

## Field Day Podcast Ep. 7 Dr. Larry Antosch.mp3

**Jordan:** Welcome to the Field Day podcast brought to you by the Ohio Farm Bureau Federation. I am your host Jordan Hoewischer, Director of Water Quality Research with the Ohio Farm Bureau. Today's episode is with Dr. Larry Antosch. He is our resident water quality expert and we sat down and gave an overview of the landscape of water quality and really set the stage for future episodes and updates on what is going on in terms of terminology. You know, how water moves in and around the lake, nutrient loading, different laws and regulations, all sorts of stuff. So expect some updates throughout the year as the algal bloom season progresses and we'll make sure that you're up to date with as much information as humanly possible. Enjoy.

**Jordan:** All right, so I guess we'll start with who you are, where you have been, where do you come from, how long have you been here, what do you do, all that good stuff.

**Dr. Antosch:** All the background, the history of Larry Antosch in two seconds. Yes. Larry Antosch, Sr. Director of Policy Development and Environmental Policy. Been with Farm Bureau going on 19 years coming up here in July. Prior to that, I was with the Ohio Environmental Protection Agency division of surface water managing the nonpoint source program and a lot of the watershed management activity. So from a very much a non-regulatory stance over at the Ohio EPA which fit in very well with what I've been doing here with the Ohio Farm Bureau dealing - with environmental policy and making sure that our members are actively engaged and a lot of these activities are taking place.

**Jordan:** So from my experience here in the last few years, I don't know if you were the first star, but you're still the only but you are a rarity in your position around Farm Bureau, correct, as being a more technical expert instead of an environmental lawyer or things like that.

**Dr. Antosch:** Yes. And again I have to give our board all the credit in the world thinking at their time, probably about 20 years ago thinking that Ohio Farm Bureau and needed someone on staff with the technical background to be able to engage in these issue of water quality making sure that policies and positions and legislation and task force reports and all that are really based off of good science and good information - just not that knee jerk position and knee jerk reaction to what happens to be the flavor of the day or the crisis of the day.

**Jordan:** While the flavor of the day the year, the season, maybe the decade maybe the century is this water quality in general and adds influence on water quality. I'd like to start with just level setting on water quality over the last four years and kind of where we've been and where we've come from in terms of why we are going to talk about some of the things we talk about today.

**Dr. Antosch:** Water quality in general in Ohio, basically since about 2010 that was when some of the first issues but some of the photographs were surfacing dealing with harmful algal blooms, blue green algae, and cyanobacteria. And that was with the grand lake St. Marys and the infamous Jet Ski, the red Jet Ski and the green water. That became very prominent in the news mainly because of blue green algae or cyanobacteria produced toxins and it becomes an issue for human health and potential concerns that way. After that, a lot of attention was being placed on across the state and a lot of attention again up

into northwest Ohio into the Lake Erie western Lake Erie Basin that started seeing some increases in the algal production kind of going back to the days of the early 1980s and we had very successfully addressed the issues back then - something happened in the mid-1990s. All of a sudden we're seeing a higher amount of dissolved phosphorus entering the system leading to the harmful algal blooms. So attention mainly has been up in the northwest Ohio, a lot of focus on harmful algal blooms but we do have water quality issues and water quality concerns across the whole state. Ohio River had issues a couple of years ago. It was a major algal bloom that ran from essentially the Pennsylvania border through halfway through Indiana and again happening at a time when there was a lot of recreational activity going on. Cincinnati was holding the river fest and so these things unfortunately tend to happen in the late summer - July, August, when the water warms up all the nutrients that have been delivered during the spring runoff are available. Blue-green algae, cyanobacteria, love those conditions and they tend to flourish.

**Jordan:** Tell us about you know what contributes the nutrients to the lake. You know we obviously know the Ohio side but overall what contributes to that lake. How does it act? How does it cycle through the system of that lake?

