2014

Hegewisch Marsh Section 506 Great Lakes Fishery & Ecosystem Restoration Study

Appendix D – Hydrology and Hydraulics

Chicago District
US Army Corps of Engineers
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Hegewisch Marsh – Hydraulics and Hydrology Appendix

Hegewisch Marsh Hydrology

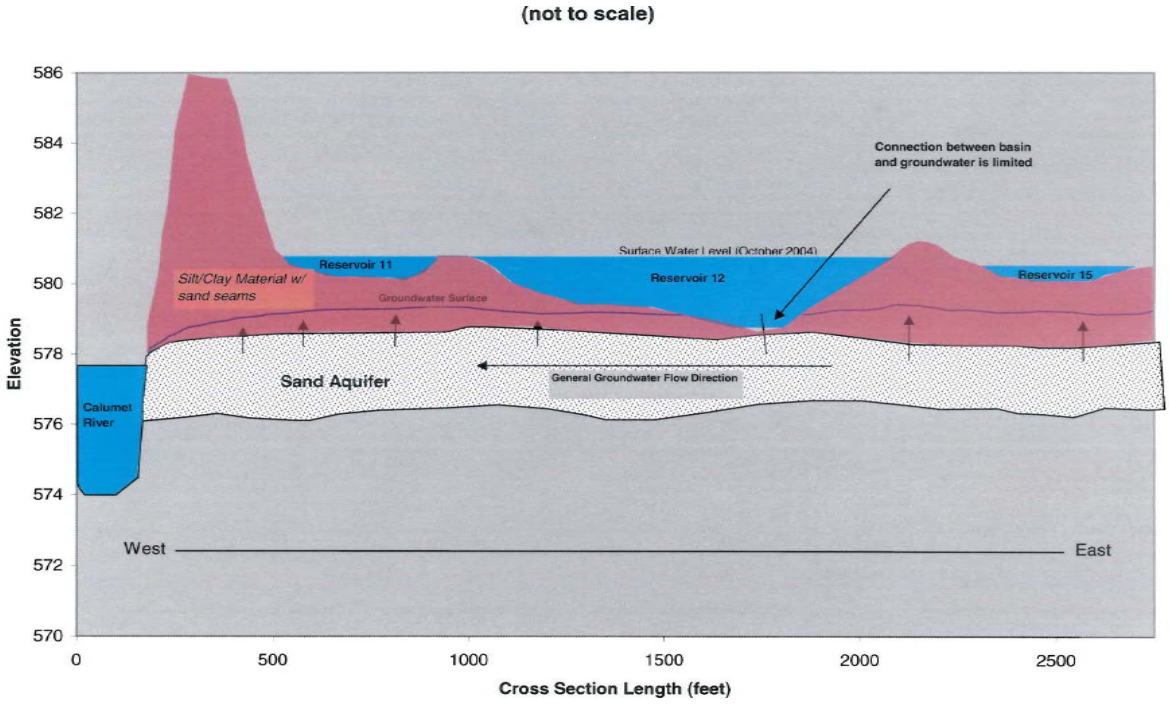
Over the past 200 years, what we know today as Hegewisch Marsh has been significantly altered. It was once part of an extensive system of marsh wetlands that extended across the southern lake plain. Today, a much smaller Hegewisch Marsh (131-acres) is bounded by the Calumet River to the west, the South Shore rail line to the north, Torrence Avenue to the east, and East 134th Street to the south. Note also that the Corps of Engineers O'Brien Lock and Dam is located at the Southwest corner of the project site. See figure 1 below.

Figure 1. A spring 2008 satellite image of Hegewisch Marsh

One of the most significant factors that will contribute to the success of the proposed ecosystem restoration of the Hegewisch Hemi-Marsh will depend on a favorable range of water levels/water depths to optimally maintain the marsh ecosystem. Many diverse variables play into these water levels, precipitation, surface water runoff, evaporation, river levels (governed by the water levels of Lake Michigan), ground water levels, seepage through the underlying geologic soil layers (most notably the sand layer), and even the ecology itself (groundwater pumping from cottonwood trees, has also been noted as a significant factor in groundwater levels).

V3 was hired as a consultant and published a study in 2006 known as the Volume VII Hegewisch Marsh Hydrologic Analysis as part of the Calumet Area Hydrologic Master Plan (HMP). For the study, marsh, river and ground water levels were monitored and hydrologic computer modeling was performed to provide hydrologic information regarding the marsh. Figure 2 below presents a conceptual cross section of the marsh from the V3 report.

Figure 2 : Visualization of Hydrogeology at Hegewisch Marsh



One of the main conclusions to come out of the study was the problem of water loss from the marsh, one large component being groundwater seepage from the marsh to the Calumet River. It is an infrequent occurrence that Calumet River/Lake Michigan water levels have the potential to be as high as or higher than water levels in the marsh. See figure 1 above and note that the average lake level is 580 feet NAVD. A 10 year lake level is 583.4 and a 100 year lake level is 584.8. For the project, preliminary proposed marsh levels fall in the range of 582 to 584 or higher, but actual water levels will be adaptively managed in the future to optimize the ecosystem habitat.

