



## NORTH DAKOTA SENATE

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### Senator Larry Luick

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### COMMITTEES:

Agriculture  
Judiciary

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Dear Ms. Townley and Minnesota Department of Natural Resources;

To begin with I would like to say thank you for this opportunity to share with you some other view points and some alternative ideas for flood protection in not only the Red River Valley but neighboring areas as well. These ideas could have huge benefits in multi-facet form. As we look at the needs of problem fixing, we would be better persons if we collectively shared information and identify how these benefits can be achieved. We don't need to have winners and losers. There are ways that everyone could come out a winner.

I am not an engineer or scholar, but rather someone that has worked with soils and water my entire life as an excavating contractor and a farmer. Mother Nature has wonderful opportunities for us to share her good graces if we choose to take advantage of them. I have learned volumes from trial and error and I tend to remember most of them.

My efforts of this comment are to try to encourage any and all parties to evaluate every possible alternative so that all possible benefits are achieved. For the most part I am staying away from the legal aspect of the controversy because I have not been exposed to the legal issues as much as the physical ones. Others, I am sure, will comment on the legal topics of concern.

My focus is on a better plan. More time consuming, maybe. More costly, maybe. More work to

achieve, maybe. The more truly valuable, useful, and desirable something is tends to extend creation time to achieve. The costs and time to construct are unknowns at this time for both this plan and the proposed project. We must work with our natural resources, such as topography, erosion, nutrient losses, soil and plant health, water shed velocities, and water management to create this better plan. This plan as I stated earlier has several facets but it will be well worth the time and money spent. No one part is a fix to the problems (yes, problems, not one problem but several) but rather an idea that if combined with other ideas that myself or others come up with would have a much larger and a more regional, state, national, and international benefit. The solution that is being considered today that involves the dam and staging area solves only one problem and creates many, many more. We need to do better.

I have always been told the staging area south of Fargo is designed to have a capacity of 200,000 acre feet. During a recent Water Topics Meeting in Bismarck we were told that number was 150,000 acre feet; I believe, if my memory is correct, in a letter to the MNDNR it was referenced at 150,000 acre feet also. The numbers vary and that's okay, but for my example I will be using the 200,000 acre feet data. The difference of 50,000 acre feet is workable into my plan.

**Facet One:** Inclusion of the research that went into the Energy and Environment Research Center's (EERC) Waffle Plan, and then reconstituted by the International Water Institute (IWI), that shows there are obvious major benefits to this concept. The first drafts of this plan were to reduce the flow to the bottom of the basin by 20%. I believe that this can be achieved with proper guidance. But let's say that a 10% or 15% reduction is a more feasible and doable amount. That is a large amount of water out of the base flood levels that can help other communities as well. This reduction in flow into the staging area would be equivalent to 20,000

to 40,000 acre ft of water south of Fargo, depending on the effectiveness (10% - 20%). For example purposes, I am going to use the average of 15% which, at 200,000 acre feet, equates to a 30,000 acre feet reduction in water flow. This leaves 170,000 acre feet of problem water. Reducing flows basin-wide in this manner will have added benefits across the entire area.

**Facet Two:** The incorporation of agricultural field tiling and its benefits. The soil profile has a huge amount of reservoir capacity that can hold a tremendous amount of water. Different soil types have different abilities in this regard simply because of soil particle sizes and air gaps between those particles. The larger the soil particle the larger the air voids. So even in the clayey type soils in the Red River Valley, a soil that is predominantly clay still has the capability of storing three to four inches of water per vertical foot of soil profile. In context of a tiled field that has been tilled with the tile runs at 3 to 4 feet deep that equates to 9 to 16 inches of surface water that is now being stored in the soil. On a larger scale it equates to 1 foot of water per acre (conservatively) on every acre of farmland that is tilled. I have always contended that every acre in this basin that needs to be tilled, should be tilled. This should be done for a variety of reasons, and I also will say that there are some areas that should not be tilled. Let's say that we tilled 200,000 acres south, east, and west of Fargo (the area contributing to the flooding problem). That alone, if managed properly, is the size of the staging area's capacity by itself.

