VOLUNTARY CONSERVATION: UTILIZING INNOVATION AND TECHNOLOGY

HEARING

BEFORE THE

SUBCOMMITTEE ON CONSERVATION AND FORESTRY

OF THE

COMMITTEE ON AGRICULTURE
HOUSE OF REPRESENTATIVES

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VOLUNTARY CONSERVATION: UTILIZING INNOVATION AND TECHNOLOGY

TUESDAY, MARCH 1, 2016

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON CONSERVATION AND FORESTRY,
COMMITTEE ON AGRICULTURE,
Washington, D.C.

The Subcommittee met, pursuant to call, at 2:41 p.m., in Room 1300 of the Longworth House Office Building, Hon. Glenn Thompson [Chairman of the Subcommittee] presiding.

Members present: Representatives Thompson, Gibson, Benishek, Allen, Bost, Lujan Grisham, Kuster, Nolan, Kirkpatrick, and Peterson (*ex officio*).

Staff present: Josh Maxwell, Patricia Straughn, Skylar Sowder, Faisal Siddiqui, John Konya, Anne Simmons, Evan Jurkovich, Nicole Scott, and Carly Reedholm.

OPENING STATEMENT OF HON. GLENN THOMPSON, A REPRESENTATIVE IN CONGRESS FROM PENNSYLVANIA

The CHAIRMAN. This hearing of the Subcommittee on Conservation and Forestry about voluntary conservation: utilizing innovation and technology, will come to order. Good afternoon, everyone. Chief, thank you for being here. Sorry about the delay. Votes have a way of getting in the way of things around here. Thank you for your patience. The good news, I guess that was the first and the last of the votes for today, so we shouldn't run into any further problems with votes or conflicts.

I would like to welcome everyone to this hearing of the Conservation and Forestry Subcommittee on the topic of utilizing innovation and technology in voluntary conservation. This hearing provides an opportunity to highlight new practices, innovative approaches to using tried and true methods and advancing technology as it applies to voluntary conservation efforts.

We know that voluntary conservation programs work. However, it has become increasingly clear that some government agencies and environmental activist organizations, which are sometimes one in the same, fail to recognize the commitment our farmers, ranchers, and foresters make to environmental stewardship.

Our farmers and ranchers, through assistance and incentives provided by the farm bill conservation programs have voluntarily reduced soil erosion, increased wetlands, improved water quality, and preserved farmland and wildlife habitat. The Earth's population is projected to grow to roughly nine billion people by the year 2050. Given the growing demands on farmlands everywhere, we

must invest in the necessary resources and the best practices to be certain that producers can continue to meet this growing need.

To that end, I am particularly proud of this Committee's work on conservation programs during the deliberation of the most recent farm bill. The 2014 Farm Bill contained creative, outside-the-box approaches to funding and delivering conservation programs.

Now one of the biggest successes of this creative approach has been the Regional Conservation Partnership Program, known as RCPP. RCPP is an innovative approach to target conservation initiatives. It uses NRCS programs that produce known conservation improvements and leverages that Federal funding with matching funding from partners in the private-sector. Now it has brought together broad coalitions consisting of commodity organizations, conservation groups, sportsmen and others to unite around a common goal.

In the first 2 years, RCPP has awarded funding to 199 projects across all 50 states and Puerto Rico, and matched over $500 million in program funding with $900 million from the partner contributions. Now these efforts that bring all perspectives to the table are the ones that are actually working, and it takes everyone coming together.

Today, we will hear firsthand how RCPP projects are being implemented in tandem with many other programs and tools at NRCS's disposal, and I especially look forward to hearing about an RCPP project that is taking place in my home, the Commonwealth of Pennsylvania.

Our farmers and ranchers are the best stewards of the land, and continually adapt to protect our natural resources, despite the overly burdensome regulatory environment that is imposed upon them. I see this all the time across the 5th District of Pennsylvania where farmers are engaging in innovative practices, including no-till farming, healthy soils, and adhering to other best practices in order to preserve the nutrients in the soil.

