

Interview with **Garfield Eckberg**  
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Voices of the River - Oral History Project

by [Anne Queenan](#)

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AQ: We are meeting here at the St. Peter Treaty Site Center, a historic place where many things happened here in history, and I'm here to interview him for "The Voices of the River" program, which is sponsored by the Minnesota Historical Cultural and Heritage Grants with Clean Water money. And we'll begin shortly.

GE: The History Center in St. Peter, doing an interview on the Minnesota River. I previously mentioned that it's kind of a benchmark in my life, the 16<sup>th</sup> of May; that was when I left the United States for Germany 56 years ago. Had a nice ride on the Atlantic Ocean for nine days and then spent about 15 months in Germany as a clerk-typist in the 7<sup>th</sup> Army Headquarters next to Stuttgart, right next to the Black Forest.

AQ: I'd love to know what you think about when the movement began and your version of that.

GE: I could start with some of my history on the project. I guess I've had an interest in the Minnesota River for many years. I relate back to the Sunday School in the Primary Department. The lesson was on Noah and the flood. Our teacher, who was also a school teacher said that many times we have a lot of water and then she said can you imagine, next time you go to St. Peter that at one time there was water from one side of that river bank onto the other. And I figured, I don't know if that's possible. Well what I found out, she was correct. Only thing is, that started when the glacier melt back about 15,000 years ago. So the river was actually that wide, but it gradually eroded down to its present location over a period of 15,000 years. And so we were both correct—the water did at one time go from one side of the bank to the other which is usually between three to five miles, and I was probably correct that it was never full of water with the present level. So both Sunday school teacher and I, I guess we're basically right. So I've always had an interest in the Minnesota River and then some years ago, I believe it was 1952, I was appointed to a Citizens Advisory Committee of the Pollution Control, and we had a series of meetings over a period of several years and thought that was very interesting because we got a lot of information on the river itself, the history of it and probably some of the things we can do with the improvement of water quality.

AQ: Can you tell me how you came to be appointed and what are some of those things you found interesting?

GE: At the time, I was on the board of directors of the Minnesota Farm Bureau Federation and when this committee was formed, they wanted a representative from the Minnesota Farm Bureau and the board then figured, well I live in this particular watershed, I would be probably the good one to do and follow it because of the background of the history of the river and where my present location is. So they sent my name in and I believe Governor Carlson then approved the recommendations of several on that committee.

AQ: And what is your location?

GE: Well I tell people I'm far from everywhere, ten miles south of ???, Minnesota, I'm ten miles north of Nicolet, I'm 12 miles from St. Peter and I'm ten miles east of Lafayette. So I'm probably in the middle of nowhere; it's in the north central part of Nicolet County, part of a big watershed of the ??? River Watershed, and we have land right alongside of the Judicial Ditch No. 1, which is a big drainage ditch that was actually established in 1908. That's where our farm is.

AQ: How did what you learned with your work there impact what you know about where your farm is?

GE: It was a cross section of the State of Minnesota. We had agency people there, county commissioners and research people from the University of Minnesota, from the geological survey organization and I think there were three or four farmers on that committee. Some people were very active in the environmental quality and had done a lot of work in researching what could be done to improve it, as well as quite a few people were from the cities because of the wastewater treatment. And that's a big factor in the water quality.

AQ: What did you learn about what can be done to improve?

GE: I guess as a farmer, agriculture is a big area in the Minnesota River Basin, and there's a tendency to point to a lot of different reasons why and what agriculture contributes. And I guess I came from the point of view that we're doing quite a bit in farming with our methods and I know on our own farm we've done a lot of work to reduce soil erosion. Because right now, if you're aware, land is pretty expensive; you don't want to go anyplace. And you tie that in with farming practices and how we've reduced the amount of trips over the field and how we are actually producing more crop with less energy being used. So that's probably where I was coming from during this period of time.

AQ: So were you endorsing the recommendations? What recommendations meant something to you?