**Dr. Antosch:** Lake Erie is a kind of an interesting situation in that the lake itself can be divided up into three basins. Western basin, central basin the eastern basin. A lot of the attention has been focused on the western basin and that's the shallowest area essentially from where it comes in either the Maumee River or the Detroit River up through the islands. That area, that water tends to circulate and replenish itself relatively quickly somewhere in the range of 20 to 30 days. So it has a quick flushing time but it also being as shallow as it is receives the nutrients that it receives and the sediment that gets spent or deposited can be re-suspended and reduce and re-release some of those nutrients. In terms of where it's coming from. Proximately 41-45 percent of the total of the annual nutrient load comes down to Detroit River and the Detroit River is now not only just Detroit, it's also Canada and the water flowing in from Lake Huron. The remainder comes from either the Maumee River, the Sandusky River or the other smaller tributaries coming into the basin itself. What we're seeing is that the majority of those get the positive transported to the lake only takes three or four storm events.

**Dr. Antosch:** As we're seeing these higher intensity short duration storms in nature to the skies opening and flushing off so you have the very much increasing opportunity for nutrients and for sediment to wash off not only from the landscape, but also be suspended in the industry networking and these are having a stream bank erosion or a bed flow with things of that nature getting into the lake itself.

**Jordan:** So you talked about rain you know and obviously you know it's raining today up in the Western Lake Erie Basin area and a little bit in Columbus. How do you think that's contributed? You said since the mid-90s something happened. You know there's a lot of factors in play but how is the rain or the environment's influence on this on this subject?

**Dr. Antosch:** Well unfortunately it's one of the major players in the whole situation and it's one that we have no control over, from the standpoint of if we could program out when we want the rainfall to come in what amounts in all that, I'd be golden and I could retire and I'd be sitting pretty somewhere. Because of the way that we're seeing these changing rainfall patterns, the fact that we're having cooler temperatures early on, the fact that we're seeing the higher intensity, the skies opening and getting the inch in about 10 minutes or 15 minutes rather than that all day soaker is having a major influence on how much is

washing off the landscape and being transported downstream. And because of that we have to come up with ways of how can we, say, water proof the watersheds or the drainage areas or our farms, but those are some of the things that we're looking at. What can we do to slow down the wash off or the runoff? What can we do to make sure that water's infiltrating the holding up the flow from the drain tiles all those kinds of things?

**Jordan:** So with that, you'd mentioned that you know 40 percent or so comes down from Detroit, so why is such a high percentage of nutrients going into the Lake being attributed to Ag. Explain I guess the loading period or what like the timing of when some of those nutrients are delivered.

**Dr. Antosch:** When they're looking at the projections of how large the algal bloom is or what influences the production within the Western Lake Erie Basin, they look at the time period from March 1 through essentially the end of July. That time period is when the nutrients that would be coming in are washed off the landscape would have the major influence on leading to the harmful algal growth or the algal blooms that we're seeing in the lake. Because of that, not that attention isn't being placed on the municipal point sources and the combining sewer overflows and the home septic tanks and all those, those are, I don't want to say continuous but in the way they are. I mean, a city is continuously treating its wastewater and discharging it into a water body versus the nonpoint pollution or the land management influence is very much dependent on the rainfall patterns that we're seeing. From the standpoint of is it a point source, nonpoint source or where's the nutrients coming from, a lot of that is dependent upon how the land is utilized or what's happening on the landscape. The western Lake Erie Basin has a large percentage of that watershed. A large percentage of that land uses in agriculture and so the agricultural land use has an influence on what's washing off the landscape. So, because it's one of the larger activities, row crop agriculture, especially crop agriculture, I don't see the finger pointing that it essentially does gets his finger pointed at it. On top of that one of the pieces or one of the components that tends to get forgotten about is the fact that we do have internal loading we have these sinks, these areas that were trapping nutrients and are slowly releasing them back into the system. We're seeing the stream bank erosion, we're seeing the material, the sediment into streams with flush and wash out. So there's a lot of that internal loading piece that that system loading that really isn't happening because of what's on the land, but because what we've been able to trap and keep in place.