In addition to the great work being done at the state and county levels, I am proud that so many of the farmers and foresters in Pennsylvania have taken voluntary steps in order to do their part to assist in the recovery of the Chesapeake Bay. The environmental gains that they have achieved are a testament to our producers. No two producers face the same natural resource concerns, whether they are 2 miles or 2,000 miles apart from each other. Protecting our drinkable water supply, keeping nutrients in the soil for the next crop year, or maintaining a supply of forage for livestock, there is no shortage of reasons why we must continue to innovate when it comes to preserving our natural resources.

I would like to obviously thank Mr. Jason Weller, Chief of the NRCS for being here today. We greatly appreciate it, Chief. I encourage everyone to pay close attention to the testimony of our second panel, which is representative of a wide swath of our country. It is encouraging to see how farmers, ranchers, foresters, and stakeholders have made promoting the health and sustainability of the land a fundamental priority.

Again, thank you all for making the time to be here today, and I look forward to hearing the testimony of each of our witnesses.

[The prepared statement of Mr. Thompson follows:]

PREPARED STATEMENT OF HON. GLENN THOMPSON, A REPRESENTATIVE IN CONGRESS FROM PENNSYLVANIA

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The CHAIRMAN. I now yield to the Ranking Member for her opening statement.

OPENING STATEMENT OF HON. MICHELLE LUJAN GRISHAM, A REPRESENTATIVE IN CONGRESS FROM NEW MEXICO

Ms. LUJAN GRISHAM. Thank you, Mr. Chairman, and welcome, Chief Weller. I, too, appreciate that we are having a hearing on how to be more innovative and how to do that in a way that incentivizes ranchers and farmers, because clearly we need their participation. In fact, they are a very effective, willing partner here because they recognize the value of effective conservation programs.

Frankly, as I am preaching to the choir, I am sure farmers and ranchers are the backbone of conservation in America. They depend on the land for their livelihoods and seek to leave it better than they found it. I don't believe that anyone cares more about the land than farmers and ranchers. Farmers and ranchers across the country have sought to protect water quality, soil, agriculture productivity, forest management, and air quality by using tools available through the farm bill. Specifically, USDA's Natural Resources Conservation Service.

I have often mentioned the inadequate rainfall and drought conditions in my home State of New Mexico, and in the Southwest. Fortunately, there are conservation tools available to help southwestern producers cope with these dire situations. I have heard from several New Mexico producers that the Conservation Stewardship Program, which pays producers to adopt conservation activities to improve working lands, is helping to keep many farmers and ranchers on their lands and in business during the past drought. The most recent dire drought has been about 5 years, but we expect drought conditions to continue for decades longer.

In addition, the Regional Conservation Partnership Program, RCPP, which was created in the 2014 Farm Bill, has allowed the New Mexico Association of Conservation Districts to work with the New Mexico Acequia Association, and several New Mexico land-grants to restore historic *acequias* on agricultural lands, and maybe for some of the folks on the Committee and our viewers today, *acequias* are a traditional way of bringing water in arid communities, and it is directly from Spain, that irrigation method. This project helps improve water quantity and quality, and supports local families and communities served by the *acequia* system. I am looking forward to hearing more about conservation efforts that we can explore to help address water shortages and improve water quality.

Soils and soil health have been a recent topic of conversation, with last year being the International Year of Soils. This resource is critical to the health of the country and production of a quality food supply, and I thank the NRCS for promoting the issue. Our soils will be a valuable part of any future plans to combat global climate change. They have the tremendous ability to store carbon, and will only become more valuable in the future. I look forward to hearing from Chief Weller on ways to capitalize on this underused carbon sink.

One project I am excited to hear more about in New Mexico is the Innovative Tribal Conservation and GHG Management Project, which is part of the RCPP under the farm bill. Conservation really is an unsung hero when we think about American agriculture. Vol-

untary conservation programs through the farm bill are key to helping our farmers and ranchers succeed and to keep protecting our natural resources.

Again, I want to thank the Chairman for holding today's hearing, and I am certainly looking forward to hearing from the witnesses. Thank you.

The CHAIRMAN. I thank the gentlelady.