GE: Well the charge, I suppose you could call it that, from Governor Carlson was to try to make Minnesota River fishable and swimmable. And one way to do that is to reduce the bacteria and then you find the sources for that bacteria. That's where a lot of the work and information came from, the people that had been involved in that.

AQ: Can you give me an example?

GE: Well, I guess my guideline on working on this river project was to change what you can change and don't try to change what you can't change. And I guess I probably have come to two sources for that and that is the river valley itself. Now you'll see here I have a picture I took from a DC-9 coming home from California in January of 1996. It was a nice smooth flight and we were descending on our way to land in Minneapolis and I happened to look out of the window and here's this beautiful sight of the Minnesota River. And what you see here is the original banks of when that river was cut when the glacier melted. And the present elevation of that river is around 750 feet. I use this as an example of the farm

where we farm. That elevation is 1,000 feet. It's about 15 miles from St. Peter. The elevation of the bridge in the city here is around 750. So that means you have a 250-foot drop within a three-mile area, and that's a big source of the residue. And it's going to be pretty hard to change that, 'cause that's the cards I suppose we've been dealt with. So then you try to cut back on erosion. I use this as an example also at our farm. My grandfather built the first well, drilled well in 1920. It was 205 feet. There was a screen put in that well because the bottom of the well set in sand and if you look at the nomenclature of the earth, where the river itself is a 250-foot drop, that sand layer was about a 200-foot level. So that tells you that the Minnesota River bed is sand and that's highly erodible and so much of the erosion comes from the river bank itself. And I've had a chance to study that a little bit every time I drive through the valley. You'll notice that there isn't a lot of protection on the land in the river valley, because of all the shade and it's open dirt. The only thing that's there to protect it is the few leaves that fall in the fall. So, so much of the erosion comes from the river itself. I had an interesting experience here several years ago. My wife's high school friend was married to a geologist from the University of Minnesota and I mentioned to him, we took a tour of the Minnesota River Valley, that when I served on this committee, a large portion of the water coming into the river from the banks itself, and he said some of those streams coming into the river are high in arsenic and mercury. Oh I said, is that why we are getting mercury in the Minnesota River? He said, yes it is. Oh I said, I thought if you read the papers and the news that it's coming from fossil fuel power plants. Well he said, some people will tell you anything when they're against things. As I looked into that and my background in high school physics and chemistry is mercury is a product of oxidation. There's two forms of oxidation, rapid and slow. Rapid is fire, so when you burn a lot of material like in a coal-burning plant or something, there is mercury being released, even though today we have a lot of equipment on the power plants to take that away. The other form of mercury comes from the slow oxidation and that's from rotting and decay. And that releases over a long period of time. As an example, if you take a branch or a log or something and burn it, you can do that in several hours. If it's allowed to rot, it will take probably 20 years or so. But it will still release mercury, and this is never brought up and this is part of the research I've done since we've been on this committee. And the general public isn't aware of that. As an example now, I have a display here. This is wood. We dug a well on our farm, this was in 1978. The well was 400 feet 'cause the original well I had mentioned before went dry. It's very common, when you talk to well drillers, that they will strike wood about the 80 to 100-foot level. This will show you that this is vegetation that was probably buried there when the glacier went through 15,000 years ago. That's petrified wood, and it's

been laying there without any oxygen and it's quite a phenomena to find that. And it's very common for well drillers to think nothing of it; it's just a common thing. So I managed to save some of that and have been handling it pretty delicately ever since. I think that's an example because of the humus that's being decomposed in the ground itself, and some of these, like mercury, is being deposited naturally. So that's my take on the mercury part of the Minnesota River.

AQ: Getting back to what you said earlier, you work on what you can change and realize what you can't change. Can you give me some examples of what you can change?