One of the recommendations from the study, that was designed to provide supplemental water to the marsh and to help alleviate this problem of water loss, was constructed. This was a solar powered water pumping system. The intent of this system was to increase the water levels in general in the marsh by pumping water from the Calumet River and providing a means of further regulating the water levels by

utilizing stop logs located in a water control structure that was also constructed as part of the system. (See figure 3 below)

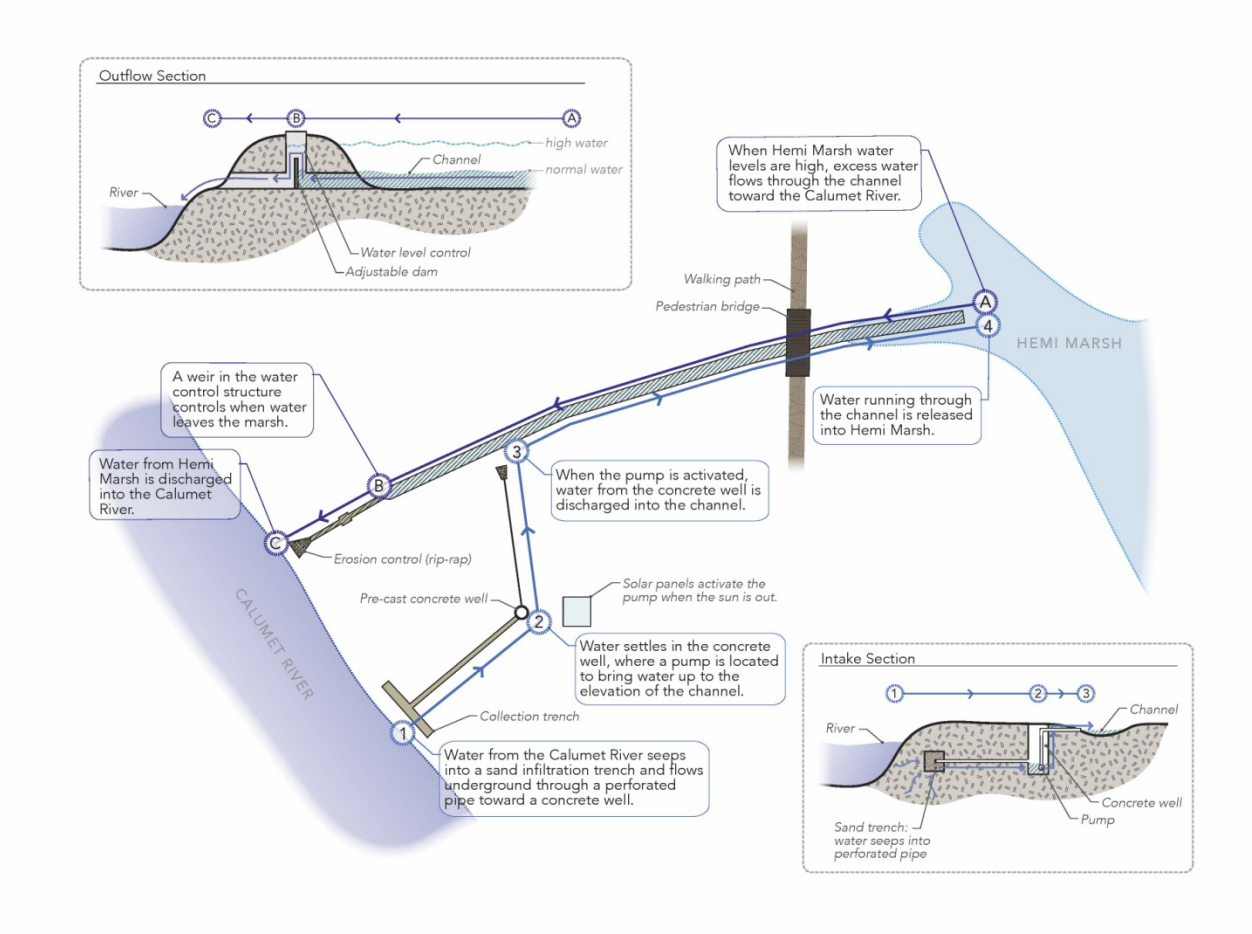


Figure 3 – Hegewish Marsh – Pump/Water Control System

While the V3 study provided much information in the form of water levels and modeling for the marsh, the conditions studied were prior to the construction of the pump/water control system. Very little information is currently available to determine if sustainable water levels can be expected with the pump system functioning. While the system was constructed several years ago, it has only just in recent months been actually put into operation, so there is currently no statistically relevant historic information available.

To better understand the range and frequency of the various dynamic water levels that will be provided with the pumping/water control structure system in place and functioning, staff gages are being recommended as part of this Corps' study to provide reliable real time information for future adaptive management of the hemi-marsh water levels. The information from these gages will be used to determine appropriate stop log levels and provide the capability to monitor this new system to adaptively manage and optimally sustain a successful hemi-marsh ecosystem.