high values in the Niagara River This is due to model boundary effects a resolved bathymetry. This effect does a surge levels in the lake. Note that pred levels in the interiver as it the scope of work and the model is not resolve the river in detail. maxwvel.63 anomalous data in the Irondequoit and Sodus Bays maxwvel.63 node 92161 is slightly higher than adjacent nodes This is an isolated anomaly in the wind Node 92161, which is located in the mi Irondequoit Bay. This anomaly occurs throughout the simulation and is relativ surrounding winds, so that the maximu observed in the maxwel.63 plot occurs time step. A review of the results has s anomaly has a localized influence on th grid cells only and has negligible impac results in Irondequoit Bay. meas v model model over predicts the WSE in comparison with the measured data in Comparison with the measured data in	
Was the max water surface elevation file checked for anomalies? Was the max wind velocity file checked for anomalies? Was the max wind velocity file checked for anomalies? Was the model time series output compared to the measured gage data? Issues File Comment Resolution maxele.63 high values in the Niagara River Niagara River This is due to model boundary effects a resolved bathymetry. This effect does a surge levels in the lake. Note that pred levels in the Niagara River are not to be support flood mapping in the river as it the scope of work and the model is not resolve the river in detail. maxwvel.63 slight horizontally oriented gradient line in the western side of the lake Gradient in wind is caused by extrapola Testing has shown that this gradient has aljacent nodes maxwvel.63 node 92161 is slightly higher than adjacent nodes This is an isolated anomaly in the wind Node 92161, which is located in the mi Irondequoit Bay. This anomaly occurs throughout the simulation and is relativ surrounding winds, so that the maximum observed in th	
Was the max current velocity file checked for anomalies? Was the max wind velocity file checked for anomalies? Was the minimum pressure file checked for anomalies? Was the model time series output compared to the measured gage data? Issues File Comment Resolution maxele.63 high values in the Niagara River This is due to model boundary effects a resolved bathymetry. This effect does 1 usuport flood mapping in the river as it the scope of work and the model is not resolve the river in detail. maxwvel.63 slight horizontally oriented gradient line in the western side of the lake Gradient in wind is caused by extrapola Testing has shown that this gradient has effect on the water surface elevation. Fe Baird/RAMPP email correspondence ti dated May 2012. maxwvel.63 node 92161 is slightly higher than adjacent nodes This is an isolated anomaly in the wind Node 92161, which is located in the mi Irondequoit Bay. This anomaly occurs throughout the simulation and is relativ surrounding winds, so that the maximus observed in the maxwel.63 plot occurs time step. A review of the results has s anomaly has a localized influence on th grid cells only and has negligible impaar results in Irondequoit Bay. meas v model over predicts the WSE in comparison with the measured data in Comparison with the measured by the single the modeled and measured by the single the maximus observed in the maxwel.63 plot occurs time step. A review of the results has s	
Was the max wind velocity file checked for anomalies? Was the minimum pressure file checked for anomalies? Was the model time series output compared to the measured gage data? Issues File Comment Resolution maxele.63 high values in the Niagara River This is due to model boundary effects a resolved bathymetry. This effect does a surge levels in the lake. Note that pred levels in the Niagara River are not to be support flood mapping in the river as it the scope of work and the model is not resolve the river in detail. maxwvel.63 slight horizontally oriented gradient line in the western side of the lake Gradient in wind is caused by extrapola Testing has shown that this gradient has effect on the water surface elevation. Fe Baird/RAMPP email correspondence ti dated May 2012. maxwvel.63 anomalous data in the Irondequoit and Sodus Bays This is an isolated anomaly in the wind Node 92161, which is located in the mi Irondequoit Bay. maxwvel.63 model over predicts the WSE in comparison with the measured data in Gomparison with the measured data in Comparison with the meas	Yes
Was the minimum pressure file checked for anomalies? Was the model time series output compared to the measured gage data? Imaxele.63 high values in the Niagara River Resolution maxele.63 high values in the Niagara River This is due to model boundary effects a resolved bathymetry. This effect does a surge levels in the lake. Note that pred levels in the Niagara River are not to be support flood mapping in the river as it the scope of work and the model is not resolve the river in detail. maxwvel.63 slight horizontally oriented gradient line in the western side of the lake Gradient in wind is caused by extrapola Testing has shown that this gradient has effect on the water surface elevation. Feating has shown that this gradient has aligntly higher than adjacent nodes maxwvel.63 node 92161 is slightly higher than adjacent nodes This is an isolated anomaly in the wind Node 92161, which is located in the mi Irondequoit Bay. This anomaly occurs throughout the simulation and is relativ surrounding winds, so that the maximus observed in the maxwel.63 plot occurs time step. A review of the results has s anomaly has a localized influence on the grid cells only and has negligible impact results in Irondequoit Bay. meas v model over predicts the WSE in comparison with the measured data in Compariso	Yes
Was the model time series output compared to the measured gage data? Issues File Comment Resolution maxele.63 high values in the Niagara River This is due to model boundary effects a resolved bathymetry. This effect does to surge levels in the lake. Note that pred levels in the Niagara River are not to be support flood mapping in the river as it the scope of work and the model is not resolve the river in detail. maxwvel.63 slight horizontally oriented gradient line in the western side of the lake Gradient in wind is caused by extrapola Testing has shown that this gradient ha effect on the water surface elevation. F Baird/RAMPP email correspondence ti dated May 2012. maxwvel.63 node 92161 is slightly higher than adjacent nodes This is an isolated anomaly in the wind Node 92161, which is located in the mi Irondequoit Bay. This anomaly occurs throughout the simulation and is relativ surrounding winds, so that the maximus observed in the maxwel.63 plot occurs time step. A review of the results has s anomaly has a localized influence on th grid cells only and has negligible impac results in Irondequoit Bay. meas v model model over predicts the WSE in comparison with the measured data in Comparison with the measured data in Discrepancies between modeled and ma are expected, particularly when compari- most likely a limitation of the modeled	Yes
FileCommentIssuesFileCommentResolutionmaxele.63high values in the Niagara RiverThis is due to model boundary effects a resolved bathymetry. This effect does a surge levels in the lake. Note that pred levels in the Niagara River are not to be support flood mapping in the river as it the scope of work and the model is not resolve the river in detail.maxwvel.63slight horizontally oriented gradient line in the western side of the lakeGradient in wind is caused by extrapola Testing has shown that this gradient has effect on the water surface elevation. F Baird/RAMPP email correspondence ti dated May 2012.maxwvel.63node 92161 is slightly higher than adjacent nodesThis is an isolated anomaly in the wind Node 92161, which is located in the mi Irondequoit Bay. This anomaly occurs throughout the simulation and is relativ surrounding winds, so that the maximu observed in the maxwel.63 plot occurs time step. A review of the results has s anomaly has a localized influence on th grid cells only and has negligible impac results in Irondequoit Bay.meas v modelmodel over predicts the WSE in comparison with the measured data in Comparison with the measured data inDiscrepancies between modeled and ma are expected, particularly when compari numerous storm events. These discrepancies between modeled	Yes
FileCommentResolutionmaxele.63high values in the Niagara RiverThis is due to model boundary effects a resolved bathymetry. This effect does a surge levels in the lake. Note that pred levels in the Niagara River are not to be support flood mapping in the river as it the scope of work and the model is not resolve the river in detail.maxwvel.63slight horizontally oriented gradient line in the western side of the lakeGradient in wind is caused by extrapola Testing has shown that this gradient has effect on the water surface elevation. F Baird/RAMPP email correspondence ti dated May 2012.maxwvel.63node 92161 is slightly higher than adjacent nodesThis is an isolated anomaly in the wind Node 92161, which is located in the mi Irondequoit Bay. This anomaly occurs throughout the simulation and is relativ surrounding winds, so that the maximu observed in the maxwel.63 plot occurs time step. A review of the results has s anomaly has a localized influence on th grid cells only and has negligible impac results in Irondequoit Bay.meas v modelmodel over predicts the WSE in comparison with the measured data in Comparison with the measured data inDiscrepancies between modeled and ma are expected, particularly when compari most likely a limitation of the modeled	Yes
maxele.63high values in the Niagara RiverThis is due to model boundary effects a resolved bathymetry. This effect does a surge levels in the lake. Note that pred levels in the Niagara River are not to be support flood mapping in the river as it the scope of work and the model is not resolve the river in detail.maxwvel.63slight horizontally oriented gradient line in the western side of the lakeGradient in wind is caused by extrapola Testing has shown that this gradient has effect on the water surface elevation. F Baird/RAMPP email correspondence ti dated May 2012.maxwvel.63node 92161 is slightly higher than adjacent nodesThis is an isolated anomaly in the wind Node 92161, which is located in the mi Irondequoit Bay. This anomaly occurs throughout the simulation and is relativ surrounding winds, so that the maximu observed in the maxwel.63 plot occurs time step. A review of the results has s anomaly has a localized influence on th grid cells only and has negligible impac results in Irondequoit Bay.meas v modelmodel over predicts the WSE in comparison with the measured data in Comparison with the meas	
Niagara Riverresolved bathymetry. This effect does a surge levels in the lake. Note that pred levels in the Niagara River are not to be support flood mapping in the river as it the scope of work and the model is not resolve the river in detail.maxwvel.63slight horizontally oriented gradient line in the western side of the lakeGradient in wind is caused by extrapola Testing has shown that this gradient has effect on the water surface elevation. F Baird/RAMPP email correspondence ti dated May 2012.maxwvel.63node 92161 is slightly higher than adjacent nodesThis is an isolated anomaly in the wind Node 92161, which is located in the mi Irondequoit Bay. This anomaly occurs throughout the simulation and is relativ surrounding winds, so that the maximu observed in the maxwel.63 plot occurs time step. A review of the results has s anomaly has a localized influence on th grid cells only and has negligible impac results in Irondequoit Bay.meas v modelmodel over predicts the WSE in comparison with the measured data in Comparison with the measured data in Comparison with the measured data in Comparison with the measured data inDiscrepancies between modeled and ma are expected, particularly when compari most likely a limitation of the modeled	Verification
maxwvel.63slight horizontally oriented gradient line in the western side of the lakeGradient in wind is caused by extrapola Testing has shown that this gradient has effect on the water surface elevation. F Baird/RAMPP email correspondence ti dated May 2012.maxwvel.63anomalous data in the Irondequoit and Sodus BaysGradient in wind is caused by extrapola Testing has shown that this gradient has effect on the water surface elevation. F Baird/RAMPP email correspondence ti dated May 2012.maxwvel.63node 92161 is slightly higher than adjacent nodesThis is an isolated anomaly in the wind Node 92161, which is located in the mi Irondequoit Bay.maxwvel.63node 92161 is slightly higher than adjacent nodesThis is an isolated anomaly in the wind Node 92161, which is located in the mi Irondequoit Bay.meas v modelmodel over predicts the WSE in comparison with the measured data in Comparison with the measured data inDiscrepancies between modeled and ma are expected, particularly when compari numerous storm events. These discrepa most likely a limitation of the modeled	not impact cted surge used to falls outside
maxwvel.63anomalous data in the Irondequoit and Sodus Baysdated May 2012.maxwvel.63node 92161 is slightly higher than adjacent nodesThis is an isolated anomaly in the wind Node 92161, which is located in the mi Irondequoit Bay. This anomaly occurs throughout the simulation and is relativ surrounding winds, so that the maximum observed in the maxwvel.63 plot occurs 	a negligible efer to
maxwvel.63node 92161 is slightly higher than adjacent nodesThis is an isolated anomaly in the wind Node 92161, which is located in the mi 	BSH BSH
meas v model model over predicts model measured data in Comparison with the measured data in model measured m	ddle of periodically e to the n difference only at one nown that the e neighboring
Cape Vincent Recognizing this, one of the goals of th analysis is to ensure a balance is observ the measured and modeled results; that under-predicts some storms and over-pu When analyzed statistically as a popula storms, the Q-Q plots showed good agr between measured and modeled wave h Figure 6.6 of Baird Lake Ontario report	ing against incies are wind fields. e comparative ed between is the model edicts others. tion of eement eights. See
Additional Comments on Detailed Check	
	Resolution Verification

Reviewer Signature:	Betry Hicks
Date:	6/7/2012

ADCIRC RE	VIEW			
Storm:	Sto	orm077_1998090400		
Reviewer:		Betsy Hicks		
Organization: RAMPP				
Date Checked		2/12	Yes	
	Was the max water surface elevation file checked for anomalies?			
	current velocity file che		Yes	
	wind velocity file check		Yes	
Was the minin	num pressure file check	ed for anomalies?	Yes	
Was the mode	el time series output com	pared to the measured gage data?	Yes	
		Issues		
File	Comment	Resolution	Verification	
maxele.63	high values in the Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH	
maxwvel.63	slight horizontally oriented gradient line in the western side of the lake	Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this	BSH	
maxwvel.63	vertically oriented gradient line in the eastern side of the lak	gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email	BSH	
maxwvel.63	anomalous data in the Irondequoit and Sodu Bays		BSH	
maxwvel.63	node 92161 is considerably higher than adjacent nodes	This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the surrounding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step. A review of the results has shown that the anomaly has a localized influence on the neighboring grid cells only and has negligible impact on surge results in Irondequoit Bay.	BSH	
meas v model	model over predicts the WSE in comparison with the measured data in all areas	 Discrepancies between modeled and measured data are expected, particularly when comparing against numerous storm events. These discrepancies are most likely a limitation of the modeled wind fields. Recognizing this, one of the goals of the comparative analysis is to ensure a balance is observed between the measured and modeled results; that is the model under-predicts some storms and over-predicts others. When analyzed statistically as a population of storms, the Q-Q plots showed good agreement between measured and modeled wave heights. See Figure 6.6 of Baird Lake Ontario report. 	BSH	

Additional Comments on I	Detailed Check		
	Comment	Resolution	Verification
Reviewer Signature:	Bitry Hicks		
Date:	6/7/2012		

ADCIRC RE	VIEW			
Storm: Storm078_1999010100				
Reviewer: Betsy Hicks				
Organization: RAMPP				
Date Checked:5/22/12				
Was the max water surface elevation file checked for anomalies?				
	current velocity file che		Yes	
	wind velocity file check		Yes	
	num pressure file check		Yes	
Was the mode	l time series output con	pared to the measured gage data?	Yes	
	I	Issues		
File	Comment	Resolution	Verification	
maxele.63	high values in the Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH	
maxwvel.63	horizontally oriented gradient line in the western side of the lab	Gradient in wind is caused by extrapolation routine. Testing has shown that this gradient has a	BSH	
maxwvel.63	vertically oriented gradient line in the eastern side of the lak	negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	BSH	
maxwvel.63	node 92161 is slightly higher than adjacent nodes		BSH	
maxwvel.63	sharp change in wind velocity in the northea	 report, which describes ice implementation methodology. The Modified Garratt Formulation (MGF) was used to define wind speeds over ice fields. Using this parabolic function, the largest wind drag 	BSH	
		occurs at 50% ice coverage. Given the coarse resolution of the ice data relative to the model grid, the winds were interpolated between neighboring ice fields of different percent coverage; in some cases, this results in regions of ice with 50% coverage, which generates the strongest winds drag coefficient under the MGF. Refer to Section 6.1.3 in Baird Lake Ontario report, which describes ice		

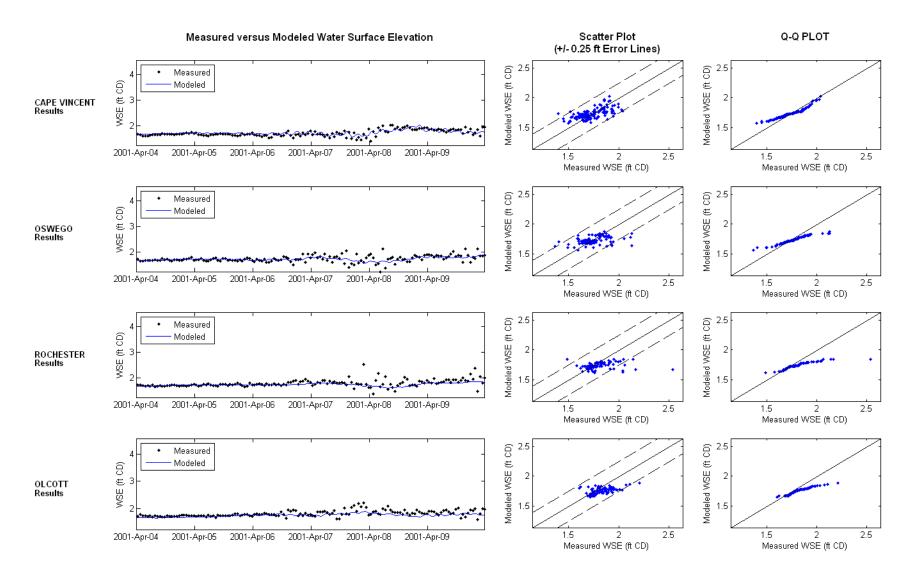
		implementation method	ology.			
Additional Con	Additional Comments on Detailed Check					
	Comment Resolution Verifica			Verification		
Reviewer Sign	ature:	Bitry Hicks				
Date:		6/7/2012				

ADCIRC RE	VIEW				
Storm: Storm079_2000051000					
Reviewer:		y Hicks			
Organization:	RA				
Date Checked					
Was the max water surface elevation file checked for anomalies?			Yes Yes		
	Was the max current velocity file checked for anomalies?				
	wind velocity file checke		Yes		
Was the minin	num pressure file checke	l for anomalies?	Yes		
Was the mode	l time series output com	ared to the measured gage data?	Yes		
		Issues			
File	Comment	Resolution	Verification		
maxele.63	high values in the Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outsi the scope of work and the model is not setup to resolve the river in detail.			
maxwvel.63	horizontally oriented gradient line in the western side of the lake	Gradient in wind is caused by extrapolation routin			
maxwvel.63	vertically oriented gradient line in the eastern side of the lake	Testing has shown that this gradient has a negligit effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run Q	BSH		
maxwvel.63	anomalous data in the Irondequoit and Sodus Bays	dated May 2012.	BSH		
maxwvel.63	node 92161 is considerably higher than adjacent nodes, results in anomaly in the SWEL as well	This is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of Irondequoit Bay. This anomaly occurs periodical throughout the simulation and is relative to the surrounding winds, so that the maximum differen observed in the maxwvel.63 plot occurs only at or time step. A review of the results has shown that anomaly has a localized influence on the neighbo grid cells only and has negligible impact on surge results in Irondequoit Bay.	ly ce ne the ring		
Additional Co	mments on Detailed Che				
	Comn	ent Resolution	Verification		
Reviewer Sigr	nature: Br	try Kicks			
Date:	6/7/2012				

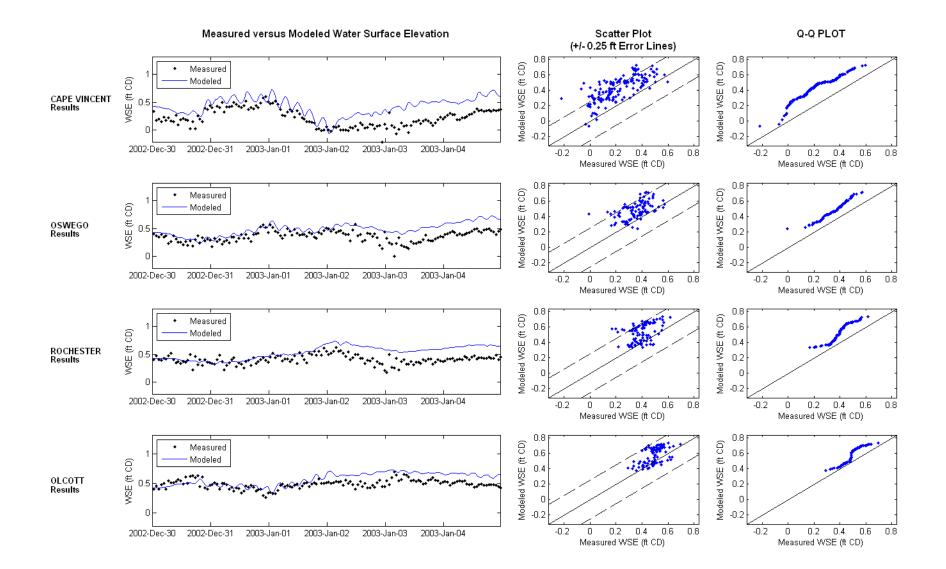
ADCIRC REVIEW					
Storm:	St	Storm080_2000120300			
Reviewer:		ara C. Davis			
Organization:		AMPP			
Date Checked:	05	05/22/2012			
Was the max water su	rface elevation fil	e checked for anomalie	es?	Yes	
Was the max current	Was the max current velocity file checked for anomalies?			Yes	
Was the max wind ve	locity file checked	d for anomalies?		Yes	
Was the minimum pre	essure file checked	d for anomalies?		Yes	
Was the model time s	eries output comp	ared to the measured ga	age data?	Yes	
	1 1	Issues	6		
File	Comment		Resolution	Verification	
maxele	Niagara River		boundary effects and poorly resolv		
	anomalous		fect does not impact surge levels ir		
			cted surge levels in the Niagara R		
			support flood mapping in the river		
		1	e of work and the model is not set	up to	
Maxwvel	Horizontal	resolve the river in de		SCD	
WIAXW VCI	gradient in the		Gradient in wind is caused by extrapolation routine.SCDTesting has shown that this gradient has a negligible effect		
	west	on the water surface elevation. Refer to Baird/RAMPP			
	west		e titled Run QC dated May 2012.		
Additional Comments		<u>ck</u>			
	Comment		Resolution	Verification	
Deviewer Signature					
Reviewer Signature:					
	\square	any your			
Date:	6/25/20	012			

ADCIRC R	EVIEW			
Storm:		Storm081_2001020700		
Reviewer:		Sara C. Davis		
Organization	1:	RAMPP		
Date Checke	d:	05/22/2012		
Was the max	water surface elevation file checked for	anomalies?		Yes
Was the max	current velocity file checked for anoma	lies?		Yes
Was the max	wind velocity file checked for anomalie	s?		Yes
Was the mini	imum pressure file checked for anomalie	s?		Yes
Was the mod	lel time series output compared to the me	easured gage data?		Yes
		Issues		
File	Comment	Resolution		Verification
maxele	Niagara River anomalous	This is due to model boundary effects and poorly resolved bathymetry impact surge levels in the lake. Note that predicted surge levels in the to be used to support flood mapping in the river as it falls outside the model is not setup to resolve the river in detail.	SCD	
maxwvel	Anomalous maximum of 125.05 at node 92161	This is an isolated anomaly in the wind dataset at Node 92161, which of Irondequoit Bay. This anomaly occurs periodically throughout the relative to the surrounding winds, so that the maximum difference obs maxwel.63 plot occurs only at one time step. A review of the results anomaly has a localized influence on the neighboring grid cells only a impact on surge results in Irondequoit Bay.	simulation and is served in the s has shown that the	SCD
Additional C	Comments on Detailed Check			
	Comment	Resoluti	on	Verification
Reviewer Sig	gnature:	Jara Jami		
Date:				

ADCIRC REVIEW					
Storm:		Storm082	_2001040400		
Reviewer:		Sara C. Da	wis		
Organization:		RAMPP			
Date Checked:		05/22/201	2		
Was the max water surface elevati	on file checked for an	nomalies?		Yes	
Was the max current velocity file of	checked for anomalie	s?		Yes	
Was the max wind velocity file ch	ecked for anomalies?			Yes	
Was the minimum pressure file ch	ecked for anomalies?			Yes	
Was the model time series output of	compared to the meas	ured gage d	ata?	Yes	
*			Issues		
File	Commen	t	Resolution	Verification	
maxele	Niagara River anon	nalous	This is due to model boundary effects and poorly resolved bathymetry.	This SCD	
			effect does not impact surge levels in the lake. Note that predicted surge levels		
		in the Niagara River are not to be used to support flood mapping in the river as		river as	
		it falls outside the scope of work and the model is not setup to resolve the river		he river	
			in detail.		
Additional Comments on Detailed	Check				
Comment			Resolution	Verification	
Measured vs. ADCIRC time series	s and scatter plots	Discrepa	ncies between modeled and measured data are expected, particularly when	n SCD	
slightly anomalous (see below).		comparin	comparing against numerous storm events. These discrepancies are most likely a		
		limitation	of the modeled wind fields. Recognizing this, one of the goals of the		
			comparative analysis is to ensure a balance is observed between the measured and		
			results; that is the model under-predicts some storms and over-predicts ot		
			When analyzed statistically as a population of storms, the Q-Q plots showed good		
			t between measured and modeled wave heights. See Figure 6.6 of Baird	Lake	
Ontario re					
Reviewer Signature:	Y	ara (Dani		
Date:					

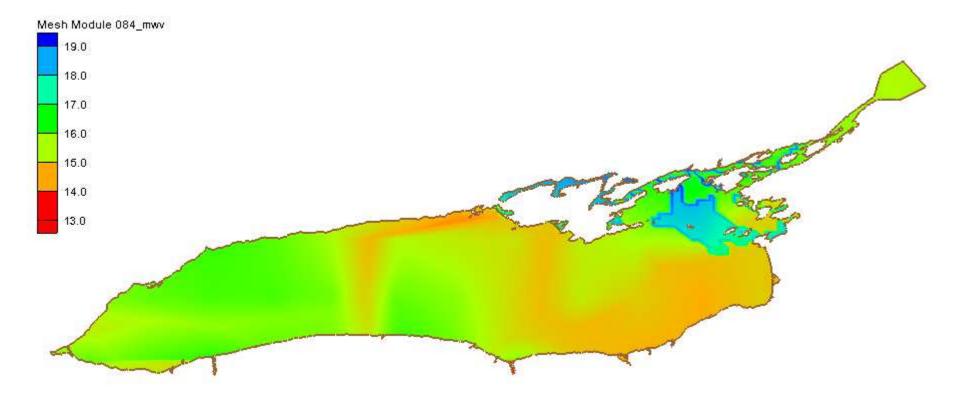


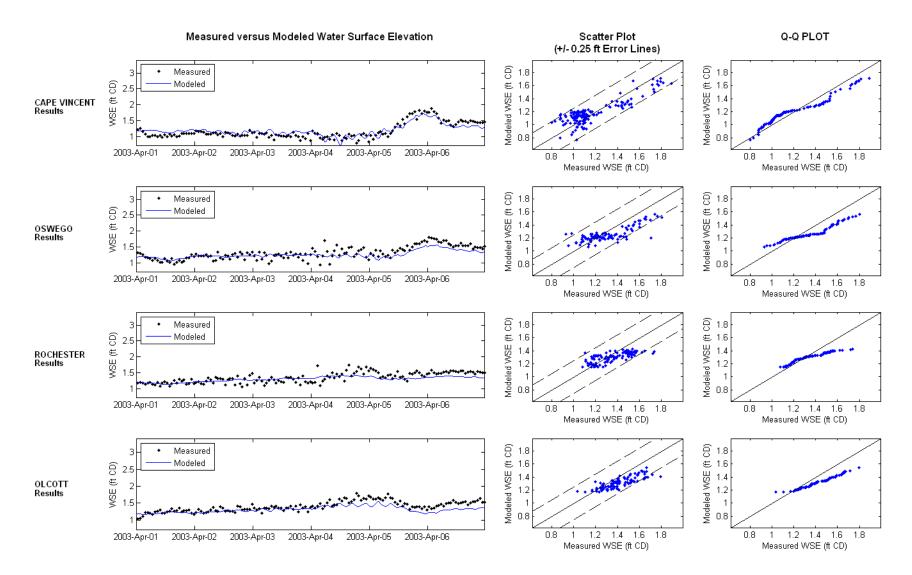
ADCIRC REVIEW							
Storm:		Storm083_2002123000					
Reviewer:		Sara C. Davis					
Organization:		RAMPP					
Date Checked: 05/22/2012							
Was the max water surface el	evation file checked for a	nomalies?	Yes				
Was the max current velocity	file checked for anomalie	s?	Yes				
Was the max wind velocity fi	le checked for anomalies?		Yes				
Was the minimum pressure fi	le checked for anomalies?		Yes				
Was the model time series ou	tput compared to the meas	sured gage data?	Yes				
	<u> </u>	Issues					
File Comment		Resolution	Verification				
maxele Niagara River	This is due to model	boundary effects and poorly resolved bathymetry. This effect does not impact surge leve	s SCD				
anomalous	in the lake. Note that	predicted surge levels in the Niagara River are not to be used to support flood mapping i	n				
	the river as it falls ou	side the scope of work and the model is not setup to resolve the river in detail.					
maxwvel Anomalous	This is an isolated and	omaly in the wind dataset at Node 6205, which is located far downstream in the St.	SCD				
maximum of	Lawrence River. This anomaly occurs periodically throughout the simulation and is relative to the surrounding						
77.09 at node 6205	winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one time step.						
		stream end of the St. Lawrence River was suppose to be removed from the fort.63 and					
		ults are influenced by the St. Lawrence River boundary as explained in the README fil					
	to rectify this.	was missed by the post processing routine. New fort.63 and fort.64 files have been provi	led				
Additional Comments on Det	ailed Check						
Comment		Resolution	Verification				
series and scatter plots anomalous (see below). storm events. These c of the goals of the corr results; that is the mod		en modeled and measured data are expected, particularly when comparing against numerous discrepancies are most likely a limitation of the modeled wind fields. Recognizing this, one mparative analysis is to ensure a balance is observed between the measured and modeled del under-predicts some storms and over-predicts others. When analyzed statistically as a the Q-Q plots showed good agreement between measured and modeled wave heights. See ake Ontario report.					
Reviewer Signature: Date:	Y	ara Dani					
Dute.							



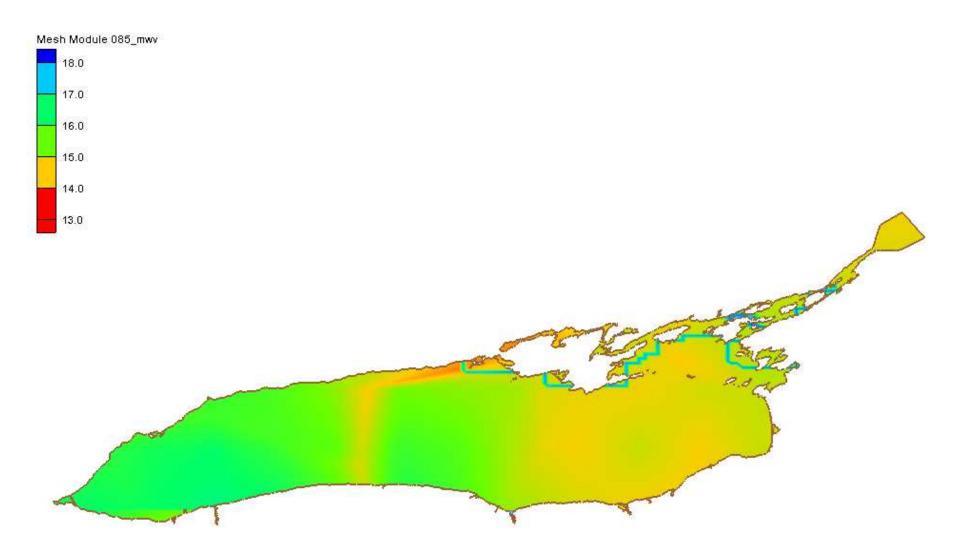
RUN NAME: Storm083_2002123000

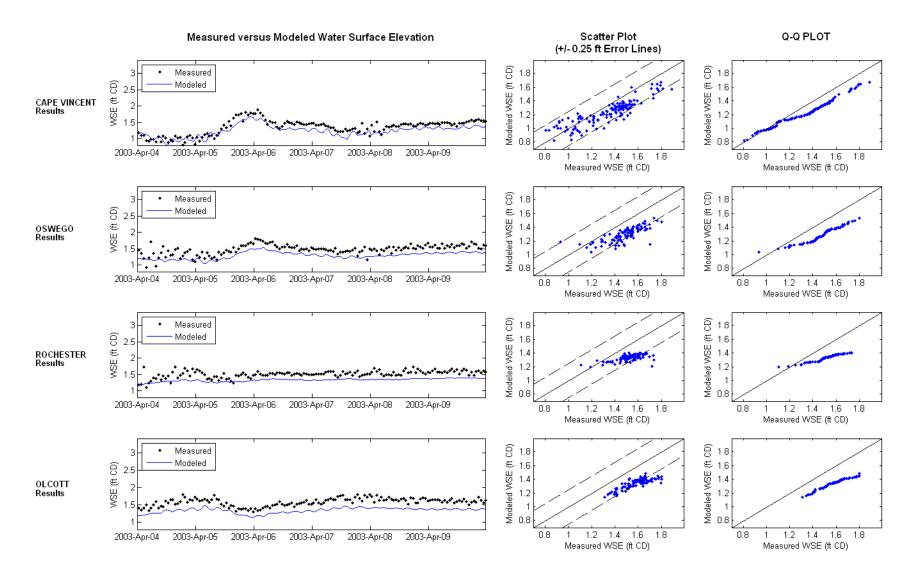
ADCIRC R	REVIEW					
Storm:			Storm084_2003040100			
Reviewer:			Sara C. Davis			
Organizatio	n:		RAMPP			
Date Check	ed:		05/22/2012			
Was the ma	x water surface elevation file ch	ecked for an	nomalies?	Yes		
Was the ma	x current velocity file checked f	for anomalie	s?	Yes		
Was the ma	x wind velocity file checked for	anomalies?		Yes		
Was the min	nimum pressure file checked for	anomalies?		Yes		
Was the mo	del time series output compared	l to the meas	ured gage data?	Yes		
			Issues			
File	Comment		Resolution	Verification		
maxele	Niagara River anomalous	surge leve support fl	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.			
Maxwvel	Horizontal gradient in west	Gradient	in wind is caused by extrapolation routine. Testing has shown that this gradient has a	SCD		
Maxwvel	Abnormal gradient in east	negligible	e effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled dated May 2012.	SCD		
Additional (Comments on Detailed Check					
	Comment		Resolution			
Measured vs. ADCIRC time series and scatter plots slightly anomalous (see below). fields obser and c show			Discrepancies between modeled and measured data are expected, particularly when comparing against numerous storm events. These discrepancies are most likely a limitation of the modeled wind fields. Recognizing this, one of the goals of the comparative analysis is to ensure a balance is observed between the measured and modeled results; that is the model under-predicts some storms and over-predicts others. When analyzed statistically as a population of storms, the Q-Q plots showed good agreement between measured and modeled wave heights. See Figure 6.6 of Baird Lake Ontario report.			
Reviewer Signature:		Jan	Rain	·		
Date:						





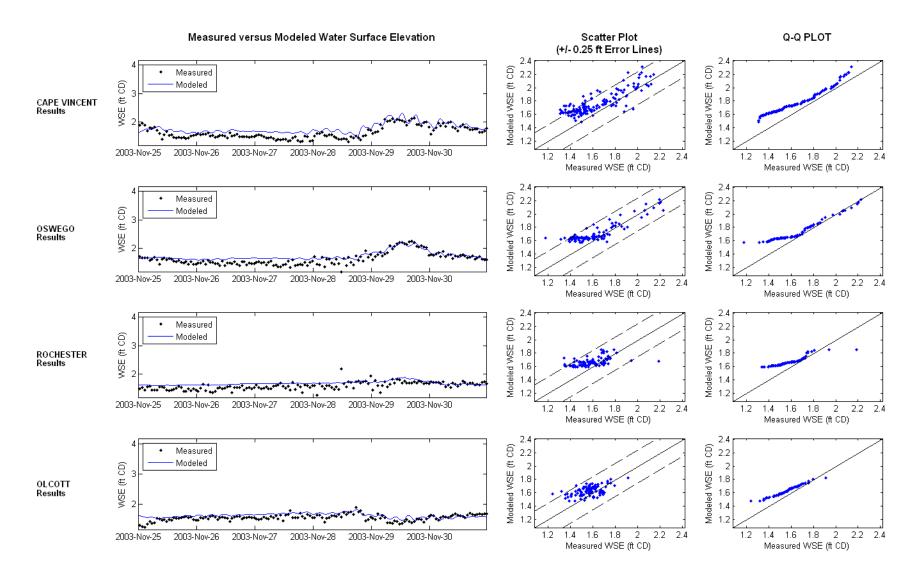
ADCIRC R	REVIEW					
Storm:			Storm085_2003040400			
Reviewer:			Sara C. Davis			
Organizatio	n:		RAMPP			
Date Check	ed:		05/22/2012			
Was the ma	x water surface elevation fi	le checked for an	iomalies?	Yes		
Was the ma	x current velocity file check	ked for anomalies	s?	Yes		
	x wind velocity file checked			Yes		
	nimum pressure file checke			Yes		
Was the mo	del time series output comp	pared to the meas	ured gage data?	Yes		
			Issues			
File	Comment		Resolution		Verification	
maxele	Niagara River	This is due to	model boundary effects and poorly resolved bathymetry. This effect does not i	mpact surge levels	SCD	
	anomalous	in the lake. N	lote that predicted surge levels in the Niagara River are not to be used to suppor	t flood mapping in		
		the river as it	falls outside the scope of work and the model is not setup to resolve the river in	detail.		
Maxwvel	Horizontal gradient in		ind and pressure is caused by extrapolation routine. Testing has shown that this		SCD	
	west/south	negligible eff	ect on the water surface elevation. Refer to Baird/RAMPP email correspondence	ce titled Run QC	SCD	
Maxwvel	Abnormal gradient in east	dated May 20	dated May 2012.			
maxwvel	Anomalous maximum of 29.44 at node 92161		ated anomaly in the wind dataset at Node 92161, which is located in the middle		SCD	
	of 29.44 at node 92161		omaly occurs periodically throughout the simulation and is relative to the surrou			
			num difference observed in the maxwvel.63 plot occurs only at one time step.			
			own that the anomaly has a localized influence on the neighboring grid cells on	ly and has		
			pact on surge results in Irondequoit Bay.			
Additional C	Comments on Detailed Che	<u>ck</u>			XX (0)	
	Comment		Resolution	· ·	Verification	
	s. ADCIRC time series		between modeled and measured data are expected, particularly when comparing		SCD	
(see below).	plots slightly anomalous		s. These discrepancies are most likely a limitation of the modeled wind fields. Recognizing this,			
(see below).	•		als of the comparative analysis is to ensure a balance is observed between the m			
			lts; that is the model under-predicts some storms and over-predicts others. Whe			
			s a population of storms, the Q-Q plots showed good agreement between measured	red and modeled		
6			See Figure 6.6 of Baird Lake Ontario report.			
Reviewer Signature:		Jara) Danie			
Date:						