GE: I guess I have to use our farm as an example. Historically it's been a dairy farm. We apply quite a bit of manure and we raised a lot of alfalfa. We used reduced tillage. One of the more interesting things I ran into some years ago was a farmer had been back to Norway and he was a farm where his ancestors had been. He said you're mow boarding up the hills. We can't do that in Minnesota because of the high erosion. Why can you do that in Norway without erosion? Well the answer was it rains different. And I started to figure out why that was. It goes back to the earliest settlers that came here from Europe, the northern part of Europe. One thing they really were scared of was thunderstorms, along with mosquitoes. There were no thunderstorms in that latitude of the British and the Scandinavian countries. So, what is a thunderstorm? How does that work? Well, you have thunder first because you have lightening, and lightening is caused by a large land mass with an outburst of warm air into the atmosphere. And you'll notice in the hot summer day, you're atmosphere will cloud up and then you have electrical charges build up into that cloud. And then usually later afternoon, it starts to discharge, and along with that it gets heavy rain. So the reason the farmer in Norway could mow board or going up the hill was because he didn't get a two or three-inch rain from a thunderstorm. That's one of the things we can't change, and that's just the way the earth is made. So now, we have thunderstorms here, so we try to do things on the farm to prevent erosion by a heavy rain and that usually is on our hillside. We put in grass waterways and save as much residue on your land as possible, and that will keep it from eroding. One of the best examples of that, and I use our dairy farm, which we sold the cows a couple years ago, but we had a lot of alfalfa and we haul a lot of manure. What alfalfa and manure does to the ground is that it improves what we call the tilt; it improves the water holding capacity. Now, the better tilt you have, the less erosion you'll have, and that's a lot to do with your crop rotation. So if you have more legume on your land and have access to animal manure, that improves it.

GE: I mentioned before the tilt of the soil and how you can improve that with your farming practices and your crop rotation. One of the better examples of the type of soil we have in this area, the Carrion-Webster, it's a heavy loam. You take a cubic foot and fill it with water, a container that's a cubic foot. You have 7-1/2 gallons of water in that container. Now you take that container and you fill it with soil, the type of soil that we have here in Nicolet County and the ????. I don't know exactly the amount, but you could put in three to four gallons of water into that soil before it runs over. That shows you what a good water capacity we have in the soil here. That brings up another question that's controversial, and that is the role of tiling. Tiling actually is one of the better conservation projects that farmers have, and it is true, we drained a few of the shallow lakes that probably shouldn't have been drained, but when you tile, you increase the water holding capacity of that soil. So now, if you get an inch or two of rain, that soil is just like a sponge. Back in the days when this was all prairie, a two-inch rain would cause actually more runoff because it couldn't get into the ground. So that's been a hard thing to explain for the so-called nonfarming public of how we've actually improved our soil and we've actually used that to prevent erosion with tiling. And this is just one of the few things that farmers have to explain to the non-farm public. Another thing that has happened in the technology in crop production. Years ago, I mentioned we used the ??? extensively and it was more subject to erosion. But we've also cut down the trips, and that's because of the herbicides that we use to reduce trips on the field. And the herbicides we use now, most of them are on contact; they don't get incorporated into the soil. So if the soil should erode, there would be no danger of the soil having anything like that in it. And another example is, with good farming practices today, it's not unusual for farmer to plant over 30,000 plants of corn per acre. When that crop matures and it's a beautiful crop out there, now you get into the carbon dioxide issue. That crop uses a tremendous amount of carbon dioxide. That's essential for plant growth. We don't spend a lot of time talking about that, how our farming and our crops out here really reduce carbon dioxide, and that's another point I think the farming industry has to explain more to the general public.

AQ: Can you tell us about your own farm and the history on your farm?

GE: Going back to my father's side, my great-grandfather, they were immigrants from Sweden and they settled in Illinois in the Dixon area. And I believe they farmed there for two years. Right in this area, and right down the road from this location is where the treaty with the United States Government and the Indian tribes was in 1851. So, about six years after the treaty, the word must have come down to Illinois that there was new land opening up in Minnesota. So they loaded up their belongings in a wagon, a team of horses, and they had a cow tied behind so

