

The WaffleSM Study Is under Way!

The idea behind the WaffleSM project is that existing flood control measures be augmented through the temporary storage of springtime runoff in existing depressions within the Red River Basin until major flood crests pass. The Energy & Environmental Research Center (EERC) project team is investigating the water storage potential in several types of depressions within the basin, including low-relief fields bounded by raised roads, ditches, and wetlands. These preexisting storage areas, supplemented by roads and drainage structures, could act as a network of channels and control structures to slowly release stored water into the Red



WaffleTM team reviews watershed models.

River after the flood crest passes. Work is under way to develop a comprehensive basinwide model to assess the technical feasibility of this concept. Among the advantages of a basinwide approach is to provide flood relief to both rural areas and municipalities.

Flooding on the Red River of the North in 1997 was severe and established the need for a new approach to flood protection in this region to augment existing flood control measures. An obvious need exists to evaluate and implement basinwide strategies to prepare the region for floods of similar or greater magnitude than the 1997 flood. According to the U.S. Army Corps of Engineers, the theoretical maximum flood height at Fargo is 60 feet (39.6 feet in 1997) and 67 feet at Grand Forks (54.4 feet in 1997). A recent publication from the University of Manitoba estimates that there is a 50% chance that a flood approaching the theoretical maximums will occur in the next 50 years. In simple terms, a comprehensive basinwide flood protection program is critical to the very survival of our communities and the economic stability of the Red River Basin.

Vision for the Red River Basin

Water is the key to our future in this region. The WaffleSM concept provides the cornerstone for long-term water security in this region during both times of flooding and drought. According to Gerry Groenewold, director of the EERC, “This isn’t about surviving, rather it is about thriving despite extremes in climatic conditions in this region.” Through the WaffleSM project, the EERC team is developing critical tools for the people of the Red River Basin to develop their own water management strategies. The WaffleSM study depends on hearing everyone’s point of view, bringing together diverse interests, and developing partnerships to provide benefit to everyone.



Committed to water management issues in the Red River Basin, Groenewold sought to secure funding for the WaffleSM concept. The North Dakota congressional delegation and Governor John Hoeven supported the EERC’s efforts to move the WaffleSM study forward. Senator Dorgan has championed the project through the appropriations process each year. The EERC received initial funding from the U.S. Department of Agriculture Natural Resources Conservation Service in the spring of 2002, which launched the first year of the WaffleSM project to investigate temporary storage of springtime runoff to augment existing flood control structures and help mitigate flooding throughout the Red River Basin.

Project Update


The WaffleSM project consist of six major components: 1) identification of storage areas, 2) data collection and database construction, 3) hydrologic/hydraulic model development, 4) public outreach, 5) WaffleSM field trials, and 6) economic evaluation of the concept. A primary focus is to identify areas that would be suitable or unsuitable for water storage based on a variety of factors such as land slope, the presence/absence of cultural features, and potential water storage volume.

The computer modeling component of the project is also well under way. This includes the development of hydrologic models for each of the watersheds in the Red River Basin to investigate the effects of distributed temporary water storage on flooding. The models can also be expanded to investigate agricultural or industrial impacts on water quality, as well as the effects of wetland restoration on sediment transport and water quality. Once the watershed models are complete, they will be combined with a main stem Red River model to form an integrated, basinwide model for use in water management studies.

EERC public outreach efforts have included attendance at meetings of local and state boards and organizations, such as county Farm Service Agency offices, Soil and Water Conservation Districts, Water Boards, Watershed Districts, Township Officers Associations, and marketing groups. Since the project was first funded in April 2002, members of the WaffleSM team have given presentations at over 120

meetings. An Agency Advisory Board (AAB) and a Citizen's Advisory Board (CAB) provide the team with objective advice regarding the WaffleSM project. The AAB advises the EERC on technical issues while the CAB provides advice on public outreach and landowner concerns related to water storage and flooding.

A new activity this past fall was the preparation of the first field trial of the WaffleSM concept. By temporarily storing water on agricultural land for a short period of time in the spring, the field trial will demonstrate the effects of water storage on the land, the surrounding roads, and flood reduction. The results of the field trial, along with structural costs and flood mitigation benefits, will be used in determining the economic feasibility of the project.