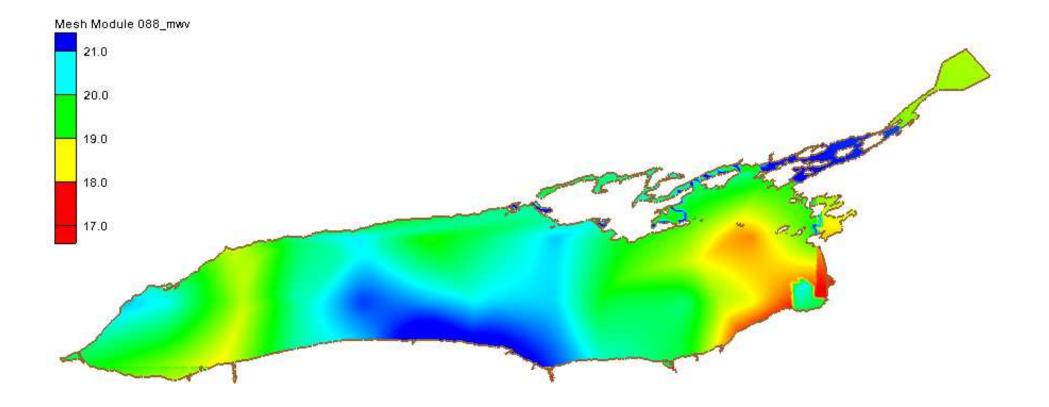


ADCIRC REVIEW					
Storm:		Storm08	6_2003041400		
Reviewer:		Sara C. I			
Organization:		RAMPP			
Date Checked:		06/13/20	012		
Was the max water su	rface elevation	on file chec	ked for anomalie	vs?	Yes
Was the max current	velocity file c	hecked for	anomalies?		Yes
Was the max wind ve	locity file che	ecked for a	nomalies?		Yes
Was the minimum pre					Yes
Was the model time s	eries output c	compared to	the measured ga	age data?	Yes
	F	<u> </u>	Issues		
File	Comm	nent	100 400	Resolution	Verification
maxwvel Additional Comments	92161	lous at node This is an isola Node 92161, v Irondequoit Ba throughout the surrounding w observed in the time step. A re anomaly has a		hich is located in the middle of y. This anomaly occurs periodically simulation and is relative to the nds, so that the maximum difference maxwvel.63 plot occurs only at one view of the results has shown that the localized influence on the neighboring and has negligible impact on surge	SCD
	Commen			Resolution	Verification
Reviewer Signature:		Jara (Marin		
Date:	6/2	25/2012	~		

ADCIRC	REVIEW					
Storm:			Storm087_2003112500			
Reviewer:			Sara C. Davis			
Organizatio			RAMPP			
Date Check			05/22/2012			
		e elevation file checked for anomalies?		Yes		
		ity file checked for anomalies?		Yes		
Was the ma	ax wind velocity	y file checked for anomalies?		Yes		
Was the m	inimum pressure	e file checked for anomalies?		Yes		
Was the m	odel time series	output compared to the measured gage data?		Yes		
			Issues			
File	Comment		Resolution		Verification	
maxele	Niagara	This is due to model boundary effects and poorly res	• •		SCD	
	River	in the lake. Note that predicted surge levels in the N				
	anomalous	the river as it falls outside the scope of work and the	model is not setup to resolve the riv	ver in detail.		
Maxwvel	Horizontal	Gradient in wind and pressure is caused by extrapola			SCD	
	gradient in	negligible effect on the water surface elevation. Ref	er to Baird/RAMPP email correspon	ndence titled Run QC		
	west	dated May 2012.				
Additional	Comments on I				1	
	omment		Resolution		Verification	
	vs. ADCIRC		ata are expected, particularly when comparing against numerous SCD			
	and scatter	storm events. These discrepancies are most likely a				
(see below	ly anomalous	one of the goals of the comparative analysis is to en				
(see below).	modeled results; that is the model under-predicts so				
		statistically as a population of storms, the Q-Q plots		neasured and modeled		
wave heights. See Figure 6.6 of Baird Lake Ontario report.						
Reviewer S	Signature:	Y	Jara Chiganin			
Date:						

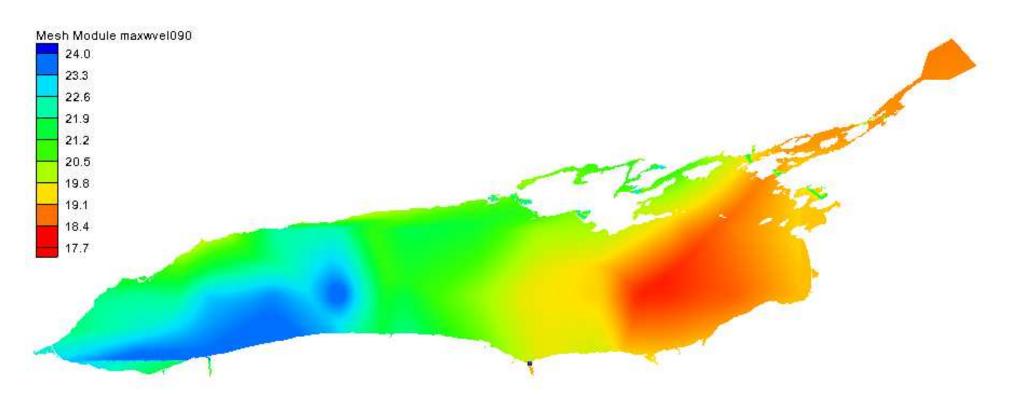


ADCIRC REVIEW						
Storm:		Storm088 2	005033000			
Reviewer:		Sara C. Dav				
Organization:		RAMPP				
Date Checked:		05/22/2012				
Was the max water surface elevat	tion file checked for a	nomalies?				Yes
Was the max current velocity file	checked for anomali	es?				Yes
Was the max wind velocity file cl	hecked for anomalies	?				Yes
Was the minimum pressure file cl	hecked for anomalies	?				Yes
Was the model time series output	compared to the mea	sured gage dat	a?			Yes
			Issues			
File	Comm	ent		Resolution		Verification
maxele	Niagara River ano	effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in th river as it falls outside the scope of work and the model is not setup to resolv the river in detail.		surge ping in the p to resolve	SCD	
Maxwvel	Abnormal gradien		shown that this gradien	ressure is caused by extrapolation routine. ' t has a negligible effect on the water surface email correspondence titled Run QC dated	e elevation.	SCD
Additional Comments on Detailed	d Check					
	Comment			Resolution		Verification
Reviewer Signature:		Jara Ch	Jani			
Date:						



ADCIRC REVIE	EW			
Storm:		Storm089_2005092600		
Reviewer:		Sara C. Davis		
Organization:		RAMPP		
Date Checked:		05/22/2012		
Was the max wate	er surface elevation file checked for a	nomalies?		Yes
Was the max curre	ent velocity file checked for anomalie	es?		Yes
Was the max wind	d velocity file checked for anomalies)		Yes
Was the minimum	n pressure file checked for anomalies	2		Yes
Was the model tin	ne series output compared to the mea	sured gage data?		Yes
		Issues		
File	Comment		Resolution	Verification
Additional Comm	ents on Detailed Check	Niagara River are not to be used	to support flood mapping in the river as it f is not setup to resolve the river in detail.	
	Comment		Resolution	Verification
Reviewer Signatu	re:	Para Rani		
Date:				

ADCIRC REVIEW						
Storm:	Storm: Storm090_2006020300					
Reviewer:		Sara C. Davis				
Organization:		RAMPP				
Date Checked:		06/13/2012				
Was the max water su	rface elevatio	n file checked for a	nomalie	s?		Yes
Was the max current v	elocity file cl	necked for anomalie	es?			Yes
Was the max wind vel	locity file che	cked for anomalies	?			Yes
Was the minimum pre	ssure file che	cked for anomalies	?			Yes
Was the model time se				ge data?		Yes
-			Issues			
File	C	omment		Resolution		Verification
maxwvel		Horizontal gradient in east. Vertical gradient in west. Has ele con		radient in wind is caused by extrapolation utine. Testing has shown that this gradient as a negligible effect on the water surface evation. Refer to Baird/RAMPP email prrespondence titled Run QC dated May 012.		SCD
Additional Comments	on Detailed (<u>Check</u>	I			
	Comment			Resolution		Verification
Reviewer Signature:						I
Date:	6/2	25/2012				

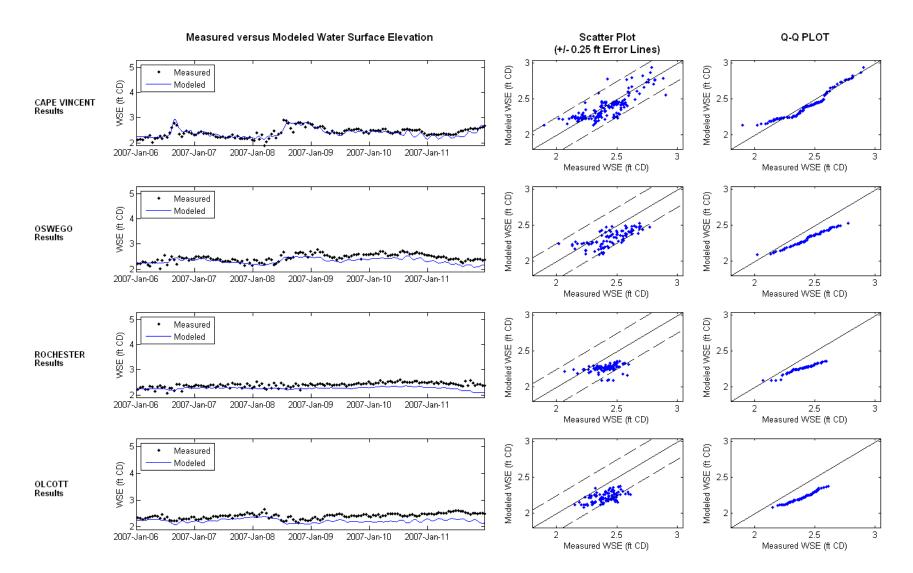


ADCIRC RE	VIEW				
Storm:		Storm091_2006031200			
Reviewer:		Sara C. Davis			
Organization:		RAMPP			
Date Checked: 05/22/2012					
Was the max water surface elevation file checked for anomalies?					
Was the max of	current velocity file checked for ar	nomalies?		Yes	
Was the max	wind velocity file checked for another	malies?		Yes	
Was the minir	num pressure file checked for ano	malies?		Yes	
	el time series output compared to the			Yes	
	A A	Issues			
File	Comment		Resolution	Verification	
maxele	Niagara River anomalous	This is due to model boundary effects and impact surge levels in the lake. Note that be used to support flood mapping in the r is not setup to resolve the river in detail.	SCD		
maxwvel	Horizontal gradient in west	Gradient in wind and pressure is caused b	Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email		
maxwvel	Vertical gradient in east	correspondence titled Run QC dated May		SCD	
Additional Co	omments on Detailed Check		Desclution	Varification	
	Com	nent	Resolution	Verification	
Reviewer Sign	nature:	Jara Dani		·	
Date:		~			

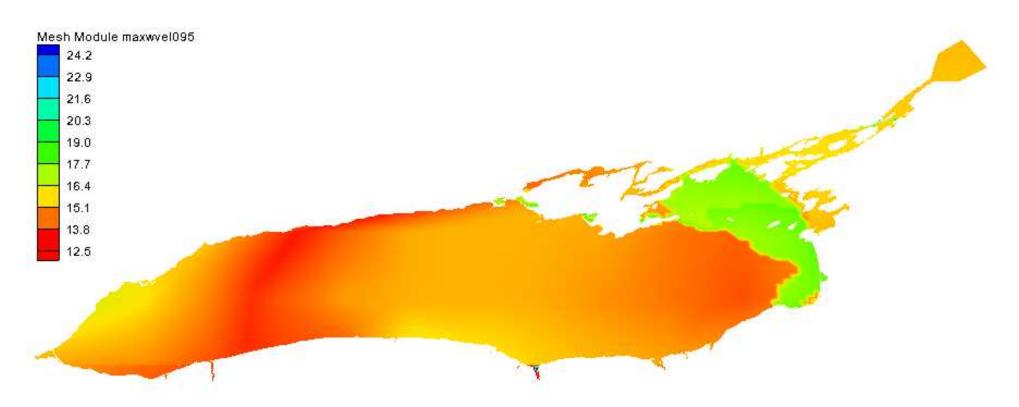
ADCIRC REV	IEW					
Storm:		Storm092_2006102600				
Reviewer:		Sara C. Davis				
Organization:						
Date Checked:						
Was the max w	ater surface elevation file checked	d for anomalies?		Yes		
Was the max cu	urrent velocity file checked for an	omalies?		Yes		
Was the max w	ind velocity file checked for anon	nalies?		Yes		
Was the minim	um pressure file checked for anon	nalies?		Yes		
Was the model	time series output compared to th	e measured gage data?		Yes		
	* *	Issues				
File	Comment		Resolution	Verification		
maxele	Niagara River anomalous	impact surge levels in the lake. Note th	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.			
maxwvel	Horizontal gradient in west	Gradient in wind and pressure is caused	Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email			
maxwvel	Vertical gradient in east	correspondence titled Run QC dated Ma		SCD		
Additional Con	nments on Detailed Check					
	Comn	nent	Resolution	Verification		
D						
Reviewer Signature:		Jara Dani				
Date:						

ADCIRC R	EVIEW					
Storm:	torm: Storm093_2006112900					
Reviewer:		Sara C. Davis				
Organization	:	RAMPP				
Date Checke	d:	05/22/2012				
Was the max	water surface elevation file checked	d for anomalies?			Yes	
Was the max	current velocity file checked for an	omalies?			Yes	
Was the max	wind velocity file checked for anor	nalies?			Yes	
	imum pressure file checked for anor				Yes	
Was the mod	lel time series output compared to th	e measured gage data?			Yes	
	r r r	Issues				
File	Comment		Resolution		Verification	
maxele	Niagara River anomalous	This is due to model boundary effects an	d poorly resolved bathymetry. This effect d	loes not	SCD	
		impact surge levels in the lake. Note that	t predicted surge levels in the Niagara River	r are not to		
			river as it falls outside the scope of work and			
		is not setup to resolve the river in detail.	*			
maxwvel	Horizontal gradient in west	Gradient in wind and pressure is caused	t in wind and pressure is caused by extrapolation routine. Testing has shown that this			
	_	gradient has a negligible effect on the wa				
		correspondence titled Run QC dated Ma	y 2012.			
maxwvel	Anomalous maximum of 49.75		lataset at Node 92161, which is located in th	e middle of	SCD	
	at node 92161	5	periodically throughout the simulation and is			
			num difference observed in the maxwvel.63			
			esults has shown that the anomaly has a local			
			nly and has negligible impact on surge resul			
		Irondequoit Bay.				
Additional C	omments on Detailed Check					
	Comm	nent	Resolution		Verification	
Reviewer Sig	matura				<u> </u>	
Kevlewer Sig	gnature.	Jara () Mani				
Date:		~				

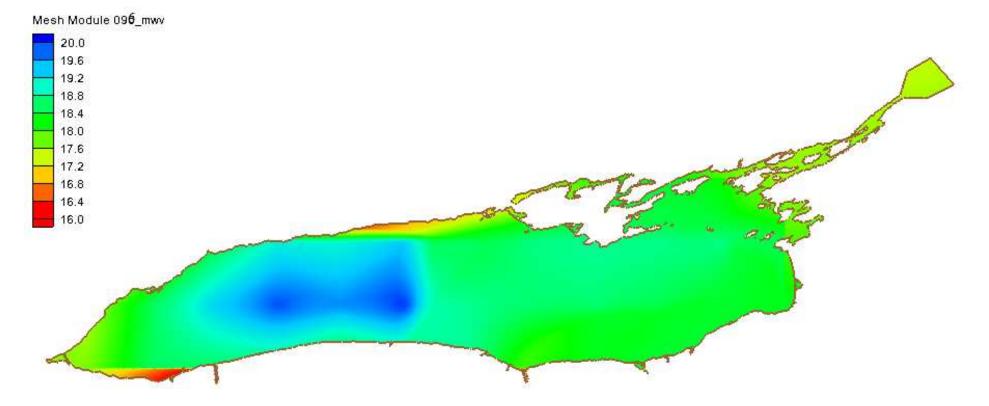
ADCIRC REVIE	EW					
Storm:		Storm094 2007010600				
Reviewer:		Sara C. Davis				
Organization:		RAMPP				
Date Checked:		05/22/2012				
Was the max wate	er surface elevation file checked for a	nomalies?	Yes			
Was the max curr	ent velocity file checked for anomalie	s?	Yes			
Was the max wind	d velocity file checked for anomalies		Yes			
Was the minimum	n pressure file checked for anomalies		Yes			
Was the model tir	ne series output compared to the mea	sured gage data?	Yes			
		Issues				
File	Comment	Resolution	Verification			
maxele	Niagara River anomalousThis is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.					
maxwvel	Horizontal gradient in west	Gradient in wind and pressure is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	SCD			
Additional Comm	ents on Detailed Check					
	Comment	Resolution	Verification			
Measured vs. AD slightly anomalou	CIRC time series and scatter plots is (see below).	Discrepancies between modeled and measured data are expected, particularly when comparing against numerous storm events. These discrepancies are most likely a limitation of the modeled wind fields. Recognizing this, one of the goals of the comparative analysis is to ensure a balance is observed between the measured and modeled results; that is the model under-predicts some storms and over-predicts others. When analyzed statistically as a population of storms, the Q-Q plots showed good agreement between measured and modeled wave heights. See Figure 6.6 of Baird Lake Ontario report.	SCD			
Reviewer Signatu	re:	Para Cingani	1			
Date:						

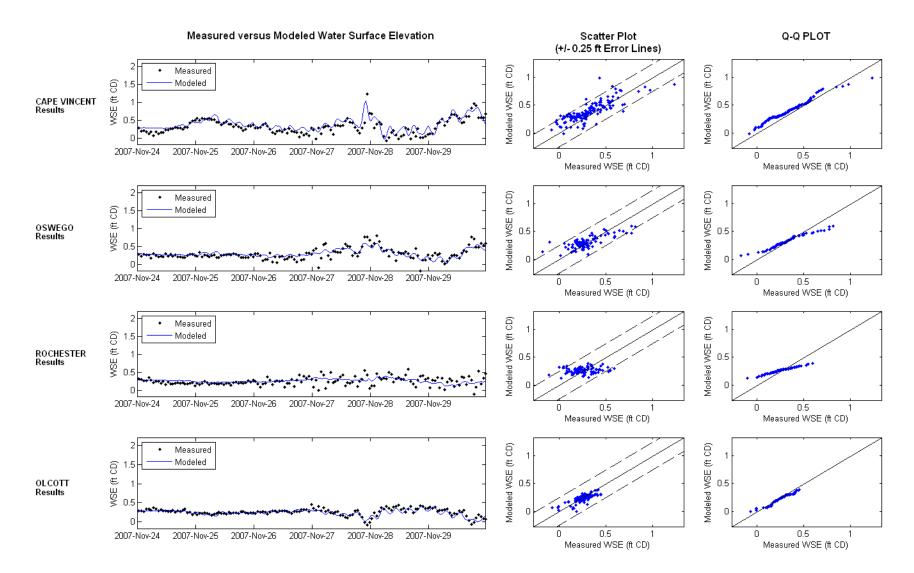


ADCIRC REV	IEW		
Storm:		Storm095_2007031500	
Reviewer:		Sara C. Davis	
Organization:		RAMPP	
Date Checked:		06/13/2012	
Was the max w	ater surface elevation fil	e checked for anomalies?	Yes
Was the max co	urrent velocity file check	ed for anomalies?	Yes
Was the max w	ind velocity file checked	for anomalies?	Yes
Was the minim	um pressure file checked	for anomalies?	Yes
Was the model	time series output comp	ared to the measured gage data?	Yes
		Issues	
File	Comment	Resolution	Verification
maxwvel	Horizontal gradient in west. Abnormal pattern in east.	Gradient in wind is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012. Pattern in the east is due to ice implementation. The Modified Garratt Formulation (MGF) was used to define wind speeds over ice fields. Given the coarse resolution of the ice data relative to the model grid, the winds were interpolated	SCD
		between neighboring ice fields of different percent coverage. Refer to Section 6.1.3 in Baird Lake Ontario report, which describes ice implementation methodology.	
Additional Cor	nments on Detailed Chec		
	Comment	Resolution	Verification
			_
Reviewer Signa	Jan	C Danie	
Date:	6/25/2012		

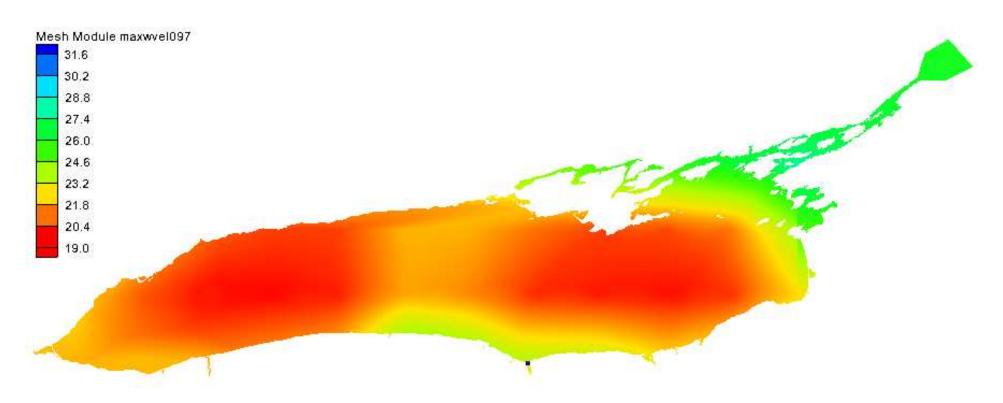


ADCIRC REV	TEW						
Storm:		Storm096_2007112400					
Reviewer:		Sara C. Davis					
Organization:		RAMPP					
Date Checked:		05/22/2012					
Was the max wa	ater surface elevation file checked	d for anomalies?	Yes				
Was the max cu	irrent velocity file checked for an	omalies?	Yes				
Was the max w	ind velocity file checked for anor	nalies?	Yes				
Was the minimu	um pressure file checked for anor	nalies?	Yes				
Was the model	time series output compared to th	ne measured gage data?	Yes				
		Issues					
File	Comment	Resolution	Verification				
maxele	Niagara River anomalous	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	SCD				
Maxwvel	Horizontal gradient in west	Gradient in wind and pressure is caused by extrapolation routine. Testing has	SCD				
maxwvel	Horizontal gradient in north	shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.	SCD				
Additional Com	nments on Detailed Check						
	Comment	Resolution	Verification				
plots slightly anomalous (see below).		Discrepancies between modeled and measured data are expected, particularly when comparing against numerous storm events. These discrepancies are most likely a limitation of the modeled wind fields. Recognizing this, one of the goals of the comparative analysis is to ensure a balance is observed between the measured and modeled results; that is the model under-predicts some storms and over-predicts others. When analyzed statistically as a population of storms, the Q-Q plots showed good agreement between measured and modeled wave heights. See Figure 6.6 of Baird Lake Ontario report.	SCD				
Reviewer Signature:		Jara Marin					
Date:							





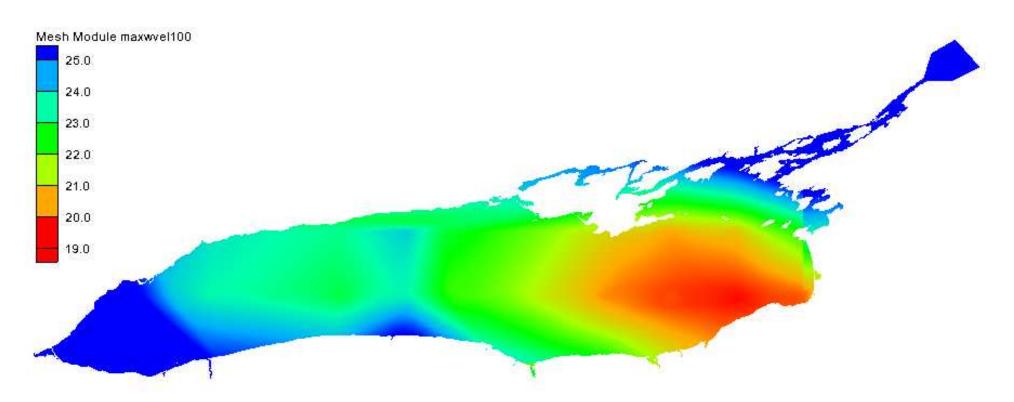
ADCIRC REVIEW								
Storm:		Storm097	torm097_2008010600					
Reviewer:	Sara C. Da	vis						
Organization:		RAMPP						
Date Checked:		06/13/2012						
Was the max water su	rface elevation	n file checke	d for anomalie	s?		Yes		
Was the max current v	velocity file ch	necked for an	nomalies?			Yes		
Was the max wind vel	locity file che	cked for anot	malies?			Yes		
Was the minimum pre	essure file cheo	cked for anot	malies?			Yes		
Was the model time se	eries output co	ompared to th	he measured ga	ge data?		Yes		
			Issues					
File	Com	nent		Resolution		Verification		
maxwvel	Vertical grad	dient in	Gradient in w	vind is caused by extrapolation r	routine.	SCD		
	east.		Testing has s	hown that this gradient has a ne	gligible			
			effect on the water surface elevation. Refer to					
			Baird/RAMPP email correspondence titled Run QC					
				dated May 2012.				
Additional Comments	Detailed (71 1.						
Additional Comments	Comment			Resolution		Verification		
	Comment			Resolution		vermcation		
Reviewer Signature:	Reviewer Signature:							
		Dag	Mari					
	7	The and	Your					
		\mathcal{A}						
Date:	6/2	5/2012	<i>.</i>					



ADCIRC REVIEW							
Storm:		Storm098_2008	3030500				
Reviewer:		Sara C. Davis					
Organization:		RAMPP					
Date Checked:		06/13/2012					
Was the max water sur	rface elevatio	n file checked for	anomalie	s?		Yes	
Was the max current w	velocity file cl	necked for anomal	ies?			Yes	
Was the max wind vel	ocity file che	cked for anomalies	s?			Yes	
Was the minimum pre	ssure file che	cked for anomalies	s?			Yes	
Was the model time se	eries output co	ompared to the me	asured ga	ige data?		Yes	
			Issues				
File	Co	omment		Resolution		Verification	
	maxwvel Vertical gradient in east.			routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.			
Additional Comments				Resolution		Verification	
	Comment			Resolution		vernication	
Reviewer Signature:		fare h	ani-				
Date:	6/2	25/2012					

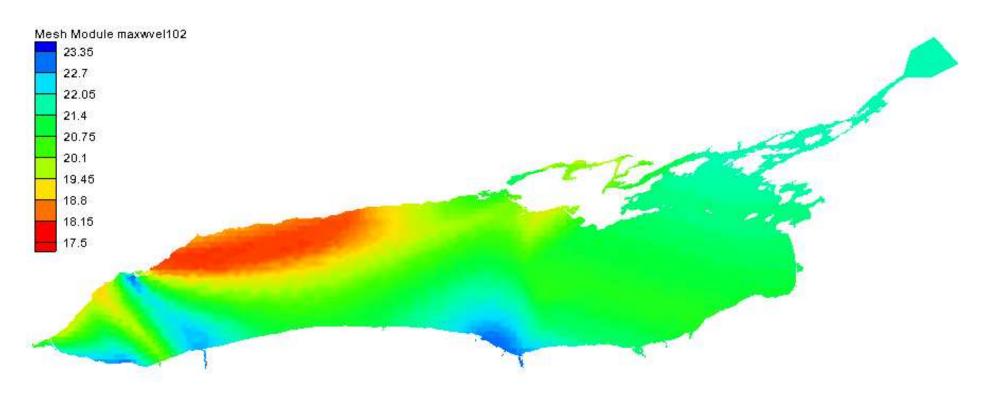
ADCIRC REVIEW							
Storm:		Storm099_2008091200					
Reviewer:	Reviewer:						
Organization:		RAMPP					
Date Checked:		06/13/2012					
Was the max water su	rface elevation	n file checked	l for anomalie	s?	Yes		
Was the max current	velocity file ch	necked for and	omalies?		Yes		
Was the max wind ve	locity file chec	cked for anon	nalies?		Yes		
Was the minimum pre	essure file chec	cked for anon	nalies?		Yes		
Was the model time s	eries output co	ompared to the	e measured ga	ge data?	Yes		
			Issues				
File	Com			Resolution	Verification		
east. r			routine. Tes negligible ef Refer to Bai	Gradient in wind is caused by extrapolation routine. Testing has shown that this gradient has a negligible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled Run QC dated May 2012.			
Additional Comments	Comment			Resolution	Verification		
Reviewer Signature:		fara	h Janin	Kesonunon			
Date: 6/25/2012							

ADCIRC REVIEW						
Storm:		Storm100_2008122500				
Reviewer:		Sara C. Davis				
Organization:		RAMPP				
Date Checked:		06/13/2012				
Was the max water surface				Yes		
Was the max current velocit	•			Yes		
Was the max wind velocity				Yes		
Was the minimum pressure	file checked f	for anomalies?		Yes		
Was the model time series of	output compar	ed to the measured gage data?		Yes		
			Issues			
File	Commer		Resolution		Verification SCD	
maxwvel maxvel	Vertical gradient in east. Abnormal pattern acro lake. Anomalous node 92161 Noisy at shoreline.	 negligible effect on the water surf Run QC dated May 2012. The spatially and time varying win across the Lake. However, this pa pattern seen across the Lake in the at This is an isolated anomaly in the Irondequoit Bay. This anomaly of surrounding winds, so that the ma time step. A review of the results neighboring grid cells only and ha 	 ient in wind is caused by extrapolation routine. Testing has shown that this gradient has a gible effect on the water surface elevation. Refer to Baird/RAMPP email correspondence titled QC dated May 2012. spatially and time varying wind file (fort.22) was checked and no abnormal patterns were observed as the Lake. However, this particular storm does change direction and is therefore the cause of the rn seen across the Lake in the maximum wind speed file. is an isolated anomaly in the wind dataset at Node 92161, which is located in the middle of lequoit Bay. This anomaly occurs periodically throughout the simulation and is relative to the bunding winds, so that the maximum difference observed in the maxwvel.63 plot occurs only at one step. A review of the results has shown that the anomaly has a localized influence on the boring grid cells only and has negligible impact on surge results in Irondequoit Bay. 			
Additional Comments on D			paraner wind conditions.			
	Comm		Resolu	ition	Verification	
Reviewer Signature:	Y	ara Rain				
Date: 6/25/2012						



ADCIRC REVIEW								
Storm:		Storm101_1970112000	Storm101_1970112000					
Reviewer:		Sara C. Davis						
Organization:		RAMPP						
Date Checked:		06/13/2012						
Was the max water su	rface elevation	on file checked for anomalie	s?			Yes		
Was the max current w	velocity file c	checked for anomalies?			1	Yes		
Was the max wind ve	locity file che	ecked for anomalies?				Yes		
Was the minimum pre-	essure file che	ecked for anomalies?			Ţ	Yes		
Was the model time s	eries output c	compared to the measured ga	ige data?			Yes		
		Issues	-					
File		Comment		Resolution		Verification		
	none							
		~ .						
Additional Comments			1	D 1.		XX : C		
	Commen	nt		Resolution		Verification		
Reviewer Signature:								
	(Jara Marin						
Date:	06	5/13/2012						

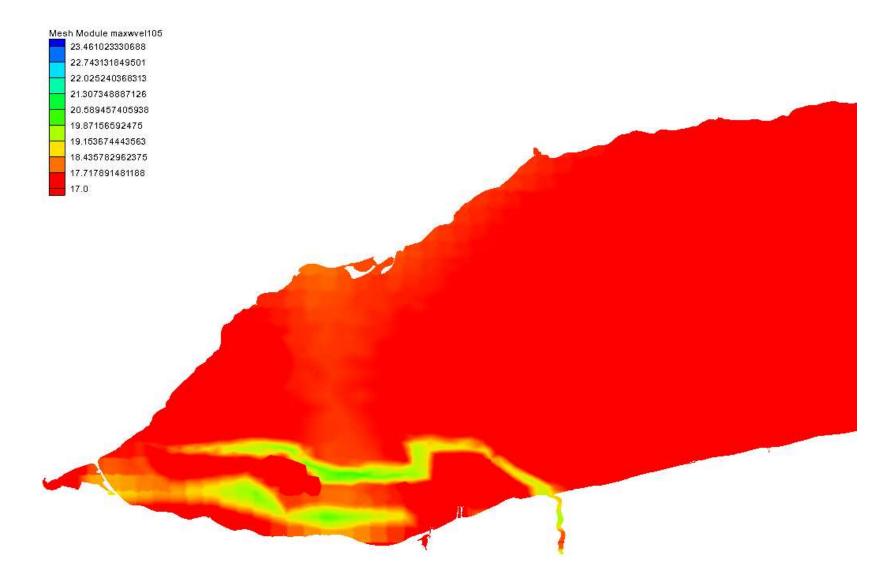
ADCIRC	REVIEW		
Storm:		Storm102_1971012400	
Reviewer:		Sara C. Davis	
Organizati	ion:	RAMPP	
Date Chec	ked:	06/13/2012	
Was the m	nax water surface el	levation file checked for anomalies?	Yes
Was the m	nax current velocity	y file checked for anomalies?	Yes
Was the m	nax wind velocity fi	ile checked for anomalies?	Yes
Was the m	ninimum pressure fi	ile checked for anomalies?	Yes
Was the m	nodel time series ou	tput compared to the measured gage data?	Yes
		Issues	
File	Comment	Resolution	Verification
maxwvel	Abnormal pattern across lake.	This storm is prior to 1979 when CFSR wind data is not available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, the winds are representative of measured data. The spatially and time varying wind file (fort.22) was checked and no abnormal patterns were observed across the Lake. However, this particular storm does change direction and is therefore the cause of the pattern seen across the Lake in the maximum wind speed file.	SCD
-	l Comments on Det		XX . C
Reviewer	Comment Signature:	Resolution Aara Dari	Verification
Date:		6/25/2012	