they had milk for the small children. And they proceeded to move west and they crossed the Mississippi by ferry, they got on the west side of the river and came up the Mississippi River up towards Red Wing and then came across what's now called the Big Woods to Henderson. And from there they stopped and got their instructions on where their land was that they were going to live on. And they came to St. Peter right here and then went up toward that farm. That was in 1857. My grandmother at the time was three years old and she talked quite a bit about that experience, driving through streams almost over the axle of the wagon, and it was quite an experience for a little girl. So, they settled in a farm and then my grandmother got married to my grandfather who was also an immigrant from Sweden. They started the farm where I lived and that was bought in 1871. So we're in our fifth generation and it's continuously family run for 142 years. So, we haven't gone too far, but that's kind of the history. Now on my mother's side, both of her parents were immigrants from Sweden and they were up closer to Stockholm and they came to St. Peter here and my grandfather and worked for the City of St. Peter. So then one day, I guess my dad discovered my mother living down here and that's the rest of the story.

AQ: Tell us how the farm looked and what they raised, and has there been change there?

GE: My dad spent quite a bit of time talking what the farm was like when they first settled there. Our township is called New Sweden Township; that kind of tells you where the settlers were. Most of the township was through in small lakes and there was a fairly large watershed that cut through much the center of the township. The farming was done with mostly raising wheat on the hills, and then every farm was fenced in for cattle, and they would have pasture where the slews were. And then they were also able to make some, we call it wild hay, and that they used for feeding the cattle then in the winter time. So the grain was basically wheat. Corn production didn't come in until quite a few years later. They tried it and it was more successful to raise wheat. And that's interesting too, because the wheat land continuously would cause also more erosion. Our first tile was dug in in 1915, where we started to improve the land and drain some of the, we call them potholes. And if you're going to have a good piece of land, you tile. So our first tile was in 1915. It's still there; it's working every bit as good as it ever was. I think I had mentioned the large watershed there. It's interesting where the roads were built, they went around the small lakes and the slews, and if you go in Nicolet County, you don't find many square fields, like a checkerboard, like you do in Iowa and some of those states because they drove around all these small lakes. 1908 is what they called the dredge went through, and it was a judicial ditch because it went through two different counties. And

that opened up the drainage for that area, because then they took some of the surface water and then it was possible to tile then into that drainage ditch. So that is continuously, we're doing that today. So that's 115 years ago, so we are continuing to do what they started to do quite a while ago.

AQ: Have there been any improvements to the drainage ditch?

GE: Yes, in 1954 it actually was reconstructed. They straightened and they actually went deeper, so that way they would put other surface ditches into that main ditch. That made it possible then for tile outlets and because of that, that's why you see such high productivity in the county here, because today it's not unusual for farmers to be averaging 200 bushel of corn, 50, 60 bushels of soybeans, weather permitting. And that was due directly, among other things, to the drainage issue. And that brings in, that's why they look now in their water quality, where they look at those drainage ditches. And it is true that it does move the water into the ditches faster, under certain conditions. But as I brought up before, right now, if you go through our farming land out here, the land that's been worked, it's just like a sponge. You could take two inches of rain real quick and there wouldn't be an erosion. So that's kind of the background of the farming in our farm.

AQ: And did you say it went from wheat to dairy and now it's corn?

GE: Yes, it's a part of technology today is they started raising corn and oats. Oats was a good feed for horses and you also get the straw for the bedding for the livestock. Oats is high in amino acids, it's relatively high in protein, I think in the 10-12 percent range, it's excellent animal feed. So they raised wheat mainly for cash crop. They'd take that to town after harvest. They would also feed wheat to livestock, 'cause it is very similar to feed value as corn. Now, today, about the 1940's, they introduced soybeans and within the last 70 years, now they've gone predominately to a rotation of corn and soybeans. And if the dairy herd is there, then they raise alfalfa and some will have some pasture. So if you drive through our county here now, now until fall, you'll see fields of corn and soybeans. And that's the change of demand of the market. You get into livestock production, you're getting into more larger facilities concentrated. Earlier every farmer had about 10-12 cows and a few root cellars and raised pigs. And now the feed lots are much bigger. I should bring this out too. Those feed lots today are very scientific on how they spread the manure. They do a good job and they spread it according to the analysis, so they're very careful not to put more on than is necessary. I could also bring out another part of technology. When it comes to commercial fertilizer, what we're doing today is what they call grid sampling. We



used to just go out in a 40-acre field and take two or three samples and then all the field got that fertilizer based on that analysis. Now they sectionalize it through the use of computers. They could put those reports in a machine when they apply the fertilizer and they can vary the rate from one end of the field to the other. That's a big plus; it reduces farmers' cost, and it reduces the chance of putting more than you need, which reduces the chance of that getting into the water supply.