Right now there are mixed views on tiling as to the way it works and if it has this much of a benefit since the ground is frozen and how would the water percolate down into the soil profile. As I had mentioned earlier, the predominate soil type in our Red River Valley is clay; many different types of clays. Most if not all of these clays expand when they get wet and shrink when they dry out, and they do this at different rates of expansion. You may have seen this if you have seen soils pull away from basement walls, or large cracks in the ground or in your

lawn. This is from the contraction or shrinking of these clay soil particles as they dry out. On the other side of the spectrum is when these clay particles get wet, they expand. Some of the clays in the clay soil types can expand up to 8 times their dried out dimension. An example of this is heaving of sidewalks or roadways. So if a soil profile is drained and the excess water removed from this soil in the fall of the year, these clays are given the opportunity to dry down and shrink which will create fissures in the soil that will remain through the frozen season and be available for water percolation in the spring. An untiled field that sits with a “full tank” of water going into the frozen season is subjected to a “barrier” of another means also. Besides the profile being full of this excess water, the clay particles expand from being wet, which causes less ability for percolation into the soil. In addition, the water itself will expand as it freezes. This creates a very water tight scenario and most all of the surface water has to run off the field. It cannot soak into the soil at all when it freezes up while wet. A benefit of a highly aerated soil is that air works as an insulator, so the more pore space between soil particles there are the less freezing depth occurs and the density of the of the frozen ground is less. When the soils stay warmer they thaw more quickly and can take on water more readily which increases water holding capacities. There is a huge difference in freezing events and water reactions when the ground freezes wet versus dry. As a contractor, that has had to excavate for various reasons in the winter, I dread the chore of digging in the years when we freeze up with a wet soil condition in the fall. If the fall and soil are both dry and the clays are not swollen, then the fissures that open up and remain open will make it easier to break open the trench. A good example of what people expected to happen and what did happen was the expected flood of 2013. The alarm was sounded, sandbagging efforts got under way, and then the water disappeared. Why? Because we

froze up in the fall of 2012 dry. The holding capacity was there and available. Some of the other benefits a controlled soil water height can provide are:

1. Better aerated soil so that aerobic bacteria can thrive, this is the beneficial bacteria that non-aquatic plants need to survive and flourish. The higher the count of these little helpers – the better the health of the soil, resulting in higher organic matter which also adds to the ability of water retention in the soil. For every 1% increase in organic matter an extra 25,000 gallons of water can be retained per acre (USDA's research). So that calculates out to more than 28,000 acre feet (conservatively) which is calculated on only 375,000 farmland acres – tilled or untilled. This is above and beyond what I had mentioned earlier about the profiles 3-4 inches per foot. It is vitally important for us to improve on our organic matter percentages for other reasons as well but that is too lengthy for this comment. One that does have a direct reason that we need to increase tilled acres is better control of nutrient losses from farm fields. Phosphorus is causing a huge problem, especially with our Canadian friends and this is a problem that we have the ability to fix. This goes hand-in-hand with increasing aerobic bacteria, organic matter, soil health, better crops, less of a need for high applications of fertilizers, which would also help in the control of phosphorus run off. The Discovery Farms from the University of Minnesota (UMN) has shown in their research that the phosphorus loss in surface runoff from an untilled field is 10 times higher than the phosphorus loss from surface runoff of a tilled field with conditions being the same in side by side studies. This is huge.
2. Decreases compaction or hardpan issues which in turn increases percolation rates.
3. Raising healthy crops requires increased water uptake by those plants.

4. The ability to store water or add water to the soil profile for possible sub irrigation needs.
5. Increased ability for varying crop selections.
6. Increases crop production and efficiencies across the spectrum of agriculture which can return significant revenue increases on every tilled acre. Basin-wide this is in the billions of dollars in crop production alone. Revenue generation instead of expensive continued maintenance.
7. Current and past practice on untilled fields was/is to laser ditch everything to get all of the water off the field as quickly as possible. I myself was hired to do that task with my equipment. I know exactly how that works. With tile in the ground it is a different story. There is more of a tolerance of getting every drop off quickly because water can now soak into the soil profile easier and quicker. Even quicker than running off the field. This contributes to less erosion, water retention, lessening phosphorus losses, and more.
8. There are many other benefits to tiling but those benefits are more directly related with farming practices and I will not go into those here and now.