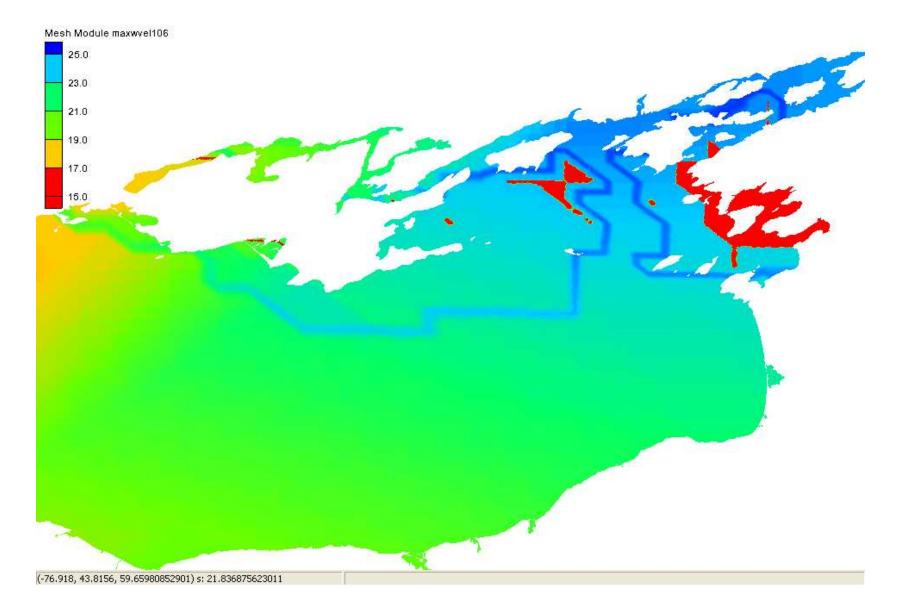
ADCIRC REVIEW					
Storm:		Storm103_1971012700			
Reviewer:		Sara C. Davis			
Organization:		RAMPP			
Date Checked:		06/18/2012			
Was the max water su	rface elevation	on file checked for anomalie	s?		Yes
Was the max current w	velocity file c	hecked for anomalies?			Yes
Was the max wind ve	locity file che	ecked for anomalies?			Yes
Was the minimum pre	essure file che	ecked for anomalies?			 Yes
			age data?		 Yes
		Issues	-	I	
File		Comment		Resolution	Verification
	none				
		~ .			
Additional Comments				D 1.1	 X X . C
	Commen	t		Resolution	 Verification
Reviewer Signature:					
	(fara Marin			
Date Checked: 06/18/2012 Was the max water surface elevation file checked for anomalies? Was the max wind velocity file checked for anomalies? Was the minimum pressure file checked for anomalies? Was the model time series output compared to the measu Image: Series of the series of the series output compared to the measu Image: Series of the series of t					

ADCIRC REVIEW						
Storm:		Storm104_1971020300				
Reviewer:		Sara C. Davis				
Organization:		RAMPP				
Date Checked:		06/18/2012				
Was the max water su	rface elevation	on file checked for anomalie	es?		Y	es
Was the max current w	velocity file o	checked for anomalies?			Y	es
Was the max wind ve	locity file ch	ecked for anomalies?			Y	es
Was the minimum pre-	essure file ch	ecked for anomalies?			Y	es
Was the model time s	eries output o	compared to the measured ga	age data?		Y	es
		Issues	-			
File				Resolution	V	Verification
	none					
		~ .				
Additional Comments			1	D 1.1		7
	Commer	nt		Resolution		Verification
Reviewer Signature:						
		Jara Dani				
Date Checked: 06/18/2012 Was the max water surface elevation file checked for anomalies? Was the max wind velocity file checked for anomalies? Was the minimum pressure file checked for anomalies? Was the model time series output compared to the measure Iss File Comment Additional Comments on Detailed Check Comment						

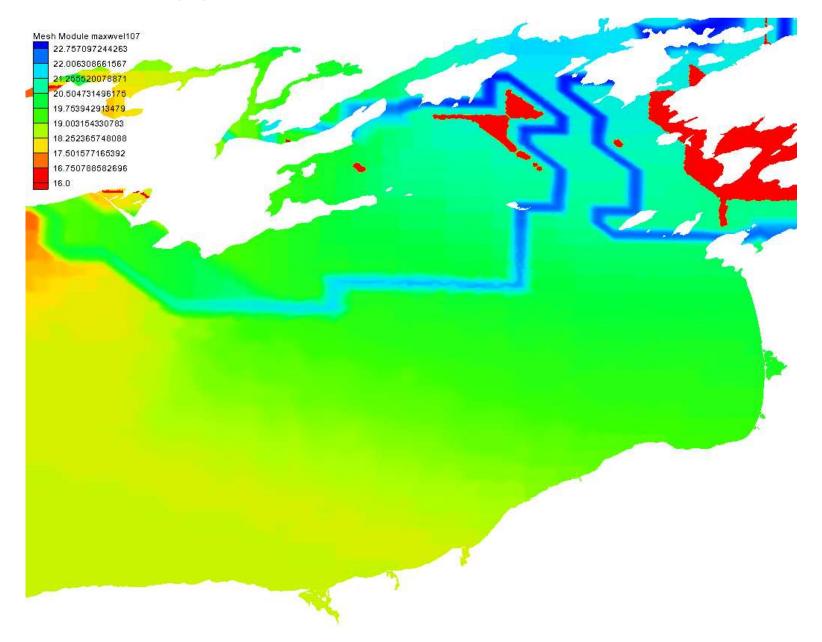
ADCIRC REVIEW	7						
Storm:			Storm105_1971021000				
Reviewer:			Sara C. Davis				
Organization:			RAMPP				
Date Checked:	Date Checked: 06/18/2012						
Was the max water s	surface elevation file	e checked for an	nomalies?		Yes		
Was the max current	velocity file check	ed for anomalie	s?		Yes		
Was the max wind v	elocity file checked	for anomalies?			Yes		
Was the minimum p	ressure file checked	for anomalies?			Yes		
Was the model time					Yes		
	I		Issues				
File	Comment		Resolution	Verification			
Additional Commen	maxwvelAbnormal gradient in west.The gradient is caused by the ice implementation and the course nature of the ice dataSCDduring this time period.The Modified Garratt Formulation (MGF) was used to define wind speeds over ice fields. Using this parabolic function, the largest wind drag occurs at 50% ice coverage. Given the coarse resolution of the ice data relative to the model grid, the winds were interpolated between neighboring ice fields of different percent coverage; in some cases, this results in regions of ice with 50% coverage, which generates the strongest winds drag coefficient under the MGF. Refer to Section 6.1.3 in Baird Lake Ontario report, which describes ice implementation methodology.						
Comr			Resolution	Verification			
Reviewer Signature:		7	ara Chanin				
Date:		6/25/2	2012				



ADCIRC	REVIEW				
Storm:			Storm106_1971022500		
Reviewer:			Sara C. Davis		
Organizati	on:		RAMPP		
Date Chec	ked:		06/22/2012		
Was the m	ax water surf	face elevation	file checked for anomalies?		Yes
Was the m	ax current ve	elocity file che	cked for anomalies?		Yes
Was the m	ax wind velo	city file check	ed for anomalies?		Yes
Was the m	inimum pres	sure file check	ed for anomalies?		Yes
Was the m	odel time ser	ries output cor	npared to the measured gage	e data?	Yes
			Issues		
File	Comment		Resolution		Verification
maxwvel	Abnormal	The gradier	its in the east are due to the	he implementation of ice.	SCD
	gradient	The Modifi	ed Garratt Formulation (I	MGF) was used to define	
	in East	wind speed	s over ice fields. Using the	his parabolic function, the	
		largest win	d drag occurs at 50% ice	coverage. Given the	
				ive to the model grid, the	
			interpolated between nei	6	
			rcent coverage; in some of		
		-	ce with about 50% covera		
			inds drag coefficient und		
		Ų		report, which describes ice	
			tion methodology.	report, which describes ice	
Additional	Comments	on Detailed Ch			
Additional	Comments	Comment		Resolution	Verification
		Comment			v enneurion
Reviewer	Reviewer Signature:				
Date:		6/2	26/2012		



ADCIRC REVIEW						
Storm:		Storm107_1971030100				
Reviewer:		Sara C. Davis				
Organization:		RAMPP				
Date Checked:		06/18/2012		-		
Was the max water surface elevation	on file checked for an	omalies?			Yes	
Was the max current velocity file		?			Yes	
Was the max wind velocity file ch					Yes	
Was the minimum pressure file checked for anomalies?				Yes		
Was the model time series output compared to the measured gage data?				Yes		
	-	Issues		•		
File	Comment		Resolution	Verification		
maxwvel	Abnormal gradient i		ture of the ice data during this time period.	SCD		
	east.		(MGF) was used to define wind speeds over			
			tion of the ice data relative to the model grid,			
			en neighboring ice fields of different percent			
			n Baird Lake Ontario report, which describes			
		ice implementation methodology.				
Additional Comments on Detailed	l Check	· ·				
	Comment		Resolution		Verification	
Reviewer Signature:		$) \cap \Omega$.				
		araf nyan				
Date:	6/25/2	012				



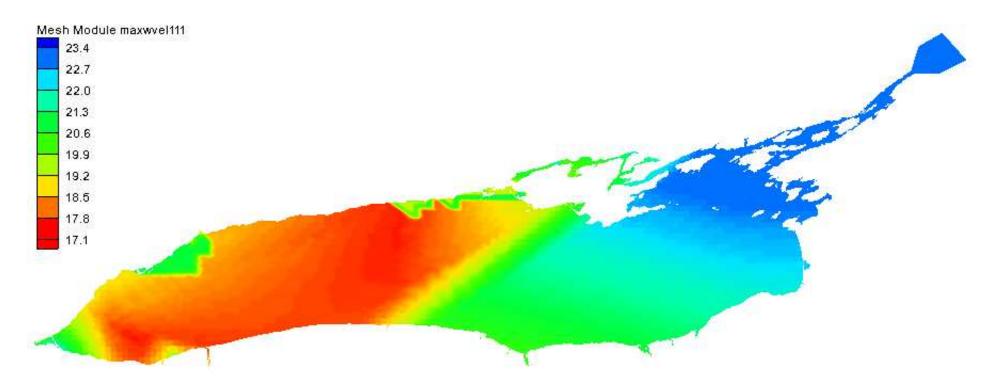
RUN NAME: Storm107_1971030100

ADCIRC REVIEW						
Storm:		Storm108_1971120800				
Reviewer: Sara C. Davis						
Organization:		RAMPP				
Date Checked:		06/18/2012		-		
Was the max water su	rface elevation	on file checked for anomalie	s?			Yes
Was the max current w	velocity file c	checked for anomalies?				Yes
Was the max wind ve	locity file che	ecked for anomalies?				Yes
Was the minimum pre-	essure file che	ecked for anomalies?				Yes
Was the model time s	eries output c	compared to the measured ga	ige data?		,	Yes
		Issues	-			
File		Comment		Resolution		Verification
	none					
	-					
Additional Comments			1	D		XX (0)
	Commen	nt		Resolution		Verification
Paviawar Signatura:					l	
		Jara Marin				
Was the max water surface elevation file checked for anomalies? Was the max wind velocity file checked for anomalies? Was the minimum pressure file checked for anomalies? Was the model time series output compared to the measu Is File Comment Additional Comments on Detailed Check Reviewer Signature:						

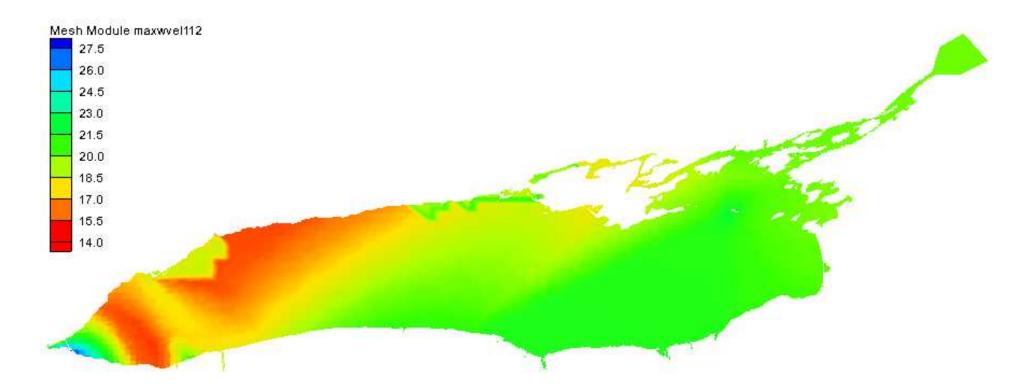
ADCIRC REVIEW						
Storm:		Storm109_1971122700				
Reviewer: Sara C. Davis						
Organization:		RAMPP				
Date Checked:		06/18/2012				
Was the max water su	rface elevation	on file checked for anomalie	es?		Y	ſes
Was the max current w	velocity file o	checked for anomalies?			Y	'es
Was the max wind ve	locity file ch	ecked for anomalies?			Y	'es
Was the minimum pre-	essure file ch	ecked for anomalies?			Y	'es
Was the model time s	eries output o	compared to the measured ga	age data?		Y	'es
		Issues	-			
File		Comment		Resolution		Verification
	none					
	-					
Additional Comments						
	Commer	nt		Resolution		Verification
Paviawar Signatura:						
		Jara Dani				
Was the max water surface elevation file checked for ano Was the max current velocity file checked for anomalies? Was the minimum pressure file checked for anomalies? Was the model time series output compared to the measure Iss File Comment none Additional Comments on Detailed Check Comment Reviewer Signature:						

ADCIRC RI	EVIEW					
Storm:			Storm110_1972012200			
Reviewer:			Sara C. Davis			
Organization	:		RAMPP			
Date Checked	d:		06/13/2012			
Was the max	water surface elevation fi	le checked for another	malies?			Yes
Was the max	current velocity file check	ked for anomalies?				Yes
Was the max	wind velocity file checke	d for anomalies?				Yes
Was the mini	mum pressure file checke	d for anomalies?				Yes
Was the mod	el time series output com	pared to the measur	ed gage data?			Yes
		·	Issues			
File	Comment		Resolution		Verification	
maxele	Abnormal pattern in east and west.	This storm is price fields have been Lake Ontario Rep unrealistic oscilla interpolated St. C difference (<10 c small, contained the data available The spatially and observed in the e	or to 1979 when CFSR pressure data is n generated using available data around th port). In addition, gaps in the data at St. ations in the water surface elevation. Ho Catherine's data was slightly lower than t em) in the water surface elevation in the within Canada where the results will not e for the natural neighbor interpolation te time varying elevation file (fort.63) was ast.	wever, for this particular storm the hat measured at Niagara causing a small eastern end on Lake Ontario. This issue is be used for mapping and is a limitation of echnique.	SCD	
maxvel	Noisy at shoreline.	in the bathymetry	ong the shore are the result of changes ir y under strong shore parallel wind condit	the velocity head that are due to variations ions.	SCD	
Additional C	omments on Detailed Che					
		Comment		Resolution		Verification
Reviewer Sig	gnature:	J	dra Rani	<u> </u>		<u> </u>
Date:		6/26/2	2012			

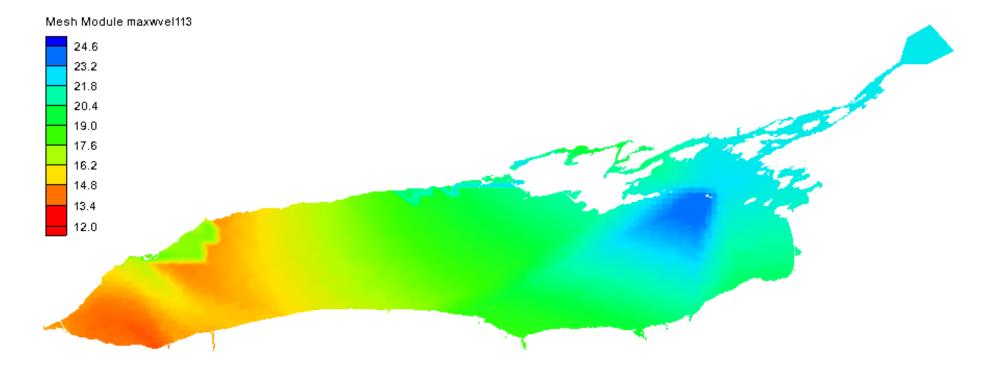
ADCIRC	REVIEW					
Storm:			Storm111_1972020100			
Reviewer:			Sara C. Davis			
Organizati	on:		RAMPP			
Date Chec			06/13/2012			
Was the m	ax water surface	e elevation file checked	for anomalies?			Yes
Was the m	ax current veloc	ity file checked for and	omalies?			Yes
		y file checked for anom				Yes
Was the m	1					Yes
				Yes		
			Issues			
File						
maxwvel	Abnormal pattern across lake. Abnormal pattern in the west and east.	data relative to the m to Section 6.1.3 in Ba This storm is prior to available wind data a winds are representat The pattern in the we when CFSR pressure the Lake (refer to Sec interpolated to avoid St. Catherine's data y elevation in the easte for mapping and is a The spatially and tim	t Formulation (MGF) was used to define wind s odel grid, the winds were interpolated between aird Lake Ontario report, which describes ice in 1979 when CFSR wind data is not available an round the Lake (refer to Section 2.2.2.1 of the F ive of measured data around the Lake. st is caused by the difference in pressure data a data is not available and natural neighbor press ction 2.2.2.1 of the Baird Lake Ontario Report). unrealistic oscillations in the water surface elev vas slightly lower than that measured at Niagara rn end on Lake Ontario. This issue is small, co limitation of the data available for the natural n e varying elevation file (fort.63) was checked a	neighboring ice fields of different percent cover pplementation methodology. d natural neighbor wind fields have been gene Baird Lake Ontario Report). Therefore, areas t St. Catherine's and Niagara This storm is pri sure fields have been generated using available In addition, gaps in the data at St. Catherine's vation. However, for this particular storm the i a causing a small difference (<10 cm) in the wantained within Canada where the results will n eighbor interpolation technique.	erage. Refer erated using of high for to 1979 data around s were nterpolated ater surface ot be used	SCD SCD
Additional	Comments on I			Development		XI. C
		Comm	ent	Resolution		Verification
Reviewer S	Signature:		6/26/2012			



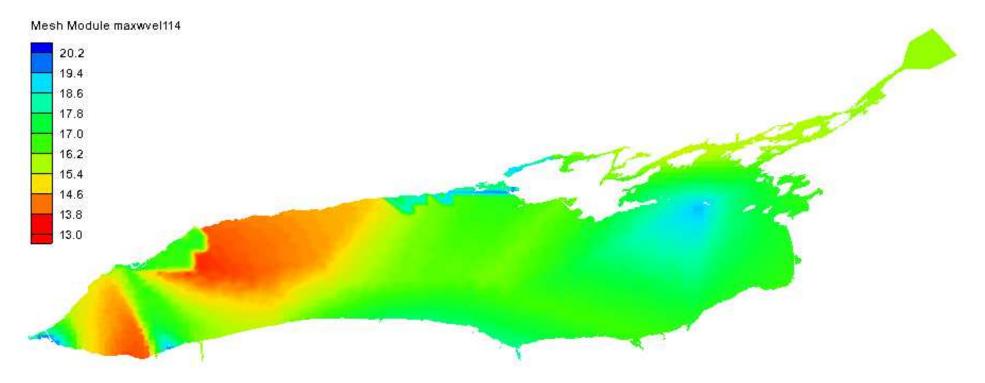
ADCIRC REVIE	EW					
Storm:			Storm112 1972111200			
Reviewer:			Sara C. Davis			
Organization:			RAMPP			
Date Checked:			06/13/2012			
Was the max wate	er surface elevation file ch	necked for ar	omalies?			Yes
Was the max curre	ent velocity file checked f	for anomalie	?			Yes
Was the max wind	l velocity file checked for	anomalies?				Yes
Was the minimum	pressure file checked for	anomalies?				Yes
Was the model tin	ne series output compared	to the meas	ured gage data?			Yes
			Issues			
File	Comment		Resolution			Verification
Additional Comm	across lake.	relative to coverage methodo This stor generated Report). varying v this parti	ion (MGF) was used to define wind speeds over ice from the model grid, the winds were interpolated between Refer to Section 6.1.3 in Baird Lake Ontario report, ogy. In is prior to 1979 when CFSR wind data is not available using available wind data around the Lake (refer to Section 6.1.2) was checked and no abnormal patter cular storm does change direction and is therefore the n wind speed file.	n neighboring ice fields of different p , which describes ice implementation able and natural neighbor wind fields Section 2.2.2.1 of the Baird Lake Or a around the Lake. The spatially and rns were observed across the Lake.	percent n s have been ntario d time However,	
Additional Comm		Comment		Resolution		Verification
Reviewer Signatu			ara mai			
Date:		6/25/2	2012			



ADCIRC RE	CVIEW					
Storm: Storm113_1972112400						
Reviewer: Sara C. Davis						
Organization:			RAMPP			
Date Checked	l:		06/13/2012			
Was the max water surface elevation file checked for anomalies?						
Was the max	current velocity file of	checked for anoma	lies?		Ţ	Yes
Was the max	wind velocity file ch	ecked for anomalie	es?		,	Yes
Was the minin	mum pressure file ch	ecked for anomalie	es?		N.	Yes
Was the mode	el time series output o	compared to the me	easured gage data?		X	Yes
			Issues			
File	Comment		Resol	ution	١	Verification
maxwvel	Abnormal pattern across lake. Abnormal pattern in the west and east.	the ice data relati coverage. Refer This storm is priousing available wo of high winds are The pattern in the 1979 when CFSF data around the I St. Catherine's wo particular storm to difference (<10 co within Canada wo neighbor interpolo	ive to the model grid, the winds were interport to Section 6.1.3 in Baird Lake Ontario report or to 1979 when CFSR wind data is not avaired wind data around the Lake (refer to Section 2 e representative of measured data around the e west is caused by the difference in pressure R pressure data is not available and natural m Lake (refer to Section 2.2.2.1 of the Baird Lake were interpolated to avoid unrealistic oscillat the interpolated St. Catherine's data was slig cm) in the water surface elevation in the east where the results will not be used for mapping lation technique.	e wind speeds over ice fields. Given the coarse r blated between neighboring ice fields of differen- rt, which describes ice implementation methodo lable and natural neighbor wind fields have been .2.2.1 of the Baird Lake Ontario Report). Ther Lake. e data at St. Catherine's and Niagara This storn eighbor pressure fields have been generated usin the Ontario Report). In addition, gaps in the dat ions in the water surface elevation. However, for htly lower than that measured at Niagara causin ern end on Lake Ontario. This issue is small, co g and is a limitation of the data available for the necked and no abnormal patterns were observed	at percent blogy. In generated refore, areas in is prior to ng available ta at or this ing a small ontained natural	SCD SCD
Additional Co	omments on Detailed		a time varying elevation me (tort.03) was el	locked and no ubnormal patients were observed	In the cust.	
		Comment		Resolution	N	Verification
Reviewer Sig	nature:		fare Co Danin			
Date:		6/2	26/2012			



ADCIRC REVIEW					
Storm:		Storm114_1972120200			
Reviewer:		Sara C. Davis			
Organization:	Organization: RAMPP				
Date Checked:		06/13/2012			
Was the max water surface e	elevation file	checked for anomalies?		Yes	
Was the max current velocit	y file checke	d for anomalies?		Yes	
Was the max wind velocity	file checked	for anomalies?		Yes	
Was the minimum pressure	file checked	for anomalies?		Yes	
Was the model time series o	utput compa	red to the measured gage data?		Yes	
Issues					
File	Comme		Resolution		Verification SCD
maxwvel Additional Comments on De	Abnormal pattern acr lake.	 Formulation (MGF) was used to de data relative to the model grid, the percent coverage. Refer to Section implementation methodology. This storm is prior to 1979 when C been generated using available wir Ontario Report). Therefore, wind and time varying wind file (fort.22 Lake. However, this particular sto across the Lake in the maximum we have a statemeter of the statemeter of th	The pattern observed on the North side of the Lake is due to ice implementation. The Modified Garratt Formulation (MGF) was used to define wind speeds over ice fields. Given the coarse resolution of the ice data relative to the model grid, the winds were interpolated between neighboring ice fields of different percent coverage. Refer to Section 6.1.3 in Baird Lake Ontario report, which describes ice implementation methodology. This storm is prior to 1979 when CFSR wind data is not available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, winds are representative of measured data around the Lake. The spatially and time varying wind file (fort.22) was checked and no abnormal patterns were observed across the Lake. However, this particular storm does change direction and is therefore the cause of the pattern seen across the Lake in the maximum wind speed file.		
	Com		Resol	ution	Verification
Reviewer Signature: Date: 6/25/2012					



ADCIRC RE	VIEW				
Storm:	Sto	orm115_1973031500			
Reviewer:	Reviewer: Sara C. Davis				
Organization:	RA	MPP			
Date Checked		/13/2012			
Was the max w	water surface elev	vation file checked for anomalies?	Yes		
Was the max c	current velocity fi	le checked for anomalies?	Yes		
Was the max w	wind velocity file	checked for anomalies?	Yes		
Was the minin	num pressure file	checked for anomalies?	Yes		
Was the mode	l time series outp	ut compared to the measured gage data?	Yes		
		Issues			
File	Comment	Resolution	Verification		
maxele	Abnormal pattern in west.	The pattern in the west is caused by the difference in pressure data at St. Catherine's and Niagara This storm is prior to 1979 when CFSR pressure data is not available and natural neighbor pressure fields have been generated using available data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). In addition, gaps in the data at St. Catherine's were interpolated to avoid unrealistic oscillations in the water surface elevation. However, for this particular storm the interpolated St. Catherine's data was slightly lower than that measured at Niagara causing a small difference (<10 cm) in the water surface elevation in the eastern end on Lake Ontario. This issue is small, contained within Canada where the results will not be used for mapping and is a limitation of the data available for the natural neighbor interpolation technique.	SCD		
	mments on Detai				
	mment	Resolution	Verification		
Reviewer Signature:	Jara	O Danim			
Date:	6/26/201	2			

ADCIRC REVIEW						
Storm:		Storm116_1973040800				
Reviewer:		Sara C. Davis	Sara C. Davis			
Organization:		RAMPP				
Date Checked:		06/13/2012				
Was the max water su	rface elevation	on file checked for anomalie	es?			Yes
Was the max current w	velocity file c	checked for anomalies?				Yes
Was the max wind ve	locity file che	ecked for anomalies?				Yes
Was the minimum pre	essure file che	ecked for anomalies?				Yes
		compared to the measured ga	age data?			Yes
Issues						
File		Comment		Resolution		Verification
	none					
		~ .				
Additional Comments			1	D 1.4		XX . C
	Commen	it		Resolution		Verification
Reviewer Signature:		~ ~ ^ ~				
		fara Marin				
Date:	06	5/13/2012				

ADCIRC REVIEW				
Storm:		Storm117_1	973103000	
Reviewer:		Sara C. Davi		
Organization:		RAMPP	·	
Date Checked:		06/13/2012		
Was the max water sur	rface elevation file checked	l for anomalies?		Yes
Was the max current v	elocity file checked for an	omalies?		Yes
Was the max wind vel	ocity file checked for anon	nalies?		Yes
Was the minimum pre-	ssure file checked for anon	nalies?		Yes
Was the model time se	eries output compared to th	e measured gage dat	a?	Yes
		00	Issues	1
File Comme	ent		Resolution	Verification
maxele Abnormal p in west and	east. storn is prior to been generated u Report). In add the water surface slightly lower th elevation in the will not be used technique. The spatially and in the east.	SCD		
Additional Comments			Devel d'an	Mart Charter
	Comment		Resolution	Verification
Reviewer Signature:		Jara Chiga	~~	1
Date:		6/26/2012		

ADCIRC REV	IEW			
Storm:			Storm118_1973110300	
Reviewer:			Sara C. Davis	
Organization:			RAMPP	
Date Checked:			06/13/2012	_
Was the max w	ater surface e	elevatio	n file checked for anomalies?	Yes
			hecked for anomalies?	Yes
			cked for anomalies?	Yes
Was the minim	um pressure f	file che	cked for anomalies?	Yes
Was the model	time series or	utput co	ompared to the measured gage data?	Yes
			Issues	•
File	Comme	nt	Resolution	Verification
maxele Abnormal pattern in west and east.			The pattern in the west is caused by the difference in pressure data at St. Catherine's and Niagara This storm is prior to 1979 when CFSR pressure data is not available and natural neighbor pressure fields have been generated using available data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). In addition, gaps in the data at St. Catherine's were interpolated to avoid unrealistic oscillations in the water surface elevation. However, for this particular storm the interpolated St. Catherine's data was slightly lower than that measured at Niagara causing a small difference (<10 cm) in the water surface elevation in the eastern end on Lake Ontario. This issue is small, contained within Canada where the results will not be used for mapping and is a limitation of the data available for the natural neighbor interpolation technique.	SCD
Additional Con		etailed (
Co	mment		Resolution	Verification
Reviewer Signa	(Jara /26/201		1
	0/	-0, -01	-	

ADCIRC RI	EVIEW					
Storm:			Storm119 1973122600			
Reviewer:			Sara C. Davis			
Organization	:		RAMPP			
Date Checke	d:		06/13/2012			
Was the max	water surface eleva	ation file checked for a	nomalies?			Yes
Was the max	current velocity fil	e checked for anomalie	es?			Yes
Was the max	wind velocity file	checked for anomalies?	2			Yes
Was the mini	imum pressure file	checked for anomalies?	?			Yes
Was the mod	lel time series outpu	it compared to the measured	sured gage data?			Yes
			Issues			
File	Comment		Resolution		Verification	
maxele	Abnormal pattern in west. omments on Detaile	The pattern in the west is caused by the difference in pressure data at St. Catherines SCD and Niagara This storm is prior to 1979 when CFSR pressure data is not available and natural neighbor pressure fields have been generated using available data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). In addition, gaps in the data at St. Catherines were interpolated to avoid unrealistic oscillations in the water surface elevation. However, for this particular storm, the interpolated St. Catherines data was slightly lower than that measured at Niagara (10.5 m compared to 10.562 m for example) by about 6 hPa. A difference of 1 hPa can cause a difference in height of 1 cm, therefore this difference in pressure causes a small difference (~6 cm) in the water surface elevation in the eastern end on Lake Ontario. This issue is small, contained within Canada where the results will not be used for mapping and is a limitation of the data available for the natural neighbor interpolation technique.				
Additional C	omments on Detaile				Deselation	Varification
		Comment			Resolution	Verification
Reviewer Sig	gnature:	H	dra Agani			I
Date:		6/26/	2012			

ADCIRC RE	VIEW				
Storm:		Storm120_1974010800			
Reviewer:		Betsy Hicks			
Organization:		AMPP			
Date Checked:		6/7/2012			
Was the max w	vater surface elevat	ion file checked for anomalies?	Yes		
Was the max c	current velocity file	checked for anomalies?	Yes		
Was the max w	vind velocity file cl	necked for anomalies?	Yes		
Was the minimum pressure file checked for anomalies?					
Was the model	l time series output	compared to the measured gage data?	Yes		
		Issues			
File	Comment	Resolution	Verification		
maxele.63	high values in the Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH		
maxwvel.63	large differences the wind velocity between adjacent nodes, as high as m/s difference observed in the southwestern part Lake Ontario	 This storm is prior to 1979 when CFSR wind data is not available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to 2.4 Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area is representative of measured winds speeds. The spatially varying time-series data was checked to 	BSH		
measure vs. model	overpredicts the surge at Cape Vincent	Discrepancy between modeled and measured data is to be expected when comparing against numerous storm events. When analyzed statistically as a population of storms, the Q-Q plots at Cape Vincent showed good agreement between measured and modeled surface elevations. See Figure 6.6 of Baird Lake Ontario report.	BSH		
maxwvel.63	band of anomalou data surrounding much of the lake		BSH		
Additional Co	mments on Detaile				
	Comment	Resolution	Verification		
Reviewer Signature:		Sitry Hicks			
Date:	6/26/2	2012			

ADCIRC RE	VIEW				
Storm:		Storm12	21_1974012800		
Reviewer:		Betsy H			
Organization:		RAMPI			
Date Checked		6/7/201			
			hecked for anomalies?	Yes	
		•	for anomalies?	Yes	
		file checked fo		Yes	
	-	file checked fo		Yes	
Was the mode	l time series c	output compare	d to the measured gage data?	Yes	
	1		Issues		
File		nment	Resolution	Verification	
maxele.63	high values in the Niagara River		This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH	
maxwvel.63	large differences in the wind velocity between adjacent nodes, as high as 1.4 m/s difference observed in the southwestern part of Lake Ontario		This storm is prior to 1979 when CFSR wind data is not available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area is representative of measured winds speeds. The spatially varying time- series data was checked to verify this.	BSH	
measure vs. model	overpredicts the surge at Cape Vincent and underpredicts the other three locations		Discrepancy between modeled and measured data is to be expected when comparing against numerous storm events. When analyzed statistically as a population of storms, the Q-Q plots showed good agreement between measured and modeled surface elevations. See Figure 6.6 of Baird Lake Ontario report.	BSH	
maxwvel.63	small area of zero wind (indicating ice) not attached to the shoreline in the northeast:		This is caused by the pre-processor that is used to adjust the wind field to account for ice. At times, when there is limited ice data there are small pockets of non- zero winds between areas of zero wind. Considering surge is generated by the winds over the entire lake, areas with zero winds along the shore have little effect on surge. In addition, for this particular storm, these small pockets in the ice data are on the Canadian side of Lake Ontario where the surge results will not be used for mapping.	BSH	
Additional Co	mments on D	etailed Check			
	Comment		Resolution	Verification	
Reviewer Sigr		C	y Hicks		
Date: 6/26/2012					

ADCIRC RE	VIEW			
Storm:		Storm122_19740	022000	
Reviewer:		Betsy Hicks		
Organization:		RAMPP		
Date Checked		6/7/2012		
Was the max y	water surface elevat	ion file checked for	or anomalies?	Yes
Was the max of	current velocity file	checked for anom	alies?	Yes
Was the max v	wind velocity file cl	necked for anomal	ies?	Yes
	num pressure file ch			Yes
		neasured gage data?	Yes	
			Issues	
File	Com	nent	Resolution	Verification
maxele.63	high values in the	Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH
maxele.63	slightly noisy values in the surge near the shoreline in the east		The variations along the shore are the result of changes in the velocity head that are due to variations in the bathymetry under strong shore parallel wind conditions.	BSH
maxwvel.63	large differences in the wind velocity between adjacent nodes, as high as 1.1 m/s difference observed in the southwestern part of Lake Ontario		This storm is prior to 1979 when CFSR wind data is not available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area is representative of measured winds speeds. The spatially varying time-series data was checked to verify this.	BSH
measure vs. model	overpredicts the surge at Cape Vincent		The peak of the storm at Cape Vincent agrees well to the measured data. Discrepancy between modeled and measured data is to be expected when comparing against numerous storm events. When analyzed statistically as a population of storms, the Q-Q plots at Cape Vincent showed good agreement between measured and modeled surface elevations. See Figure 6.6 of Baird Lake Ontario report.	BSH
Additional Co	mments on Detailed	1 Check		XI 10
	Comment		Resolution	Verification
Reviewer Sigr	nature: 12	sitry B	ficks	
Date:	6/26/2	2012		

B R water surface elevation current velocity file chec wind velocity file chec num pressure file chec	ked for anomalies?	Yes Yes Yes Yes
R water surface elevation current velocity file check wind velocity file check num pressure file check l time series output con	AMPP /7/2012 file checked for anomalies? ecked for anomalies? ked for anomalies? ked for anomalies?	Yes Yes
water surface elevation surrent velocity file check wind velocity file check num pressure file check l time series output con	7/2012 file checked for anomalies? ecked for anomalies? ked for anomalies? ked for anomalies?	Yes Yes
water surface elevation current velocity file chec vind velocity file chec num pressure file chec l time series output co	file checked for anomalies? ecked for anomalies? ked for anomalies? ked for anomalies?	Yes Yes
current velocity file cho wind velocity file chec num pressure file chec l time series output co	ecked for anomalies? ked for anomalies? ked for anomalies?	Yes Yes
wind velocity file chec num pressure file chec l time series output con	ked for anomalies? ked for anomalies?	Yes
num pressure file chec l time series output co	ked for anomalies?	
l time series output co		Yes
•	mpared to the measured gage data?	
Comment		Yes
Comment	Issues	
	Resolution	Verification
high values in the Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail	BSH
large differences in the wind velocity between adjacent nodes, as high as 2.0 m/s difference observed in the southwestern part of Lake Ontario	This storm is prior to 1979 when CFSR wind data is not available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area is representative of measured winds speeds. The spatially varying time-series data was checked to verify this.	BSH
band of anomalous wind data adjacent to the ice area in the northeast	The Modified Garratt Formulation (MGF) was used to define wind speeds over ice fields. Using this parabolic function, the largest wind drag occurs at 50% ice coverage. Given the coarse resolution of the ice data relative to the model grid, the winds were interpolated between neighboring ice fields of different percent coverage; in some cases, this results in regions of ice with 50% coverage, which generates the strongest winds drag coefficient under the MGF. Refer to Section 6.1.3 in Baird Lake Ontario report, which describes ice implementation methodology.	BSH
overpredicts the surge at Cape Vincent	Discrepancy between modeled and measured data is to be expected when comparing against numerous storm events. When analyzed statistically as a population of storms, the Q-Q plots at Cape Vincent showed good agreement between measured and modeled surface elevations. See Figure 6.6 of Baird Lake Ontario report.	BSH
omment	Resolution	Verification
	0	
	large differences in the wind velocity between adjacent nodes, as high as 2.0 m/s difference observed in the southwestern part of Lake Ontario band of anomalous wind data adjacent to the ice area in the northeast overpredicts the surge at Cape Vincent mments on Detailed C omment ature:	lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.large differences in the wind velocity between adjacent nodes, as high as 2.0 m/s difference observed in the southwestern part of Lake OntarioThis storm is prior to 1979 when CFSR wind data is not available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area is representative of measured winds speeds. The spatially varying time-series data was checked to verify this.band of anomalous wind data adjacent to the ice area in the northeastThe Modified Garratt Formulation (MGF) was used to define wind speeds over ice fields. Using this parabolic function, the largest wind drag occurs at 50% ice coverage. Given the coarse resolution of the ice data relative to the model grid, the winds were interpolated between neighboring ice fields of different percent coverage; in some cases, this results in regions of ice with 50% coverage, which generates the strongest winds drag coefficient under the MGF. Refer to Section 6.1.3 in Baird Lake Ontario report, which describes ice implementation methodology.overpredicts the surge at Cape VincentDiscrepancy between modeled and measured data is to be expected when comparing against numerous storm events. When analyzed statistically as a population of storms, the Q-Q plots at Cape Vincent showed good agreement between measured and modeled surface elevations. See Figure 6.6 of Baird Lake Ontario report.mments on Detailed Check tommentResolution