**Jordan:** Yeah you know I've heard you speak before about system lag and in legacy phosphorus. I mean I think that is a big issue that's not being talked about enough. I've said before with maybe current farmers it's not, it's not you know to blame them but it is their problem and that problem might be too many nutrients in the ditches and waterways and things that are finally kind of hitting that tipping point. Can you talk a little bit more about the lag to the system and the role that you know legacy phosphorus may play in this issue?

**Dr. Antosch:** Yes. You have to realize that today we're in the times when people want to see instantaneous results. They want real time information they want real time. You know, you changed your management practice yesterday so why am I not seeing water quality improvements today? We know that natural systems take time to re-adjust. From an agricultural watershed, it's not unrealistic to have 10 to 20 years after management practices in place to ultimately see what the impact is in the stream system itself. That lag

time is one that I don't think there's an appreciation for that lag time. Now what we can do is start monitoring smaller watersheds. There's some attention now going into ok, can we look at a smaller tributary and then track the management practices and the management changes that are happening in that in that area. Monitor the water quality and look at changes that way. By the time you get down to the water vole station in the Maumee, you've got a whole heck of a big watershed to deal with and to be able to look at changes at that point may not be realistic in the short term. Whereas if we go up into the watershed itself, up into the smaller tributaries and do some monitoring may be able to track that. But still that's not going to be an instantaneous change it's going to take time for the system to re-adjust.

**Dr. Antosch:** Now Mother Nature does a really good job of accepting those changes but it just takes time.

**Jordan:** That's a fair point. And in a world where you know seasonal greenness in the lake, it's tough to expect patience from some people but it's a really good point to make. So you talk about trying to understand you know what's out there on the landscape and doing studies about what nutrients are coming from where. Can you talk about some of the studies and reports that have been out? There's quite a few of them so I don't know which one you want to start with but you know there's been a lot of reports from different institutions about what's going on in the landscape. Can you talk about some of those?

**Dr. Antosch:** Yes. Just recently I say within the past months there have been three documents have come out that have been in the news and have been reviewed and looked at. One is, every year there is a tributary loading report that comes out. Its work from Heidelberg University from their tributary monitoring and provides that to the Lake Erie commission to track changes in attributes of nutrient loads and the tributaries into Lake Erie. Over time, I mean you can look at the five year moving average and the fact that there appears to be some downward movement in where those numbers are going. But again all highly dependent upon how much rainfall and how much runoff we have. And you can really see the changes in annual variation because of if it's a wet or a dry year. Report on that, you know the take away that that's come out is that well we're not we're not making any difference we're not seeing a directional change and in what those loadings are. Again kind of hard to do that with the natural variation then the fact that Mother Nature gives us an experiment every year. So that one came out and identified, well maybe all the work we are doing isn't showing up as water quality improvements. The other report that came out was Ohio EPA which releases every two years what they're calling their Mass Balance Study and then again major river basins are trying to partition out how much of the nutrient load is coming from the point sources, the municipalities and industries that have a permit to discharge under the federal Clean Water Act and then the remainder is how much is coming off of what they consider the nonpoint source of the non-permanent areas. They try and make an estimate on the amount that would be coming from home sewage treatment systems and septic tanks, but then there's the remainder component. This was the second year, the second time that the reports come out, they did one two years ago, they have five years of data very much within the document they're saying, while we're not seeing any trends we also don't have enough information and we haven't monitored long enough. They're saying that they're going to need at least 10 years of evaluation to be able to statistically make a determination whether or not there's a change or not.

