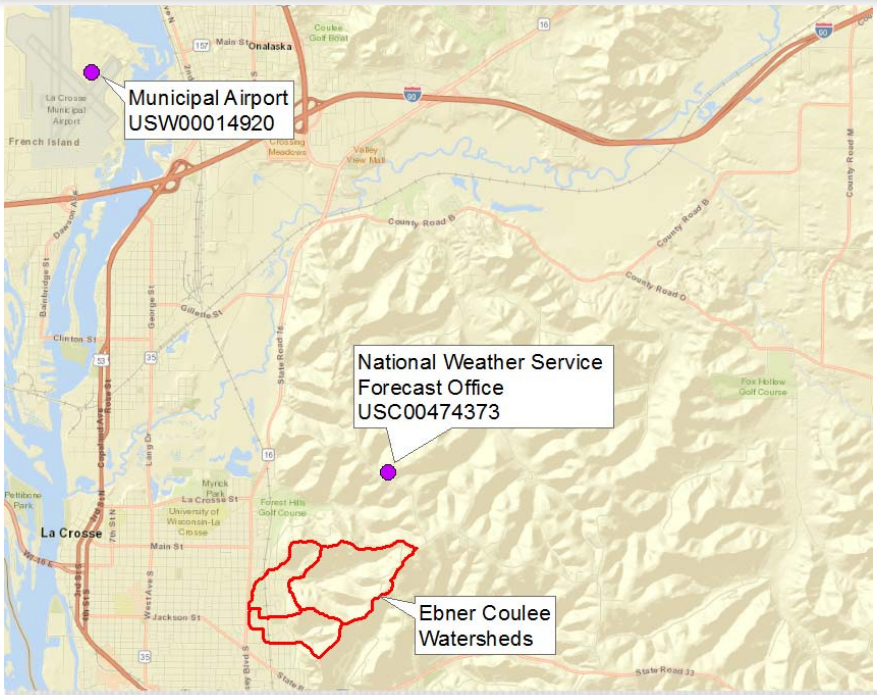
Ebner Coulee Floodway Remapping Study

Phase 2: Historic Rainfall Analysis & Hydrologic Calibration

January 2018

Fact Sheet



Two weather stations are in close proximity to Ebner Coulee

Historic Rainfall Analysis

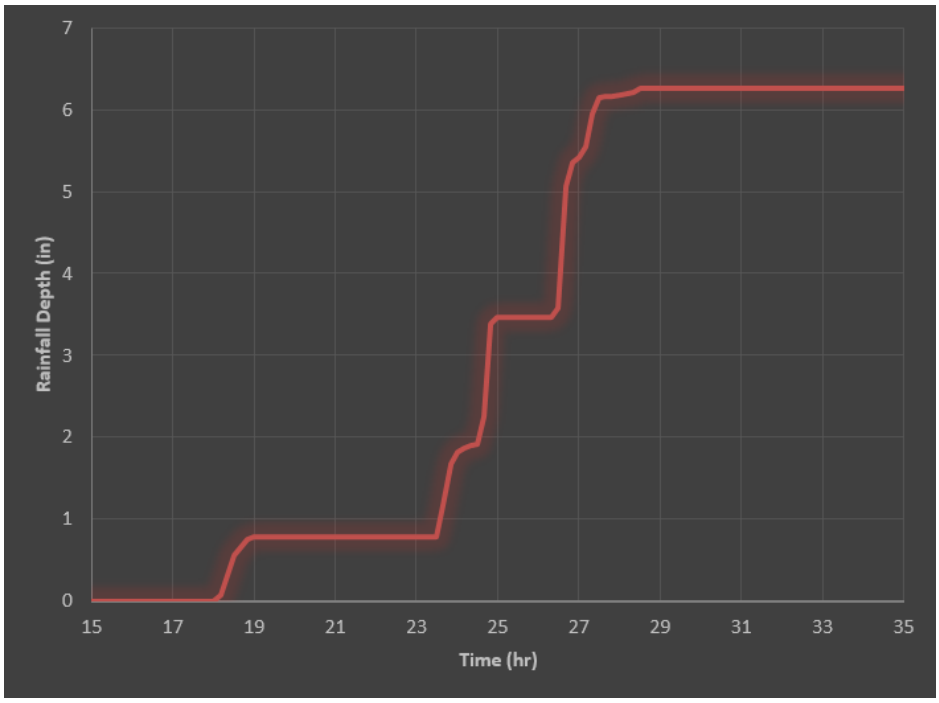
Analyzing the most severe rainfalls in the last 20 years.

