The assessment will gather information on the multiple benefits, from three to four water storage and food retention structures around the state, including but not limited to, reducing sediment, suspended solids, nutrients, and peak flows, while providing habitat and wildlife benefits and protecting infrastructure. In addition, the assessment would quantify the cost and benefits of additional structures or infiltration practices, that would be required to improve flood mitigation and meet water quality goals in Minnesota’s watersheds. The Yellow Medicine River Watershed District will work collaboratively with the Board of Water and Soil Resources and other agencies to assess and quantify cumulative environmental benefits of existing and planned water storage and flood-retention structures statewide.

There is general agreement that Minnesota should continue efforts to retain water on the land for a defined period of time in order to reduce flood peak flows and to improve water quality and aquatic ecology. A fundamental obstacle is understanding which best management practices are most effective in specific landscape settings. Flood damage reduction projects have proven to be an effective tool to reduce flood peaks and to improve downstream water quality, thus mitigating the effects of agricultural practices and replacing the need for many smaller best-management practices. In some areas, these structures have been in place for many years. However, the beneficial impacts of the facilities have not been assessed. Streams with these structures, and with historical streamflow and water-quality information and calibrated watershed models, provide unique opportunities to assess the beneficial impacts afforded by these structures. This project would utilize historical information and additional modeling to estimate the effectiveness of these structures in variety of locations across the state. This information would then be used to assess the location and numbers or structures that would be needed to reduce flood peaks and to mitigate the effects of unmanaged or uncontrolled agricultural drainage.

Agricultural drainage has provided many benefits that allow farmers better access to croplands and to complete farming operations in a timely manner. Without agricultural drainage on much of Minnesota's croplands, increases in soil productivity and crop yields would be difficult and economic returns would be diminished. While the drainage of Minnesota’s croplands provides benefits, there are some downstream issues with unmanaged or uncontrolled agricultural drainage, which may increase flooding, may affect available water recharge to wetlands, may impact migrating waterfowl populations in the spring, and may possibly degrade downstream water quality. Increasing the use of water storage and flood retention structures, of various sizes, may provide an opportunity to mitigate the impacts of uncontrolled or unmanaged agricultural drainage in some areas. However, a thorough evaluation of the benefits of water storage and flood retention structures has not been completed. The completion of watershed computer models for water quality assists in providing a unique opportunity to assess the beneficial effect of water storage and flood retention structures and to examine the potential benefits of increasing the numbers of these structures across the state.

The study also will present an assessment of alternatives to large impoundment structures such as dispensed storage and water infiltration into the soil of this conservation practice and will identify locations for additional structure installations.

**II. PROJECT ACTIVITIES AND OUTCOMES**

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| **Activity 1: Determine extent of existing retention basins, historical monitoring data and water quality models.**  **Activity 2: Determine Cumulative Impact of Existing Projects and whether alternatives to large impoundments would be more cost effective**  **Activity 3: Determine extent of projects needed to fully meet watershed goals**  **ENRTF BUDGET: $500,000** |  |

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| **Outcome** | **Completion Date** |
| *1. Identify three to four retention locations having water quality information and models.* | *December 31, 2020* |
| *2. Model watersheds with retention basins to assess cumulative benefits and impacts for water quality and flood retention.* | *July 1, 2021* |
| *3. identify and prioritize the needs for statewide retention projects to meet water quality goals.* | *June 30, 2022* |

*The Red River Watershed Management Board will assist in collaborating and partnering with the Yellow Medicine River Watershed District.*

*It is expected that this project will assist in determining the amount of retention basins need ed in specific watersheds for water quality and flood reduction*