**Facet Three:** The studies of areas for water detention. Today there are many projects being considered in both North Dakota and Minnesota. There are some that have been completed since the 200,000 acre feet staging area figure was devised. My thoughts are that these areas are extremely important and necessary. In my conversations with NRCS officials and other engineers in regard to their efforts to expand funding and assistance for the PL-566 program and the new RCPP program, new detention areas are being brought to the table now

more than ever before and with good reason. The cooperative effort and the landowner incentives are more attractive than they were in the past and flood control, erosion control, nutrient management into waterways, property damages (both personal & public) roads, etc. are being looked at more closely than ever before. I know that the collaborative effort will be heightened going forward. These sites not only have local benefits, but also detain water from the Fargo flood area. This creates a two-fold benefit or more. These sites, as I mentioned, are extremely important and are currently being looked at now to a greater extent.

Some of the potential sites have holding capacities of 4,000 to 6,000 acre feet each. I am told that there are 6 more potential sites of good standing south of Fargo on the North Dakota side of the river. That is 30,000 to 36,000 acre feet of detention. There are several sites on the Minnesota side of the river, two that are in use today and a third that is under construction that have a direct result on Fargo flood water amounts. The two combined detain about 20, 000 acre feet. Other sites in MN and ND have been located and are being considered, some as large as 100,000 acre feet. This is where the focus needs to go. These detention areas can provide local benefits and provide a means to keep more water out of the Fargo flood area as well. Please see attachment A at the end of this comment.

An itemization of the reductions I've listed so far are:

- 200,000 acre feet (water capacity of staging area)
- 30,000 acre feet (Waffle Plan Project)
- 200,000 acre feet (tiling only 200,000 acres)
- 28,000 acre feet 25,000 gallons/acre (with 1% OM increase)

calculated on only

375,000 acres. This works on tiled or  
untiled farmland so

this is extremely conservative.

- 36,000 acre feet ND detention possibilities south of Fargo  
= a negative 94,000 acre feet acre feet out of the total flood problem

The Minnesota detention projects are not yet included for a reason, I will get to that later.

I personally believe that we as a society are not obligated to succumb to wishes of a few so that a community can continue to grow and prosper, especially at the cost or loss to others. I believe this also with education and classroom sizes. The bigger they are the more problems that can be created and the quality of education (quality of life of afflicted area) goes down. In either scenario, a more mediocre size classroom or community shows more benefit to all. To promote the agenda of expecting flood protection for vacant farmland with eyes on future development is not something I believe in, nor should it be a number one priority. However, hear me out. In this particular case, I feel that the needs for the smaller communities, say in a 50 mile radius of Fargo in MN and ND, should be given the opportunity to increase their sizes to get to that more mediocre size that I believe is more beneficial.

Right now, as I am told, there are approximately 69 miles of river shoreline through the FM area that has needed sandbag or levee protection. Approximately 49 miles of this is now protected to 42.5 feet. This leaves around 20 miles that need to be completed and I am told that half of those miles will be completed by the end of 2016 if not sooner. So the dire need for very quick action on this staging structure is not necessary at all. If we needed to fight a 2009 or 1997 equivalent flood today we should be able to do that without too much trouble. Will it be unwelcomed work? Yes definitely, but we can handle that. As weather projections look, we



may find this out in the spring of 2016. We are supposed to see a wetter than normal winter, but if we continue with a dry fall maybe it will not be a problem. This will be a good test for the researchers looking at tiling and frozen ground percolation rates. It really depends on how all those “untiled” acres freeze up. Wet or dry.

Some place south of Fargo the contours of elevation could be found to determine where development could continue and at what elevation it is too low. Today it seems that building in the natural flood plain is acceptable as long as enough fill is hauled in to elevate the desired structure. Each cubic yard of fill hauled into that area displaces one cubic yard equivalent of water which is 201.97 gallons, and let's say that the needed elevation was to add 5' of material. The calculations are endless because of different sizes of homes, garages, driveways, outbuildings, slopes, etc. But let's look at a generic 2500 sq ft home with a 30' X 30' garage (900 sq ft) equaling 3400 sq ft total plus the fill berm around the structure at 5' sloping down and away. The displacement of water from this single structure could be 700 to 800,000 gallons. This does not include the driveway fill and is a conservative slope on the fill around the structure. There are 325,851 gallons in one acre foot of water, so for each area constructed, or fill hauled into this flood plain equivalent to this size structure, 2 1/2 acre feet of water is displaced somewhere else. Why are the needs for higher and higher protection really needed? What is really the cause of this increase? I believe it is called encroachment.