ADCIRC RE	VIEW				
Storm:		Storm124_1	1974031400		
Reviewer:		Betsy Hicks	3		
Organization:		RAMPP			
Date Checked		6/7/2012			
Was the max w	water surface	e elevation file check	ted for anomalies?		Yes
		ity file checked for a			Yes
		y file checked for an			Yes
	-	e file checked for an			Yes
Was the mode	l time series	output compared to	the measured gage data?		Yes
			Issues		
File		Comment	Resolution	Verificat	tion
maxele.63	River	s in the Niagara	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH	
maxwvel.63	large differences in the wind velocity between adjacent nodes, as high as 1.5 m/s difference observed in the northeastern part of Lake Ontario		The Modified Garratt Formulation (MGF) was used to define wind speeds over ice fields. Using this parabolic function, the largest wind drag occurs at 50% ice coverage. This area in the northeastern end of the lake has 60% ice coverage and therefore the wind speeds are increased according to the MGF. Refer to Section 6.1.3 in Baird Lake Ontario report, which describes ice implementation methodology.	BSH	
measure vs. model	overpredicts the surge at Cape Vincent		Discrepancy between modeled and measured data is to be expected when comparing against numerous storm events. When analyzed statistically as a population of storms, the Q-Q plots at Cape Vincent showed good agreement between measured and modeled surface elevations. See Figure 6.6 of Baird Lake Ontario report.	BSH	
Additional Co	mments on I	Detailed Check			
Comment		nt	Resolution	Verificat	tion
Reviewer Sigr	nature:	Betry	Hicks	<u> </u>	
Date: 6/26/2012					

ADCIRC REVIEW					
Storm:		Storm125_1974	4041100		
Reviewer:		Betsy Hicks			
Organization:		RAMPP			
Date Checked:		6/7/2012		-	
		e elevation file checked		Yes	
Was the max c	urrent veloc	ity file checked for another	malies?	Yes	
		file checked for anoma		Yes	
Was the minin	num pressure	e file checked for anoma	alies?	Yes	
Was the model	l time series	output compared to the	measured gage data?	Yes	
			Issues		
File		Comment	Resolution	Verification	
maxele.63	high values in the Niagara River		This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH	
Additional Con	mments on I	Detailed Check	1	1	
	Comm	ent	Resolution	Verification	
Reviewer Signature: Butry V.		Bitry b.	ficks	1	
Date: 6/26/2012		6/26/2012			

ADCIRC RE	VIEW				
Storm:		Storm126 1974	051500		
Reviewer:		Betsy Hicks			
Organization: RAMPP					
Date Checked: 6/7/2012					
Was the max	water surface elevat	ion file checked for	or anomalies?	Yes	
Was the max of	current velocity file	checked for anom	nalies?	Yes	
Was the max	lies?	Yes			
Was the minir	num pressure file cl	necked for anomal	lies?	Yes	
	1		neasured gage data?	Yes	
	1	1	Issues		
File	Com	nent	Resolution	Verification	
maxele.63	high values in the Niagara River large differences in the wind		This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail. This storm is prior to 1979 when CFSR wind	BSH	
	velocity between as high as 0.8 m/s observed in the sc of Lake Ontario	adjacent nodes, difference buthwestern part	data is not available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area is representative of measured winds speeds. The spatially varying time-series data was checked to verify this.		
Additional Co	mments on Detailed	d Check	-		
Comment			Resolution	Verification	
Reviewer Sign	nature: 12	Sitry B	ficks		
Date: 6/26/2012		2012			

ADCIRC RE	VIEW				
Storm:		Storm127 19	74111200		
Reviewer: Betsy Hicks			7/4111200		
Organization: RAMPP					
Date Checked: 6/7/2012					
Was the max w	water surface	elevation file checked	d for anomalies?	Yes	
Was the max of	current veloci	ty file checked for an	omalies?	Yes	
		file checked for anon		Yes	
Was the minin	num pressure	file checked for anon	nalies?	Yes	
Was the mode	l time series	output compared to th	e measured gage data?	Yes	
			Issues	L	
File		Comment	Resolution	Verification	
maxele.63	high values River	in the Niagara	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH	
measure vs. model	overpredicts the surge at Cape Vincent		The peak of the storm at Cape Vincent agrees well with the measured data. However, discrepancy between modeled and measured data is to be expected when comparing against numerous storm events. When analyzed statistically as a population of storms, the Q-Q plots at Cape Vincent showed good agreement between measured and modeled surface elevations. See Figure 6.6 of Baird Lake Ontario report.	BSH	
Additional Co		etailed Check			
Comment			Resolution	Verification	
Reviewer Sigr	nature:	Bitry	Kicks	1	
Date:		6/25/2012			

ADCIRC RE	VIEW				
Storm: Storm1		Storm12	28_1974112900		
		Betsy H			
		RAMPE)		
Date Checked: 6/7/2012			2		
Was the max water surface elevation file cl				Yes	
	current velocity file c			Yes	
	wind velocity file che			Yes	
Was the minin	num pressure file che	ecked for	r anomalies?	Yes	
Was the model	l time series output c	compared	d to the measured gage data?	Yes	
			Issues		
File	Comment		Resolution	Verification	
maxele.63	high values in the Niagara River		This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH	
maxwvel.63	large differences in the wind velocity between adjacent nodes, as high as 1.5 m/s difference observed in the southwestern part of Lake Ontario		This storm is prior to 1979 when CFSR wind data is not available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area is representative of measured winds speeds. The spatially varying time- series data was checked to verify this.	BSH	
measure vs. model	overpredicts the surge at Cape Vincent		The starting water surface elevation in the model is set to the average of all four gauges. In this storm it appears that the water level at Cape Vincent at the start of the storm was lower than the other gauges causing an overprediction. Note that, Cape Vincent is located in the St. Lawrence River where water levels can be influenced by downstream conditions that are not included in the model. Discrepancy between modeled and measured data is to be expected when comparing against numerous storm events. When analyzed statistically as a population of storms, the Q-Q plots at Cape Vincent showed good agreement between measured and modeled surface elevations. See Figure 6.6 of Baird Lake Ontario report.	BSH	
Additional Con	mments on Detailed	Check	*	•	
Comment			Resolution	Verification	
Reviewer Sign	B	V	y Hicks		
Date:	6/26/20	012			

ADCIRC REV	IEW					
Storm:		Storm129	1975012300			
Reviewer: B		Betsy Hick	Betsy Hicks			
Organization: RA		RAMPP	AMPP			
Date Checked:		6/7/2012				
Was the max wa	Yes					
	rrent velocity file			Yes Yes		
Was the max wind velocity file checked for anomalies?						
Was the minimum pressure file checked for anomalies?						
Was the model	time series output	compared to	the measured gage data?	Yes		
			Issues			
File	Comment		Resolution	Verification BSH		
	high values in the Niagara River	bathyn lake. 1 are not falls o	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.			
	63 a few small areas of zero wind (indicating ice) not attached to the shoreline in the northeast:		This is caused by the pre-processor that is used to adjust the wind field to account for ice. At times, when there is limited ice data there are small pockets of non-zero winds between areas of zero wind. Considering surge is generated by the winds over the entire lake, areas with zero winds along the shore have little effect on surge. In addition, for this particular storm, these small pockets in the ice data are on the Canadian side of Lake Ontario where the surge results will not be used for mapping.			
model	surge at Cape t Vincent t I I I I I I I I I I I I I I I I I I		The starting water surface elevation in the model is set to the average of all four gauges. In this storm it appears that the water level at Cape Vincent at the start of the storm was lower than the other gauges causing an overprediction. Note that, Cape Vincent is located in the St. Lawrence River where water levels can be influenced by downstream conditions that are not included in the model. Discrepancy between modeled and measured data is to be expected when comparing against numerous storm events. When analyzed statistically as a population of storms, the Q-Q plots at Cape Vincent showed good agreement between measured and modeled surface elevations. See Figure 6.6 of Baird Lake Ontario report.			
Additional Corr	ments on Detailed					
	Comment		Resolution	Verification		
Reviewer Signa	ture:	Sitry	Hicks			
Date:	6/26/2	2012				

ADCIRC RE	VIEW					
Storm:		Storm1	30_1975022300			
Reviewer:		Betsy H				
Organization:		RAMPI				
Date Checked		6/7/201				
			hecked for anomalies?		Yes	
	current velocity file				Yes	
	wind velocity file ch				Yes	
Was the minin	num pressure file ch	ecked fo	r anomalies?		Yes	
Was the mode	l time series output	compare	d to the measured gage data?		Yes	
			Issues			
File	Comment		Resolution		Verification	
maxele.63	high values in the Niagara River		This is due to model boundary ef resolved bathymetry. This effect levels in the lake. Note that pred the Niagara River are not to be us mapping in the river as it falls ou work and the model is not setup t detail.	does not impact surge icted surge levels in sed to support flood tside the scope of	BSH	
maxwvel.63	large differences in the wind velocity between adjacent nodes, as high as 1.5 m/s difference observed in the southwestern part of		This storm is prior to 1979 when not available and natural neighbo been generated using available w Lake (refer to Section 2.2.2.1 of t Report). Therefore, this area is r measured winds speeds. The spa series data was checked to verify	BSH		
measure vs. model	Lake Ontario overpredicts the surge at Cape Vincent and underpredicts the other three locations		The starting water surface elevation in the model is set to the average of all four gauges. In this storm it appears that the water level at Cape Vincent at the start of the storm was lower than the other gauges causing an overprediction. Note that, Cape Vincent is located in the St. Lawrence River where water levels can be influenced by downstream conditions that are not included in the model. Discrepancy between modeled and measured data is to be expected when comparing against numerous storm events. When analyzed statistically as a population of storms, the Q-Q plots showed good agreement between measured and modeled surface elevations. See Figure 6.6 of Baird Lake Ontario report.		BSH	
Additional Co	mments on Detailed	Check	· · · · · · · · · · · · · · · · · · ·			
		omment		Resolution	Verification	
Reviewer Sigr	nature:		y Kicks			
Date:	6/26/2	012				

ADCIRC RE	VIEW					
Storm:		S	torm131_1975033100			
Reviewer:			Betsy Hicks			
Organization:		R	AMPP			
Date Checked	•	6	/7/2012			
Was the max w	water surface ele	vation file	checked for anomalies?	Yes		
Was the max of	current velocity f	ile checke	ed for anomalies?	Yes		
Was the max w	wind velocity file	checked	for anomalies?	Yes		
Was the minin	num pressure file	e checked	for anomalies?	Yes		
Was the mode	l time series out	out compa	red to the measured gage data?	Yes		
	1	1	Issues			
File	Commer	nt	Resolution	Verification		
maxele.63	high values in the Niagara River		This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH		
maxele.63	higher surge th normally obser the eastern side Irondequoit Ba be explained by winds in the ar	ved in of the y, could y high	Large wind speeds (~29 m/s) occurred in this area causing high surge in the eastern end of the Bay.	BSH		
maxwvel.63	large differences in the wind velocity between adjacent nodes, as high as 0.6 m/s difference observed in the southwestern part		This storm is prior to 1979 when CFSR wind data is not available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area is representative of measured winds speeds. The spatially varying time-series data was checked to verify this.	BSH		
measure vs. model	of Lake Ontario overpredicts the surge at Cape Vincent and underpredicts the other three locations		The starting water surface elevation in the model is set to the average of all four gauges. In this storm it appears that the water level at Cape Vincent at the start of the storm was lower than the other gauges causing an overprediction. Note that, Cape Vincent is located in the St. Lawrence River where water levels can be influenced by downstream conditions that are not included in the model. Discrepancy between modeled and measured data is to be expected when comparing against numerous storm events. When analyzed statistically as a population of storms, the Q-Q plots at Cape Vincent showed good agreement between measured and modeled surface elevations. See Figure 6.6 of Baird Lake Ontario report.	BSH		
Additional Co	mments on Detai	iled Check				
	Comment		Resolution	Verification		
Reviewer Sigr	nature:	B	itry Hicks			
Date: 6/26/20		6/26/201	2			

ADCIRC RE	ADCIRC REVIEW					
Storm:		Storm132_1975	5110700			
Reviewer:		Betsy Hicks				
Organization:		RAMPP				
Date Checked:		6/7/2012		-		
Was the max w	vater surface	elevation file checked	for anomalies?	Yes		
Was the max c	urrent velocit	ty file checked for anor	nalies?	Yes		
Was the max w	vind velocity	file checked for anoma	llies?	Yes		
Was the minin	num pressure	file checked for anoma	llies?	Yes		
Was the model	l time series c	output compared to the	measured gage data?	Yes		
			Issues	•		
File		Comment	Resolution	Verification		
maxele.63	high values	in the Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH		
Additional Con						
	Comme	nt	Resolution	Verification		
Reviewer Sign		Betry b	ficks	<u> </u>		
Date:		6/26/2012				

ADCIRC RE	VIEW			
Storm:		Storm133_1975	112800	
Reviewer:		Betsy Hicks		
Organization:		RAMPP		
Date Checked	:	6/7/2012		
Was the max w	water surface elevat	ion file checked for	or anomalies?	Yes
Was the max of	current velocity file	checked for anom	alies?	Yes
Was the max w	wind velocity file ch	ecked for anomal	ies?	Yes
Was the minin	num pressure file cl	necked for anomal	ies?	Yes
Was the mode	l time series output	compared to the r	neasured gage data?	Yes
			Issues	
File	Com	nent	Resolution	Verification
maxele.63	high values in the	Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH
maxwvel.63	large differences in the wind velocity between adjacent nodes, as high as 0.8 m/s difference observed in the southwestern part of Lake Ontario		This storm is prior to 1979 when CFSR wind data is not available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area is representative of measured winds speeds. The spatially varying time-series data was checked to verify this.	BSH
measure vs. model	overpredicts the surge at Cape Vincent		Discrepancy between modeled and measured data is to be expected when comparing against numerous storm events. When analyzed statistically as a population of storms, the Q-Q plots at Cape Vincent showed good agreement between measured and modeled surface elevations. See Figure 6.6 of Baird Lake Ontario report.	BSH
Additional Co	mments on Detailed	l Check		
	Comment		Resolution	Verification
Reviewer Sigr	nature: 12	sitry B	ficks	
Date:	6/26/2	2012		

ADCIRC RE	VIEW			
Storm:		Storm134_1975121	800	
Reviewer:		Betsy Hicks		
Organization:		RAMPP		
Date Checked	:	6/7/2012		
Was the max	water surface elevat	ion file checked for a	nomalies?	Yes
Was the max of	current velocity file	checked for anomali	es?	Yes
Was the max	wind velocity file cl	ecked for anomalies	?	Yes
Was the minir	num pressure file ch	necked for anomalies	?	Yes
Was the mode	el time series output	compared to the mea	sured gage data?	Yes
			Issues	1
File	Cor	nment	Resolution	Verification
maxele.63	high values in the	Niagara River	This is due to model boundary effects and	BSH
		-	poorly resolved bathymetry. This effect	
			does not impact surge levels in the lake.	
			Note that predicted surge levels in the	
			Niagara River are not to be used to support	
			flood mapping in the river as it falls	
			outside the scope of work and the model is	
1.60	1 1/00		not setup to resolve the river in detail.	Dav
maxwvel.63		n the wind velocity	This storm is prior to 1979 when CFSR	BSH
	between adjacent		wind data is not available and natural	
	0.9 m/s difference		neighbor wind fields have been generated	
	southwestern part	of Lake Ontario	using available wind data around the Lake	
			(refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area is	
			representative of measured winds speeds.	
			The spatially varying time-series data was	
			checked to verify this.	
measure vs.	overpredicts the s	urge at Cape	Discrepancy between modeled and	BSH
model	Vincent	0 · · · · r ·	measured data is to be expected when	
			comparing against numerous storm events.	
			When analyzed statistically as a population	
			of storms, the Q-Q plots at Cape Vincent	
			showed good agreement between	
			measured and modeled surface elevations.	
			See Figure 6.6 of Baird Lake Ontario	
A 44:4:	D. (. '1	l Charle	report.	
Additional Co	mments on Detailed	<u>i Check</u>	Resolution	Verification
	Comment		Kesolulloli	vermeation
				<u> </u>
Reviewer Sign	nature:	11	I	l
8	12	Tity A	icks	
		stry A	-	
		0		
Data	C 10 C 10	012		
Date:	6/26/2	2012		

ADCIRC RE	EVIEW				
Storm:		Storm135 1976013	000		
Reviewer:		Betsy Hicks			
Organization:		RAMPP			
Date Checked	1:	6/7/2012			
Was the max	water surface elevat	ion file checked for a	nomalies?		Yes
Was the max	current velocity file	checked for anomalie	es?		Yes
Was the max	wind velocity file ch	necked for anomalies	?		Yes
Was the mini	mum pressure file ch	necked for anomalies	?		Yes
Was the mode	el time series output	compared to the mea	sured gage data?		Yes
			Issues		
File	Cor	nment	Res	olution	Verification
maxele.63	high values in the Niagara River		This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.		BSH
maxele.63	slightly noisy values in the surge near the shoreline in the east		The variations along the shore are the result of changes in the velocity head that are due to variations in the bathymetry under strong shore parallel wind conditions.		BSH
maxele.63	higher surge than normally observed in the eastern side of the Irondequoit Bay, please confirm that this is supported by the wind direction		High winds from the west, therefore supporting high surge values in the eastern side of Irondequoit Bay.		BSH
Additional Co	omments on Detailed	l Check			
	(Comment		Resolution	Verification
Reviewer Sig	nature: 12	Sitry H	icks	<u> </u>	1
Date:	6/26/2	2012			

ADCIR	C REVIEW					
Storm:		Storm136_1976030200				
Reviewe	er:	Betsy Hicks	y Hicks			
Organiz	ation:	RAMPP				
Date Ch		6/7/2012				
Was the	e max water surface elevat	on file checked for anomalies?		Yes		
Was the	e max current velocity file	checked for anomalies?		Yes		
Was the	max wind velocity file c	ecked for anomalies?		Yes		
Was the	minimum pressure file c	ecked for anomalies?		Yes		
Was the	model time series output	compared to the measured gage of	data?	Yes		
	×	Issues				
File	Comment	I	Resolution	Verification		
maxel e.63	high values in the Niaga River	bathymetry. This effect d lake. Note that predicted are not to be used to suppo	dary effects and poorly resolved oes not impact surge levels in the surge levels in the Niagara River ort flood mapping in the river as it work and the model is not setup to	BSH		
maxw vel.63	large differences in the velocity between adjace nodes, as high as 1.0 m/ difference observed in the northwestern part of Lab Ontario	tindThis storm is prior to 1979available and natural neigigenerated using availableto Section 2.2.2.1 of the BTherefore, this area is repr	This storm is prior to 1979 when CFSR wind data is not available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area is representative of measured winds speeds. The spatially varying time-series data was checked			
maxw vel.63	band of anomalous wind data adjacent to the ice a	wind speeds over ice field the largest wind drag occur coarse resolution of the ice the winds were interpolate of different percent covera regions of ice with 50% co strongest winds drag coeff Section 6.1.3 in Baird Lak	The Modified Garratt Formulation (MGF) was used to define wind speeds over ice fields. Using this parabolic function, the largest wind drag occurs at 50% ice coverage. Given the coarse resolution of the ice data relative to the model grid, the winds were interpolated between neighboring ice fields of different percent coverage; in some cases, this results in regions of ice with 50% coverage, which generates the strongest winds drag coefficient under the MGF. Refer to Section 6.1.3 in Baird Lake Ontario report, which describes			
measu re vs. model	underpredicts the surge Olcott	t Discrepancy between mod expected when comparing When analyzed statisticall Q-Q plots at Olcott showe	ice implementation methodology. Discrepancy between modeled and measured data is to be expected when comparing against numerous storm events. When analyzed statistically as a population of storms, the Q-Q plots at Olcott showed good agreement between measured and modeled surface elevations. See Figure 6.6 of Baird Lake Ontario report			
Addition	nal Comments on Detaile	Check				
	(omment	Resolution	Verification		
Review	er Signature:	try Hicks				
Date:	6/26/	012				

ADCIRC RE	VIEW				
Storm:		Storm137 1976	5040800		
Reviewer:		Betsy Hicks			
Organization:		RAMPP			
Date Checked	:	6/7/2012			
Was the max w	water surface elevat	ion file checked	for anomalies?		Yes
Was the max of	current velocity file	checked for anot	nalies?		Yes
Was the max w	wind velocity file ch	ecked for anoma	alies?		Yes
	num pressure file ch				Yes
	-		measured gage data?		Yes
	1	1	Issues		
File	Comm	nent		lution	Verification
maxele.63	high values in the	Niagara River	resolved bathymetry. Th	n the river as it falls k and the model is not	BSH
maxwvel.63	large differences in the wind velocity between adjacent nodes, as high as 0.7 m/s difference observed in the southwestern part of Lake Ontario		This storm is prior to 1979 when CFSR wind data is not available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area of higher winds is representative of measured winds speeds in this area. The spatially varying time-series data was checked to verify this.		BSH
measure vs. model	overpredicts the surge at Cape Vincent		Discrepancy between modeled and measured data is to be expected when comparing against numerous storm events. When analyzed statistically as a population of storms, the Q-Q plots at Cape Vincent showed good agreement between measured and modeled surface elevations. See Figure 6.6 of Baird Lake Ontario report.		BSH
Additional Co	mments on Detailed	l Check			
	0	Comment		Resolution	Verification
Reviewer Sigr	nature: 12	sitry b	ficks		
Date:	6/26/2	2012			

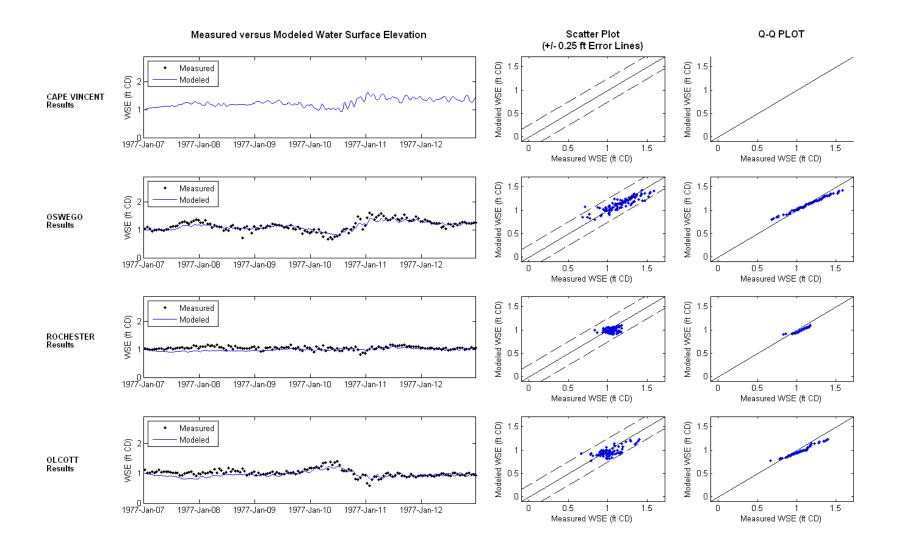
ADCIRC RE	VIEW					
Storm:		Storm138_1	1976042400			
Reviewer:		Betsy Hicks				
Organization:		RAMPP				
Date Checked:		6/7/2012				
Was the max w	vater surface elev	ation file check	ted for anomalies?		Yes	
Was the max c	urrent velocity fil	le checked for a	anomalies?		Yes	
Was the max w	vind velocity file	checked for an	omalies?		Yes	
Was the minin	num pressure file	checked for an	omalies?		Yes	
			the measured gage data?		Yes	
		-	Issues		I	
File	Comn	nent	Resolu	tion	Verification	
maxele.63	high values in th River	ne Niagara	This is due to model boundaresolved bathymetry. This essure levels in the lake. No levels in the Niagara River a support flood mapping in the the scope of work and the more resolve the river in detail.	effect does not impact te that predicted surge are not to be used to e river as it falls outside	BSH	
maxwvel.63	large differences in the wind velocity between adjacent nodes, as high as 0.7 m/s difference observed in the southwestern part of Lake Ontario		This storm is prior to 1979 when CFSR wind data is not available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area of higher winds is representative of measured winds speeds in this area. The spatially varying time-series data was checked to verify this.		BSH	
measure vs. model	overpredicts the surge at Cape Vincent		Discrepancy between modeled and measured data is to be expected when comparing against numerous storm events. When analyzed statistically as a population of storms, the Q-Q plots at Cape Vincent showed good agreement between measured and modeled surface elevations. See Figure 6.6 of Baird Lake Ontario report.		BSH	
Additional Con	mments on Detail	ed Check				
		Comment		Resolution	Verification	
Reviewer Sign	ature:	Bitry	Hicks	<u> </u>	<u> </u>	
Date:	6/26	5/2012				

ADCIRC RE	VIEW				
Storm:		Storm139_197605160)()		
Reviewer:		Betsy Hicks			
Organization:		RAMPP			
Date Checked:		6/7/2012			
		ion file checked for and	omalies?		Yes
					Yes
	Was the max current velocity file checked for anomalies? Was the max wind velocity file checked for anomalies?				
	•	necked for anomalies?			Yes Yes
was the model	i time series output	compared to the measu			Yes
File	Co	mment	sues	esolution	Verification
maxele.63	high values in the			del boundary effects and	BSH
maxele.05	mgn values in the	Magara River		athymetry. This effect	БЭП
				urge levels in the lake.	
			1	6	
				not to be used to support the river as it falls	
				of work and the model is	
maxwvel.63	larga difforances	n the wind velocity		ve the river in detail. r to 1979 when CFSR	BSH
maxwvei.05		nodes, as high as 1.0	-		БЭП
	m/s difference obs		wind data is not available and natural neighbor wind fields have been generated		
	southwestern part				
	southwestern part	of Lake Ontario	using available wind data around the Lake		
		(refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area is			
				measured winds speeds.	
				ving time-series data was	
			checked to verify		
measure vs.	overpredicts the s	urge at Cape Vincent,	Discrepancy betw		BSH
model		lochester and Olcott		to be expected when	Don
model	underpredicts at 1	toonester und oreste		t numerous storm events.	
			1 0 0	atistically as a population	
				Q plots showed good	
				en measured and modeled	
				See Figure 6.6 of Baird	
			Lake Ontario repo	•	
Additional Con	mments on Detailed		^		
	C	Comment		Resolution	Verification
Reviewer Sign	ature: 12	Titan 11:	-ka		
		sitry Ar			
		J			
		-			
Date:	6/26/2	2012			

ADCIRC RE	VIEW					
Storm:		Storm140 197	76112700			
Reviewer:		Betsy Hicks				
Organization:		RAMPP				
Date Checked	:	6/10/2012				
Was the max	Was the max water surface elevation file checked for anomalies?					
Was the max of	current velocity file	checked for and	omalies?		Yes	
Was the max	wind velocity file cl	ecked for anon	nalies?		Yes	
Was the minir	num pressure file ch	necked for anon	nalies?		Yes	
Was the mode	l time series output	compared to th	e measured gage data?		Yes	
	*		Issues			
File	Comm	ent	Resolu	ition	Verification	
maxele.63	high values in the River	Niagara	This is due to model bour poorly resolved bathymet not impact surge levels in predicted surge levels in t not to be used to support river as it falls outside the model is not setup to reso	ry. This effect does the lake. Note that he Niagara River are flood mapping in the scope of work and the	BSH	
maxwvel.63	large differences in the wind velocity between adjacent nodes, as high as 0.7 m/s difference observed in the northwestern part of Lake Ontario		This storm is prior to 1979 when CFSR wind data is not available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area is representative of measured winds speeds. The spatially varying time-series data was checked to verify this.		BSH	
measure vs. model	overpredicts the surge at Cape Vincent		Discrepancy between modeled and measured data is to be expected when comparing against numerous storm events. When analyzed statistically as a population of storms, the Q-Q plots at Cape Vincent showed good agreement between measured and modeled surface elevations. See Figure 6.6 of Baird Lake Ontario report.		BSH	
Additional Co	mments on Detailed	l Check				
	(Comment		Resolution	Verification	
Reviewer Sign	nature: 12	sitry b	Ficks		1	
Date:	6/26/2	2012				

ADCIRC REVI	EW					
Storm:	Sto	rm141 1977010700				
Reviewer:	Bet	tsy Hicks				
Organization:	RA	MPP				
Date Checked:		0/2012				
Was the max was	ter surface elevation file checked for	or anomalies?	Yes			
Was the max cur	rent velocity file checked for anom	alies?	Yes			
Was the max wir	nd velocity file checked for anomal	ies?	Yes			
Was the minimum	m pressure file checked for anomal	ies?	Yes			
Was the model ti	ime series output compared to the n	neasured gage data?	Yes			
		Issues				
File	Comment	Resolution	Verification			
maxele.63	high values in the Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH			
maxwvel.63	large differences in the wind velocity between adjacent nodes, as high as 2.4 m/s difference observed in the southwestern part of Lake Ontario	This storm is prior to 1979 when CFSR wind data is not available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area is representative of measured winds speeds. The spatially varying time-series data was checked to verify this.	BSH			
maxwvel.63	small area of zero wind (indicating ice) not attached to the shoreline in the southwest:	This is caused by the pre-processor that is used to adjust the wind field to account for ice. At times, when there is limited ice data there are small pockets of non-zero winds between areas of zero wind. Considering surge is generated by the winds over the entire lake, areas with zero winds along the shore have little effect on surge. This is shown in measured vs modeled plots; the modeled data agrees well with the measured data at gauges along the shoreline near this area (Olcott and Rochester).	BSH			
maxwvel.63	band of anomalous wind data adjacent to the ice area	This band in the wind data is caused by the transition in ice coverage from 100% to 10%. The Modified Garratt Formulation (MGF) was used to define wind speeds over ice fields. Using this parabolic function, the largest wind drag occurs at 50% ice coverage. Given the coarse resolution of the ice data relative to the model grid, the winds were interpolated between neighboring ice fields of different percent	BSH			

measure vs. model	overpredicts the surge at all four locations	 coverage; in some cases, this results in regions of ic which generates the strongest winds drag coefficier Section 6.1.3 in Baird Lake Ontario report, which d methodology. Disagree. Modeled results agree well to measure. 	at under the MGF. Refer to lescribes ice implementation	BSH
Additional Commen	ts on Detailed Check			
	Com	Resolution	Verification	
Reviewer Signature:	Bit	y Hicks		
Date:	6/26/2012			



ADCIRC RE	VIEW						
Storm:		Storm142_1977012600					
Reviewer:		Betsy Hicks					
Organization:		RAMPP					
Date Checked	:	6/10/2012					
Was the max y	water surface elevation f	ile checked for anomalies?		Yes			
Was the max of	current velocity file chec	ked for anomalies?		Yes			
Was the max	wind velocity file checke	d for anomalies?		Yes			
Was the minir	num pressure file checke	ed for anomalies?		Yes			
Was the mode	el time series output com	pared to the measured gage data?		Yes			
	1	Issues					
File	Comment	Resolution		Verification			
maxele.63	high values in the Niagara River	bathymetry. This effect does not impact lake. Note that predicted surge levels in not to be used to support flood mapping	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve				
maxele.63	higher surge than normally observed in the eastern side of the Irondequoit Bay, please confirm that wind direction supports the result	Wind direction is from the southwest, the	Wind direction is from the southwest, therefore supporting high surge values in the eastern side of Irondequoit Bay.				
maxwvel.63	large differences in the wind velocity between adjacent nodes, as high as 1.0 m/s difference observed in the western part of Lake Ontario	available and natural neighbor wind field using available wind data around the Lak 2.2.2.1 of the Baird Lake Ontario Report is representative of measured winds spee	This storm is prior to 1979 when CFSR wind data is not available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area is representative of measured winds speeds. The spatially varying time-series data was checked to verify this.				
maxwvel.63	band of anomalous wind data throughout lake perimeter	coverage from 90% to 10%. The Modifi Formulation (MGF) was used to define v fields. Using this parabolic function, the occurs at 50% ice coverage. Given the c ice data relative to the model grid, the wi between neighboring ice fields of differe some cases, this results in regions of ice which generates the strongest winds drag	This band in the wind data is caused by the transition in ice coverage from 90% to 10%. The Modified Garratt Formulation (MGF) was used to define wind speeds over ice fields. Using this parabolic function, the largest wind drag occurs at 50% ice coverage. Given the coarse resolution of the ice data relative to the model grid, the winds were interpolated between neighboring ice fields of different percent coverage; in some cases, this results in regions of ice with 50% coverage, which generates the strongest winds drag coefficient under the MGF. Refer to Section 6.1.3 in Baird Lake Ontario report,				
Additional Co	omments on Detailed Che	*					
		mment	Resolution	Verification			
Reviewer Sigi	nature:	Betry Hicks					
Date:	6/26/	2012					

ADCIRC RE	VIEW					
Storm:		Storm1-	43 1977031500			
Reviewer:		Betsy H				
Organization:		RAMP				
Date Checked	:	6/10/20				
Was the max w	water surface elevati	on file c	hecked for anomalies?			Yes
Was the max of	current velocity file	checked	for anomalies?			Yes
Was the max w	wind velocity file ch	ecked fo	r anomalies?			Yes
Was the minin	num pressure file ch	ecked fo	or anomalies?			Yes
			d to the measured gage data?			Yes
			Issues			
File	Comment		Resolution		Verificatio	n
maxele.63	high values in the Niagara River		This is due to model boundary e poorly resolved bathymetry. Th does not impact surge levels in t Note that predicted surge levels Niagara River are not to be used flood mapping in the river as it f outside the scope of work and th not setup to resolve the river in o	is effect he lake. in the to support falls e model is	BSH	
maxwvel.63	large differences in wind velocity betw adjacent nodes, as as 1.6 m/s differen observed in the southwestern part Lake Ontario	in the This storm is prior to 1979 when CFSR ween wind data is not available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area is representative of measured winds speeds. The spatially varying time-series data was		n CFSR atural generated d the Lake aird Lake s area is ls speeds.	BSH	
measure vs. model	overpredicts the su Cape Vincent and underpredicts at Rochester and Olc	-	checked to verify this. Discrepancy between modeled and measured data is to be expected when comparing against numerous storm events. When analyzed statistically as a population of storms, the Q-Q plots showed good agreement between measured and modeled surface elevations. See Figure 6.6 of Baird Lake Ontario report.		BSH	
Additional Co	mments on Detailed	Check	•			
	С	omment		Resc	olution	Verification
Reviewer Sigr	nature: 12	Tetr	y Hicks			
Date:	6/26/2	012				