AQ: Yes, can you tell me a little bit more about that?

GE: Well it's just one of those things nowadays with the computers and the equipment out there how, it's really amazing how you can so call micromanage those nutrients. And farming so interesting and I've been at it all my life now and I'm still amazed at the technology and how farmers adopted this technology. And the end result is good production and actually improving water quality at the same time.

AQ: You made a comment about how the market has changed over the years and so your family farm has changed. How has that happened and what has been the implication for you? Is that part of the Farm Bill? Can you explain to us what you've done with the farm bureau and if there is any connection there?

GE: Yes, if you go back into the farming business, what has also taken place is the demand of the market has changed. And as an example, four percent of the world's population is in the United States; 96 percent of the world population is outside of our borders. That has opened up a big market for protein as an example, and soybeans fills that market. So as an example, we have exported about 50 percent of our soybean crop since the 1950's, and that's a big part not only of the farm economy, but the whole state and the nation of the processing and all that that's gone into that. The same with corn, with the increase in the population, for example, and the export market, there's a big demand for protein, also with corn. And that is through the livestock industry. We are exporting quite a bit of pork, quite a bit of beef and some dairy products. So this change then has come back to the farm and how you adjust your crops and what you are raising. As an example, we don't raise oats anymore in our farm because number one, we did sell the dairy herd. We still feed cattle. We don't feed them oats and I think another thing is in the farm, we've had a farm program since the '30's and a lot of history there trying to adjust to changes also. But the government usually has been slower to adjust than the farmers adjusting on their own through what the market conditions. I could mention also, more and more as the Farm Bill is debated, the conservation has a bigger section in it. And

there's a lot of programs out there to put land out of production with grass, highly erodible land. There's also an attempt to rebuild watersheds. So it's a combination of farmers' ingenuity and government policy that's out there. As of right now, as we speak, they're drafting a new Farm Bill and conservation is a big part of that.

AQ: Can you tell us why is conservation a big part of the Farm Bill now?

GE: Well, I think it saves the soil. Now if you go back and a good example of that public television now in the spring has had a series of articles on the Dust Bowl. We have kind of forgotten about that and how they've had programs to put more grass and different things to keep the wind down. And a good example of that is right here in St. Peter. Right as you drive out of here, as I mentioned before, this is all sand. My dad talked about coming to St. Peter years ago, there would be sand drifts the size of snow banks. Through the work of our county extension office, they planted rows of trees. Today they're raising good crops down here, just by planting trees or breaking the wind down, or things like that. So those are the type of things that have been going on in addition to all this.

AQ: Did it increase after the days of the Dust Bowl?

GE: Yes, if you go back, I mentioned the first farm bills were in the 30's, was a direct result of the Dust Bowl, of how you could develop programs to solve that. A big factor in administering those programs was the county extension, and through meetings with farmers and farming practices and we're continuing to do that. That's almost 80 years ago and we're still doing it.

AQ: Can you give me some example of county extension and also any other agencies locally that work on these things?

GE: Okay, it's interesting 'cause I talked about I was working in the Farm Bureau for example. That actually got started back through the land grant system and about 1914 is when the extension started. And that was the start of the so-called government assistance to do these projects. And that is still continuing and the legislature appropriates money for that type of programs. That's where the 4-H program started, teaching people how to farm wisely. In 1916 there's a bill to allow for the teaching of vocational agriculture in schools, and that was basically, today they call it the FFA program, but those were programs started to teach young people farming practices, how to take care of your livestock, how to save your soil. Those are the type of things that were started and we're still doing it.