If a contour elevation is near elevations of the levees on the south end of Fargo and a reasonable berm was built paralleling the Wild Rice and the Red Rivers thereby allowing only recreational use and farm practices in the area on the lower flood plain side. Determine the elevation of this reasonable height berm and there should be many, many years of growth ability on the higher ground. The consideration of a smaller staging area would work well into this plan

also, but needs to happen within the already identified natural flood plain not pushed up onto others on higher ground that chose not to build in the flood plain. It is no one's fault that we have a flood plain to deal with, we need to respect it, plan around it, and figure out the best options for all to live with it. Maybe we can also avert the problem of the amended Executive Order 11988 and Executive Order 13690.

Next is the possible construction of a detention pond south of Fargo. This could provide an excellent back up for internal protection. Removed material could be used for the construction of the berm that I referred to earlier.

**Facet Four:** Many concerns and studies have focused around a possible new dam on the ND and SD state line. I am questioned about this continually. Mother Nature has given us an awesome area for water detention and yet we choose to not think it through and make it work to our advantage. This area has a huge potential. My idea is the consideration of a new dam 1/2 mile into ND that could easily detain 285,000 acre feet of water by itself. This dam would allow for the shutdown of the flow of water in the Bois de Sioux River from March 1<sup>st</sup> of each year until the flood peak flows at Fargo are passed or near passed, 100% shutdown or as needed. This detention site would take approximately 1200 square miles out of the watershed that feeds the flood problem at Fargo. 1200 square miles is a very large area. This site alone has more holding capacity by 85,000 acre feet than the complete staging area by itself. With the other alternatives we were conservatively at a negative 94,000 acre feet and now if we reduce that by another 200,000 – 285,000 acre feet, that takes 294,000 to 380,000 acre feet out of the base flood numbers entirely. This creates the possibility of total removal of 400,000 to 500,000 acre feet (conservatively) of water away from the problem area. This detention site would also benefit the flooding along the Bois de Sioux south of Wahpeton, take concerns away that I have about the

integrity of the CP Rail Bridge and rail bed east of Fairmount which serves as a pinch point and holds back a tremendous amount of water. If this rail bed were to fail when the water was high and with one of the many trains crossing this bridge on top of it, Wahpeton and Breckenridge and many others would see severe damages. This detention area could possibly alleviate the problem the Chahinkapa Zoo faces today with the current levee and the USACE. The efforts of this project include the waters of the three Minnesota projects – in the Bois de Sioux watershed and I am not doubling up on total detention amounts. The concern of the timing of water flows has been considered and the modeling done in my head tells me that if you are removing 100% of the flow – 100% of the sum of the water is removed from total calculations, hence timing in some cases is not relevant, the peak flows don't happen from the detained water areas.

I know these ideas need some work, but with the condition of completion of the levees in Fargo, we do have time to put together a better plan that has benefits for more people, communities, and property. We also can meld together the natural resource benefits attributable to better soil and water management practices. This is not a difficult problem to fix. It may look beyond comprehension and massive but what I like to do is look at these big problems I face and just break them down into smaller pieces. Fix a portion of it at a time. It works quite well.

A few more ideas of water management are: 1) increase the numbers and sizes of ditches perpendicular to the main stem river to more quickly and effectively remove the early water into the main channel and maybe some of the intermediate water before there are concerns of peak flows, and 2) cost share for tiling projects.

In summary, I would like to say that even as complicated as some of this looks or sounds, I know it is doable, practical and much better than the current “one-community benefits” plan. As I have mentioned, I know each of these ideas need further revision but I assure you that

enough consideration and study has already been performed on most of these by university studies, engineers and industry professionals to warrant implementing rather than the current plan. This plan is multi-faceted because consideration of water control from different areas is imminent.