There are two rainfall measuring stations near Ebner Coulee. The first is located at the La Crosse Municipal Airport (located 5 miles away), and the second is at the La Crosse Weather Forecast Office (located 1 mile away). Rainfall data at these stations was used to create plots of rainfall depth vs. time, called hyetographs, for the three largest rainfall events that occurred in the last 20 years. These storms occurred in August 2007, June 2008, and July 2017, with the 2017 event being the most intense. These hyetographs were used as inputs to the hydrologic models to estimate how much runoff resulted from each rainfall event.

Phase 2 Overview

The first phase of this study utilized a methodology developed by the US Geologic Survey (USGS) to update runoff rates from Ebner Coulee. The analysis resulted in lower runoff rates and less flooding with fewer homes shown in the floodplain. In order for the results to be recognized by FEMA, a Letter of Map Revision is necessary, which requires prior concurrence by the Wisconsin DNR.

Phase 2 of this study involves studying major historic rainfall events, such as the storm that occurred in July of 2017, and relating historic flow rates to the flow rates used to create the current flood maps. Based on resident feedback, significant flooding has not been observed with any storm over the past 20 years. If the hydrologic model used for the current mapping produces flood-causing flows with inputs from historic storms, then it is reasonable to conclude the flow rates used to make the current floodplain maps likely overestimate those observed.



The July 2017 storm event saw 6.26 inches of rain fall in under 11 hours. 1.5 inches fell within just 20 minutes, making this a very intense storm. This was almost a 50 year storm in terms of intensity and depth.

Hydrologic Analysis

Relating historic storms to the flow rates used to create the current flood maps.

The original hydrologic model used to create the flood maps was not available, so the first part of the Phase 2 hydrologic analysis involved creating a model of the Ebner Coulee drainage area that is calibrated to output a peak flow rate of 1430 cubic feet per second (cfs) (the flow used to create the current flood maps) into Ebner Coulee for a 100 year recurrence interval rainfall event.

In addition to the rainfall intensity, duration, and depth, there are three key components in a hydrologic model that dictate how much runoff occurs for a given rainfall event. These components are drainage area, ability of the soil to absorb water, and the time it takes the water to flow through the watershed. The drainage area is fixed and was set to match the area used in the original flood mapping, so the soil properties and water travel time parameters were adjusted until the model output the desired peak flow rate of 1430 cfs.

Next, the three major historic rainfall events were entered into this calibrated model. The table below shows the results of the calibrated model. The 10 and 50 year storms were also entered into the calibrated model for comparison.

Storm	Rain Depth (in)	Calibrated Model Flow (cfs)
10 year, 24 hr	4.47	490
50 year, 24 hr	6.53	1093
100 year, 24 hr	7.57	1431
August - 2007	7.59	326
June - 2008	5.31	527
July - 2017	6.26	996

The August 2007 storm had the highest rainfall total, but this was a steady, less intense storm, so the runoff was estimated to be less than a 10 year event. The July 2017 storm had a peak flow rate about 100 cfs less than the 50 year event, making it the most severe event in terms of peak runoff that has occurred in the last 20 years.

What do the Results Mean?

As is well known by the city, the 1430 cfs used in the current flood maps results in major flooding. However, no major flooding has been reported in the Ebner Coulee watershed over the last 20 years, despite several major storms.

The historic storm that resulted in the highest runoff rate is the July 2017 rainfall event. This storm produced flows of 996 cfs from the calibrated model, a little under that of a 50 year storm. While the July 2017 runoff flow from the calibrated model was not comparable to that of a 100 year event, it is still enough to cause major flooding. The image to the right depicts the flooding associated with 996 cfs based on a hydraulic model of the area. No such flooding was reported, **which supports the idea that the flow rates modeled may not be reflective of real world conditions and may be too high**.

Next Steps

The next step involves gathering more information about the July 2017 event. A community survey will be utilized in an effort to obtain all available high water and flooding information from the July 2017 event. The Wisconsin DNR has indicated that calibration to this event may be sufficient to warrant their concurrence with a Letter of Map Revision for Ebner Coulee.

The information contained in this fact sheet was prepared by Short Elliott Hendrickson, Inc. as part of the Ebner Coulee Floodway FIRM Mapping Study.

Questions Regarding this Study:

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