AQ: Can you tell me, is there anything more you want to share in terms of real specific stories in your life that you've witnessed along those lines, where the

play of the land and the soil and the water, how related they are and anything related to this topic.

GE: I guess we mentioned before kind of a partnership between farmers and the government to do these things. I think you'll go back to 1862, that was the Morrill Act, and that was where we established the land grant system. The University of Minnesota is an example of that. And what that was, it was called the Morrill Act, who was the author of it, and that every state that had representation at that time in the United States House of Representatives, would be granted 10,000 acres of land to be used for education and engineering schools to teach farmers how to run steam engines, boilers and farming. You had a series of legislation then and eventually in 1914 then they came with what's known as the Smith-Lever Act. That was the beginning of extension, where each county would have an agent to educate farmers of how to do that. 1916 you had the Smith-Hughes Act, and that's where we got into the teaching of vocational agriculture. So that's ongoing and I see that all the time because I was in FFA back in the 50's and that was very beneficial to me because the first thing you do, you learn how to keep farm records, so you don't do anything expensive, like wasting money on crop production and all that.

And you tested soil and made sure that you were putting on the right nutrients. When we first tested the soil on our farm, it was low in phosphate. Today, most of the land is high in phosphate and that's through manure application and proper soil testing. So we also, why we've got to be careful not to get those levels too high, 'cause that could get into the water system and eventually into the river. So that's pretty much the background of that from an educational standpoint.

AQ: So the partnership between the government and farmers, could you tell me a little bit more about your perspective of the various agencies involved in water quality and farming?

GE: Along with that, today you'll see most counties have what they call a soil and water district, and they have a board of directors. And they have programs out there for assisting farmers such as grass waterways. Now they've got a big program for removing open tile inlets and using a rock inlet so that the water seeps through the grounds rather than it goes directly into the ground. You have, I believe, it's the NRCS, that's another agency. So all of these agencies are connected with the Department of Agriculture and they are funded through the government, both the state and at the national level. They've done a lot, and as an example on our farm, every year I get an order for trees on our farm. And I go through our grove. Just two weeks ago I planted ten hackberries and ten black

walnuts. I suppose officially they call that reforestation, but that helps to replace what the wind blows down and like in our woods for example, we've had a lot of ??? and we're trying to replace them with hardwoods. So there's an example, trees are very reasonable and I use that program every spring.

AQ: Is there a history of the value of land and the return rate for profit for the farmer who's farming their land versus the money available to do those trees and the programs you just described?

GE: One of the more interesting things I've observed in recent years is that rapid escalation in farmland value. The stories that come from my family, we're in our fifth generation, and then you go through what each generation is going to sell your land to the next generation, that provides continuity, but you don't want to overcharge them so they lose it. So that's getting into transferring land from generation to generation; that's a big thing. In recent years the value of land has really escalated for several reasons. Good crops and good markets and farmers today can run so much land that they're willing to pay more for land. It's kind of risky sometimes, but they're doing it. And that has really led to a transfer of wealth, which traditionally was in the cities back to the country. And the big question now is will that continue or will we go through a same period as we did in the 1980's when interest rates would go high and then would that start another crisis. And that nobody has the answer to because we don't know the conditions that are going to be coming. So here again, the factor in that is the farm program itself, 'cause we've had some pretty good programs now for direct payments. They're going to take them out of the next farm bill for example, that's in effect, and we don't know all going to be in there. So that's another issue that's ongoing.

AQ: Specifically when I talk about your comment about not just the value of land, but when you think about an individual landowner who has to make decisions on how to use the land and what portion of the land should be designated to conservation in order to preserve the water, and the difference in monies available for the conservation part, use of the land versus the crop, whether it's direct payment or insurance, or whatever the case may be, can you speak to how you've seen that change and where you see it going?