Possible detention areas that I have not mentioned yet are on the Sheyenne River, the Maple River, and a possible 100,000 acre feet project in Minnesota. There are more projects under consideration as well, again see Attachment A. To say that detention is not going to be the answer may be an understatement and what we need to do is get all the information gathered (in due time) and then reevaluate the situation. Other benefits that I have not mentioned that deserve mentioning are: 1) due to lowering the base flood water levels at Fargo from the alternatives removing so much water from the mix, cemeteries would have less of an impact as is now a huge problem for the staging area, 2) lowering the amount of water in all of the rivers, creeks, and altered staging area may reduce the base flood levels for flood insurance and could lessen the amount of homes required to purchase flood insurance. This is a new problem for everyone close to the rivers and creeks all the way through Wahpeton and Breckenridge, not just Fargo and Moorhead. I would also think that that insurance change will affect homes along all of the tributaries. 3) There was a concern by the USACE of getting an alternative plan through Congressional Authorization. My thinking is that, yes, you have the authorization on the first plan, but you also have the lawsuits, and the State of MN and the MNDNR not happy with your plan, or the way it has all been handled, all of the Joint Powers Authority (JPA) members which consists of 35 different groups of officials from counties, school boards, townships, fire departments, law enforcements, etc. from MN and ND are fighting your plan. There are hundreds if not thousands of individuals against your plan. You do not have the funding and the

chances of that happening when there is all this turmoil is lessened. The estimates of cost for the plan are way too old to even be at all viable and those were essentially numbers for an unfinished plan with still no answers for some very crucial decisions and expenses. Why not consider a plan that more entities, officials, the State of MN, the MNDNR, more of the State of ND, JPA members, private persons, affected property owners up and down the valley, maybe even Manitoba and Canadian officials can get behind and instead of cussing you out, maybe you would get a pat on the back for the considerations sought after and made work. We are simple folks that don't want an elaborate, expensive, and complicated remedy that very easily could freeze up, sink, and/or be cost prohibitive to maintain in the future. We need a plan with more benefits to more people and property. We need a better plan.

I am hopeful that due to the more widespread benefits of these and other alternatives a rejection be considered in the issuing the MNDNR permit of this ill-thought out project because we can do better. Thank you for reading and considering my comment.

Sincerely,



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**Attachment A**  
**Red River Basin Commission**

**RRBC Ex Officio Meeting**  
**September 3, 2015**

US Farm Bill Update Regional Conservation Partnership Program (RCPP)

- On June 17<sup>th</sup> Red River Retention Authority approved moving forward on funding for “Technical Assistance” to complete 20 RCPP watershed plans.
  - 6 ND Watersheds
    - ✓ Cass County Joint WRD – Swan Creek Watershed
    - ✓ Cass County Joint WRD – Upper Maple River Sub Watershed
    - ✓ Cass County Joint WRD – Rush River Watershed
    - ✓ Richland County WRD – North Branch Antelope Creek – Tributary of Wild Rice River
    - ✓ Park River Joint WRD – North Branch Park River Watershed
    - ✓ Walsh County WRD – Forest River Watershed
  - 14 MN Watersheds
    - ✓ Bois de Sioux Watershed – Five Mile Creek
    - ✓ Bois de Sioux Watershed – Rabbit River
    - ✓ Bois de Sioux Watershed – Bois de Sioux Direct
    - ✓ Roseau River Watershed – Roseau Lake Bottom
    - ✓ Roseau River Watershed – Beltrami Island Area Water Management Project
    - ✓ Wild Rice Watershed – Green Meadow Sub Watershed
    - ✓ Wild Rice Watershed – South Branch of WRR Sub Watershed
    - ✓ Wild Rice Watershed – Moccasin Creek Sub Watershed
    - ✓ Sand Hill River Watershed – Upper Sand Hill River Watershed
    - ✓ Two Rivers Watershed District – Klondike Clean Water Retention Project #11
    - ✓ Middle-Snake-Tamarac Rivers Watershed – J.D. #14 FDR Project
    - ✓ Middle-Snake-Tamarac Rivers Watershed – J.D. #19 FDR Project
    - ✓ Red Lake Watershed – Four Legged Lake Watershed
    - ✓ Red Lake Watershed – Pine Lake Watershed