ADCIRC RE	VIEW					
Storm:		Storm144 1977033000				
Reviewer:		Betsy Hicks				
Organization:		RAMPP				
Date Checked	:	6/10/2012				
Was the max y	water surface elevation file	checked for anomalies?	Yes			
Was the max of	current velocity file checke	d for anomalies?	Yes			
Was the max w	wind velocity file checked	for anomalies?	Yes			
Was the minir	num pressure file checked	for anomalies?	Yes			
		red to the measured gage data?	Yes			
		Issues				
File	Comment	Resolution	Verification			
maxele.63	high values in the Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH			
maxwvel.63	large differences in the wind velocity between adjacent nodes, as high as 4.1 m/s difference observed in the southwestern part of Lake Ontario (Martindale Pond)	This storm is prior to 1979 when CFSR wind data is not available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area is representative of measured winds speeds. The spatially varying time-series data was checked to verify this.	BSH			
maxwvel.63	band of anomalous wind data in the east	This band in the wind data is caused by the transition in ice coverage from 80% to 10%. The Modified Garratt Formulation (MGF) was used to define wind speeds over ice fields. Using this parabolic function, the largest wind drag occurs at 50% ice coverage. Given the coarse resolution of the ice data relative to the model grid, the winds were interpolated between neighboring ice fields of different percent coverage; in some cases, this results in regions of ice with about 50% coverage, which generates the strongest winds drag coefficient under the MGF. Refer to Section 6.1.3 in Baird Lake Ontario report, which describes ice implementation methodology.	BSH			
measure vs. model	underpredicts surge at Rochester and Olcott	Discrepancy between modeled and measured data is to be expected when comparing against numerous storm events. When analyzed statistically as a population of storms, the Q-Q plots showed good agreement between measured and modeled surface elevations. See Figure 6.6 of Baird Lake Ontario report.	BSH			
Additional Co	mments on Detailed Check					
	Com	nment Resolution	Verification			
Reviewer Sign	nature:	Betry Hicks				
Date:	6/26/	2012				

ADCIRC RE	VIEW				
Storm:		Storm145_19	77110900		
Reviewer: Betsy Hicks					
Organization:		RAMPP			
Date Checked	:	6/10/2012			
Was the max y	water surface elevat	ion file checked	d for anomalies?		Yes
Was the max of	current velocity file	checked for an	omalies?		Yes
Was the max y	wind velocity file ch	ecked for anor	nalies?		Yes
Was the minir	num pressure file ch	necked for anor	nalies?		Yes
			e measured gage data?		Yes
	· · · · · · · · · · · · · · · · · · ·	r	Issues		
File	Comm	ent		olution	Verification
maxele.63	high values in the River	Niagara	This is due to model bour resolved bathymetry. Thi surge levels in the lake. N levels in the Niagara Rive support flood mapping in the scope of work and the resolve the river in detail.	s effect does not impact Note that predicted surge ar are not to be used to the river as it falls outside	BSH
maxwvel.63	large differences in the wind velocity between adjacent nodes, as high as 1.2 m/s difference observed in the southwestern part of Lake Ontario		This storm is prior to 1979 when CFSR wind data is not available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area is representative of measured winds speeds. The spatially varying time-series data was checked to verify this.		BSH
measure vs. model	overpredicts surge Vincent		 Verify this. Discrepancy between modeled and measured data is to be expected when comparing against numerous storm events. When analyzed statistically as a population of storms, the Q-Q plots at Cape Vincent showed good agreement between measured and modeled surface elevations. See Figure 6.6 of Baird Lake Ontario report. 		BSH
Additional Co	mments on Detailed			Resolution	Verification
	Ĺ	Comment		Resolution	vernication
Reviewer Sigr	nature: 12	sitry 1	Hicks		1
Date:	6/26/2	2012			

ADCIRC RE	VIEW				
Storm:		Storm146_1	977120300		
Reviewer:		Betsy Hicks			
Organization:		RAMPP			
Date Checked	:	6/10/2012			
Was the max w	water surface elevat	ion file check	ed for anomalies?		Yes
Was the max of	current velocity file	checked for a	nomalies?		Yes
Was the max w	wind velocity file cl	necked for and	omalies?		Yes
Was the minin	num pressure file cl	necked for and	omalies?		Yes
Was the mode	l time series output	compared to	the measured gage data?		Yes
		-	Issues		
File	Comm	ent	Resolu	ition	Verification
maxele.63	high values in the River	Niagara	This is due to model bound resolved bathymetry. This surge levels in the lake. No levels in the Niagara River support flood mapping in t outside the scope of work a setup to resolve the river in	effect does not impact ote that predicted surge are not to be used to he river as it falls and the model is not	BSH
maxwvel.63	large differences in the wind velocity between adjacent nodes, as high as 1.6 m/s difference observed in the southwestern part of Lake Ontario		This storm is prior to 1979 is not available and natural have been generated using around the Lake (refer to S Baird Lake Ontario Report is representative of measur spatially varying time-serie verify this.	BSH	
measure vs. model	overpredicts surge at Cape Vincent		Discrepancy between modeled and measured data is to be expected when comparing against numerous storm events. When analyzed statistically as a population of storms, the Q-Q plots at Cape Vincent showed good agreement between measured and modeled surface elevations. See Figure 6.6 of Baird Lake Ontario report.		BSH
Additional Co	mments on Detailed			-	
	(Comment		Resolution	Verification
Reviewer Sigr	nature: 12	Sitry	Hicks	1	1
Date:	6/26/2	2012			

ADCIRC RE	VIEW					
Storm:		Storm147_1977120600				
Reviewer:		Betsy Hicks				
Organization:		RAMPP				
Date Checked		6/10/2012				
Was the max w	water surface elevation	on file checked for anomalies?		Yes		
Was the max of	current velocity file c	hecked for anomalies?		Yes		
Was the max w	wind velocity file che	ecked for anomalies?		Yes		
Was the minin	num pressure file che	ecked for anomalies?		Yes		
Was the mode	l time series output c	compared to the measured gage data?		Yes		
	_	Issues				
File	Comment	Resolution		Verification		
maxele.63 maxwvel.63	high values in the Niagara River	bathymetry. This effect does not impact so lake. Note that predicted surge levels in t not to be used to support flood mapping in outside the scope of work and the model is resolve the river in detail. This storm is prior to 1979 when CFSR w	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail. This storm is prior to 1979 when CFSR wind data is not			
	the wind velocity between adjacent nodes, as high as 1.0 m/s difference observed in the southwestern part of Lake Ontario	generated using available wind data arour Section 2.2.2.1 of the Baird Lake Ontario Therefore, this area is representative of m	available and natural neighbor wind fields have been generated using available wind data around the Lake (refer to Section 2.2.2.1 of the Baird Lake Ontario Report). Therefore, this area is representative of measured winds speeds. The spatially varying time-series data was checked to verify this.			
Additional Co	mments on Detailed	Check				
	Co	omment	Resolution	Verification		
Reviewer Sigr	nature: 18	try Hicks				
Date:	6/26/20	012				

ADCIRC RE	VIEW				
Storm:		Storm148 197	78011100		
Reviewer:		Betsy Hicks			
Organization:		RAMPP			
Date Checked:		6/10/2012			
Was the max w	vater surface elevat	ion file checked	l for anomalies?		Yes
Was the max c	current velocity file	checked for and	omalies?		Yes
Was the max w	vind velocity file cl	necked for anon	nalies?		Yes
Was the minin	num pressure file cl	necked for anon	nalies?		Yes
Was the model	l time series output	compared to the	e measured gage data?		Yes
	*		Issues		
File	Comm	ent	Resolu	ition	Verification
maxele.63	high values in the Niagara River		This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.		BSH
maxwvel.63	large differences in the wind velocity between adjacent nodes, as high as 3.5 m/s difference observed in the northwestern part of Lake Ontario bands of anomalous wind data throughout lake		The Modified Garratt Formulation (MGF) was used to define wind speeds over ice fields. Using this parabolic function, the largest wind drag occurs at 50% ice coverage. Given the coarse resolution of the ice data relative to the model grid, the winds were interpolated between neighboring ice fields of different percent coverage; in some cases, this results in regions of ice with 50% coverage, which generates the strongest winds drag coefficient under the MGF. Refer to Section 6.1.3 in Baird Lake Ontario report, which describes ice implementation methodology.		BSH
maxwvel.63					BSH
Additional Con	mments on Detailed	1 Check			
	(Comment		Resolution	Verification
Reviewer Sign	ature:	Sitry D	Ficks		
Date:	6/26/2	2012			

ADCIRC RE	VIEW				
Storm:		Storm149_19780	011700		
Reviewer:	Betsy Hicks				
Organization:		RAMPP			
Date Checked:	:	6/10/2012			
Was the max w	water surface elevat	ion file checked for	or anomalies?		Yes
Was the max c	current velocity file	checked for anom	alies?		Yes
Was the max w	wind velocity file ch	necked for anomal	ies?		Yes
Was the minin	num pressure file ch	necked for anomal	ies?		Yes
Was the model	l time series output	compared to the r	neasured gage data?		Yes
			Issues		
File	Comr	nent	Reso	olution	Verification
maxele.63 maxwvel.63 maxwvel.63	Comment high values in the Niagara River large differences in the wind velocity between adjacent nodes, as high as 1.0 m/s difference observed in the northwestern part of Lake Ontario bands of anomalous wind data throughout lake		ResolutionThis is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.The Modified Garratt Formulation (MGF) was 		BSH BSH BSH
Additional Con	mments on Detailed	l Check	methodology.		
	C	Comment		Resolution	Verification
Reviewer Sign	nature: 12	sitry B	ficks		
Date:	6/26/2	2012			

ADCIRC RE	VIEW			
Storm:	S	torm150_1978012300		
Reviewer:		etsy Hicks		
Organization:		AMPP		
Date Checked		/10/2012		
		file checked for anomalies?	Yes	
Was the max of	current velocity file ch	ecked for anomalies?	Yes	
Was the max	wind velocity file chec	ked for anomalies?	Yes	
Was the minir	num pressure file chec	ked for anomalies?	Yes	
Was the mode	el time series output co	mpared to the measured gage data?	Yes	
		Issues	•	
File	Comment	Resolution	Verification	
maxele.63	high values in the Niagara River	This is due to model boundary effects and poorly resolved bathymetry. This effect does not impact surge levels in the lake. Note that predicted surge levels in the Niagara River are not to be used to support flood mapping in the river as it falls outside the scope of work and the model is not setup to resolve the river in detail.	BSH	
maxwvel.63				
maxwvel.63	small area of zero wind (indicating ice) not attached to the shoreline in the northeast:	This is caused by the pre-processor that is used to adjust the wind field to account for ice. At times, when there is limited ice data there are small pockets of non-zero winds between areas of zero wind. Considering surge is generated by the winds over the entire lake, areas with zero winds along the shore have little effect on surge. In addition, for this particular storm, these small pockets in the ice data are on the Canadian side of Lake Ontario where the surge results will not be used for mapping.	BSH	
Additional Co	mments on Detailed C	heck		
	Comment	Resolution	Verification	
Reviewer Sigr	nature: 1B	itry Hicks		
Date:	6/26/201	2		

SWAN REVIEW						
Storm:	Storm001_19	Storm001_1979040300				
Reviewer:	Christina Lin	Christina Lindemer				
Organization:	RAMPP					
Date Checked:	4/12/2012					
Was the max significant w	vave height map chee	cked	for anomalies?	Ye	es	
Was the wave period at m	ax significant wave	heigh	t checked for anomalies?	Ye	es	
Was the wave direction at	max significant way	ve hei	ght checked for anomalies?	Ye	es	
			Issues			
File	Comment		Resolution		Verification	
Swan_TP_atMaxHS.63	Areas of unusual hi period (See slides 3 4)	high Localized spikes in wave height and period are a		CAL		
Additional Comments on		-				
Comme	nt		Resolution		Verification	
Reviewer Signature:						
Date:	6/18/2012					

SWAN REVIEW							
Storm:	Storm002_1980010900						
Reviewer:		Christina Lin	demer				
Organization:		RAMPP					
Date Checked:		4/13/2012					
Was the max significa	nt wave height	ht map checked	l for anomali	es?		Y	es
Was the wave period a	at max signifi	cant wave heig	ht checked f	or anomalies?		Y	es
Was the wave directio	n at max sign	ificant wave he	eight checked	d for anomalies?		Y	es
			Issues				
File	Cor	nment	R	esolution	Verificat	tion	
swan_HS_max.63	Wave data v concentration slide 3)	where ice on > 0.9 (see	1 /		Storm was rerun, and SWAN output is appropriate for ice coverage. The output looks fi		for ice
Additional Comments	on Detailed	Check_					
	Commen	t		Reso	olution		Verificati on
Reviewer Signature:	(06	$\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{$				
Date:	6/2	22/2012					

SWAN REVIEW									
Storm:	Storm003_19	Storm003_1980060600							
Reviewer:	Christina Lin	Christina Lindemer							
Organization:	RAMPP								
Date Checked:	4/13/2012								
Was the max significant w	wave height map che	cked	for anomalies?	Ye	es				
Was the wave period at m	hax significant wave	heigh	t checked for anomalies?	Ye	es				
Was the wave direction at	t max significant way	ve hei	ight checked for anomalies?	Ye	es				
			Issues	•					
File	Comment		Resolution		Verification				
Swan_TP_atMaxHS.63	Area of unusual hig period (Node: 2319 See slide 4)		Localized spikes in wave height at known issue in the SWAN model transition in elevation is not smoo due to the coarseness of the mesh http://www.caseydietrich.com/201 refraction-on-coarse-meshes-part- observed spike(s) are limited to or elements and are located either on side of the lake or in the St. Lawre where output will not be used for the mapping.	CAL					
Additional Comments on		-							
Comme	nt		Resolution		Verification				
Reviewer Signature:	C	X							
Date:	6/18/2012								

SWAN REVIEW							
Storm:		Storm004_1982010800					
Reviewer:		Christina Lindemer					
Organization:		RAMPP					
Date Checked:		4/13/2012					
Was the max signification	nt wave heig	ght map checked for anomali	es?			Yes	
Was the wave period	at max signif	ficant wave height checked for	or anomal	ies?		Yes	
Was the wave direction	n at max sig	nificant wave height checked	l for anon	nalies?		Yes	
		Issues					
File		Comment		Resolution		Verification	
swan_HS_max.63 Additional Comments	(See slide)	3)	where ice has concentration > 0.9			CAL	
Additional Comments	Commer			Resolution		Verification	
	Commen			itesolution		· critication	
Reviewer Signature:			7				
Date:	6/	/18/2012					

SWAN REVIEW			
Storm:	Storm005_1982012900		
Reviewer:	Christina Lindemer		
Organization:	RAMPP		
Date Checked:	4/13/2012; re-reviewed	6/6/2012	
Was the max significant w	vave height map checked for anomalies	?	Yes
Was the wave period at ma	ax significant wave height checked for	anomalies?	Yes
Was the wave direction at	max significant wave height checked	for anomalies?	Yes
	Issues		
File	Comment	Resolu	tion Verification
swan_HS_max.63	Linear feature in wave field connecti areas of high ice concentration (Slide		re-run The issue has been corrected.
Swan_TP_atMaxHS.63	Linear feature in period field associa the linear feature in wave field. (see		re-run The issue has been corrected.
Swan_DIR_atMaxHS.63	Linear feature in direction field that corresponds with linear feature in wa and period field. Secondary linear fea that doesn't correspond to wave field slide 8)	ature	re-run The issue has been corrected for the primary linear feature, the secondary is still there, but perhaps due to timestep issues in wave extraction.
Additional Comments on I	· · · · · · · · · · · · · · · · · · ·		XX 101 .1
	Comment	Resolution	Verification
Reviewer Signature:	DE	2	I

SWAN REVIEW						
Storm:	Storm006_1984022500					
Reviewer:	Christina Lindemer					
Organization:	RAMPP					
Date Checked:	4/13/2012					
Was the max significant wave heigh	nt map checked for anomali	es?		Yes		
Was the wave period at max signific	cant wave height checked f	or anomal	ies?	Yes		
Was the wave direction at max sign	ificant wave height checked	d for anon	nalies?	Yes		
	Issues					
File	Comment		Resolution	N Verification		
Additional Comments on Detailed		1				
Comment		Resolution Verificati				
Ice field does not match ice data. Ic		The ice input data matches the CAL				
part of lake has concentration of 50		original source data. See section				
while it was considered 90% (see s	lide 6)	2.2.3 of EEMAL also Optomic Draft 2012 02				
		FEMALakeOntario_Draft_2012-02-				
		14 Chpt1-2-5-6-8. Therefore no change required.				
		enangei	equiter.			
Reviewer Signature:				I		
C	1061	_				
	A XX					
		>				
Date: 6/1	6/18/2012					

SWAN REVIEW						
Storm:		Storm007 1984	042700			
Reviewer: Christina Linden						
Organization:		RAMPP				
Date Checked:		4/13/2012; re-ch	necked 6	6/2012		
Was the max significant w	vave height m	ap checked for a	nomalie	s?		Yes
Was the wave period at m	ax significan	t wave height che	cked for	anomalies?		Yes
Was the wave direction at	max signific	ant wave height c	checked	for anomalies?		Yes
		-	ssues			
File	Со	mment		Resolution	Verification	
swan_HS_max.63	in locations should exist	Wave field has anomalies, in locations where no data should exist due to ice concentration > 0.7 . (See		was re-run	There are no anomalies anymore, however the d is significantly different from previous run.	
swan_TP_atMaxHS.63	ice concentr	Anomalies associated with ice concentration, where no data should exist. (See		was re-run	There are no anomalies anymore, however the c is significantly different from previous run.	
swan_DIR_atMaxHS.63	portion of the eastern (ass concentration 6).	ociated with ice on). (See slide	Storm was re-run		There are no anymore, how is significantl from previous	vever the data y different
Additional Comments on	Detailed Che	<u>ck</u>				
	Comment			Resolutio	on	Verification
Based on ice atlas lake was ice-free at the time of storm (SI 7)				Ice data removed, storm re-run no sigr wave d anymo		
Reviewer Signature:		S	P	2		<u> </u>
Date:	6/6	/2012				

SWAN REVIEW						
Storm:		Storm008_1985011800				
Reviewer:		Christina Lindemer				
Organization:		RAMPP				
Date Checked:		4/13/2012				
Was the max significa	nt wave heigh	nt map checked for anomalies	s?			Yes
Was the wave period a	at max signific	cant wave height checked for	r anomali	es?		Yes
Was the wave directio	n at max sign	ificant wave height checked	for anom	alies?		Yes
		Issues				
File		Comment		Resolution		Verification
Additional Comments	on Detailed (<u>Check</u>				
	Comment			Resolution		Verification
Reviewer Signature:		(DDD)				
Date:	6/1	8/2012				

SWAN REVIEW						
Storm:	Storm009_19851125500					
Reviewer:		Christina Lindemer				
Organization:		RAMPP				
Date Checked:		4/13/2012				
Was the max significant v	vave height n	nap checked for anomalies	s?			Yes
Was the wave period at m	ax significan	t wave height checked for	anomali	es?		Yes
Was the wave direction at	max signific	ant wave height checked	for anom	alies?		Yes
		Issues				
File		Comment		Resolution		Verification
swan_DIR_atMaxHS.63		n eastern part of lake (see	Storm starts with a strong NW wind that causes the Max Hs in the Eastern part of lake. The winds then switch to a predominately Eastern direction which drives the Max Hs in the rest of the lake.		CAL	
Additional Comments on		eck		D 1.		X <i>I</i> . C
	Comment			Resolution		Verification
			ļ			
Reviewer Signature:		(D) P	2			
Date:	6/1	.8/2012				

SWAN REVIEW							
Storm:		Storm010_1985112900					
Reviewer:		Christina Lindemer					
Organization:		RAMPP					
Date Checked:		4/13/2012					
Was the max signification	nt wave heigh	t map checked for anomali	es?			Yes	
Was the wave period a	t max signific	cant wave height checked for	or anomal	ies?		Yes	
Was the wave direction	n at max sign	ificant wave height checked	for anon	nalies?		Yes	
		Issues					
File		Comment		Resolution		Verification	
Additional Comments	on Detailed O	<u>Check</u>					
	Comment		Resolution			Verification	
Reviewer Signature:							
Date:	6/1	8/2012					

SWAN REVIEW						
Storm:		Storm011_1985112900				
Reviewer:		Christina Lindemer				
Organization:		RAMPP				
Date Checked:		4/13/2012				
Was the max significa	nt wave heigh	nt map checked for anomalie	es?			Yes
Was the wave period a	at max signific	cant wave height checked fo	or anomali	ies?		Yes
Was the wave directio	n at max sign	ificant wave height checked	for anom	alies?		Yes
		Issues		·		
File		Comment		Resolution		Verification
Additional Comments	on Detailed (<u>Check</u>				
	Comment			Resolution		Verification
Reviewer Signature:		OS DE				
Date:	6/1	8/2012				

SWAN REVIEW						
Storm:	Storm012_1985112900					
Reviewer:		Christina Lindemer				
Organization:		RAMPP				
Date Checked:		4/13/2012				
•	-	ht map checked for anomalies				Yes
Was the wave period a	ıt max signifi	cant wave height checked for a	anomali	es?		Yes
Was the wave direction	n at max sign	ificant wave height checked for	or anom	alies?		Yes
		Issues				
File		Comment		Resolution		Verification
Additional Comments	on Detailed	Check				
	Comment	t	Resolution			Verification
Reviewer Signature:						
Date:	6/1	18/2012				

SWAN REVIEW							
Storm:		Storm013_199111300					
Reviewer:		Christina Lindemer					
Organization:		RAMPP					
Date Checked:		4/13/2012					
Was the max signification	nt wave heigh	nt map checked for anomalies?				Yes	
Was the wave period a	at max signifi	cant wave height checked for a	nomali	ies?		Yes	
Was the wave direction	n at max sign	ificant wave height checked fo	r anom	alies?		Yes	
		Issues					
File		Comment		Resolution		Verification	
Additional Comments	on Detailed (<u>Check</u>					
	Comment		Resolution			Verification	
Reviewer Signature:							
Date:	6/1	8/2012					

SWAN REVIEW					
Storm:	Storm014_19	9112	1100		
Reviewer:	Christina Lin	demer	r		
Organization:	RAMPP				
Date Checked:	4/13/2012				
Was the max significant	wave height map che	cked	for anomalies?	Ye	es
Was the wave period at 1	nax significant wave	heigh	t checked for anomalies?	Ye	es
Was the wave direction a	at max significant wa	ve hei	ght checked for anomalies?	Ye	es
			Issues		
File	Comment		Resolution		Verification
swan_TP_atMaxHS.63 Additional Comments or	Area of anomaly in wave period (see sli 4)	de	Localized spikes in wave height a known issue in the SWAN model transition in elevation is not smoo due to the coarseness of the meshs http://www.caseydietrich.com/201 refraction-on-coarse-meshes-part- observed spike(s) are limited to or elements and are located either on side of the lake or in the St. Lawre where output will not be used for i mapping.	CAL	
Comm			Resolution		Verification
Reviewer Signature:		Ref. 1			
Date:	6/18/2012				

SWAN REVIEW						
Storm:	Storm015_19	Storm015_1992042900				
Reviewer:	Christina Line	demer				
Organization:	RAMPP					
Date Checked:	4/13/2012					
Was the max significant	• •			Ye	~	
Was the wave period at 1		-		Ye	es	
Was the wave direction a	at max significant wa	ve heigh	nt checked for anomalies?	Ye	es	
			Issues			
File	Comment		Resolution		Verification	
swan_TP_atMaxHS.63	Area of anomaly in wave period (Node: 23196; see slide 4)				CAL	
Additional Comments on						
Comme	ent		Resolution		Verification	
Reviewer Signature:						
Date:	6/18/2012					

SWAN REVIEW						
Storm:	Storm016_19	Storm016_1992080800				
Reviewer:	Christina Lir	Christina Lindemer				
Organization:	RAMPP					
Date Checked:	4/16/2012					
Was the max significant w	ave height map che	cked f	for anomalies?	Ye	es	
Was the wave period at m	ax significant wave	height	t checked for anomalies?	Ye	es	
			ght checked for anomalies?	Ye	es	
			Issues			
File	Comment		Resolution		Verification	
swan_TP_atMaxHS.63	Area of anomaly ir wave period (Node 23491, 23388, 232 23196; see slide 4)	e: 90,)	Localized spikes in wave height a known issue in the SWAN model transition in elevation is not smoo due to the coarseness of the mesh http://www.caseydietrich.com/201 refraction-on-coarse-meshes-part- observed spike(s) are limited to on elements and are located either on side of the lake or in the St. Lawre where output will not be used for i mapping.	where a sharp thly resolved See: <u>1/05/27/wave-</u> <u>2/</u> . The he or two the Canadian ence River,	CAL	
swan_DIR_atMaxHS.63	Wind direction file may require review (see slide 5)	I direction fileReviewed: Max Hs in eastern region of lakerequire reviewrange from 1 - 1.2 metres. The end of the			CAL	
Additional Comments on	Detailed Check					
Commer		1	Resolution		Verification	
		1				
Reviewer Signature:		Æ				
Date:	6/18/2012		5/18/2012			

SWAN REVIEW						
Storm:		Storm017_1992111000				
Reviewer:		Christina Linc	lemei	r		
Organization:		RAMPP				
Date Checked:		4/16/2012				
Was the max significant	wave he	eight map cheo	cked	for anomalies?	Ye	es
Was the wave period at 1	nax sigi	nificant wave	heigh	t checked for anomalies?	Ye	es
Was the wave direction a	at max s	ignificant way	ve hei	ght checked for anomalies?	Ye	es
				Issues		
File		Comment		Resolution		Verification
swan_TP_atMaxHS.63 Additional Comments or	wave j 23196	of anomaly in period (Node: ; see slide 4) ed Check	Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the meshSee: <u>http://www.caseydietrich.com/2011/05/27/wave- refraction-on-coarse-meshes-part-2/</u> . The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.			CAL
Comme				Resolution		Verification
Reviewer Signature: Date:	6/	18/2012	X			

SWAN REVIEW						
Storm:	Storm018_19	Storm018_1992120800				
Reviewer:	Christina Line	lemer				
Organization:	RAMPP					
Date Checked:	4/16/2012					
Was the max significant	• •		Yes			
-		height checked for anomalies?	Yes			
Was the wave direction a	at max significant wa	ve height checked for anomalies?	Yes			
		Issues				
File	Comment	Resolution	Verification			
swan_TP_atMaxHS.63	Area of anomaly in wave period (Node: 23196; see slide 4)	Localized spikes in wave height and known issue in the SWAN model w transition in elevation is not smooth due to the coarseness of the meshSe <u>http://www.caseydietrich.com/2011</u> <u>refraction-on-coarse-meshes-part-2</u> observed spike(s) are limited to one elements and are located either on t side of the lake or in the St. Lawren where output will not be used for fl mapping.	where a sharp hly resolved ee: <u>1/05/27/wave-</u> <u>/</u> . The e or two the Canadian nce River,			
Additional Comments or	n Detailed Check		I			
Comme	ent	Resolution	Verification			
Reviewer Signature:						
Date:	6/18/2012					

SWAN REVIEW							
Storm:	Storm019_1993030100						
Reviewer:		Christina Lindemer					
Organization:		RAMPP					
Date Checked:		4/16/2012					
Was the max significa	nt wave heigh	nt map checked for anomalies?			Yes		
Was the wave period a	at max signifi	cant wave height checked for anom	alies?		Yes		
Was the wave directio	n at max sign	ificant wave height checked for and	omalies?		Yes		
		Issues					
File		Comment	Resolution	1	Verification		
Additional Comments	on Detailed	<u>Check</u>					
	Comment		Resolution		Verification		
Reviewer Signature:							
Date:	6/1	8/2012					

SWAN REVIEW						
Storm:						
Reviewer:		Christina Lindemer				
Organization:		RAMPP				
Date Checked:		4/16/2012				
-		ht map checked for anomali				Yes
Was the wave period a	at max signifi	cant wave height checked for	or anomal	ies?		Yes
Was the wave directio	n at max sigr	ificant wave height checked	l for anon	nalies?		Yes
		Issues				
File		Comment		Resolution	l	Verification
swan_HS_max.63	where ice c	ata on the western portion of oncentration is < 0.7 (See sl arries over in wave period ar	There was a malfun the post processing storm will be post processed again an for QC.	script,	Wave data now appropriate for ice coverage.	
Additional Comments	on Detailed	Check				
	Commen	t		Resolution		Verification
Reviewer Signature:		()}}	2			
Date:	6/2	22/2012				

SWAN REVIEW						
Storm:	Storm021_19	Storm021 1993101500				
Reviewer:	Christina Line	demer				
Organization:	RAMPP					
Date Checked:	4/16/2012					
Was the max significant	wave height map che	cked f	for anomalies?	Ye	es	
Was the wave period at 1	max significant wave	heigh	t checked for anomalies?	Ye	es	
Was the wave direction a	at max significant way	ve hei	ght checked for anomalies?	Ye	es	
			Issues			
File	Comment		Resolution		Verification	
swan_TP_atMaxHS.63 Additional Comments or	Area of anomaly in wave period (Node: 23196, 23195, 2328 see slide 4)		Localized spikes in wave height a known issue in the SWAN model transition in elevation is not smoo due to the coarseness of the mesh http://www.caseydietrich.com/201 refraction-on-coarse-meshes-part- observed spike(s) are limited to or elements and are located either on side of the lake or in the St. Lawre where output will not be used for mapping.	CAL		
Comm			Resolution		Verification	
Reviewer Signature:		C				
Date:	6/18/2012					

SWAN REVIEW					
Storm:	Storm022_1	996051800			
Reviewer:	Christina Li	Christina Lindemer			
Organization:	RAMPP				
Date Checked:	4/16/2012				
Was the max significant way	ve height map chec	ked for anomalies?	Yes		
Was the wave period at max	significant wave h	eight checked for anomalies?	Yes		
Was the wave direction at m	ax significant wave	e height checked for anomalies?	Yes		
		Issues			
File	Comment	Resolution	Verification		
Measured_vs_SWAN.bmp	There is a large difference betwee modeled and measured data, wi low correlation fo buoy C45135	against numerous storm events. The discrepancies are most likely a limita modeled wind fields. Recognizing th the goals of the comparative analysis a balance is observed between the mo modeled results; that is the model un some storms and over-predicts others analyzed statistically as a population the Q-Q plots showed good agreement measured and modeled wave heights	comparing se tition of the his, one of is to ensure easured and der-predicts s. When of storms, nt between . See		
swan_TP_atMaxHS.63	Area of anomaly wave period (Nod 23196, 23288; see slide 4)	period (Node:known issue in the SWAN model where a sharp6, 23288; seetransition in elevation is not smoothly resolved			
Additional Comments on De	etailed Check				
Comment		Resolution	Verification		
Reviewer Signature:		(DD)			
Date:	6/18/2012				

SWAN REVIEW						
Storm:		Storm023_1997021900				
Reviewer:		Christina Lindemer				
Organization:		RAMPP				
Date Checked:		4/16/2012; re-checked 6	6/2012			
Was the max significant	wave height	map checked for anomali	es?			Yes
Was the wave period at a	max significa	nt wave height checked f	or anomal	lies?		Yes
Was the wave direction a	at max signif	icant wave height checked	d for anor	nalies?		Yes
		Issues				
File		Comment		Resolution		Verification
swan_HS_max.63	concentratio	we data where the ice on > 0.7 . This issue is also in the wave period and directly lide 3).		The storm was re-i	run	There is no longer data where ice concentrations are > 0.7 .
swan_TP_atMaxHS.63	Area of and 23196; see	omaly in wave period (No slide 5)	de:	Ice data covers this now	s node	This issue no longer exists.
Additional Comments or	n Detailed Ch	neck				
	Comment			Resolution		Verification
Reviewer Signature:						
Date:	6/6	5/2012				

SWAN REVIEW						
Storm:		Storm024_199	9901	1100		
Reviewer:		Christina Lind				
Organization:		RAMPP				
Date Checked:		4/16/2012				
Was the max significant	wave h	neight map cheo	cked	for anomalies?	Ye	es
Was the wave period at r	nax sig	gnificant wave l	heigh	t checked for anomalies?	Ye	es
Was the wave direction a	at max	significant way	ve hei	ght checked for anomalies?	Ye	es
				Issues		
File		Comment		Resolution		Verification
swan_TP_atMaxHS.63	wave 39081 39541 40007 40491	a of anomaly in e period (Node:Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the meshSee: http://www.caseydietrich.com/2011/05/27/wave- refraction-on-coarse-meshes-part-2/. The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.		CAL		
	D . "	1 1 01 1				
Additional Comments on		led Check				XX : C
Comme		2000/	<u> </u>	Resolution		Verification
Wave height at C45135 shows 200% error			are of num like Rec anal the und Who the of mea of B	screpancies between modeled and r expected, particularly when compar- nerous storm events. These discrepa- ly a limitation of the modeled wind ognizing this, one of the goals of th ysis is to ensure a balance is observ- measured and modeled results; that er-predicts some storms and over-pr en analyzed statistically as a popula Q-Q plots showed good agreement sured and modeled wave heights. S caird Lake Ontario report.	ing against ancies are most fields. e comparative ved between is the model redicts others. tion of storms, between See Figure 6.6	CAL
Ice file does not match the actual ice data (Slide 7).				ice input data matches the original section 2.2.3 of FEMALakeOntario		CAL
	02-14 Chpt1-2-5-6-8. Therefore no change required.					
Reviewer Signature:		C	Z	R		
Date:		/18/2012				

SWAN REVIEW								
Storm:	Storm025	Storm025_1999030300						
Reviewer:	Christina I	Lindemer						
Organization:	RAMPP							
Date Checked:	4/16/2012							
Was the max significant	wave height map checke	d for anomalie	es?		Yes			
Was the wave period at a	nax significant wave hei	ght checked fo	or anomalies	s?	Yes			
Was the wave direction a	at max significant wave h	neight checked	for anomal	lies?	Yes			
		Issues						
File	Comment	Resolu	ition	Verification				
swan_HS_max.63	There is wave data where ice concentrations are greater than 0.7 in the northern part of the Lake. (see slides: 3)	Ice Data was complete, sto be re-run wit ice represent re-sent for Q	orm will h proper ation and	Wave data is appropriate for ice coverage now.				
swan_TP_atMaxHS.63	Area of anomaly in wave period in the northern part of the lake (see slide 5)	the run is QC f the		Wave data is app coverage now.	ropriate for ice			
Measured_vs_Swan	The modeled results for Buoy C45135 is not consistent with measured results and have a poor correlation.							
Additional Comments or	n Detailed Check							
	Comment			Resolution	Verification			
There is an area of high not interfere with US ma		ide that will						
			1					
Reviewer Signature:		R	1		I			
Date:	6/22/2012							

SWAN REVIEW					
Storm:	Storm026_19	9991101	100		
Reviewer:	Christina Line				
Organization:	RAMPP				
Date Checked:	4/16/2012				
Was the max significant	wave height map che	ecked fo	or anomalies?	Ye	es
Was the wave period at a	max significant wave	height	checked for anomalies?	Ye	es
Was the wave direction a	at max significant way	ve heig	ht checked for anomalies?	Ye	s
			Issues		
File	Comment		Resolution		Verification
swan_TP_atMaxHS.63 swan_TP_atMaxHS.63	Area of anomaly in wave period (Node: 23196, see slide 4) Area of anomaly in wave period in the		Localized spikes in wave height an known issue in the SWAN model transition in elevation is not smoot due to the coarseness of the mesh http://www.caseydietrich.com/201 refraction-on-coarse-meshes-part- observed spike(s) are limited to or elements and are located either on side of the lake or in the St. Lawre where output will not be used for the mapping. Localized spikes in wave height an known issue in the SWAN model	where a sharp thly resolved See: <u>1/05/27/wave-</u> <u>2/</u> . The he or two the Canadian ence River, floodplain	CAL
	(see slide 5)	lake	known issue in the SwAN model transition in elevation is not smoot due to the coarseness of the meshS http://www.caseydietrich.com/201 refraction-on-coarse-meshes-part- observed spike(s) are limited to or elements and are located either on side of the lake or in the St. Lawre where output will not be used for t mapping.	thly resolved See: <u>1/05/27/wave-</u> <u>2/</u> . The ne or two the Canadian ence River,	
Additional Comments or	n Detailed Check				
Comm			Resolution		Verification
Reviewer Signature:		26			
Date:	6/18/2012				

SWAN REVIEW						
Storm:		Storm027_20	0012	1500		
Reviewer:		Christina Lindemer				
Organization:		RAMPP				
Date Checked:		4/16/2012				
Was the max significant	wave h	eight map cheo	cked	for anomalies?	Ye	es
Was the wave period at a	nax sig	nificant wave l	heigh	t checked for anomalies?	Ye	es
Was the wave direction a	at max s	significant way	ve hei	ight checked for anomalies?	Ye	es
				Issues		
File		Comment		Resolution		Verification
swan_HS_max.63	There is wave data where ice concentrations are greater than 0.7 (see slide 3)			The area of concern is limited to a localized region near the Canadian shoreline. This area will not influence the wave model results that will be used to support floodplain mapping along the US shoreline.		CAL
swan_TP_atMaxHS.63	wave	Area of anomaly in wave period (Node: 23196, see slide 5)		Localized spikes in wave height and known issue in the SWAN model transition in elevation is not smoot due to the coarseness of the meshS http://www.caseydietrich.com/201 refraction-on-coarse-meshes-part- observed spike(s) are limited to or elements and are located either on side of the lake or in the St. Lawree where output will not be used for the mapping.	CAL	
swan_TP_atMaxHS.63	Area of anomaly in wave period in the northern part of the lake (see slide 6)		ake	Localized spikes in wave height at known issue in the SWAN model transition in elevation is not smood due to the coarseness of the mesh http://www.caseydietrich.com/201 refraction-on-coarse-meshes-part- observed spike(s) are limited to or elements and are located either on side of the lake or in the St. Lawre where output will not be used for the mapping.	where a sharp thly resolved See: <u>1/05/27/wave-</u> <u>2/</u> . The he or two the Canadian ence River,	CAL
Additional Comments or	n Detail	led Check				
Comm				Resolution		Verification
Reviewer Signature:		C				
Date:	6/18/2012					