GE: Go back to a little history on the farm program. We had high production periods during World War II and then the Korean War and then in the 50's, then we were getting more production than we had use for. It came with the soil bank, where you would take out whole farms and put it in grass to cut production in order to raise farm prices. And that was a fairly good program, but then they figured out

well we started to lose markets to other countries who were expanding their markets and we were cutting back. In the 1960's, you had what they called a Feed Grain Program and that was based on your history production level on your farm. So in other words, if your grandfather had some wheat in the 1930's, you still had an allotment on the land that you could get credit for, 'cause the government wasn't adjusting to what the markets were changing. Then in the 80's you had what they called a Pick Program and that was taking land out of production. Now here we are in 2010 and that era with the big markets opening up. I could back up say to the 1990's where you had CRP they called it, Conservation Reserve Program, and that's been in effect until recent years. Now, with the big markets opening up, a lot of this CRP land is coming back into production, and with that is coming more highly erodible land because farmers are producing for that market. So you've got this out there and that's pretty much the present day situation.

AQ: What do you see happening in terms of the next 25, 30 years and what do you envision will be the quality or the changes for the Minnesota River Basin?

GE: Well, I think we will improve it. Another factor we haven't talked about and our committee spent a lot of time on was the waste treatment plants of your cities. I can remember standing on the bridge here in the St. Peter area, and there would be discharge pipes, it wasn't clear water. So historically, the river has been used as a sewer, untreated sewage; the carp liked it. Then we got into waste treatment. Now, what was being discussed in the 90's was to greatly expand that to take out more phosphate because those waste treatment byproducts are high in phosphate. I think you've seen within the last 20 years these cities have updated to take phosphates out and then that coordinates with what I'm talking about with the phosphates on the farm. That's why we don't put on more than we need, 'cause you don't want the phosphates to go in the river, 'cause that's the same as if the waste treatment was putting it in. so that's how farmers are doing to adjust and I think those two things, between the waste treatment and the application of manure, commercial fertilizer accurately, I will see that to continue, 'cause there's no new technology coming out. Now we have the genetically modified plants where the plant can have the resistance to the bugs, rather than to apply pesticides on it.

AQ: And so you see in the next 25 or 30 years technology and farming being the answer for improving the conditions with the Minnesota River Basin?

GE: I think you'll see more improvement like that, yeah. 'Cause our farmers are very quick to adapt to new technology.

AQ: And then do you think they'll put more conservation measures in too, even though what you just described as being the conflicting forces of market versus the price of conservation...

GE: Yeah, if the prices stay high like they have, it's going to be harder to divert land out of production for that.

AQ: And how does that bear for the river?

GE: I guess we've made a lot of progress and we'll continue to do more.

AQ: The TMDL process, what do you think about them and what are your attitudes and beliefs about them?

GE: Well I believe it pretty much deals with the percentage of those whatever you want to call it, compared to the total and it's an issue and I think we address the issue like what we've been talking about with our farming, total maximum daily load. You try to reduce that and you reduce that by proper application of manure, proper application of fertilizer more residue to prevent water escaping with soil in it. So I know farmers have a pretty good educational challenge ahead of them because there's a lot of these programs, so many of them probably don't have the farm background like the farmers that are out there every day. So they get sent to like your water legacy and all that, there's a lot of things out there.

AQ: So for you, what is at the heart of the matter for you when it comes to the effort to restore the Minnesota River and its basin and the watersheds that feed into it?

GE: Well we're very fortunate that it's there I guess, because this is why we've been able to improve production and why we have been able to provide into a major industry, which in turn provides a lot of employment. Like in Mankato, all the soybean plants. And another issue we haven't even talked about and that is energy, 'cause now quite a bit of corn is being used for ethanol. That has put more pressure on corn raising to adjust to that market. And then you get into mandates and there's a whole laundry list of issues out there. That's why I've kept active in the Farm Bureau and you follow this. I've been up to the legislature I think nearly every year since 1967. Some years I've been there five different times, so you follow legislation, you talk to your legislators, you talk to your so-called movers and shakers, your agency people. You've got to keep that communication line open. And we need to get the communication so we adjust and we also communicate out that we are doing a pretty good job.

AQ: Could you tell me a little bit about one or two of the awards you've gotten and your role. I believe it's related to the Farm Bureau.