**Dr. Antosch:** So again another report that's saying that things are changing but in this

case there is a very visible recognition that we need more data, we need more time to be able to track that change and be able to see if it is making a difference. Third report that came out again this is called the Integrator report. Ohio EPA as part of the federal Clean Water Act every two years is to do an evaluation of the status of Ohio's water resources and then also look at those that are not meeting their potential and develop, put them on a schedule to develop some kind of a management strategy to bring them into potential. It's called the integrator report because early on there's two sections of the Clean Water Act that required two year reports and so they started rather than having independent reports combining them together. One was 305B report. Someone may recognize that nomenclature and the others the 303D report. 305B was essentially the status of the state's resources. 303D was the ones that are not meeting uses, what are we going to do. Do we need to develop a TMD out maximum daily load or just continue on with existing management practices or existing programs to bring that into attention? That report was the first time that Ohio had developed a process to evaluate the open waters of Lake Erie and so their recommendations for recreational purposes because of the harmful Algal blooms and the extent of the algal blooms that the open waters of the western Lake Erie Basin should be declared impaired. The draft report still going through public review and comment and then Ohio EPA will take those comments and submit a final report, probably sometime in the end of May or beginning of June, so probably the next few weeks.

**Jordan:** Yes, so you said impairment. You know people who are maybe paying attention to some of the articles or some of the comments that are coming out, what does that mean?

**Dr. Antosch:** The impairment is essentially or if a water body is deemed impaired, the Ohio EPA looks at and evaluates water bodies, streams, and rivers, lakes under a multitude of used designations or how that resource can be used. There's an aquatic life. So are the fish bugs happy? Are they meeting or do they have populations, do they have numbers that they should have given their place on the landscape. If that watershed or if that water body or stream has a public drinking water intake or if it's designated for public drinking water, they evaluate whether or not it's meeting its potential. Whether or not there's nitrate violations or bacterial violations things on that nature. And then there's also the recreational use and recreational use again, primarily more of a bacterial. So are the waters safe for recreation. If you're going to go in and get sick or potentially get sick you want to eliminate any exposure to the water or reduce exposure to the water. And that's the one use that Ohio EPA developed a tool on to evaluate the open waters of Lake Erie because harmful algal blooms do produce toxins. There is a potential then for health impacts if from a recreational standpoint. Because it's not meeting that use, that potential for recreation, it then is declared impaired for that use. Once the water body is listed as impaired then the next step goes into place as to how do we get it off the list. How do we make it so that we can from a recreational standpoint how can we recreate in that wider body?

**Jordan:** And what are the steps if that happens? I mean how do you get out of the impairment state?

**Dr. Antosch:** Impairment state, getting out of it is based off of gain monitoring and they redo those use-attainability assessments or look at with new data if there's changes being made. Each time one of these integrator reports come out there are water bodies that are taken off the list because they've met their potential because of things that have happened in the watershed.

**Jordan:** Another thing that I've seen thrown around I'm sure other people seen around as the watershed in distress. Can you explain where that's come from and kind of how it's been applied to this current situation?

**Dr. Antosch:** Watershed in distress is a state designation or declaration. It is part of the Department of Agriculture's agricultural pollution abatement rules and it's being applied in Ohio in the Grand Lake St. Marys watershed. In that situation, farmers in that in that basin because of a large amount of livestock either livestock production or utilization of manure part of their fertility plans. Farmers in that watershed that utilized or generated manure had to develop a nutrient management plan that was submitted to the state, reviewed and is being tracked. They also had restrictions on the application of manure during the winter time and rather than say frozen snow cover ground, it's got specific dates when no manure application can take place.

**Dr. Antosch:** There is some discussion of should that designation be moved into the Western Lake Erie Basin. The current rules that the Department of Agriculture have, there are about seven or so criteria that should be looked at prior to recommendation by the Soil and Water Conservation Commission as making that designation as a watershed in distressed. The discussion that's taking place is then should Western Lake Erie Basin be a watershed in distressed because the current rules really look at sediment manure or materials attached to sediment feeling is that probably would not be as appropriate in the western Lake Erie Basin because about 20 percent of the nutrients are generated through livestock and utilization of manures in terms of fertility plants. And so you have a large area, we take a lot of resources around the state to make sure that the nutrient management plans are developed, that they are being followed, that they are being reviewed. It doesn't seem like under the current rules and regulations that are out there that would be inappropriate tool for the western Lake Erie Basin.