SWAN REVIEW						
Storm:	Storm0	28_2001061700				
Reviewer:	Christin	Christina Lindemer				
Organization:	RAMP	P				
Date Checked:	4/16/20	12				
Was the max significant wave height	nap checke	ed for anomalies?	les			
Was the wave period at max significa	nt wave hei	ght checked for anomalies?	les			
Was the wave direction at max signifi	cant wave	-	les			
		Issues	-			
File	Commen	t Resolution	Verification			
Measured_vs_SWAN_selected.bmp swan_TP_atMaxHS.63	There is a large difference between modeled and measured wave data for buoy C45135 (see slide 1) Area of anomaly i wave period (Node: 23196, 23289, see slide 4)	 data are expected, particularly when comparing against numerous storm events. These discrepancies are most likely a limitation of the modeled wind fields. Recognizing this, one of the goals of the comparative analysis is to ensure a balance is observed between the measured and modeled results; that is the model under-predicts some storms and over-predicts others. When analyzed statistically as a population of storms, the Q-Q plots showed good agreement between measured and modeled wave heights. See Figure 6.6 of Baird Lake Ontario report. Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the meshSee: http://www.caseydietrich.com/2011/05/27/wave-refraction-on-coarse-meshes-part-2/. The 	CAL			
Additional Comments on Detailed Ch	eck_		-			
Comment		Resolution	Verification			
Reviewer Signature:			1			
Date:	ate: 6/18/2012					

SWAN REVIEW				
Storm:	Storm02	29_2002012900		
Reviewer:	Christin	a Lindemer		
Organization:	RAMPE)		
Date Checked:	4/16/20	12		
Was the max significant wave height n	nap checke	d for anomalies?	Yes	
Was the wave period at max significan	t wave hei	ght checked for anomalies?	Yes	
Was the wave direction at max signific	ant wave h	height checked for anomalies?	Yes	
		Issues		
File	Comment	Resolution		Verification
	There is a large difference between modeled and measured wave data for buoy C45135 (see slide 1)	 is being looked at(Slide 1 is from storm 28). Will provide file if original was misplaced or deleted. 		CAL
	Area of anomaly in wave period (Node: 23196, see slide 5)	transition in elevation is not smooth due to the coarseness of the meshSec http://www.caseydietrich.com/2011/	here a sharp ly resolved e: <u>(05/27/wave-</u> . The or two ne Canadian ce River,	CAL
Additional Comments on Detailed Che	eck_			
Comment		Resolution		Verification
Reviewer Signature:				
Date:	6/22/201	2		

SWAN REVIEW					
Storm:	Storm030_20	Storm030 2002030700			
Reviewer:	Christina Lin	deme	r		
Organization:	RAMPP				
Date Checked:	4/16/2012				
Was the max significant	wave height map che	cked	for anomalies?	Ye	es
			t checked for anomalies?	Ye	es
Was the wave direction a	at max significant wa	ve hei	ight checked for anomalies?	Ye	es
			Issues		
File	Comment		Resolution		Verification
swan_HS_max.63	There is wave data where the ice concentration is greater than 0.9 (See slide 2	with proper ice representation and re-sent QC.			Wave data is appropriate for ice coverage.
swan_TP_atMaxHS.63	Area of anomaly in wave period (Node: 23196, see slide 5)		High spikes in wave height and period are a known issues in the SWAN models where a sharp transition in elevation is not smoothly resolved due to the coarseness of the mesh. See: http://www.caseydietrich.com/2011/05/27/wave-refraction-on-coarse-meshes-part-2/. The location of these spikes is either located on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.		CAL
Additional Comments or	1 Detailed Check				
Comm			Resolution		Verification
Reviewer Signature:			2		
Date:	6/25/2012				

SWAN REVIEW							
Storm:		Storm031_2003020200					
Reviewer:		Christina Lindemer					
Organization:		RAMPP					
Date Checked:		4/16/2012					
Was the max significa	nt wave heigh	nt map checked for anomalies?	2			Yes	
Was the wave period a	at max signifi	cant wave height checked for a	anomali	ies?		Yes	
Was the wave directio	n at max sign	ificant wave height checked for	or anom	alies?		Yes	
		Issues					
File		Comment		Resolution		Verification	
Additional Comments	on Detailed (Check					
	Comment			Resolution		Verification	
Reviewer Signature:							
Date:	6/1	8/2012					

SWAN REVIEW							
Storm:		Storm032_20	0311	1000			
Reviewer:		Christina Linc					
Organization:		RAMPP					
Date Checked:		4/16/2012					
Was the max significant						Ye	
Was the wave period at 1			-			Ye	es
Was the wave direction a	at max s	ignificant way	ve hei	ight checked for and	omalies?	Ye	es
				Issues			
File		Comment			Resolution		Verification
swan_TP_atMaxHS.63	wave p 23196	of anomaly in period (Node:Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved 			known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the meshSee: <u>http://www.caseydietrich.com/2011/05/27/wave- refraction-on-coarse-meshes-part-2/</u> . The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain		CAL
swan_TP_atMaxHS.63	wave p northe	rea of anomaly in ave period in the orthern portion of the ke. (see slide 5)		Localized spikes i known issue in the transition in eleva due to the coarsen <u>http://www.caseye</u> <u>refraction-on-coar</u> observed spike(s) elements and are l side of the lake or where output will mapping.	e SWAN model ation is not smoothess of the mesh dietrich.com/201 rse-meshes-part- are limited to or located either on the St. Lawre	where a sharp thly resolved See: <u>1/05/27/wave-</u> <u>2/</u> . The le or two the Canadian ence River,	CAL
Additional Comments or		ed Check					
Comme	ent			R	Resolution		Verification
Reviewer Signature:							
Date:	6/	6/12/2012					

SWAN REVIEW						
Storm:		Storm033_2004122000				
Reviewer:		Christina Lind	leme	r		
Organization:		RAMPP				
Date Checked:		4/16/2012				
Was the max significant	wave h	eight map cheo	cked	for anomalies?	Ye	es
Was the wave period at a	nax sig	nificant wave l	neigh	t checked for anomalies?	Ye	es
Was the wave direction a	at max s	significant wav	e hei	ight checked for anomalies?	Ye	es
				Issues	<u> </u>	
File		Comment		Resolution		Verification
swan_HS_max.63	where conce	ntrations are will not influence the wave model results that will be used to support floodplain mapping		e. This area results that	CAL	
swan_TP_atMaxHS.63	wave	of anomaly in period (Node: 5, see slide 5) Localized spike known issue in transition in ele due to the coars <u>http://www.cas</u> <u>refraction-on-c</u> observed spike elements and an side of the lake where output w		Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the meshSee: http://www.caseydietrich.com/2011/05/27/wave- refraction-on-coarse-meshes-part-2/. The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.		CAL
Additional Comments on		led Check		Resolution		Verification
Comm	ent			Resolution		verification
Reviewer Signature:			<u> </u>			
Date: 6/18/2012						

SWAN REVIEW						
Storm:	Storm034_20	Storm034_2006021400				
Reviewer:	Christina Line	demei	r			
Organization:	RAMPP					
Date Checked:	4/16/2012					
Was the max significant	wave height map che	cked t	for anomalies?	Ye	es	
Was the wave period at a	max significant wave	heigh	t checked for anomalies?	Ye	es	
Was the wave direction a	at max significant way	ve hei	ght checked for anomalies?	Ye	es	
			Issues			
File	Comment		Resolution		Verification	
swan_HS_max.63	There is wave data where ice concentrations are greater than 0.7 (see slide 3)	will not influence the wave model results that will be used to support floodplain mapping		region near the Canadian shoreline. This area will not influence the wave model results that		
swan_TP_atMaxHS.63	Area of anomaly in wave period (Node: 23196, see slide 5)		Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the mesh See: <u>http://www.caseydietrich.com/2011/05/27/wave- refraction-on-coarse-meshes-part-2/</u> . The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.		CAL	
Additional Comments or	n Detailed Check					
Comm			Resolution		Verification	
2.5						
		1				
		1				
Reviewer Signature:	(D)	R				
Date: 6/18/2012						

SWAN REVIEW							
Storm:	Storm035_2008012700						
Reviewer:		Christina Lindemer					
Organization:		RAMPP					
Date Checked:		4/17/2012					
Was the max significan	nt wave heigh	t map checked for anomalies?			Yes		
Was the wave period a	t max signific	cant wave height checked for anomal	ies?		Yes		
Was the wave direction	n at max sign	ificant wave height checked for anom	nalies?		Yes		
		Issues					
File		Comment	Resolution		Verification		
Additional Comments	on Detailed C	Check					
	Comment		Resolution		Verification		
Reviewer Signature:		(DD)					
Date:	6/1	8/2012					

SWAN REVIEW							
Storm:	orm: Storm036_2008020300						
Reviewer:		Christina Lindemer					
Organization:		RAMPP					
Date Checked:		4/17/2012; re-checked 6/	/6/2012				
Was the max significant	wave height	map checked for anomalie	s?		Yes		
Was the wave period at	max significa	nt wave height checked fo	r anomali	es?	Yes		
Was the wave direction	at max signifi	cant wave height checked	for anom	alies?	Yes		
		Issues					
File		Comment		Resolution	Verification		
swan_HS_max.63	are greater t	ve data where ice concentri than 0.7. This issue is also r the period and directional)		The storm was re-run	This issue has been resolved.		
swan_TP_atMaxHS.63 Area of anomaly in wave period (Nod 23196, see slide 6)				The storm was re-run	This issue has been resolved since it is covered by ice in the new storm run.		
Additional Comments or	n Detailed Ch	leck					
	Comment			Resolution	Verification		
Reviewer Signature:	(DE	\mathbb{Z}				
Date:	6/6	5/2012					

SWAN REVIEW			
Storm:	Storm037_20	09120800	
Reviewer:	Christina Line	lemer	
Organization:	RAMPP		
Date Checked:	4/17/2012		
Was the max significant		cked for anomalies?	Yes
Was the wave period at a	max significant wave	height checked for anomalies?	Yes
Was the wave direction a	at max significant way	ve height checked for anomalies?	Yes
		Issues	
File	Comment	Resolution	Verification
swan_TP_atMaxHS.63	Area of anomaly in wave period (Node: 23196, see slide 4)	Localized spikes in wave height and known issue in the SWAN model wittransition in elevation is not smooth due to the coarseness of the meshSec http://www.caseydietrich.com/2011/ refraction-on-coarse-meshes-part-2/ observed spike(s) are limited to one elements and are located either on the side of the lake or in the St. Lawrend where output will not be used for floo mapping.	here a sharp ly resolved e: <u>(05/27/wave-</u> . The or two le Canadian ce River,
swan_TP_atMaxHS.63	Area of anomaly in wave period (Node: 39082, see slide 5)	Localized spikes in wave height and known issue in the SWAN model wittransition in elevation is not smooth due to the coarseness of the meshSee http://www.caseydietrich.com/2011/ refraction-on-coarse-meshes-part-2/. observed spike(s) are limited to one elements and are located either on the side of the lake or in the St. Lawrence where output will not be used for floo mapping.	here a sharp ly resolved e: <u>(05/27/wave-</u> . The or two he Canadian ce River,
Additional Comments on			×7 · C· , ·
Comm	ent	Resolution	Verification
Reviewer Signature:			
Date:	6/18/2012		

SWAN REVIEW						
Storm:		Storm038_1979080400				
Reviewer:		Christina Lindemer				
Organization:		RAMPP				
Date Checked:		4/17/2012				
Was the max significant	wave h	height map che	cked	for anomalies?	Ye	es
Was the wave period at n	nax sig	gnificant wave	heigh	t checked for anomalies?	Ye	es
Was the wave direction a	at max	significant way	/e hei	ght checked for anomalies?	Ye	es
				Issues		
File		Comment		Resolution		Verification
swan_TP_atMaxHS.63	wave	of anomaly in period (Node: Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the meshSee: http://www.caseydietrich.com/2011/05/27/wave- refraction-on-coarse-meshes-part-2/. The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.			CAL	
Additional Comments or	n Detai	led Check				
Comme	ent			Resolution		Verification
Reviewer Signature:			S	2		I
Date:	6	/18/2012				

SWAN REVIEW							
Storm:	Storn	Storm039_1979120500					
Reviewer:	Chris	tina Linden	ner				
Organization:	RAM	IPP					
Date Checked:	4/17/	2012					
Was the max significant	wave height	map checke	ed for anomalies?	Y	es		
Was the wave period at a	nax significa	nt wave hei	ght checked for anomalies?	Y	es		
Was the wave direction a	at max signifi	icant wave l	height checked for anomalies?	Y	'es		
			Issues				
File	Com	nment	Resolutio	n	Verification		
swan_TP_atMaxHS.63	Area of ano wave period 23196 see s						
Additional Comments or	Detailed Ch	eck					
Comm			Resolution		Verification		
Reviewer Signature:		SE					
Date:	6/18/20)12					

SWAN REVIEW							
Storm:	Storm040_1	Storm040 1974032100					
Reviewer:	Christina Lir	Idemer					
Organization:	RAMPP						
Date Checked:	4/17/2012						
Was the max significant	wave height map che	ecked for anomalies?	Yes				
Was the wave period at 1	max significant wave	height checked for anomalies?	Yes				
Was the wave direction a	at max significant wa	we height checked for anomalies?	Yes				
		Issues					
File	Comment	Resolution	Verification				
swan_TP_atMaxHS.63	Area of anomaly in wave period (Node 23196 see slide 4)						
Additional Comments or	n Detailed Check						
Comme	· · · · ·	Resolution	Verification				
			+				
Reviewer Signature:							
Date:	6/18/2012						

SWAN REVIEW					
Storm:	Storm041	_1980102	2300		
Reviewer:	Christina	Lindeme	r		
Organization:	RAMPP				
Date Checked:	4/17/2012	2			
Was the max significant	wave height map	checked	for anomalies?	Ye	es
Was the wave period at n	nax significant wa	ave heigh	t checked for anomalies?	Ye	es
Was the wave direction a	at max significant	wave hei	ight checked for anomalies?	Ye	es
			Issues		
File	Commen	ıt	Resolution		Verification
swan_TP_atMaxHS.63	wave period (No	of anomaly in period (Node: Localized spikes in wave height and per known issue in the SWAN model where transition in elevation is not smoothly re due to the coarseness of the meshSee: http://www.caseydietrich.com/2011/05/ refraction-on-coarse-meshes-part-2/. T observed spike(s) are limited to one or te elements and are located either on the C side of the lake or in the St. Lawrence F where output will not be used for flood mapping.		where a sharp thly resolved See: <u>1/05/27/wave-</u> <u>2/</u> . The he or two the Canadian ence River,	CAL
Additional Comments or	Detailed Check				
Comme	ent		Resolution		Verification
Reviewer Signature:	C	26			1
Date:	6/18/2012				

SWAN REVIEW						
Storm:	Storm	042_198012	21100			
Reviewer:	Christi	na Lindem	er			
Organization:	RAMP	P				
Date Checked:	4/17/20	012				
Was the max significant	wave height m	ap checked	1 for anomalies?	Ye	es	
Was the wave period at n	nax significant	t wave heig	th checked for anomalies?	Ye	es	
Was the wave direction a	t max signific:	ant wave h	eight checked for anomalies?	Ye	es	
			Issues			
File	Comn	nent	Resolution		Verification	
swan_TP_atMaxHS.63	wave period	of anomaly in Localized spikes in wave height period (Node: known issue in the SWAN mode 9, 23196 see slide transition in elevation is not smode due to the coarseness of the mess http://www.caseydietrich.com/2/ refraction-on-coarse-meshes-pare observed spike(s) are limited to elements and are located either of side of the lake or in the St. Law where output will not be used for		where a sharp thly resolved See: <u>1/05/27/wave-</u> <u>2/</u> . The le or two the Canadian ence River,	CAL	
Additional Comments or	Detailed Che	<u>ck</u>				
Comme	ent		Resolution		Verification	
Reviewer Signature:					1	
Date:	6/18/201	2				

SWAN REVIEW						
Storm:	Storm043	Storm043 1981112500				
Reviewer:	Christina	Lindeme	r			
Organization:	RAMPP					
Date Checked:	4/17/2012	2				
Was the max significant	wave height map	checked	for anomalies?	Ye	es	
Was the wave period at n	nax significant w	vave heigh	nt checked for anomalies?	Ye	es	
Was the wave direction a	at max significant	t wave hei	ight checked for anomalies?	Ye	es	
			Issues			
File	Commer	nt	Resolution		Verification	
swan_TP_atMaxHS.63	wave period (N	of anomaly in Localized spikes in wave height and period known issue in the SWAN model where a stransition in elevation is not smoothly resol due to the coarseness of the meshSee: http://www.caseydietrich.com/2011/05/27/vrefraction-on-coarse-meshes-part-2/. The observed spike(s) are limited to one or two elements and are located either on the Cana side of the lake or in the St. Lawrence Rive where output will not be used for floodplair mapping.		where a sharp thly resolved See: <u>1/05/27/wave-</u> <u>2/</u> . The he or two the Canadian ence River,	CAL	
Additional Comments or	Detailed Check					
Comme			Resolution		Verification	
Reviewer Signature:						
Date:	6/18/2012					

SWAN REVIEW						
Storm:	S	Storm044 1982010200				
Reviewer:	C	Christina Lindemer				
Organization:	R	AMPP				
Date Checked:	4/	/17/2012				
Was the max significant	wave heig	ght map che	cked	for anomalies?	Ye	es
Was the wave period at 1	nax signi	ficant wave 1	heigh	t checked for anomalies?	Ye	es
Was the wave direction a	at max sig	gnificant way	ve hei	ght checked for anomalies?	Ye	es
				Issues		
File	(Comment		Resolution		Verification
swan_TP_atMaxHS.63	wave pe	of anomaly in Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the meshSee: http://www.caseydietrich.com/2011/05/27/wave-refraction-on-coarse-meshes-part-2/. refraction-on-coarse-meshes-part-2/. the observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.			where a sharp thly resolved See: <u>1/05/27/wave-</u> <u>2/</u> . The he or two the Canadian ence River,	CAL
Additional Comments on		l Check	_			-
Comme	ent			Resolution		Verification
Reviewer Signature:		Œ	2			1
Date:	6/18	8/2012				

SWAN REVIEW						
Storm:		Storm045_198201200	00			
Reviewer:		Christina Lindemer				
Organization:		RAMPP				
Date Checked:		4/17/2012				
Was the max significant	wave heig	ht map checked for anor	malies?			Yes
Was the wave period at max significant wave height checked for anomalies?						
Was the wave direction a	at max sign	nificant wave height che	cked for	anomalies?		Yes
		Issu	ies			
File		Comment		Resolution		Verification
swan_HS_max.63	concentra have an io	ta where there isn't an ic ation defined (slide 2) bu ce concentration greater on the surrounding regions (5)	ut may than	The ice input data matches the original source data. See section 2.2.3 of FEMALakeOntario_Draft_2012- 02-14 Chpt1-2-5-6-8. Therefore no change required		CAL
swan_TP_atMaxHS.63	ice conce may have than 0.7 b	riod data where there isr ntration defined (slide 2 e an ice concentration gr based on the surrounding ee slide 7)	eater	The ice input data matc original source data. Se 2.2.3 of FEMALakeOntario_Dr 02-14 Chpt1-2-5-6-8. The no change required	CAL	
Additional Comments or	n Detailed	Check		I		1
	Comment			Resolution		Verification
Ice file does is not consistent with measured ice (Slide 9 The northern part lake has ice concentration of less than 70% while the ice file that was inputted to SWAN appeared to have 100% ice concentration.			source FEMA	e input data matches the o data. See section 2.2.3 o LakeOntario_Draft_2012 2-5-6-8. Therefore no ch d	f 2-02-14	CAL
Reviewer Signature:			7			
Date:	6/	/18/2012				

SWAN REVIEW						
Storm: Storm046_1982040300						
Reviewer: Christina Lindemer						
Organization:		RAMPP				
Date Checked:		4/17/2012; re-checked 6/6				
Was the max significant	wave height	map checked for anomalies	?			Yes
Was the wave period at a	max significat	nt wave height checked for	anomalie	es?		Yes
Was the wave direction a	at max signifi	cant wave height checked f	for anoma	lies?		Yes
		Issues				
File		Comment		Resolution	Verifica	
swan_HS_max.63		ve data where ice on is greater than 0.7 (see	The sto	rm was rerun	This issues the exists	ue no long
swan_TP_atMaxHS.63		maly in wave period 96, 23196 see slide 4)	The sto	rm was rerun	exists be	ue no longer ecause it is by wave
Additional Comments or	1 Detailed Ch	eck				
	Comment		Resolution			Verification
Reviewer Signature:			2			
Date:	6/6	5/2012				

SWAN REVIEW						
Storm:	Storm047_19	98211	0300			
Reviewer:	Christina Lin	Christina Lindemer				
Organization:	RAMPP					
Date Checked:	4/17/2012					
Was the max significant	wave height map che	ecked	for anomalies?	Ye	es	
Was the wave period at n	nax significant wave	heigh	nt checked for anomalies?	Ye	es	
Was the wave direction a	at max significant wa	ve hei	ight checked for anomalies?	Ye	es	
			Issues			
File	Comment		Resolution		Verification	
swan_TP_atMaxHS.63	Area of anomaly in wave period (Node: 23196 see slide 4)			where a sharp thly resolved See: <u>1/05/27/wave-</u> <u>2/</u> . The he or two the Canadian ence River,	CAL	
Additional Comments or	Detailed Check					
Comme			Resolution		Verification	
Reviewer Signature:		Z				
Date:	6/18/2012					

SWAN REVIEW						
Storm:	Storm048_19	Storm048_1982122600				
Reviewer:	Christina Lin	demer				
Organization:	RAMPP					
Date Checked:	4/18/2012					
Was the max significant	wave height map che	ecked for anomalies?	Yes			
Was the wave period at a	max significant wave	height checked for anomalies?	Yes			
Was the wave direction a	at max significant wa	ve height checked for anomalies?	Yes			
		Issues				
File	Comment	Resolution	VerificationaCAL			
swan_TP_atMaxHS.63	Area of anomaly in wave period (Node 23196 see slide 4)	Node: known issue in the SWAN model where a sharp				
Additional Comments or	n Detailed Check					
Comm		Resolution	Verification			
Reviewer Signature:		R				
Date:	6/18/2012					

SWAN REVIEW							
Storm:		Storm049_1985030100					
Reviewer:		Christina Lindemer					
Organization:		RAMPP					
Date Checked:		4/18/2012					
Was the max significant	wave height r	nap checked for anomalie	s?			Yes	
Was the wave period at r	nax significar	nt wave height checked for	r anomalie	es?		Yes	
Was the wave direction a	t max signific	cant wave height checked	for anoma	alies?		Yes	
		Issues					
File		Comment		Resolution		Verification	
swan_TP_atMaxHS.63	There is wave period data where there shoul not be any data due to ice concentrations. (See slide 5)			There was a malfun in the post processin script, storm will be processed again and sent for QC.	ng e post	Wave data is appropriate for ice coverage	
swan_TP_atMaxHS.63		ome wave period anomalie est shore of the lake (See	Will address after re has been QC	e-run	Wave data is appropriate for ice coverage		
swan_Dir_atMaxHS.63		ectional data where there s lue to ice concentrations. (There was a malfun in the post processin script, storm will be processed again and sent for QC.	ng e post	Wave data is appropriate for ice coverage.	
Additional Comments on	Detailed Che	eck				U	
	Comment			Resolution		Verification	
Reviewer Signature:		DD.					
Date:	6/2	2/2012					

SWAN REVIEW						
Storm:		Storm050_198	8601	0600		
Reviewer:		Christina Lind	lemer	r		
Organization:		RAMPP				
Date Checked:		4/17/2012				
Was the max significant	wave	height map chec	ked t	for anomalies?	Y	es
Was the wave period at 1	nax si	ignificant wave h	neigh	t checked for anomalies?	Y	es
Was the wave direction a	at max	x significant wav	e hei	ght checked for anomalies?	Y	es
	0			Issues		
File		Comment		Resolution		Verification
swan_HS_max.63	when conc 0.7. into	ere ice icentrations are > . This issue extends o the wave period direction files. (See		The area of concern is limited to a region near the Canadian shoreline will not influence the wave model will be used to support floodplain along the US shoreline.	e. This area results that	CAL
swan_TP_atMaxHS.63	Area wave	a of anomaly in e period (Node: 96; see slide 5)		Localized spikes in wave height ar a known issue in the SWAN mode sharp transition in elevation is not resolved due to the coarseness of t <u>http://www.caseydietrich.com/201</u> <u>e-refraction-on-coarse-meshes-par</u> observed spike(s) are limited to on elements and are located either on side of the lake or in the St. Lawre where output will not be used for f mapping.	el where a smoothly he meshSee: <u>1/05/27/wav</u> <u>tt-2/</u> . The te or two the Canadian once River,	CAL
		'1. 1 Cl 1				
Additional Comments or Comm		ined Check		Pasalutica		Verification
Comm	ent			Resolution		vernication
Reviewer Signature:			E	\geq		J
Date:	6/18/2012					

SWAN REVIEW					
Storm:	Storm051_1	98609	1200		
Reviewer:	Siva Sangar	leswai	ran		
Organization:	RAMPP				
Date Checked:	5/25/2012				
Was the max significant v	wave height map che	cked	for anomalies?	Ye	es
Was the wave period at m	-	-		Ye	es
Was the wave direction at	t max significant wa	ve hei	ght checked for anomalies?	Ye	es
			Issues		
File	Comment		Resolution		Verification
Swan_TP_atMaxHS.63 Measured vs	Areas of unusual h period (See slides 3 4) File for wave heigh	3 &	Localized spikes in wave height an known issue in the SWAN model transition in elevation is not smoor due to the coarseness of the mesh <u>http://www.caseydietrich.com/201</u> <u>refraction-on-coarse-meshes-part-</u> observed spike(s) are limited to or elements and are located either on side of the lake or in the St. Lawre where output will not be used for the mapping. There is no Buoy Data prior to 1950	where a sharp thly resolved See: <u>1/05/27/wave-</u> <u>2/</u> . The le or two the Canadian once River, floodplain	CAL
SWAN_selected.bmp	comparison not provided.		There is no Buoy Data prior to 19.	59	
Additional Comments on	Detailed Check		-		-
Comme	ent		Resolution		Verification
		 			
Reviewer Signature:			7		
Date:	6/19/2012				

SWAN REVIEW							
Storm:	Storm052_19	Storm052_1986100100					
Reviewer:	Siva Sangam	eswar	an				
Organization:	RAMPP						
Date Checked:	5/25/2012						
Was the max significant w	wave height map chee	cked f	for anomalies?	Ye	es		
Was the wave period at m	-	-		Ye	es		
Was the wave direction at	t max significant way	ve hei	ght checked for anomalies?	Ye	es		
			Issues				
File	Comment		Resolution		Verification		
Swan_TP_atMaxHS.63Areas of unusual high period (See slides 3 & 4)Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the mesh See: http://www.caseydietrich.com/2011/05/27/wave- refraction-on-coarse-meshes-part-2/. The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.					CAL		
Additional Comments on Comme		1	Resolution		Verification		
	in		Resolution		vernication		
Reviewer Signature: Date:	6/19/2012	P	2				

SWAN REVIEW								
Storm:	Storm053_1988011000							
Reviewer:		Siva Sangameswaran						
Organization:		RAMPP						
Date Checked:		6/14/2012						
Was the max significant wave height r	nap check	ted for anomalies?			Yes			
Was the wave period at max significant	nt wave he	eight checked for anomalies?			Yes			
Was the wave direction at max signific	cant wave	height checked for anomalies	\$?		Yes			
		Issues						
File		Comment	Resolution		Verification			
Additional Comments on Detailed Che	eck_							
Commen	ıt		Resolution		Verification			
Reviewer Signature:		OS R						
Date:	6/	22/2012						

SWAN REVIEW							
Storm:	Storm054_19	Storm054_1988061900					
Reviewer:	Siva Sangame	eswar	an				
Organization:	RAMPP						
Date Checked:	5/29/2012						
Was the max significant w	wave height map chee	cked f	for anomalies?	Ye	es		
Was the wave period at m	-	-		Ye	es		
Was the wave direction at	t max significant way	ve heig	ght checked for anomalies?	Ye	es		
			Issues	•			
File	Comment		Resolution		Verification		
	Swan_TP_atMaxHS.63Areas of unusual high period (See slide 4)Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the meshSee: http://www.caseydietrich.com/2011/05/27/wave- refraction-on-coarse-meshes-part-2/. The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.						
Additional Comments on		1	Deselution		Manifi anti an		
Comme	nı		Resolution		Verification		
Reviewer Signature: Date:	6/19/2012	8	2				

SWAN REVIEW							
Storm:	Storm055_19	Storm055_1988071400					
Reviewer:	Siva Sangame	eswar	ran				
Organization:	RAMPP						
Date Checked:	5/29/2012						
Was the max significant w	vave height map cheo	cked f	for anomalies?	Ye	es		
Was the wave period at m	U	0		Ye	es		
Was the wave direction at	max significant wav	ve hei	ght checked for anomalies?	Ye	es		
			Issues	•			
File	Comment		Resolution		Verification		
Swan_TP_atMaxHS.63Areas of unusual high period (See slide 4)Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the meshSee: http://www.caseydietrich.com/2011/05/27/wave- refraction-on-coarse-meshes-part-2/. The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.Image: Description of the state of					CAL		
Additional Comments on Comme			Resolution		Verification		
Comme	iit		Kesoluuoli		venneauon		
Reviewer Signature:	04	2	>				
Date:	6/19/2012						

SWAN REVIEW	SWAN REVIEW								
Storm:									
Reviewer:		Siva Sangameswaran							
Organization:		RAMPP							
Date Checked:		5/29/2012							
Was the max significant w	ave height m	hap checked for anomalies	?			Yes			
Was the wave period at ma	ax significant	t wave height checked for	anomalie	es?		Yes			
Was the wave direction at	max signific	ant wave height checked f	or anoma	llies?		Yes			
		Issues							
File		Comment		Resolution	1	Verification			
Additional Comments on I	Detailed Che	<u>ck</u>							
	Comment			Resolution		Verification			
Reviewer Signature:	(DD.							
Date:	6/2	26/2012							

SWAN REVIEW	SWAN REVIEW								
Storm:									
Reviewer:		Siva Sangameswaran							
Organization:		RAMPP							
Date Checked:		5/29/2012							
Was the max significant w	ave height m	ap checked for anomalies?	?			Yes			
Was the wave period at ma	ax significant	t wave height checked for a	anomalie	es?		Yes			
Was the wave direction at	max significa	ant wave height checked for	or anoma	llies?		Yes			
		Issues							
File		Comment		Resolution		Verification			
Additional Comments on I	Detailed Che	<u>ck</u>							
	Comment			Resolution		Verification			
Reviewer Signature:	DD.								
Date:	6/2	26/2012							

SWAN REVIEW						
Storm:	Storm058_19	Storm058_1989020500				
Reviewer:	Siva Sangam	eswa	ran			
Organization:	RAMPP					
Date Checked:	5/29/2012					
Was the max significant v	wave height map che	cked	for anomalies?	Ye	es	
Was the wave period at m	nax significant wave	heigh	t checked for anomalies?	Ye	es	
Was the wave direction a	t max significant way	ve hei	ight checked for anomalies?	Ye	es	
			Issues			
File	Comment		Resolution		Verification	
Swan_TP_atMaxHS.63	Areas of unusual hi period (See slide 4)		Localized spikes in wave height an known issue in the SWAN model of transition in elevation is not smoot due to the coarseness of the meshS <u>http://www.caseydietrich.com/201</u> <u>refraction-on-coarse-meshes-part-2</u> observed spike(s) are limited to on elements and are located either on side of the lake or in the St. Lawren where output will not be used for f mapping.	where a sharp hly resolved see: <u>1/05/27/wave-</u> <u>2/</u> . The e or two the Canadian nce River,	CAL	
Additional Comments on			Resolution		XZ	
Comme	nt		Resolution		Verification	
Reviewer Signature:					1	
Date:	6/19/2012					

SWAN REVIEW									
Storm:		Storm059_1989031500							
Reviewer:		Siva Sangameswaran							
Organization:		RAMPP							
Date Checked:		5/29/2012							
Was the max significant w	ave height m	hap checked for anomalies?			Yes				
Was the wave period at m	ax significan	t wave height checked for anomal	les?		Yes				
Was the wave direction at	max signific	ant wave height checked for anom	alies?		Yes				
		Issues							
File		Comment	Resolution	l	Verification				
None									
Additional Comments on	Detailed Che	<u>ck</u>							
	Comment		Resolution						
	-								
Reviewer Signature:	(Dod -							
Date:	6/2	26/2012							

SWAN REVIEW							
Storm:	Storm060_19	Storm060 1989101100					
Reviewer:	Siva Sangam	eswar	ran				
Organization:	RAMPP						
Date Checked:	5/29/2012						
Was the max significant w	wave height map che	cked t	for anomalies?	Ye	es		
Was the wave period at m	hax significant wave	heigh	t checked for anomalies?	Ye	es		
Was the wave direction a	t max significant way	ve hei	ght checked for anomalies?	Ye	es		
			Issues				
File	Comment		Resolution		Verification		
	Swan_TP_atMaxHS.63Areas of unusual high period (See slide 4)Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the meshSee: http://www.caseydietrich.com/2011/05/27/wave- refraction-on-coarse-meshes-part-2/. The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.						
Additional Comments on	Detailed Check						
Comme		Γ	Resolution		Verification		
Reviewer Signature:			2				
Date:	6/19/2012						

SWAN REVIEW							
Storm:	Storm061_19	Storm061 1990110300					
Reviewer:	Siva Sangam	eswar	ran				
Organization:	RAMPP						
Date Checked:	5/29/2012						
Was the max significant v	wave height map chee	cked t	for anomalies?	Ye	es		
Was the wave period at m	ax significant wave l	heigh	t checked for anomalies?	Ye	es		
Was the wave direction at	t max significant way	ve hei	ght checked for anomalies?	Ye	es		
			Issues				
File	Comment		Resolution		Verification		
	Swan_TP_atMaxHS.63Areas of unusual high period (See slide 4)Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the meshSee: http://www.caseydietrich.com/2011/05/27/wave- refraction-on-coarse-meshes-part-2/. The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.						
Additional Comments on	Detailed Check						
Comme		1	Resolution		Verification		
Reviewer Signature:			2				
Date:	6/19/2012						

SWAN REVIEW								
Storm:	Storm062 19	Storm062_1991032500						
Reviewer:		Siva Sangameswaran						
Organization:	RAMPP							
Date Checked:	5/30/2012							
Was the max significant v	wave height map chec	cked f	for anomalies?	Ye	es			
Was the wave period at m				Ye	es			
-	-	-	ght checked for anomalies?	Ye	es			
			Issues					
File	Comment		Resolution		Verification			
Swan_TP_atMaxHS.63 Swan_MaxHS	Areas of unusual hi period (See slide 5) Waves where ice>7 (slides 2&3)		Localized spikes in wave height an known issue in the SWAN model transition in elevation is not smood due to the coarseness of the meshS http://www.caseydietrich.com/201 refraction-on-coarse-meshes-part-/ observed spike(s) are limited to or elements and are located either on side of the lake or in the St. Lawre where output will not be used for f mapping. The area of concern is limited to a region near the Canadian shoreling will not influence the wave model will be used to support floodplain along the US shoreline.	CAL				
Additional Comments on		-						
Comme	nt		Resolution		Verification			
Reviewer Signature:			2		I			
Date:	6/19/2012							

SWAN REVIEW								
Storm:	Storm063_19	Storm063_1992122300						
Reviewer:	Siva Sangam	leswara	n					
Organization:	RAMPP							
Date Checked:	5/30/2012							
Was the max significant v				Ye	es			
Was the wave period at m	nax significant wave	height	checked for anomalies?	Ye	es			
Was the wave direction a	t max significant way	ve heig	ht checked for anomalies?	Ye	es			
			Issues					
File	Comment		Resolution		Verification			
Swan_TP_atMaxHS.63	Areas of unusual hi period (See slide 4))	Localized spikes in wave height an known issue in the SWAN model transition in elevation is not smoot due to the coarseness of the mesh a http://www.caseydietrich.com/201 refraction-on-coarse-meshes-part-2 observed spike(s) are limited to on elements and are located either on side of the lake or in the St. Lawre where output will not be used for f mapping.	where a sharp thly resolved See: <u>1/05/27/wave-</u> <u>2/</u> . The le or two the Canadian once River,	CAL			
A 11'd' 1 C								
Additional Comments on Comme			Resolution		Verification			
Comme	111		Resolution		vermeation			
Reviewer Signature:								
Date:	6/19/2012							