GE: A couple years ago my wife and I received the honorary life award and they tried to recognize servers from long term people. I kind of joke with people, I think it's called the exhausted rooster award. But it's fun to get those rewards. I think it's humbling and gratifying, I guess.

GE: I guess, I came on the county board in 1963 and I'm still active at the county level, and I was on the state board for 12 years. I was on the American Dairy Advisory Committee four years in the 1980's, served two years as the chair, got to meet other people around the whole country on the dairy issue. And you go to the national meetings and you see what people are doing all over the country, even foreign countries. So it's been quite an education.

GE: I think in recent years, if you drive through the country, you'll see another program that's very valuable and they have a setback on these drainage ditches for a legume of some kind. So if there is a chance of water coming directly, it gets filtered before that. One thing in our country here, it's so flat, but if you go to Southeast Minnesota, you see a lot of contour farming. It's very pretty. I guess another part, and interesting in the Minnesota River, number one, it's one of the more beautiful places in Minnesota in the fall. I tell this story of my sister and her husband. They were going to a meeting in the fall of the year up to Duluth. They called up the Triple A, where is the most beautiful drive now to go to Northern Minnesota? They said the prettiest place in Minnesota is between Mankato and Henderson. She lived ten miles from there. The other thing, doing some research on the river valley itself, I took a tour with a geologist some years ago, in the Minnesota River Valley is some of the oldest rock in the world.

AQ: Do you want to show us that map and tell us about that?

GE: What I have here is a map that came from the Geology Department at the University of Minnesota. It's a kind of computerized makeup of the rock layers in the upper Midwest. I mentioned the nomenclature of the earth and how the river valley and our farm and the wells and the rock layers and the sand. Here you can see what was Lake Agizsi at one time and the Red River. And here's the Minnesota River Valley and the rock formation that's in this area. You have a similar rock formation then going into South Dakota and into Nebraska.

AQ: Is this from the glacial days?

GE: I suppose you'd call it the glacial drift. And I suppose originally the way the earth was formed, there were rock layers in there. I believe there's seven different types of rock formations in Minnesota. There's one in Iowa, so you can see the difference in the type of soil because some of the rock layers in the iron mining

range are similar to the bottom of the Minnesota River Valley. What is interesting is to talk to well drillers. If you ever want to get into geology, talk to your well drillers, 'cause that's what their trade is 'cause they're digging holes in the ground all over. Some of these rock layers, they've had a hard time to go through to get good wells. But today they have equipment that can penetrate those rock layers and go 400 feet or so into the ground to get good well.

AQ: Does this also show you the wider path you were talking about earlier?

GE: Well that goes back to the glacial drift. I suppose now you could go up to Lake Superior. Supposedly they were caused by volcanoes because if you, what they call igneous rock, you walk along the north shore for Minnesota, it's the identical rock that you'll see from the lava in Hawaii. So way back when, those holes were formed by volcanoes and then for some reason they filled up with water and there they are. But look at the rock structure up into Canada for example. And then here you have your big lakes, here's Lake Mille Lacs and Red Lake. Here's Mille Lacs here and I suppose this is your White Face and Goalake chains up in here and then this is Red Lake up here and Lake xxx here.

AQ: And where is your farm?

GE: Okay, well see this here, that little dot? That's North America's largest pothole, 10,000 acres. I'm ten miles north of there. It's a very shallow lake, it's Swan Lake. Years back I guess they had trumpeter swans in there. I think you still do see that some time but that's a 10,000 acre, call it pothole. It's a marsh; a lot of duck hunting.

AQ: Is your farm right there?

GE: Ten miles north.

GE: This is the Red River and it shows more details of the ice. Here's another one on the ice.

AQ: What is the main message from that article?

GE: It tells you how the Minnesota River was formed after the glacier melted, and you can see the valley was cut, I suppose with new soil, but then you've got that hard rock layer down there. Most of Nicolet County is in that rock layer. I think it's probably a granite. There's another rock called Kneis and that's very dominant in the Martin area.