**Jordan:** Yeah in a world where you know government employees are few and far between than they used to be it seems more of these monitoring the regulatory things that will require people to check up on things is probably not feasible really from the way things are set up right now.

**Dr. Antosch:** Yes and that's one of the one of the big issues that we have. And even within our Farm Bureau policy is that you know if something is going to be placed, you know we have the fertilizer applicators certification program that requires resources. I mean for that training for the follow up and then the recertification and all of that. So the program itself sounds really good but if you don't have the support structure behind it it's really hard to move forward with. Same thing with any kind of a conservation program or a regulatory program you need to have the resources in place to go out and be able to work one on one to provide that technical assistance for those that that may need it. And then also the follow up in terms of if someone makes a mistake and they need to have that regulatory, hate to say regulatory hammer, but the some type of a follow up because of an incident then it may be what is right.

**Jordan:** So what are some of the ways you know that are being used to maybe even determine what's being done on the landscape already. You know I think not enough work has been done to account for what farmers are already doing conservation wise. How do we know what's being done or what should be done and where to address the issue?

**Dr. Antosch:** Ah, the \$64,000 question: who's doing what. How many widgets have gone on the landscape? How are we moving the needle?

**Dr. Antosch:** Very important question, something that we need to be able to address and make sure that our members, that the agricultural community don't feel, I don't want to say intimidated, but a lot of times we have to make sure that if we are tracking land management practices or changes or conservation areas that we can disaggregate that and track it more on a watershed basis and not have individual farmers linked to the database. Their comfort level is not at the point where we're going in and recording everything they're doing and having that accessible to whoever. It's very key, we need to be able to track. Right now we can work with either the NRCS through their conservation programs. How many things went in and where we can work with our soil and water districts. Again looking at state resources who's doing what and where. Unfortunately that doesn't track those individuals that say I really don't want to deal with a federal or state program, I want to do it on my own mainly because some of them might be timing. So you could sign up for an Equip program or something under the farm bill within NRCS and while you may make it on the list it may be quite a while before someone could come out and design or help and you don't want to wait that long. So those individual resources that go in wouldn't be captured by just looking at the readily available or the information available through either federal conservation programs or state conservation programs.

**Dr. Antosch:** We know that a lot of folks utilize technical service providers or they work with their certified crop adviser or they're doing fertility and other management practices through an agribusiness through their fertilizer dealer and so that may be an avenue of obtaining some information, but again it would have to be the client, the farmer would have to sign off to be able to release that information into some data set or a database.

**Jordan:** Yeah I mean that's a slippery situation. You know obviously privacy is important but also you know sharing some information is a good thing. You know it's good to see what's actually been going on so that we can maybe address some things. It's understandable when privacy can kind of get in the way a little bit.

**Dr. Antosch:** Yes, and like I say the whole idea becomes one of at what level can we track it or what level do you do it on. Yes, I mean would be good to know. We know that for 4 million acres of cropland in the western Lake Erie Basin and by working with certified ag dealers, about half of that is covered by the work that they're doing. And so we know that. But if someone says where, we have to go back to those agribusinesses and be able to get and release that information.

**Jordan:** So is there anything we've missed or anything you'd like to bring up. We're going to hopefully give periodic water quality updates that will build on kind of what we've spoke about today. Was there anything that you can you can think of?

**Dr. Antosch:** I think one of the things that have come out and this was a report that came out of the International Commission looking at fertilizer use within the western Lake Erie Basin and what we're seeing over time is that the fertilizer inputs have been dropping, are declining. We're at the point we're probably putting on less nutrients than are being taken off by the crops that are growing. So we're in a way I would say mining the soil but you almost can say we are. The nutrients in the soil are being utilized. So that's I think a positive. The other piece that came out of that study was startling to look at some of these,

you know we've done a very good job putting in waterways or buffers or field borders to trap sediment and trap nutrients to keep that from getting into our waterways and into our streams and rivers and ditches and things. What's happening at least the feeling is that these areas now because we're not harvesting the material become while they were good traps. Now they're becoming sources of nutrients and we need to start looking at what are the unintended consequences of our previous conservation practices and what can we do to draw down or reduce the nutrient loss from those areas. Looking at maybe and I am not going to pick on any particular type of vegetation but some type of vegetation grasses or whatever that could be harvested out of the buffers. So not only are they trapping and if you're harvesting and being able to utilize that that vegetation then you're also then removing some of those nutrients out of that area. That again a very positive report in terms of fertilizer use and also identifying some of things that we may not have control over just because of its unintended consequence of some of our earlier conservation practices.

