

## **Intro to Rhinebeck Village's Watershed Assessment Materials**

Our CSC Task Force has gathered together two pieces that together build a more comprehensive Watershed Assessment. This is fitting because as a municipality located on the Hudson River, we are uniquely situated to understand our community as part of the ecosystem that interplays with our watershed. To that end, we are including the Riverkeeper watershed assessment as well as a Marist College research project which took an in depth look at the flow of the Landsman Kill through the Asher Dam to Crystal Lake. These are the main bodies of water that relate to the Village.

## **Hudson 7**

As part of our membership in the Hudson 7, Riverkeeper undertook a watershed assessment of the Hudson River and surrounding estuaries and tributaries. Riverkeeper developed a scorecard for assessing water quality and made recommendations to members for further protection of drinking water and the ecosystems into which they're embedded.

Website:

<https://www.hudson7.org/>

Included items:

Agreement between 7 municipalities (2018)

Riverkeeper's Final Report (2018)

## **Marist Research Project**

In January 2019, Mayor Bassett announced that Landsman Kill, which runs through the Village and into Crystal Lake, would be the subject of a study by college students in the Environmental Science and Policy at the Marist College School of Science. Associate Professor Dr. Richard Feldman was announced to be leading this "project-based" class for seniors. The goal would be to study how to plan for increased rain and storm water runoff in the Hudson Valley due to climate change.

Dr. Feldman and his students set about examining policy issues, scientific needs, precipitation records, and climate projection as they study the effects of increased runoff on the lower Landsman Kill. The goal was announced to develop a prediction model for when to release water from Crystal Lake in anticipation of flood events, and whether the release valves need to be upgraded to handle the volume.

In June 2019, Mayor Bassett announced in his monthly newsletter the important research by the Environmental Science students from Marist College. This full report was presented to the Village Board, and it will help us to better plan for weather events and the impacts on Asher Dam (Crystal Lake). The students, working with Dr. Richard Feldman, analyzed storm water runoff, identified flood plains and interviewed many homeowners across the Landsman Kill and Crystal Lake area. Those residents reported more wet weather, leading to more flooding, and

ongoing loss of shoreline. This is an important step in preparedness, and we are thankful to Dr. Feldman and the Marist Students for their excellent work.

#### Summary of Research Report:

Asher Dam, located on Crystal Lake, controls the natural flow of the Landsman Kill watershed through the operation of four valves. The Landsman Kill watershed extends from the Village of Rhinebeck into the Towns of Rhinebeck and Milan. Focusing upstream of Asher Dam, the watershed covers 27.2 kilometers of land that drains into Crystal Lake. Regulations impacting the operation of the dam were assessed in order to determine if Rhinebeck is in compliance with New York Department of Environmental Conservation (DEC) guidelines. Some regulations were violated, making Rhinebeck vulnerable to lawsuits brought forward by flooding victims. Regional precipitation rates and discharge values from Asher Dam were evaluated in order to create an instructional model for the operation of the dam valves. This model can be used to calculate differences in drainage depending on precipitation levels and the degree to which the valves are opened. However, this project highlights what further research needs to be monitored and recorded in the future to create a comprehensive predictive model. Various monitoring and mitigation options were assessed in order to determine how the village should move forward in preventing flooding. Rain gauges, water level transducers, and stream gauges can all be used to produce accurate data on the watershed that can be used for a future predictive model. Research on riparian vegetation found fifteen species of shrubs and trees that are best suited for mitigation in Rhinebeck based on criteria such as growth rate, lifespan, root depth, and flood tolerance. Grant opportunities were researched in order to provide the Village of Rhinebeck with funding options for mitigative projects and dam updates. The Climate Smart Communities Grant presents the most realistic opportunity for Rhinebeck based on the amount of money available and the number of annual recipients.