SWAN REVIEW							
Storm:	Storm064_	199302	20900				
Reviewer:	Siva Sanga	meswa	ran				
Organization:	RAMPP	AMPP					
Date Checked:	6/14/2012	14/2012					
Was the max significant wave	e height map chec	ked for	r anomalies?	Ye	es		
Was the wave period at max s	significant wave h	neight c	checked for anomalies?	Ye	es		
Was the wave direction at ma	x significant wav	e heigh	t checked for anomalies?	Ye	es		
			Issues				
File	Comment		Resolution		Verification		
Swan_TP_atMaxHS.63 Additional Comments on Det	Areas of unusua high period (See slide 4) <u>ailed Check</u>		CAL				
Comment			Resolution		Verification		
T 1 C 1							
Reviewer Signature:			2				
Date:	6/22/2012						

SWAN REVIEW							
Storm:	Storm065_19	Storm065_1994022000					
Reviewer:	Siva Sangam	Siva Sangameswaran					
Organization:	RAMPP						
Date Checked:	5/30/2012						
Was the max significant w	wave height map che	cked	for anomalies?	Ye	es		
Was the wave period at m	hax significant wave	heigh	t checked for anomalies?	Ye	es		
Was the wave direction a	t max significant way	ve hei	ght checked for anomalies?	Ye	es		
			Issues				
File	Comment		Resolution		Verification		
Swan_TP_atMaxHS.63	Areas of unusual hi period (See slide 5)		CAL				
A 11'd' 1 O					L		
Additional Comments on Comme		1	Resolution		Verification		
Comme	111		Resolution		vermeation		
Reviewer Signature:			2				
Date:	6/22/2012						

SWAN REVIEW								
Storm:	Storm066_19	Storm066_1994110300						
Reviewer:	Siva Sangam	eswar	ran					
Organization:	RAMPP							
Date Checked:	5/30/2012							
Was the max significant w	<u> </u>			Ye				
Was the wave period at m		-		Ye				
Was the wave direction at	t max significant way	ve hei	ght checked for anomalies?	Ye	es			
			Issues					
File	Comment		Resolution		Verification			
Swan_TP_atMaxHS.63	Areas of unusual hi period (See slide 4)		CAL					
Additional Comments on	Datailad Chaola							
<u>Additional Comments on</u> Comme	· · · · · · · · · · · · · · · · · · ·	1	Resolution		Verification			
Comme			Resolution		, enneation			
		l –						
Reviewer Signature:								
Date:	6/19/2012							

SWAN REVIEW								
Storm:	Storm067_19	Storm067_1994111900						
Reviewer:	Siva Sangam	Siva Sangameswaran						
Organization:	RAMPP							
Date Checked:	5/31/2012	31/2012						
Was the max significant v	wave height map chee	cked	for anomalies?	Ye	es			
Was the wave period at m	nax significant wave	heigh	t checked for anomalies?	Ye	es			
Was the wave direction at	t max significant way	ve hei	ght checked for anomalies?	Ye	es			
			Issues					
File	Comment		Resolution		Verification			
Swan_TP_atMaxHS.63	Areas of unusual hi period (See slides 4 and 5)		Localized spikes in wave height an known issue in the SWAN model transition in elevation is not smoot due to the coarseness of the mesh http://www.caseydietrich.com/201 refraction-on-coarse-meshes-part- observed spike(s) are limited to on elements and are located either on side of the lake or in the St. Lawre where output will not be used for f mapping.	CAL				
Additional Comments on	Detailed Cheeds							
Additional Comments on Comme		1	Resolution		Verification			
	III		Resolution		vermeation			
Reviewer Signature:			2					
Date:	6/19/2012							

SWAN REVIEW								
Storm:	Storm068_19	Storm068_1994122100						
Reviewer:	Siva Sangam	eswai	ran					
Organization:	RAMPP							
Date Checked:	5/31/2012							
Was the max significant w				Ye				
Was the wave period at m	0	0		Ye				
Was the wave direction at	t max significant way	ve hei	ght checked for anomalies?	Ye	es			
			Issues					
File	Comment		Resolution		Verification			
Swan_TP_atMaxHS.63	Areas of unusual hi period (See slides 4 and 5)		Localized spikes in wave height at known issue in the SWAN model transition in elevation is not smoot due to the coarseness of the mesh http://www.caseydietrich.com/201 refraction-on-coarse-meshes-part- observed spike(s) are limited to or elements and are located either on side of the lake or in the St. Lawre where output will not be used for f mapping.	CAL				
Additional Comments on		<u> </u>			XX : C			
Comme	nt		Resolution		Verification			
Reviewer Signature:					1			
Date:	6/19/2012							

SWAN REVIEW								
Storm:	Storm069_19	Storm069_1995010300						
Reviewer:	Siva Sangam	leswar	ran					
Organization:	RAMPP							
Date Checked:	5/31/2012							
Was the max significant v	wave height map che	cked f	for anomalies?	Ye	es			
Was the wave period at m		-		Ye	es			
Was the wave direction at	t max significant way	ve hei	ght checked for anomalies?	Ye	es			
			Issues					
File	Comment		Resolution		Verification			
Swan_TP_atMaxHS.63	Areas of unusual hi period (See slide 5)		nd period are a where a sharp thly resolved See: <u>1/05/27/wave-</u> <u>2/</u> . The the or two the Canadian once River, floodplain	CAL				
A 11'd' 1 O	D. (. 1. 1. 01							
Additional Comments on Comme		r –	Resolution		Verification			
Comme	iit.		Resolution		Vermeation			
Reviewer Signature:			2					
Date:	6/19/2012							

SWAN REVIEW								
Storm:	Storm070_19	Storm070_1995110800						
Reviewer:	Siva Sangam	eswa	ran					
Organization:	RAMPP							
Date Checked:	5/31/2012							
Was the max significant w	wave height map chee	cked	for anomalies?	Ye	es			
Was the wave period at m	nax significant wave	heigh	t checked for anomalies?	Ye	es			
Was the wave direction at	t max significant way	ve hei	ight checked for anomalies?	Ye	es			
			Issues					
File	Comment		Resolution Localized spikes in wave height an		Verification			
Swan_TP_atMaxHS.63	Areas of unusual hi period (See slide 4)		CAL					
	-							
Additional Comments on			D 1.4		X7 . C			
Comme	nt		Resolution		Verification			
Reviewer Signature:		2						
Date:	6/19/2012							

SWAN REVIEW						
Storm:	500					
Reviewer:	Siva	Sangameswara	n			
Organization:	RAN	MPP				
Date Checked:		/2012				
Was the max significant wave height	map checked for	r anomalies?				Yes
Was the wave period at max significa	nt wave height c	checked for anor	nalies?			Yes
Was the wave direction at max signifi	cant wave heigh	t checked for an	nomalies	?		Yes
		Issues				
File	(Comment		Resolution	1	Verification
Swan_TP_atMaxHS.63	slides 5 and 6)	al high period (See	The larger wave propagating thr the channel interacting with generated chop producing the difference seen i	ough bay	CAL
Additional Comments on Detailed Ch						
Comme	nt			Resolution		Verification
Reviewer Signature:	Ċ	382	-			
Date:	6/22/20	12				

SWAN REVIEW							
Storm: Storm072_199603				100			
Reviewer:		Siva Sangameswaran					
Organization:		RAMPP					
Date Checked:		5/31/2012					
Was the max significant wave height	map check	ed for anomalies?				Yes	
Was the wave period at max significa	nt wave he	eight checked for anor	nalies?			Yes	
Was the wave direction at max signifi	icant wave	height checked for an	nomalie	s?		Yes	
		Issues					
File		Comment		Resolution		Verification	
Swan_TP_atMaxHS.63	Areas of unusual high period (See slides 5 and 6)			The larger waves are propagating through the channel interacting with bay generated chop producing the difference seen in Tp		CAL	
Ice file	on does not match the e data (slide 2)	9	The area of conce limited to a locali region near the Canadian shorelin This area will not influence the wav model results that be used to suppor floodplain mappin along the US shoreline.	ern is zed ne. e z will t	CAL		
Additional Comments on Detailed Ch	neck						
Comme	nt			Resolution		Verification	
Reviewer Signature:	(()}}					
Date:	6/	19/2012					

SWAN REVIEW							
Storm:	Storm073_	Storm073_1996110500					
Reviewer:	Siva Sanga	meswai	an				
Organization:	RAMPP	AMPP					
Date Checked:	5/31/2012						
Was the max significant wave	e height map chec	ked for	anomalies?	Ye	es		
Was the wave period at max s	significant wave h	eight cl	hecked for anomalies?	Ye	es		
Was the wave direction at ma	x significant wave	e heigh	t checked for anomalies?	Ye	es		
			Issues				
File	Comment		Resolution		Verification		
Swan_TP_atMaxHS.63 Additional Comments on Det	Areas of unusua high period (See slide 4) <u>ailed Check</u>	e k tu d <u>h</u> o e si w	Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the mesh See: <u>http://www.caseydietrich.com/2011/05/27/wave-</u> <u>refraction-on-coarse-meshes-part-2/</u> . The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.				
Comment	······		Resolution		Verification		
Reviewer Signature:		R	2				
Date:	6/19/2012						

SWAN REVIEW					
Storm:	Storm074_	19971	20800		
Reviewer:	Siva Sanga	meswa	aran		
Organization:	RAMPP				
Date Checked:	5/31/2012				
Was the max significant wave	e height map chec	ked fo	or anomalies?	Ye	es
Was the wave period at max s	significant wave h	neight	checked for anomalies?	Ye	es
Was the wave direction at ma	x significant wave	e heig	ht checked for anomalies?	Ye	es
			Issues		
File	Comment		Resolution		Verification
Swan_TP_atMaxHS.63 Additional Comments on Det	Areas of unusua high period (See slide 4) <u>ailed Check</u>		Localized spikes in wave height an known issue in the SWAN model w transition in elevation is not smooth due to the coarseness of the mesh S http://www.caseydietrich.com/201 refraction-on-coarse-meshes-part-2 observed spike(s) are limited to one elements and are located either on the side of the lake or in the St. Lawren where output will not be used for fl mapping.	where a sharp hly resolved See: <u>1/05/27/wave-</u> <u>/</u> . The e or two the Canadian nce River,	CAL
Comment			Resolution		Verification
			r		
Reviewer Signature:		P	2		
Date:	6/19/2012				

SWAN REVIEW					
Storm:		Storm	075_1998011200		
Reviewer:			angameswaran		
Organization:		RAMI			
Date Checked:		5/31/2			
Was the max significant v				Ye	S
Was the wave period at m	ax significant	wave heig	ht checked for anomalies?	Ye	S
Was the wave direction at	max significa	nt wave h	eight checked for anomalies?	Ye	s
			Issues		
File	Comm	ent	Resolution		Verifica tion
Measured_vs_SWAN_s elected.bmp Swan_TP_atMaxHS.63	C45135 and Explain discr in modeled v measured wa heights and v periods Areas of unu period (See s	repancies s ve vave sual high	 are expected, particularly when comparing against numerous storm events. These discrepancies are most likely a limitation of the modeled wind fields. Recognizing this, one of the goals of the comparative analysis is to ensure a balance is observed between the measured and modeled results; that is the model under-predicts some storms and over-predicts others. When analyzed statistically as a population of storms, the Q-Q plots showed good agreement between measured and modeled wave heights. See Figure 6.6 of Baird Lake Ontario report. 		
Swan_MaxHS.63	Waves where ice>70% (slides 2,3)		 the St. Lawrence River, where output will not be used for floodplain mapping. The area of concern is limited to a localized region near the Canadian shoreline. This area will not influence the wave model results that will be used to support floodplain mapping along the US shoreline. 		CAL
Additional Comments on	Detailed Chec	k			
Comm	ent		Resolution		Verificatio
					n
Reviewer Signature:		C			
Date:		6/19/201	2		

SWAN REVIEW					
Storm:	Storm076_	1998	031800		
Reviewer:	Siva Sanga				
Organization:	RAMPP				
Date Checked:	5/31/2012				
Was the max significant wave	e height map chec	cked f	for anomalies?	Ye	es
Was the wave period at max s	significant wave h	neight	t checked for anomalies?	Y	es
Was the wave direction at ma	x significant wav	e hei	ght checked for anomalies?	Y	es
			Issues	•	
File	Comment		Resolution		Verification
Swan_TP_atMaxHS.63	Areas of unusua high period (See slide 5)		Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the mesh See: <u>http://www.caseydietrich.com/2011/05/27/wave-</u> <u>refraction-on-coarse-meshes-part-2/</u> . The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.		CAL
Additional Comments on Det	ailed Check	1			XX . C. /
Comment			Resolution		Verification
Reviewer Signature:		£			
Date:	6/19/2012				

SWAN REVIEW						
Storm:	Storm077_	Storm077_1998090400				
Reviewer:	Siva Sanga	mesv	waran			
Organization:	RAMPP					
Date Checked:	5/31/2012					
Was the max significant wave	e height map chec	ked f	for anomalies?	Ye	es	
Was the wave period at max s	significant wave h	neigh	t checked for anomalies?	Ye	es	
Was the wave direction at ma	x significant wave	e hei	ght checked for anomalies?	Ye	es	
			Issues	•		
File	Comment		Resolution		Verification	
Swan_TP_atMaxHS.63	Areas of unusua high period (See slide 4)		Localized spikes in wave height ar known issue in the SWAN model of transition in elevation is not smoot due to the coarseness of the mesh S <u>http://www.caseydietrich.com/201</u> <u>refraction-on-coarse-meshes-part-2</u> observed spike(s) are limited to on elements and are located either on side of the lake or in the St. Lawre where output will not be used for f mapping.	where a sharp hly resolved See: <u>1/05/27/wave-</u> <u>2/</u> . The e or two the Canadian nce River,	CAL	
Additional Comments on Det	ailed Check	1			XX 100 - 1	
Comment			Resolution		Verification	
Reviewer Signature:		Æ			1	
Date:	6/19/2012					

SWAN REVIEW						
Storm:	Storm078_	Storm078_1999010100				
Reviewer:	Siva Sanga					
Organization:	RAMPP					
Date Checked:	5/31/2012					
Was the max significant wave	• ·			Ye		
Was the wave period at max s	significant wave h	neigh	t checked for anomalies?	Ye	es	
Was the wave direction at ma	x significant wav	e hei	ght checked for anomalies?	Ye	es	
			Issues			
File	Comment		Resolution		Verification	
Swan_TP_atMaxHS.63	Areas of unusua high period (See slide 5)	-	Localized spikes in wave height an known issue in the SWAN model w transition in elevation is not smooth due to the coarseness of the mesh S <u>http://www.caseydietrich.com/2011</u> <u>refraction-on-coarse-meshes-part-2</u> observed spike(s) are limited to one elements and are located either on side of the lake or in the St. Lawren where output will not be used for fi- mapping.	where a sharp hly resolved See: <u>1/05/27/wave-</u> <u>2/</u> . The e or two the Canadian nce River,	CAL	
Additional Comments on Det	ailed Check	1				
Comment			Resolution		Verification	
Reviewer Signature:		P			1	
Date:	6/19/2012					

SWAN REVIEW						
Storm:	Storm07	9_2000051000				
Reviewer:		Siva Sangameswaran				
Organization:	RAMPP					
Date Checked:	5/31/201					
Was the max significant wave height	map checked	l for anomalies?	Y	es		
Was the wave period at max signification	ant wave heig	ht checked for anomalies?	Y	es		
Was the wave direction at max signif	ricant wave he	eight checked for anomalies?	Y	es		
		Issues				
File	Comment	Resolution		Verificatio n		
Measured_vs_SWAN_selected.bm p Swan_TP_atMaxHS.63	C45135 and C45139: Discrepanci s in modeled vs measured wave height and wave periods Areas of unusual higl period (See slide 4)	 Discrepancies between modeled and measured data are expected, particularly when comparing against numerous storm events. These discrepancies are most likely a limitation of the modeled wind fields. Recognizing this, one of the goals of the comparative analysis is to ensure a balance is observed between the measured and modeled results; that is the model under-predicts some storms and over-predicts others. When analyzed statistically as a population of storms, the Q-Q plots showed good agreement between measured and modeled wave heights. See Figure 6.6 of Baird Lake Ontario report. Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the mesh See: http://www.caseydietrich.com/2011/05/27/wav e-refraction-on-coarse-meshes-part-2/. The observed spike(s) are limited to one or two elements and are located either on the Canadian 		CAL		
Additional Comments on Detailed C	haalt	side of the lake or in the St. Lawrenc where output will not be used for flor mapping.				
Comment	ICCK	Resolution		Verificatio		
Comment		Resolution		n		
Reviewer Signature:						
Date:	6/12/2012					

SWAN REVIEW							
Storm:	Storm080_	Storm080_2000120300					
Reviewer:	Siva Sanga	Siva Sangameswaran					
Organization:	RAMPP						
Date Checked:	5/31/2012						
Was the max significant wave	height map chec	ked f	for anomalies?	Ye	es		
Was the wave period at max s	ignificant wave h	neight	checked for anomalies?	Ye	es		
Was the wave direction at max	x significant wav	e heig	ght checked for anomalies?	Ye	es		
			Issues				
File	Comment		Resolution		Verification		
Swan_TP_atMaxHS.63 Swan MaxHS	Areas of unusua high period (See slide 5) Waves where icc	2	Localized spikes in wave height and known issue in the SWAN model of transition in elevation is not smoot due to the coarseness of the mesh S http://www.caseydietrich.com/201 refraction-on-coarse-meshes-part-2 observed spike(s) are limited to on elements and are located either on side of the lake or in the St. Lawren where output will not be used for f mapping. The area of concern is limited to a	CAL			
Swan_MaxHS	Waves where ico 70% (slides (2,3		The area of concern is limited to a region near the Canadian shoreline will not influence the wave model will be used to support floodplain is along the US shoreline.	. This area results that	CAL		
Additional Comments on Deta	ailed Check	I					
Comment			Resolution		Verification		
Reviewer Signature:	Ø	B	2				
Date:	6/19/2012						

SWAN REVIEW						
Storm:	Storm081_20	01020700				
Reviewer:		Siva Sangameswaran				
Organization:	RAMPP					
Date Checked:	6/1/2012					
Was the max significant wave		d for anomalies?	Ye	es		
Was the wave period at max s	ignificant wave heig	ght checked for anomalies?	Ye	es		
Was the wave direction at ma	x significant wave h	eight checked for anomalies?	Ye	es		
		Issues				
File	Comment	Resolution		Verification		
Swan_TP_atMaxHS.63	Areas of unusual high period (See slide 5).	Localized spikes in wave height an known issue in the SWAN model w transition in elevation is not smooth due to the coarseness of the mesh S http://www.caseydietrich.com/201 refraction-on-coarse-meshes-part-2 observed spike(s) are limited to on- elements and are located either on side of the lake or in the St. Lawren where output will not be used for fr mapping	where a sharp hly resolved See: <u>1/05/27/wave-</u> <u>2/</u> . The e or two the Canadian nce River,	CAL		
Swan_TP_atMaxHS.63	Abrupt increase in wave period observed in the area shown on Slide 6.	mappingLocalized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the mesh See: http://www.caseydietrich.com/2011/05/27/wave- refraction-on-coarse-meshes-part-2/. The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.		CAL		
	11 1 01 1					
Additional Comments on Det	alled Check	D1 (Manifi		
Comment		Resolution		Verification		
Reviewer Signature:	(DSE					
Date:	6/19/2012					

SWAN REVIEW						
Storm:	Storm082_	Storm082_2001040400				
Reviewer:	Siva Sanga	meswaran				
Organization:	RAMPP					
Date Checked:	6/1/2012					
Was the max significant wave	e height map chec	ked for anomalies?	Ye	es		
Was the wave period at max s	significant wave h	eight checked for anomalies?	Ye	es		
Was the wave direction at ma	x significant wav	e height checked for anomalies?	Ye	es		
		Issues				
File	Comment	Resolution		Verification		
Swan_TP_atMaxHS.63	Areas of unusua high period (See slide 5 and 6)	known issue in the SWAN model w transition in elevation is not smoot due to the coarseness of the mesh S <u>http://www.caseydietrich.com/201</u> <u>refraction-on-coarse-meshes-part-2</u> observed spike(s) are limited to on elements and are located either on side of the lake or in the St. Lawren	Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the mesh See: <u>http://www.caseydietrich.com/2011/05/27/wave- refraction-on-coarse-meshes-part-2/</u> . The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.			
Additional Comments on Det	ailed Check					
Comment		Resolution		Verification		
Reviewer Signature:						
Date:	6/19/2012					

SWAN REVIEW						
Storm:	Storm083_2	Storm083_2002123000				
Reviewer:	Siva Sangar	Siva Sangameswaran				
Organization:	RAMPP					
Date Checked:	6/1/2012					
Was the max significant wave	height map chec	ked f	or anomalies?	Ye	es	
Was the wave period at max s	ignificant wave h	eight	checked for anomalies?	Ye	es	
Was the wave direction at ma	x significant wave	e heig	ght checked for anomalies?	Y	es	
			Issues			
File	Comment		Resolution		Verification	
Swan_TP_atMaxHS.63	Areas of unusua high period (See slide 5)		Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the mesh See: <u>http://www.caseydietrich.com/2011/05/27/wave-</u> <u>refraction-on-coarse-meshes-part-2/</u> . The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.		CAL	
Swan_MaxHS	Waves where ice>70% (slides 2,3)		The area of concern is limited to a region near the Canadian shoreline will not influence the wave model will be used to support floodplain n along the US shoreline.	. This area results that	CAL	
Additional Comments on Deta	ailed Check					
Comment			Resolution		Verification	
Comment			Resolution		, enneation	
Reviewer Signature:		R	2		1	
Date:	6/19/2012					

SWAN REVIEW						
Storm:	Storm084	Storm084_2003040100				
Reviewer:	Siva Sanga	_				
Organization:	RAMPP					
Date Checked:	6/1/2012					
Was the max significant wave	U			Ye	es	
Was the wave period at max s	significant wave h	neight	t checked for anomalies?	Ye	es	
Was the wave direction at ma	x significant wav	e heig	ght checked for anomalies?	Ye	es	
			Issues			
File	Comment		Resolution		Verification	
Swan_TP_atMaxHS.63	Areas of unusua high period (See slide 7)		Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the mesh See: <u>http://www.caseydietrich.com/2011/05/27/wave- refraction-on-coarse-meshes-part-2/</u> . The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.		CAL	
Additional Comments on Det	ailed Check					
Comment			Resolution		Verification	
Reviewer Signature:		P				
Date:	6/19/2012					

SWAN REVIEW						
Storm:	Storm085_	Storm085_2003040400				
Reviewer:	Siva Sanga	meswa	aran			
Organization:	RAMPP					
Date Checked:	6/1/2012					
Was the max significant wave	e height map chec	ked fo	or anomalies?	Ye	es	
Was the wave period at max s	significant wave h	neight	checked for anomalies?	Ye	es	
Was the wave direction at ma	x significant wav	e heig	ht checked for anomalies?	Ye	es	
			Issues			
File	Comment		Resolution		Verification	
Swan_TP_atMaxHS.63	Areas of unusua high period (See slide 5)	2	Localized spikes in wave height an known issue in the SWAN model w transition in elevation is not smooth due to the coarseness of the mesh S <u>http://www.caseydietrich.com/201</u> <u>refraction-on-coarse-meshes-part-2</u> observed spike(s) are limited to one elements and are located either on a side of the lake or in the St. Lawren where output will not be used for fit mapping.	where a sharp hly resolved See: <u>1/05/27/wave-</u> <u>2</u> . The e or two the Canadian nce River,	CAL	
Additional Comments on Dat						
Additional Comments on Det Comment	aneu Check	I	Resolution		Verification	
Comment			Resolution		vermeation	
Reviewer Signature:		Æ				
Date:	6/19/2012					

SWAN REVIEW						
Storm:	Storm086_	Storm086_2003041400				
Reviewer:	Siva Sanga	neswaran				
Organization:	RAMPP					
Date Checked:	6/14/2012					
Was the max significant wave	e height map chec	ed for anoma	lies?	Ye	es	
Was the wave period at max s	significant wave h	ight checked	for anomalies?	Ye	es	
Was the wave direction at ma	x significant wav	height check	ed for anomalies?	Ye	es	
		Issues	5			
File	Comment		Resolution		Verification	
Swan_TP_atMaxHS.63 Additional Comments on Det	Areas of unusua high period (See slide 4) <u>ailed Check</u>	High spikes in wave height and period are a known issues in the SWAN models where a sharp transition in elevation is not smoothly resolved due to the coarseness of the mesh. See: http://www.caseydietrich.com/2011/05/27/wave- refraction-on-coarse-meshes-part-2/. The location of these spikes is either located on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.		CAL		
Comment			Resolution		Verification	
T 1 C 1						
Reviewer Signature:	D	R				
Date:	6/22/2012					

SWAN REVIEW						
Storm:	Storm087_	2003	3112500			
Reviewer:	Siva Sanga	Siva Sangameswaran				
Organization:	RAMPP					
Date Checked:	6/1/2012					
Was the max significant wave	e height map chec	ked	for anomalies?	Ye	es	
Was the wave period at max s	significant wave h	neigh	t checked for anomalies?	Ye	es	
Was the wave direction at ma	x significant wav	e hei	ght checked for anomalies?	Ye	es	
			Issues			
File	Comment		Resolution		Verification	
Swan_TP_atMaxHS.63	Areas of unusua high period (See slide 4)		Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the mesh See: <u>http://www.caseydietrich.com/2011/05/27/wave-</u> <u>refraction-on-coarse-meshes-part-2/</u> . The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.		CAL	
	11011					
Additional Comments on Det Comment	alled Check	1	Resolution		Verification	
Comment			Resolution		vermeation	
Reviewer Signature:		E				
Date:	6/19/2012					

SWAN REVIEW						
Storm:	Storm088	Storm088_2005033000				
Reviewer:	Siva Sanga					
Organization:	RAMPP					
Date Checked:	6/1/2012	5/1/2012				
Was the max significant wave	e height map chec	ked t	for anomalies?	Ye	es	
Was the wave period at max s	significant wave h	neigh	t checked for anomalies?	Ye	es	
Was the wave direction at ma	x significant wav	e hei	ght checked for anomalies?	Ye	es	
			Issues			
File	Comment		Resolution		Verification	
Swan_TP_atMaxHS.63	Areas of unusua high period (See slide 5)		Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the mesh See: <u>http://www.caseydietrich.com/2011/05/27/wave-</u> <u>refraction-on-coarse-meshes-part-2/</u> . The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.		CAL	
			<u> </u>			
Additional Comments on Det Comment	ailed Check	T	Resolution		Verification	
Comment			Resolution		vermeation	
Reviewer Signature:		5				
Date:	6/19/2012					

SWAN REVIEW						
Storm:	Storm089_2	2005	092600			
Reviewer:	Siva Sanga					
Organization:	RAMPP					
Date Checked:	6/1/2012	6/1/2012				
Was the max significant wave	e height map chec	ked t	for anomalies?	Ye	es	
Was the wave period at max s	significant wave h	neigh	t checked for anomalies?	Ye	es	
Was the wave direction at ma	x significant wave	e hei	ght checked for anomalies?	Ye	es	
			Issues			
File	Comment		Resolution		Verification	
Swan_TP_atMaxHS.63	Areas of unusua high period (See slide 4)		Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the mesh See: http://www.caseydietrich.com/2011/05/27/wave-refraction-on-coarse-meshes-part-2/. The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.		CAL	
Additional Comments on Det Comment	alled Check	1	Resolution		Verification	
Comment			Resolution		vermeation	
Reviewer Signature:		Z	2			
Date:	6/19/2012					

SWAN REVIEW					
Storm:	Storm090	Storm090 2006020300			
Reviewer:	Siva Sanga	meswaran			
Organization:	RAMPP				
Date Checked:	6/14/2012				
Was the max significant wave	e height map chec	ked for anomalies?	Yes		
Was the wave period at max s	significant wave h	eight checked for anomalies?	Yes		
Was the wave direction at ma	x significant wave	e height checked for anomalies?	Yes		
		Issues			
File	Comment	Resolution	Verification		
Swan_TP_atMaxHS.63 Additional Comments on Det	Areas of unusua high period (See slide 5) ailed Check	8 1	e-		
Comment		Resolution	Verification		
Reviewer Signature:					
Date:	6/22/2012				

SWAN REVIEW					
Storm:	Storm091_	2006	031200		
Reviewer:	Siva Sanga	mesw	varan		
Organization:	RAMPP				
Date Checked:	6/1/2012				
Was the max significant wave	e height map chec	ked f	for anomalies?	Ye	es
Was the wave period at max s	-	-		Ye	es
Was the wave direction at ma	x significant wav	e heig	ght checked for anomalies?	Ye	es
			Issues		
File Swan_TP_atMaxHS.63	Comment Areas of unusua		Resolution High spikes in wave height and per		Verification CAL
	high period (See slides 5 and 6)	2	known issues in the SWAN models sharp transition in elevation is not s resolved due to the coarseness of th http://www.caseydietrich.com/201 refraction-on-coarse-meshes-part-2 location of these spikes is either loo Canadian side of the lake or in the River, where output will not be use floodplain mapping. The larger waves are propagating channel interacting with bay gener producing the difference seen in Tp		
Additional Comments on Det	ailed Check				
Comment			Resolution		Verification
Reviewer Signature:					
Date:	6/22/2012				

SWAN REVIEW							
Storm:	Storm092	torm092_2006102600					
Reviewer:	Siva Sanga						
Organization:	RAMPP	AMPP					
Date Checked:	6/1/2012	1/2012					
Was the max significant wave	e height map chec	ked t	for anomalies?	Ye	es		
Was the wave period at max s	significant wave h	leigh	t checked for anomalies?	Ye	es		
Was the wave direction at ma	x significant wave	e hei	ght checked for anomalies?	Ye	es		
			Issues				
File	Comment		Resolution		Verification		
Swan_TP_atMaxHS.63	Areas of unusua high period (See slide 4)		Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the mesh See: http://www.caseydietrich.com/2011/05/27/wave-refraction-on-coarse-meshes-part-2/. The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.		CAL		
Additional Comments on Det Comment	alled Check	1	Resolution		Verification		
Comment			Resolution		vermeation		
Reviewer Signature:	05	2					
Date:	6/19/2012						

SWAN REVIEW						
Storm:	Storm093_	Storm093_2006112900				
Reviewer:	Siva Sanga	mesv	varan			
Organization:	RAMPP					
Date Checked:	6/1/2012					
Was the max significant wave	• ·			Ye	es	
Was the wave period at max s	significant wave h	neigh	t checked for anomalies?	Ye	es	
Was the wave direction at ma	x significant wav	e hei	ght checked for anomalies?	Ye	es	
			Issues			
File	Comment		Resolution		Verification	
Swan_TP_atMaxHS.63	Areas of unusua high period (See slide 4)			CAL		
Additional Comments on Det	ailed Check					
Comment			Resolution		Verification	
Reviewer Signature:		P	2			
Date:	6/19/2012					

SWAN REVIEW						
Storm:	Storm094_	Storm094_2007010600				
Reviewer:	Siva Sanga	mesv	varan			
Organization:	RAMPP					
Date Checked:	6/1/2012	6/1/2012				
Was the max significant wave	• •			Ye		
Was the wave period at max s	significant wave h	neight	t checked for anomalies?	Ye	es	
Was the wave direction at ma	x significant wav	e hei	ght checked for anomalies?	Ye	es	
			Issues			
File	Comment		Resolution		Verification	
Swan_TP_atMaxHS.63	Areas of unusua high period (See slide 4)	-			CAL	
Additional Comments on Det	ailad Chaola					
Additional Comments on Det Comment	alleu Check	1	Resolution		Verification	
Comment			Resolution		vermeation	
Reviewer Signature:		Z	2			
Date:	6/19/2012					

SWAN REVIEW						
Storm:	500					
Reviewer:		Siva Sangameswaran	n			
Organization:		RAMPP				
Date Checked:		6/14/2012				
Was the max significant wave height	-					Yes
Was the wave period at max significa	nt wave he	eight checked for anon	nalies?			Yes
Was the wave direction at max signifi	icant wave	height checked for an	omalies	s?		Yes
		Issues				
File		Comment		Resolution		Verification
NO DATA PROVIDED for HSMax, TPatHSMax, DIRatHSMax				Data provided 06\22\2012		CAL
Additional Comments on Detailed Ch	eck					
Commen	nt		Resolution			Verification
Reviewer Signature:	(\leq			
Date:	6/	25/2012				

SWAN REVIEW					
Storm:	Storm096_	2007	112400		
Reviewer:	Siva Sanga	Siva Sangameswaran			
Organization:	RAMPP				
Date Checked:	6/1/2012				
Was the max significant wave	e height map chec	ked	for anomalies?	Ye	es
Was the wave period at max s	significant wave h	neigh	t checked for anomalies?	Ye	es
Was the wave direction at ma	x significant wav	e hei	ght checked for anomalies?	Ye	es
			Issues		
File	Comment		Resolution		Verification
Swan_TP_atMaxHS.63	Areas of unusua high period (See slide 4)		Localized spikes in wave height and period are a known issue in the SWAN model where a sharp transition in elevation is not smoothly resolved due to the coarseness of the mesh See: http://www.caseydietrich.com/2011/05/27/wave-refraction-on-coarse-meshes-part-2/. The observed spike(s) are limited to one or two elements and are located either on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.		CAL
Additional Comments on Det Comment	alled Check	1	Resolution		Verification
Comment			Resolution		vermeation
Reviewer Signature:		E			
Date:	6/19/2012				

SWAN REVIEW							
Storm:	Storm097_	Storm097_2008010600					
Reviewer:	Siva Sanga	mesv	waran				
Organization:	RAMPP						
Date Checked:	6/14/2012						
Was the max significant wave	e height map chec	ked	for anomalies?	Ye	es		
Was the wave period at max	significant wave h	neigh	t checked for anomalies?	Ye	es		
Was the wave direction at ma	x significant wav	e hei	ght checked for anomalies?	Ye	es		
			Issues				
File	Comment		Resolution		Verification		
Swan_TP_atMaxHS.63 Additional Comments on Det	Areas of unusua high period (See slide 5)		High spikes in wave height and period are a known issues in the SWAN models where a sharp transition in elevation is not smoothly resolved due to the coarseness of the mesh. See: http://www.caseydietrich.com/2011/05/27/wave- refraction-on-coarse-meshes-part-2/. The location of these spikes is either located on the Canadian side of the lake or in the St. Lawrence River, where output will not be used for floodplain mapping.		CAL		
<u>Additional Comment</u> Comment		1	Resolution		Verification		
Comment			Kesolutioli		vermeauon		
Reviewer Signature:		K					
Date:	6/22/2012						

SWAN REVIEW						
Storm:		Storm098_20080305	500			
Reviewer:		Siva Sangameswarar	1			
Organization:		RAMPP				
Date Checked:		6/14/2012				
Was the max significant wave height	map check	ted for anomalies?				Yes
Was the wave period at max significa	nt wave he	eight checked for anon	nalies?			Yes
Was the wave direction at max signifi	cant wave	height checked for an	omalies	?		Yes
		Issues				
File		Comment		Resolution	1	Verification
Additional Comments on Detailed Ch	<u>eck</u>					
Commen	nt		Resolution			Verification
Reviewer Signature:		OS R				
Date:	6/	22/2012				

SWAN REVIEW							
Storm:		Storm099_20080912	200				
Reviewer:		Siva Sangameswaran					
Organization:		RAMPP					
Date Checked:		6/14/2012					
Was the max significant wave height	map check	ked for anomalies?				Yes	
Was the wave period at max signification		-				Yes	
Was the wave direction at max signif	ïcant wave	height checked for an	nomalies	?		Yes	
		Issues					
File Measured_vs_SWAN.bmp		Comment ncies in wave heights		Resolution Discrepancy bety		Verification CAL	
		measured and model n ved In C45139. See sl		modeled and measured data is expected for son storm events. It most likely a limitation of the modeled wind fu When analyzed statistically as a population of sto the Q-Q plots sh good agreement between measure modeled wave heights. See Fig 7.8 of Baird Lak Ontario report.	ne is elds. orms, owed ed and ure		
Additional Comments on Detailed Ch	heck						
Comme				Resolution		Verification	
Reviewer Signature:		(DDC)					
Date:	6/	22/2012					