**Dr. Antosch:** The other piece that came out is probably about a year or so ago. But again this is a natural resource conservation service study looking at the Maumee River basin and really getting into that what's happening from the edge of the field down to the lake itself. We can put in and can document the conservation practices that does or can reduce the nutrient loss sediment at the edge of our farm fields by 40 percent or so. If you take those same practices and then look at what the impact is through a mildly exercise through the whole river basin. The amount that is being reduced as you get to the lake is probably about 20 percent or so. So even though we're doing a fantastic job controlling what we need to control or doing what we can to control, nutrient loss and managing nutrients on the farm at farm level. That whole natural system the lag time the internal loadings and all that, it's going to take time to show up in the last monitoring station before getting the lake. We have to do a better job explaining and getting that fact that that lag time that response time is not instantaneous and as much as folks don't want to say or wait 20 years to see a difference, that's going to be unfortunately the reality.

**Jordan:** Yeah I mean you talk about you know the education of farmers has gone up, fertilizer use has seemingly leveled out or gone down. So test levels have gone down. And so really you know we talk about the influence of rain the influence of the lag in Legacy of phosphorus. It really is interesting to see those things work against each other but that very well could be the thing that kind of pushes over the top right now. And I'm always hesitant to say hey it's something else but you know in concert with improving conservation efforts on farm understanding the lag and legacy is extremely important. And then also the water quantity part of it all, trying to keep things from totally rushing off the field.

**Dr. Antosch:** That's right. And the data shows that you can have majority of your nutrient transport on three or four rain events. So for the majority of the time, our farmers, and our members are doing can be golden. I mean what they're doing is everything that they should be doing. Looks good, feels good, they're productive in terms of being able to have the crops that they want and they're sustainable and all that and then you get that 1-2 inch rain event and you get 50 percent 60 percent of the nutrient loss in that one event.

**Jordan:** Yeah it's pretty significant. I mean I think you know even just anecdotally you can observe that there's more rain events happening there. So the severity is increased but even just statistically if you look at the weather stations around some parts of Ohio, you're getting you know 50, 60, 70 percent increase in one inch or more rains or you know that

was 1.5 to 2-inch rains that were happening way more often than they used to.

**Dr. Antosch:** Yeah, and then how do we how do we address that so that becomes our challenge. If that's becoming the norm then what can we do to change our conservation practices. What can we do to change our farming system to be able to address that and still be able to produce the food that we want need and maintain the lifestyle that everyone likes?

**Jordan:** Yeah, we will just become a rice growing state if we could get the heat.

**Dr. Antosch:** We could do that, we will just go into wild rice. That's one of my wild ideas way back when is that, let's go back to wild rice in the Maumee River basin. Make it agritourist. In Minnesota they have to come out and have a certain kind of boat to harvest wild rice so it's just major agri-terrorism.

**Jordan:** Like a pig. You pick your own right.

**Dr. Antosch:** Yeah that's it. All right.

**Jordan:** I think that's all I got for you today but hopefully you guys will hear more from Dr. Antosch on further updates as kind of the summer water quality season rolls on and we'll go from there.

**Dr. Antosch:** Thanks, Jordan.

**Jordan:** That was Dr. Larry Antosch from the Ohio Farm Bureau Federation. If you want to learn more about Farm Bureau please visit [ofbf.org](http://ofbf.org) or if you want to learn more about one of our big nutrient management and water quality projects please visit [blancharddemofarms.org](http://blancharddemofarms.org). Thank you.