The WaffleSM study is being conducted within the 49,000-square-mile Red River Basin.



Frequently Asked Questions

In upcoming newsletters, we will post questions frequently asked of our EERC project team, along with the answers. You are welcome to call, write, or e-mail us with your questions.

What about the impacts on agriculture?

Many of the potential storage areas available in the Red River Basin are located on privately owned agricultural lands, and agriculture is the backbone of the region's economy. The WaffleSM project team recognizes that any practice that adversely affects agriculture is not in the best interest of our economy or our community. Therefore, one of the key components of this project is the investigation of the effects of water storage on agricultural land. Past studies have shown that temporary water storage prior to planting can have both positive and negative effects. For example, the enhanced soil moisture that may result from implementation of the project can be beneficial to crop yields. In fact, a study done by the North Dakota State University (NDSU) Extension Service for the North Dakota Wetlands Trust has shown this to be the case. We also have anecdotal evidence to indicate that standing water in the early spring can result in frost leaving the soils more quickly and may allow farmers to till the soil earlier than areas that did not have standing water present for a short time. The most obviously negative impact could be a reduction in crop yields if there is a delay in planting. The economics of any agricultural-related impacts are being evaluated as part of the WaffleSM project.

If you hold back the water in one area, won't that flood another landowner's field?

No. If the WaffleSM concept were implemented, culverts would ultimately be fitted with overflow standpipes that would allow for precise control of the elevation of the stored water. The elevation control would allow water to be stored on the parcel of land while still allowing water from other upgradient areas to flow through the drainage system.

Would farmers receive payments for storing water on agricultural lands?

Because the focus of the current project is to determine the feasibility of the WaffleSM plan, it is impossible to anticipate what kind of payments (if they are needed) would be made to landowners for storing water on their lands. There are simply too many variables at this point, such as the amount and types of land needed, the length of storage, the effects on productivity, etc., to allow us to speculate about what types of compensation landowners will receive for storing water. These questions will be answered by the work now under way, and one of the products of this project will be to supply policymakers with the information they need to develop plans for compensation if that is necessary. One of the guiding principles of the project is that methods can only be employed if they have a positive, or at least neutral, impact on agriculture and the region's economy in general.

If it is determined that the WaffleSM is feasible, who would implement the plan, and is participation mandatory?

Traditionally, large-scale water management has always taken a *command-and-control* approach. Too often, the traditional approach relied on heavy-handed legal tools like eminent domain and heavy equipment like bulldozers to accomplish water management goals. These tactics often subjugated the rights of individual landowners for the "greater good" as defined by the government, sometimes resulting in harm to the very communities and individuals the projects were designed to protect. Because the WaffleSM and other basinwide approaches rely on the cooperation of the entire region, such heavy-handed tactics should never be used to implement the project. A major portion of the feasibility study currently under way is designed to assess landowner desires and cooperation. The results of the WaffleSM project will be shared with local landowners, water boards, watershed districts, county commissions, and other local groups for their review and assessment. They will be free to adopt the plan if they see sufficient benefit or reject it in favor of other strategies. We anticipate that the plan will be implemented for portions of the basin first, and other portions will adopt it when they see the benefits. In any case, we support *local control and basinwide cooperation and coordination* as the *only way* for the WaffleSM to be implemented.

the WaffleSM



Did you know?

From 1882 to present, official records of the basin show:

- Major flooding about every 4–6 years, affecting large areas.
- Devastating flooding about every 10 years.

(LeFever et al., 1999; International Joint Commission, 1997)

Since 1965, as many as 20 separate presidential disaster declarations have been made to respond to flood disasters in the basin.

(FEMA data from Jan. 1, 1965 – Nov. 3, 2000)

The 1997 springtime flood:

- Resulted in sustained economic damages approaching US\$5 billion.
- Affected nearly 850,000 people.

(International Joint Commission, 2000)

Future

The University of Manitoba estimates a 50% chance of a flood approaching the theoretical maximum height in the next 50 years.

(Booy, 1998)

Do you have any other questions or comments regarding the WaffleSM project? We appreciate your interest and input. Please contact Bethany Bolles, Project Manager.

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