

Waffle

Frequently Asked Questions

the Waffle SM



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What is the WaffleSM flood mitigation concept?

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 basin until major flood crests pass. These existing depressions include low-relief fields bounded by raised roads, ditches, and wetlands. These 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 River as the flood crest passes.

What is the status of the WaffleSM plan now?

The Energy & Environmental Research Center (EERC) is just beginning the second year of a multiyear U.S. Department of Agriculture (USDA)-sponsored program that will examine the feasibility of the WaffleSM concept and develop a series of models and databases that could be used by Red River Basin decision makers to implement the program and other water management strategies in the future. Efforts in the first year of the project focused on assessing the water volumes needed to result in a significant reduction in peak flows and mitigate the effects of large springtime floods. Results thus far have indicated that the water volumes necessary to have significant effects on flooding are within reasonable limits when compared to potential storage capacity. Additional Year One activities included the formation of an Agency Advisory Board (AAB) and a Citizen's Advisory Board (CAB). The AAB is providing technical advice, while the CAB is providing advice concerning landowner issues. Efforts in Year Two are focusing on developing hydrologic models, refining data sets, demonstrating a small-scale WaffleSM concept, analyzing the economics of the WaffleSM concept, and continuing public outreach and education activities.

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.

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 might receive for storing water. These questions will be answered by the work now under way, and one of the products of this project will 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 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.

What about the impact on roads?

Will roads have to be reinforced in order to hold back water? Because the WaffleSM concept primarily involves holding back small amounts of water for short periods of time, we do not anticipate that broad-scale engineering of the current road structures will be necessary. However, current stream-crossing codes do not permit the use of standard roads to hold back water, and these technical issues will be addressed by the feasibility study. It is true that roads can be adversely affected by uncontrolled flooding, especially when water levels within a field reach the road height. Because the WaffleSM concept proposes to use standpipes to control the elevation of water storage, it is highly unlikely that roads will wash out during the brief period of water storage in the spring. However, because there is little information available of the effects of controlled, temporary water storage on roads, this will be investigated

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during the field trial of the WaffleSM. In some locations, where road stability could be a concern (such as in sandy beach-ridge areas), it may be practical to build up select roadways in order to hold back water. Discussions with township board supervisors have indicated that structural enhancement of selected roads may be desirable since, in many areas, the deterioration of the roads is so severe during the spring thaw that it precludes travel over broad areas, resulting in problems for school transportation and response times for emergency vehicles. By coordinating flood control and road safety efforts, everyone will benefit.

The WaffleSM concept is already in place (for example, road confinement) in the Red River Basin, and it doesn't work – it still floods. How is this different?

It is true that there is a significant network of roads and various other features that slow down water movement to the Red River and its tributaries; however, there is no current strategy in place for managing a timed release of this water to prevent downstream flooding. If the flow of water can be released in a regimented manner to allow for gradual input to the river, it would result in significantly decreased flooding and overland flow in the downstream areas.

The WaffleSM is designed to mitigate major springtime flooding; what will the effects be on summer floods?

In recent years, major flooding has occurred as a result of intense thunderstorms during the growing season. Major damage to crops, as well as rural and urban properties, has occurred as a result of these summertime floods. Obviously, none of the culvert gates will be closed during the growing season so that the drainage of croplands will not be impaired after the threat of springtime flooding passes. Although the WaffleSM concept was designed to mitigate springtime flood events before most of the planting has occurred, we believe that the project results will be beneficial to those dealing with the problem of summertime flood events as well. The WaffleSM project's models and databases will provide the water management professionals of the basin with a much-improved understanding of the drainage of the Red River Basin and subbasins. The water management tools provided by this project could be used to develop emergency action plans for extreme weather events in each subbasin. Although it is impossible to guarantee this outcome at this time, it is possible that the ability to coordinate drainage within the subbasins may prove useful for reducing damages as a result of summertime storm events.

What about dry years? How would the WaffleSM plan affect the region during droughts?

This is one of the biggest differences between the WaffleSM and more conventional flood control measures; the WaffleSM is a useful water management tool in both dry and wet climatic conditions. As we all know, if you don't like the weather in the Red River Basin, wait a minute, and it will change. Our ever-changing weather pattern extends to long-term climatic trends as well. We are currently experiencing the wet part of an ongoing cycle of alternating wet and dry periods, but it is certain that in the future there will be dry periods such as those experienced in the 1920s and '30s. When farmers are battling the devastating effects of drought, more conventional flood control measures such as dikes will not be of any benefit. The infrastructure provided by the WaffleSM project will allow farmers to retain moisture on croplands in the spring and potentially allow for the increased recharge of precious groundwater resources. The databases and models provided by the WaffleSM will allow water professionals to manage the resource more wisely.

Will the WaffleSM replace other flood control strategies?

No, the WaffleSM is designed to augment and enhance the other strategies already in place and those planned for the future. We all have to work together to successfully manage our natural resources in the Red River Basin.

Considerable effort and resources have been applied to other flood control measures in the Red River Basin, including the building of dikes, dry dams, bypass structures, and wetland and riparian restorations. These strategies have been an effective part of our battle to mitigate flood damage and manage water in the basin. In the past, the WaffleSM plan has often been criticized by the proponents of the other flood mitigation strategies. We assert that any effective water management strategy needs to include a variety of options and a comprehensive basinwide approach. Too often, past flood control strategies focused solely on the major towns and cities, ignoring the devastating effects of flooding in the small towns, rural residences, and croplands of the basin. For example, the new dikes in Grand Forks–East Grand Forks are an effective deterrent to flooding, but they do little to benefit the surrounding rural areas. The WaffleSM concept would provide relief for both rural land and municipalities.

The reality of water management in the basin is that we need to explore and pursue any feasible means of dealing with the natural climate cycles and extreme weather events that we experience in order to ensure the best possible future for our children and grandchildren. Because the WaffleSM project will develop new information and models for the entire basin, it will benefit those working on other water management strategies as well.

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 assessment and appraisal. 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.

What are some of the additional benefits of performing the WaffleSM feasibility study?

The WaffleSM feasibility study will result in the first comprehensive, detailed database and hydrologic model for the entire Red River Basin. The feasibility study results will include land-use data and agricultural economics data, along with drainage information in a user-friendly GIS (geographic information system) format that will be shared with state and local governing bodies and agencies. The application of this global model will be very beneficial to decision makers charged with the wise management of our resources. The WaffleSM project can serve as a national model for resource management in agricultural regions.

Do you have any other questions or comments regarding the WaffleSM project?

We appreciate your interest and questions. Please contact:

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