SWAN REVIEW						
Storm:		Storm100_2008122	500			
Reviewer:		Siva Sangameswaran				
Organization:		RAMPP				
Date Checked: 6/14/2012						
Was the max significant wave height	map check	ted for anomalies?				Yes
Was the wave period at max significa	nt wave he	eight checked for anot	malies?			Yes
Was the wave direction at max signifi	icant wave	height checked for a	nomalies	?		Yes
		Issues				
File		Comment		Resolution	1	Verification
Ice_data.csv Wave data observed in most portions of the La concentrations > 0.7.		tions of the Lake, who			CAL	
Additional Comments on Detailed Ch	<u>ieck</u>					
Comme	nt			Resolution		Verification
Reviewer Signature:		DD Z	<u>I</u>			
Date:	6/	22/2012				

SWAN REVIEW						
Storm:		Storm101_1970112000				
Reviewer:		Siva Sangameswaran	1			
Organization:		RAMPP				
Date Checked:	Date Checked: 6/14/2012					
Was the max significant wave height	1					Yes
Was the wave period at max significa	nt wave he	eight checked for anon	nalies?			Yes
Was the wave direction at max signifi	cant wave	height checked for an	omalies	?		Yes
		Issues				
File		Comment		Resolution	I	Verification
Additional Comments on Detailed Ch	<u>eck</u>					
Commer	nt		Resolution			Verification
Reviewer Signature:		OS &				
Date:	6/	22/2012				

SWAN REVIEW						
Storm:		Storm102_1971012400				
Reviewer:		Siva Sangameswaran				
Organization:		RAMPP				
Date Checked:		6/15/2012				
Was the max significant wave height	map checke	d for anomalies?			Yes	
Was the wave period at max significa-	nt wave hei	ght checked for anomalies?			Yes	
Was the wave direction at max signifi	cant wave h	neight checked for anomalies	?		Yes	
		Issues				
File		Comment	Resolution	ı	Verification	
No Data Provided.			Data provided 06\22\2012		CAL	
Additional Comments on Detailed Ch	<u>eck</u>					
Comment		Resol	ution		Verification	
Reviewer Signature:	(OS DE				
Date:	6/2	5/2012				

SWAN REVIEW						
Storm:		Storm103_19710127	700			
Reviewer:		Christina Lindemer				
Organization:		RAMPP				
Date Checked:		6/18/2012				
Was the max significant wave height	map check	ted for anomalies?				Yes
Was the wave period at max significa	nt wave he	eight checked for anon	nalies?			Yes
Was the wave direction at max signifi	cant wave	height checked for an	omalies	?		Yes
		Issues				
File		Comment		Resolution	l	Verification
Additional Comments on Detailed Ch	leck					
Commer	nt		Resolution			Verification
Reviewer Signature:	(DD.				
Date:	6/	26/2012				

SWAN REVIEW						
Storm:		Storm104_1971020	300			
Reviewer:		Christina Lindemer				
Organization: RAMPP						
Date Checked:		6/18/2012				
Was the max significant wave height	map check	ked for anomalies?				Yes
Was the wave period at max significa	nt wave h	eight checked for anor	nalies?			Yes
Was the wave direction at max signifi	icant wave	e height checked for ar	nomalies	;?		Yes
		Issues				
File		Comment		Resolution	ı	Verification
Ice_data.csv	Incomplete ice data provided results suggest ice concentrat 0.7.			Ice data was incomplete(older datasets 1960 - 1972, tend to be incomplete) Polygon was added for the Bay of Quinte		CAL
Additional Comments on Detailed Ch	a ch					
Additional Comments on Detailed Cr				Resolution		Verification
Comme	int –			Resolution		vermeation
Reviewer Signature:		(DSE	\mathbf{S}			
Date:	6	/26/2012				

SWAN REVIEW						
Storm:		Storm105_19710210	000			
Reviewer:		Christina Lindemer				
Organization:		RAMPP				
Date Checked:		6/18/2012				
Was the max significant wave height	map check	ted for anomalies?			Yes	
Was the wave period at max significa	nt wave he	eight checked for anor	nalies?		Yes	
Was the wave direction at max signifi	icant wave	height checked for an	omalies	;?	Yes	
		Issues				
File		Comment		Resolution	Verification	
Ice_data.csv				Ice data was incomplete(older datasets 1960 - 197 tend to be incomple Polygon was added where ice concentration was >70% .	ete)	
Additional Comments on Detailed Ch	neck			•		
Comme	nt			Resolution	Verification	
Reviewer Signature:	(OS.			·	
Date:	6/	26/2012				

SWAN REVIEW								
Storm:	Storm106_1971022	2500						
Reviewer:	Christina Lindemer							
Organization:	RAMPP	RAMPP						
Date Checked:	6/18/2012							
Was the max significant wave her	ight map checked for anomalies?		Yes					
Was the wave period at max sign	ificant wave height checked for ano	malies?	Yes					
Was the wave direction at max si	gnificant wave height checked for a	nomalies?	Yes					
	Issues							
File	Comment	Resolution	Verification					
Ice_data.csv	Incomplete ice data provided. Wave results suggest ice concentrations > 0.7.	Ice data was incomplete(older datasets 1960 - 1972, tend to be incomplete) Polygon was added where ice concentration was >70% . Polygon inputted into simulation encroached into Bay of Quinte where there was no ice data but will not influence the wave model results that will be used to support floodplain mapping along the US shoreline.	CAL					
swan_HS_max.63	Linear features where wave heights are lower than surrounding, suggest ice issue (see slide 3)	There was a malfunction in the post processing script, the storm will be post processed again and re-sent for QC.	CAL					
swan_TP_atMaxHS.63	Linear features where wave periods are lower than surrounding, suggest ice issue (see slide 4)	There was a malfunction in the post processing script, the storm will be post processed again and re-sent for QC.	CAL					
swan_DIR_atMaxHS.63	Linear features where wave directions are different than surrounding, suggest ice issue (see slide 5)	There was a malfunction in the post processing script, the storm will be post processed again and re-sent for QC.	CAL					
Additional Comments on Detaile	d Check							
Con	nment	Resolution	Verification					
Reviewer Signature:	<u>OSE</u>		<u> </u>					
Date:	6/26/2012							

SWAN REVIEW							
Storm:		Storm107_1971030	100				
Reviewer:		Christina Lindemer					
Organization:		RAMPP					
Date Checked:		6/19/2012					
Was the max significant wave heigh	nt map checl	ked for anomalies?				Yes	
Was the wave period at max signific	-		nalies?			Yes	
Was the wave direction at max sign				;?		Yes	
		Issues					
File		Comment		Resolution	1	Verification	
Ice_data.csv		ete ice data provided.		Ice data was incomplete(olde datasets 1960 - 1 tend to be incom Polygon was add where ice concentration was >70% . Polygor inputted into simulation encro into Bay of Quir where there was data but will no influence the was model results that be used to suppor floodplain mapp along the US shoreline.	1972, nplete) ded as n pached nte no ice t t ve at will ort	CAL	
Additional Comments on Detailed	Check						
Comm				Resolution		Verification	
Reviewer Signature:		Ø	\geq				
Date:	6/	/26/2012					

SWAN REVIEW					
Storm: Storm108_19711208)0		
Reviewer:		Christina Lindemer			
Organization:		RAMPP			
Date Checked:		6/19/2012			
Was the max significant wave height	-				Yes
Was the wave period at max significant	nt wave he	eight checked for anoma	alies?		Yes
Was the wave direction at max signifi	cant wave	height checked for ano	malies	?	Yes
		Issues		• •	
File		Comment		Resolution	Verification
Additional Comments on Detailed Ch	<u>eck</u>				
Commer	nt			Resolution	Verification
Reviewer Signature:	(DD.			
Date:	6/	26/2012			

SWAN REVIEW					
Storm:		Storm109_1971122700			
Reviewer:		Christina Lindemer			
Organization:		RAMPP			
Date Checked:		6/19/2012			
Was the max significant wave height	map check	ted for anomalies?			Yes
Was the wave period at max significa-	nt wave he	eight checked for anomalies?			Yes
Was the wave direction at max signifi	cant wave	height checked for anomalie	es?		Yes
		Issues			
File		Comment	Resolution	1	Verification
Additional Comments on Detailed Ch	eck				-
Commer	nt		Resolution		Verification
Reviewer Signature:	(DD.			
Date:	6/	26/2012			

SWAN REVIEW						
Storm:		Storm110_1972012	200			
Reviewer:		Siva Sangameswaran				
Organization:		RAMPP				
Date Checked: 6/15/2012						
Was the max significant wave height map checked for anomalies?					Yes	
Was the wave period at max signification	int wave he	eight checked for anor	nalies?		Yes	
Was the wave direction at max signif	icant wave	height checked for an	nomalies	;?	Yes	
		Issues				
File		Comment		Resolution	Verification	
Ice_data.csv	Wave data observed in the norm most portions of the Lake, whe concentrations > 0.7.			Ice_data.csv is incorrect for storm time period. Ice da were incomplete an therefore not considered for this SWAN simulation. (see attached ice images)	ıd	
Additional Comments on Detailed Ch	neck					
Comme				Resolution	Verification	
Reviewer Signature:		DR.				
Date:	6/	25/2012				

SWAN REVIEW						
Storm:		Storm111_1972020100				
Reviewer:		Siva Sangameswaran				
Organization:		RAMPP				
Date Checked: 6/15/2012						
Was the max significant wave height				Yes		
Was the wave period at max significant wave height checked for anomalies?						Yes
Was the wave direction at max significant wave height checked for anomalies?						Yes
		Issues				
File		Comment		Resolution	1	Verification
	tta.csv Data does not cover the entire (refer slide 2). Based on the original is present, there is wave data concentrations are greater that			Ice data closest to storm peak was incomplete; it was decided to exclude ice from model simulation.		CAL
Additional Comments on Detailed Ch			1			
Comme	nt			Resolution		Verification
Reviewer Signature:	(DD.	<u> </u>			
Date:	6/2	22/2012				

SWAN REVIEW							
Storm:		Storm112_19721112	orm112_1972111200				
Reviewer:		Siva Sangameswaran					
Organization:		RAMPP					
Date Checked:	6/15/2012			-			
Was the max significant wave height	map check	ked for anomalies?				Yes	
Was the wave period at max signification	ant wave he	eight checked for anor	nalies?			Yes	
Was the wave direction at max signif	ïcant wave	height checked for an	nomalies	\$?		Yes	
Issues							
File		Comment		Resolution		Verification	
	ice map, concentr	de 2) Based on the par there is wave data wh ations are > 0.7. The is s appear identical to st	ere ice ce	within 2 weeks of storm peak; ice excluded from n simulation. An house script was developed to cal nearest ice data (ice_data.csv) t storm peak after which a decision made to include\exclude model simulatio based how near fell to peak of st (ice_data.csv sh have been delete prior to sending	was nodel in s Il the o the o the m a was ice in on data corm. ould ed		
Additional Comments on Detailed Ch				D			
Comme	nt			Resolution		Verification	
Reviewer Signature:	(02	<u> </u>			1	
Date:	6/	/22/2012					

SWAN REVIEW							
Storm:		Storm113_1972112400					
Reviewer:		Siva Sangameswaran					
Organization:		RAMPP					
Date Checked:		6/15/2012					
Was the max significant wave height			Yes				
Was the wave period at max signification	ant wave he	eight checked for anon	nalies?			Yes	
Was the wave direction at max signif	icant wave	height checked for an	omalies	?		Yes	
		Issues					
File		Comment		Resolution	n	Verification	
Ice data.csv	(refer slid coverage wave dat	es not cover the entire I de 2) Based on the ice e that is provided, there ta where ice concentrat Ice data appears ident 11, 112.	e is tions	There were no is within 2 weeks storm peak; ice excluded from r simulation. An house script was developed to ca nearest ice data (ice_data.csv) t storm peak after which a decision made to include\exclude model simulation based how near fell to peak of st (ice_data.csv sh have been delete prior to sending	of was nodel in s II the o the o the in was ice in on data corm. ould ed	CAL	
Additional Comments on Detailed Cl Comme				Resolution		Verification	
201110							
Reviewer Signature:	(DB.				<u> </u>	
Date:	6/	/22/2012					

SWAN REVIEW							
Storm:		Storm114_1972120200					
Reviewer:		Siva Sangameswaran					
Organization:		RAMPP					
Date Checked:		6/15/2012					
Was the max significant wave height	map check	ked for anomalies?				Yes	
Was the wave period at max signification	ant wave he	eight checked for anor	nalies?			Yes	
Was the wave direction at max signif	ficant wave	height checked for an	omalies	?		Yes	
		Issues					
File		Comment		Resolution	n	Verification	
Ice data.csv	(refer sli map, the concentr	es not cover the entire is de 2). Based on provid re is wave data where ations are > 0.7. Ice da to storms 111, 112, 1	led ice ice ata is	There were no id within 2 weeks of storm peak; ice is excluded from m simulation. An house script was developed to cal nearest ice data (ice_data.csv) tr storm peak after which a decision made to include\exclude model simulation based how near fell to peak of st (ice_data.csv sh have been delete prior to sending	of was nodel in s Il the o the o the in was ice in on data corm. ould ed	CAL	
Additional Comments on Detailed C	1. e. a.1.			<u> </u>			
Additional Comments on Detailed C Comme				Resolution		Verification	
Reviewer Signature:		DS B	<u> </u>			<u> </u>	
Date:	6/	2/2012					

SWAN REVIEW							
Storm:		Storm115_19730315	1500				
Reviewer:		Siva Sangameswaran					
Organization:		RAMPP					
Date Checked:		6/15/2012					
Was the max significant wave height	ed for anomalies?				Yes		
Was the wave period at max significant wave height checked for and						Yes	
Was the wave direction at max significant wave height checked for anomali				?		Yes	
	_	Issues					
File		Comment		Resolution The area of conc		Verification CAL	
Ice_data.csv	Wave data observed in the northern most portions of the Lake, where ice concentrations > 0.7.		limited to a localized region near the Canadian shoreline. This area will not influence the wave model results that will be used to support floodplain mapping along the US shoreline.				
Additional Comments on Detailed Ch	neck						
Comme	nt			Resolution		Verification	
Reviewer Signature:	(DD -					
Date:	6/2	22/2012					

SWAN REVIEW							
Storm:		Storm116_1973040800					
Reviewer:		Siva Sangameswaran					
Organization:	RAMPP						
Date Checked:		6/15/2012					
Was the max significant wave height	map check	ted for anomalies?				Yes	
Was the wave period at max significa	nt wave he	eight checked for anon	nalies?			Yes	
Was the wave direction at max significant wave height checked for an				?		Yes	
Issues							
File		Comment		Resolution	I	Verification	
Additional Comments on Detailed Ch	leck						
Commer	nt		Resolution			Verification	
Reviewer Signature:	(DA:					
Date:	6/	22/2012					

SWAN REVIEW						
Storm:		GLProdRunQCForm	rm_Storm117_1973103000			
Reviewer:		Christina Lindemer				
Organization:	RAMPP					
Date Checked: 6/15/2012						
Was the max significant wave height	map check	ked for anomalies?				Yes
Was the wave period at max significant wave height checked for anon						Yes
Was the wave direction at max significant wave height checked for an				?		Yes
Issues						
File		Comment		Resolution		Verification
Additional Comments on Detailed Ch	eck					
Commer	nt		Resolution			Verification
Reviewer Signature:		OSZ.				
Date:	6/	22/2012				

SWAN REVIEW						
Storm:		Storm118_19731103	0300			
Reviewer:		Christina Lindemer				
Organization:	RAMPP					
Date Checked:		6/15/2012				
Was the max significant wave height	map check	ted for anomalies?				Yes
Was the wave period at max significa	nt wave he	eight checked for anom	nalies?			Yes
Was the wave direction at max significant wave height checked for an			omalies	?		Yes
		Issues				
File		Comment		Resolution		Verification
Additional Comments on Detailed Ch	leck					
Commer	nt		Resolution			Verification
Reviewer Signature:		OS DE				
Date:	6/	22/2012				

SWAN REVIEW							
Storm:		Storm119_19731226	2600				
Reviewer:		Christina Lindemer					
Organization:	RAMPP						
Date Checked:		6/15/2012					
Was the max significant wave height	map check	ted for anomalies?				Yes	
Was the wave period at max significa	nt wave he	eight checked for anom	nalies?			Yes	
Was the wave direction at max significant wave height checked for an			omalies	?		Yes	
		Issues					
File		Comment		Resolution		Verification	
Additional Comments on Detailed Ch	<u>ieck</u>						
Commer	nt		Resolution			Verification	
Reviewer Signature:	(D.D.					
Date:	6/	22/2012					

SWAN REVIEW							
Storm:		Storm120_1974010800					
Reviewer:		Christina Lindemer					
Organization:	RAMPP						
Date Checked:		6/15/2012					
Was the max significant wave height	map check	ted for anomalies?			Yes		
Was the wave period at max significa	nt wave he	eight checked for anomalie	s?		Yes		
Was the wave direction at max signifi	height checked for anoma	lies?		Yes			
File		Comment	Resoluti	Resolution			
No Data provided	Data pro	vided					
Additional Comments on Detailed Ch	<u>ieck</u>						
Comme	nt		Resolution		Verification		
Reviewer Signature:	(OS CO					
Date:	6/	22/2012					

SWAN REVIEW						
Storm:		Storm121_197401280	2800			
Reviewer:		Christina Lindemer				
Organization:	RAMPP					
Date Checked: 6/15/2012						
Was the max significant wave height	map check	ted for anomalies?				Yes
Was the wave period at max significant wave height checked for anon						Yes
Was the wave direction at max significant wave height checked for an				?		Yes
Issues						
File		Comment		Resolution		Verification
Additional Comments on Detailed Ch	<u>eck</u>					Γ
Commer	nt		Resolution			Verification
Reviewer Signature:		DD.				
Date:	6/	22/2012				

SWAN REVIEW							
Storm:		Storm122_19740220	000				
Reviewer:		Christina Lindemer					
Organization: RAMPP							
Date Checked:							
Was the max significant wave height n	map check	ted for anomalies?				Yes	
Was the wave period at max significant wave height checked for anor						Yes	
Was the wave direction at max significant wave height checked for an				?		Yes	
Issues							
File		Comment		Resolution		Verification	
Additional Comments on Detailed Che	<u>eck</u>						
Commen	nt		Resolution			Verification	
Reviewer Signature:		DR.					
Date:	6/	22/2012					

SWAN REVIEW							
Storm:		Storm123_19740302	200				
Reviewer:		Christina Lindemer					
Organization: RAMPP							
Date Checked:							
Was the max significant wave height n	ted for anomalies?				Yes		
Was the wave period at max significant wave height checked for anor						Yes	
Was the wave direction at max significant wave height checked for an				?		Yes	
Issues							
File		Comment		Resolution		Verification	
Additional Comments on Detailed Che	<u>eck</u>						
Commen	nt		Resolution			Verification	
Reviewer Signature:		DR.					
Date:	6/	22/2012					

SWAN REVIEW							
Storm:		Storm124_197403140	00				
Reviewer:		Christina Lindemer					
Organization:	RAMPP						
Date Checked: 6/15/2012							
Was the max significant wave height i	map check	xed for anomalies?				Yes	
Was the wave period at max significant	nt wave he	eight checked for anoma	alies?			Yes	
Was the wave direction at max significant wave height checked for an				?		Yes	
File		Comment		Resolution		Verification	
Additional Comments on Detailed Ch	<u>eck</u>						
Commer	nt			Resolution		Verification	
Reviewer Signature:		DD.					
Date:	6/	22/2012					

SWAN REVIEW							
Storm:		Storm125_197404140	00				
Reviewer:		Christina Lindemer					
Organization:	RAMPP						
Date Checked: 6/15/2012							
Was the max significant wave height	map check	ted for anomalies?				Yes	
Was the wave period at max significant wave height checked for anon						Yes	
Was the wave direction at max significant wave height checked for an				?		Yes	
File		Comment		Resolution		Verification	
Additional Comments on Detailed Ch	<u>eck</u>					Γ	
Commer	nt			Resolution		Verification	
Reviewer Signature:		DD.					
Date:	6/	22/2012					

SWAN REVIEW								
Storm:		Storm126_19740515	500					
Reviewer:		Christina Lindemer						
Organization: RAMPP								
Date Checked:								
Was the max significant wave height map checked for anomalies?						Yes		
Was the wave period at max significant wave height checked for anor						Yes		
Was the wave direction at max significant wave height checked for an				?		Yes		
File		Comment		Resolution		Verification		
Additional Comments on Detailed Che	<u>eck</u>							
Commen	ıt			Resolution		Verification		
Reviewer Signature:		DA.						
Date:	6/	22/2012						

SWAN REVIEW							
Storm:		Storm127_19741112	200				
Reviewer:		Christina Lindemer					
Organization: RAMPP							
Date Checked:							
Was the max significant wave height n	ted for anomalies?				Yes		
Was the wave period at max significant wave height checked for anor						Yes	
Was the wave direction at max significant wave height checked for an				?		Yes	
Issues							
File		Comment		Resolution		Verification	
Additional Comments on Detailed Che	<u>eck</u>						
Commen	nt		Resolution			Verification	
Reviewer Signature:		DDZ.					
Date:	6/	22/2012					

SWAN REVIEW							
Storm:		Storm128_19741129	900				
Reviewer:		Christina Lindemer					
Organization: RAMPP							
Date Checked:							
Was the max significant wave height n	nap check	ted for anomalies?				Yes	
Was the wave period at max significant wave height checked for anor						Yes	
Was the wave direction at max significant wave height checked for an				?		Yes	
Issues							
File		Comment		Resolution		Verification	
Additional Comments on Detailed Che	<u>eck</u>						
Commen	t		Resolution			Verification	
Reviewer Signature:		() SSR					
Date:	6/26/2012						

SWAN REVIEW							
Storm:	Storm129_	1975	012300				
Reviewer:	Christina L	inde	mer				
Organization:	rganization: RAMPP						
Date Checked:	6/15/2012						
Was the max significant wave	Ye	es					
Was the wave period at max s	significant wave h	neigh	t checked for anomalies?	Ye	es		
Was the wave direction at ma	x significant wav	e hei	ght checked for anomalies?	Ye	es		
			Issues				
File	Comment		Resolution		Verification		
swan_TP_atMaxHS.63 Additional Comments on Det	Area of high wa period, node 39082. See slide <u>ailed Check</u>		High spikes in wave height and per known issues in the SWAN models sharp transition in elevation is not s resolved due to the coarseness of th http://www.caseydietrich.com/2011 refraction-on-coarse-meshes-part-2 location of these spikes is either loo Canadian side of the lake or in the s River, where output will not be use floodplain mapping.	CAL			
Comment			Resolution		Verification		
		<u> </u>					
Reviewer Signature:		2	2				
Date:	6/22/2012						

SWAN REVIEW							
Storm:		Storm130_19750223	300				
Reviewer:		Christina Lindemer					
Organization: RAMPP							
Date Checked:							
Was the max significant wave height n	map check	ted for anomalies?				Yes	
Was the wave period at max significant wave height checked for anor						Yes	
Was the wave direction at max significant wave height checked for an				?		Yes	
Issues							
File		Comment		Resolution		Verification	
Additional Comments on Detailed Che	<u>eck</u>						
Commen	nt		Resolution			Verification	
Reviewer Signature:		DD.					
Date:	6/	22/2012					

SWAN REVIEW							
Storm:		Storm131_19750331	100				
Reviewer:		Christina Lindemer					
Organization: RAMPP							
Date Checked:							
Was the max significant wave height n	ted for anomalies?				Yes		
Was the wave period at max significant wave height checked for anor						Yes	
Was the wave direction at max significant wave height checked for an				?		Yes	
Issues							
File		Comment		Resolution		Verification	
Additional Comments on Detailed Che	<u>eck</u>						
Commen	nt		Resolution			Verification	
Reviewer Signature:		DD -					
Date:	6/	22/2012					

SWAN REVIEW							
Storm:		Storm132_19751107	700				
Reviewer:		Christina Lindemer					
Organization: RAMPP							
Date Checked:							
Was the max significant wave height n	ted for anomalies?				Yes		
Was the wave period at max significant wave height checked for anor						Yes	
Was the wave direction at max significant wave height checked for an				?		Yes	
Issues							
File		Comment		Resolution		Verification	
Additional Comments on Detailed Che							
Commen	nt		Resolution			Verification	
Reviewer Signature:		DD					
Date:	6/	22/2012					

SWAN REVIEW							
Storm:		Storm133_19751128	300				
Reviewer:		Christina Lindemer					
Organization: RAMPP							
Date Checked:							
Was the max significant wave height n	ted for anomalies?				Yes		
Was the wave period at max significant wave height checked for anor						Yes	
Was the wave direction at max significant wave height checked for an				?		Yes	
Issues							
File		Comment		Resolution		Verification	
Additional Comments on Detailed Che	<u>eck</u>						
Commen	nt		Resolution			Verification	
Reviewer Signature:		DD.					
Date:	6/	22/2012					

SWAN REVIEW							
Storm:		Storm134_19751218	300				
Reviewer:	Christina Lindemer						
Organization:		RAMPP					
Date Checked:		6/15/2012					
Was the max significant wave height n	map check	ted for anomalies?				Yes	
Was the wave period at max significant	nt wave he	eight checked for anon	nalies?			Yes	
Was the wave direction at max significant wave height checked for an				?		Yes	
File		Comment		Resolution		Verification	
Additional Comments on Detailed Che	<u>eck</u>						
Commen	nt		Resolution			Verification	
Reviewer Signature:		DD -					
Date:	6/	22/2012					

SWAN REVIEW							
Storm:		Storm135_19760130	000				
Reviewer:	Christina Lindemer						
Organization:		RAMPP					
Date Checked:		6/15/2012					
Was the max significant wave height n	map check	ted for anomalies?				Yes	
Was the wave period at max significant	nt wave he	eight checked for anon	nalies?			Yes	
Was the wave direction at max significant wave height checked for an				?		Yes	
Issues							
File		Comment		Resolution		Verification	
Additional Comments on Detailed Che	<u>eck</u>						
Commen	nt		Resolution			Verification	
Reviewer Signature:		DD -					
Date:	6/	22/2012					

SWAN REVIEW							
Storm:		Storm136_19760302	00				
Reviewer:		Christina Lindemer					
Organization:		RAMPP					
Date Checked:		6/14/2012					
Was the max significant wave height	map check	ted for anomalies?				Yes	
Was the wave period at max significant	nt wave he	eight checked for anom	nalies?			Yes	
Was the wave direction at max significant wave height checked for an			omalies	?		Yes	
Issues							
File		Comment		Resolution		Verification	
Additional Comments on Detailed Ch	<u>eck</u>						
Commer	nt		Resolution			Verification	
Reviewer Signature:		D.C.					
Date:	6/	22/2012					

SWAN REVIEW							
Storm:		Storm137_19760408	300				
Reviewer:	Christina Lindemer						
Organization:		RAMPP					
Date Checked:		6/14/2012					
Was the max significant wave height n	map check	ted for anomalies?				Yes	
Was the wave period at max significant	nt wave he	eight checked for anon	nalies?			Yes	
Was the wave direction at max significant wave height checked for an				?		Yes	
File		Comment		Resolution		Verification	
Additional Comments on Detailed Che	<u>eck</u>						
Commen	nt		Resolution			Verification	
Reviewer Signature:		DD.					
Date:	6/	22/2012					

SWAN REVIEW							
Storm:		Storm138_19760424	400				
Reviewer:		Christina Lindemer					
Organization:		RAMPP					
Date Checked:		6/14/2012					
Was the max significant wave height n	map check	ted for anomalies?				Yes	
Was the wave period at max significant	nt wave he	eight checked for anon	nalies?			Yes	
Was the wave direction at max significant wave height checked for an				?		Yes	
Issues							
File		Comment		Resolution		Verification	
Additional Comments on Detailed Che	<u>eck</u>						
Commen	nt		Resolution			Verification	
Reviewer Signature:		DD -					
Date:	6/	22/2012					

SWAN REVIEW							
Storm:		Storm139_19760516	500				
Reviewer:	Christina Lindemer						
Organization:		RAMPP					
Date Checked:		6/14/2012					
Was the max significant wave height n	map check	ted for anomalies?				Yes	
Was the wave period at max significant	nt wave he	eight checked for anon	nalies?			Yes	
Was the wave direction at max significant wave height checked for an				?		Yes	
File		Comment		Resolution		Verification	
Additional Comments on Detailed Che	<u>eck</u>						
Commen	nt		Resolution			Verification	
Reviewer Signature:		DD -					
Date:	6/	22/2012					

SWAN REVIEW							
Storm:		Storm140_19761127	700				
Reviewer:	Christina Lindemer						
Organization:		RAMPP					
Date Checked:		6/14/2012					
Was the max significant wave height n	map check	ted for anomalies?				Yes	
Was the wave period at max significant	nt wave he	eight checked for anon	nalies?			Yes	
Was the wave direction at max significant wave height checked for an				?		Yes	
File		Comment		Resolution		Verification	
Additional Comments on Detailed Che	<u>eck</u>						
Commen	nt		Resolution			Verification	
Reviewer Signature:		DR.					
Date:	6/	22/2012					

SWAN REVIEW						
Storm:		Storm141_1977010	700			
Reviewer:		Christina Lindemer				
Organization:		RAMPP				
Date Checked: 6/14/2012						
Was the max significant wave height map checked for anomalies?						Yes
Was the wave period at max signific	ant wave he	ight checked for anor	nalies?			Yes
Was the wave direction at max signi	ficant wave	height checked for ar	nomalies	;?		Yes
		Issues				
File		Comment		Resolution		Verification
swan_DIR_atMaxHS.63 Additional Comments on Detailed C	ice border surroundi of lake.	high wave direction a r that are not coheren ing nodes on southern	t with	Wave directions are variable as they are taken at max Hs and therefore can have abrupt changes. Wind file was reviewed and wave directions are consistent with wind directions.		CAL
Additional Comments on Detailed C				Resolution		Verification
Comm	CIII			Resolution		vermeation
Reviewer Signature:		DDZ.				
Date:	6/2	22/2012				

SWAN REVIEW							
Storm:		Storm142_19770126	500				
Reviewer:	Christina Lindemer						
Organization:		RAMPP					
Date Checked:		6/14/2012					
Was the max significant wave height n	map check	ted for anomalies?				Yes	
Was the wave period at max significant	nt wave he	eight checked for anon	nalies?			Yes	
Was the wave direction at max significant wave height checked for an				?		Yes	
File		Comment		Resolution		Verification	
Additional Comments on Detailed Che	<u>eck</u>						
Commen	nt		Resolution			Verification	
Reviewer Signature:		DD -					
Date:	6/	22/2012					

SWAN REVIEW						
Storm:		Storm143_1977031500				
Reviewer:		Christina Lindemer				
Organization:		RAMPP				
Date Checked:		6/14/2012		-		
Was the max significant wave height	map check	ted for anomalies?			Yes	
Was the wave period at max signification	int wave he	eight checked for anomalies?			Yes	
Was the wave direction at max signif	icant wave	height checked for anomalies	s?		Yes	
		Issues		I		
File		Comment	Resolution	n	Verification	
Swan_Hs_atMaxHS.63, Swan_Tp_atMaxHS.63, Swan_Dir_atMaxHS.63	, period or directional data rn portion of lake where ice cates ice concentrations < slide 2 for ice coverage. data coverage for this date no ice in this region.	post processing the storm will be processed again re-sent for QC	malfunction in the post processing script, the storm will be post processed again and			
Con	nment		Resolution	n	Verification	
Reviewer Signature:						
Date:	6/	6/27/2012				

SWAN REVIEW							
Storm:		Storm144_19770330	000				
Reviewer:	Christina Lindemer						
Organization:		RAMPP					
Date Checked:		6/14/2012					
Was the max significant wave height n	map check	ted for anomalies?				Yes	
Was the wave period at max significant	nt wave he	eight checked for anon	nalies?			Yes	
Was the wave direction at max significant wave height checked for an				?		Yes	
File		Comment		Resolution		Verification	
Additional Comments on Detailed Che	<u>eck</u>						
Commen	nt		Resolution			Verification	
Reviewer Signature:		DDZ-					
Date:	6/	22/2012					

SWAN REVIEW							
Storm:		Storm145_197711090	00				
Reviewer:	Christina Lindemer						
Organization:		RAMPP					
Date Checked:		6/14/2012					
Was the max significant wave height	map check	ted for anomalies?				Yes	
Was the wave period at max significant	nt wave he	eight checked for anom	alies?			Yes	
Was the wave direction at max significant wave height checked for an				?		Yes	
Issues							
File		Comment		Resolution		Verification	
Additional Comments on Detailed Ch	<u>eck</u>					Γ	
Commer	nt			Resolution		Verification	
Reviewer Signature:		D.C.					
Date:	6/	22/2012					

SWAN REVIEW							
Storm: Storm146_1977120			300				
Reviewer:		Christina Lindemer					
Organization:		RAMPP					
Date Checked:		6/14/2012					
Was the max significant wave height n	map check	ted for anomalies?				Yes	
Was the wave period at max significant wave height checked for anon			malies?			Yes	
Was the wave direction at max signific	cant wave	height checked for an	omalies	?		Yes	
		Issues					
File		Comment		Resolution		Verification	
Additional Comments on Detailed Che	<u>eck</u>						
Comment			Resolution			Verification	
Reviewer Signature:		DD -					
Date:	6/	22/2012					

SWAN REVIEW						
Storm: Storm147_1977120			500			
Reviewer:		Christina Lindemer				
Organization:		RAMPP				
Date Checked:		6/14/2012				
Was the max significant wave height n	map check	ted for anomalies?				Yes
Was the wave period at max significant	nt wave he	eight checked for anon	nalies?			Yes
Was the wave direction at max signific	cant wave	height checked for an	omalies	?		Yes
		Issues				
File		Comment Resolution			Verification	
Additional Comments on Detailed Che	<u>eck</u>					
Comment			Resolution			Verification
Reviewer Signature:		DD -				
Date:	6/	22/2012				

SWAN REVIEW						
Storm: Storm148_19780111			100			
Reviewer:	Christina Lindemer					
Organization:		RAMPP				
Date Checked: 6/14/2012						
Was the max significant wave height i	-				Yes	
Was the wave period at max significant	nt wave he	ight checked for anon	nalies?		Yes	
Was the wave direction at max signific	cant wave	height checked for an	omalies	?	Yes	
		Issues				
File		Comment	Resolution		Verification	
Additional Comments on Detailed Ch						
Comment				Resolution	Verification	
Reviewer Signature:		DD2				
Date:	6/2	22/2012				

SWAN REVIEW							
Storm:		Storm149_1978011700					
Reviewer:		Christina Lindemer					
Organization:		RAMPP					
Date Checked: 6/14/2012							
Was the max significant wave height	map check	ted for anomalies?				Yes	
Was the wave period at max signification	ant wave he	eight checked for anor	nalies?		Yes		
Was the wave direction at max signif	ïcant wave	height checked for an	nomalies	?	Yes		
		Issues					
File		Comment		Resolution	1	Verification	
Swan_Hs_atMaxHS.63,	Wave, pe	eriod or directional dat	ta on	Ice in western po	ortion	CAL	
Swan_Tp_atMaxHS.63,	western p	portion of lake where	ice	of lake is classif	ied as		
Swan_Dir_atMaxHS.63		cates ice concentration		20% coverage and			
			de 2 for ice coverage. therefore not included		luded		
Ice_data.csv		Ice data is significantly different than		Ice data matches ice		CAL	
	data for Storm 148, which was 6		6	map of Jan. 18, 1978			
days prior.							
Additional Comments on Detailed C			r			1	
Comme			Resolution		Verification		
Reviewer Signature:		DR.	1			1	
Date:	6/	22/2012					

SWAN REVIEW						
orm: Storm_150_19780			2300			
Reviewer: Christina Lindeme						
Organization: RAMPP						
Date Checked:		6/14/2012				
Was the max significant wave height map checked for anomalies?						Yes
Was the wave period at max signification	int wave he	ight checked for anon	nalies?		Yes	
Was the wave direction at max signif	icant wave	height checked for an	omalies	?	Yes	
		Issues				
File		Comment		Resolution		Verification
Swan_Hs_atMaxHS.63, Swan_Tp_atMaxHS.63, Swan_Dir_atMaxHS.63 Ice_data.csv Additional Comments on Detailed Ch	No wave, period or directional data on western portion of lake where ice data indicates ice concentrations < 0.7. See slide 2 for ice coverage. Ice data is significantly different than data for Storm 149, which was 6 days prior.		There was a malfunction in the post processing script, the storm will be post processed again and re-sent for QC Ice data matches ice map of Jan. 25, 1978		Western portion of lake now looks appropriate. CAL	
Comme Reviewer Signature:		DD	2	Resolution		Verification
Date:	6/2	27/2012				