I now recognize the Ranking Member of the full Agriculture Committee, Mr. Peterson, for an opening statement.

OPENING STATEMENT OF HON. COLLIN C. PETERSON, A REPRESENTATIVE IN CONGRESS FROM MINNESOTA

Mr. PETERSON. Thank you, Mr. Chairman. I will be brief. I want to thank you and the Ranking Member for holding this hearing.

The farm bill's conservation programs provide necessary tools for farmers and ranchers that preserve our natural resources and help us meet regulatory requirements. I have been a long-time supporter of voluntary conservation efforts, and these efforts have been useful in my area in a number of different ways.

One of the things I have been trying to do is get folks to understand that if we do drainage water management in the right way, we can not only do a better job of managing the water, but also get environmental benefits from being able to do this. In my part of the world, we have this flooding going on in the Red River Valley, and whenever we have a flood, it just goes across land and washes everything out and it all goes in the river, and it is a big mess. One thing I am trying to get people to look at is the benefits we can get if we do pattern tiling, where we try to manage this water underneath the ground instead of over top of the ground. We have a witness from my district here to explain that to people today, and I thank the Chairman for including that person. Also, we are going to, potentially, have a field listening session up in our part of the world to further explore this, so I appreciate the opportunity to have those folks here, and Chief, we are looking forward to your testimony. Welcome to the Committee.

The CHAIRMAN. I thank the gentleman. The chair requests that other Members submit their opening statements for the record so that the witnesses can begin their testimony to ensure that there is ample time for questions. The chair would also like to remind Members that they will be recognized for questioning in the order of seniority for Members who were present at the start of the hearing. After that, Members will be recognized in order of their arrival. I appreciate the Members' understanding.

Once again, Chief, thank you so much, I know it is difficult carving time out of what are busy days to be able to come here and to join us. Once again, I am pleased to welcome Chief Jason Weller, Natural Resources Conservation Service, U.S. Department of Agriculture, to the table, and Chief Weller, please go ahead and begin when you are ready. We have waived the normal 5 minutes of time to give you adequate time to present the information that you have before us.

So go ahead and begin when you are ready.

STATEMENT OF JASON WELLER, CHIEF, NATURAL RESOURCES CONSERVATION SERVICE, U.S. DEPARTMENT OF AGRICULTURE, WASHINGTON, D.C.

Mr. WELLER. Good afternoon, Mr. Chairman, Ms. Lujan Grisham, and Members of the Committee. It is good to see you all again. I am really excited to be here today and I really commend the Committee. Mr. Chairman, the opportunity you are affording NRCS, but also the other witnesses here, to talk about all the really positive contributions that farmers and ranchers are making, and how much innovation is occurring right now in the private lands voluntary incentive-based conservation arena. It is unprecedented, and I hope to be able to touch upon it really briefly in my presentation, and I also very much appreciate your forbearance here to allow me to extend my remarks a few minutes and actually share with the Committee some slides that I have put together. This is, I guess, a fallout from the last hearing we had with you and the Committee on the soil health topic. This is really an expansion on that topic.

The way this is organized—and this has been really difficult for me because, in part, there is so much I want to talk about and there are so many awesome things that are happening right now. To get this condensed down to 10 minutes is pretty hard to do, so I am going to do my best.

This is grouped into three topic areas. First, is next level upgrade for science, next level upgrade for tools, and then next level upgrade for partnerships. And all of you talked about this in your opening statements, really touched upon what is happening in these three areas of science, tools, and partnerships.

NRCS started, as you know, over 80 years ago in the wake of the Dust Bowl, and we were at the very beginning, the very genesis, the first chief, Hugh Hammond Bennett, Dr. Bennett created a Soil Conservation Service. We were known as a technical, science-based agency, and what we shared was that scientific knowledge with that farmer and rancher to better manage, initially, their soils. It is really, then incumbent upon us to stay current with current edge of the science, state of the science, and continue to share that technical knowledge. And really, in everything that we do, whether it is through a program, through a conservation plan, it is sharing and imparting that technical knowledge on the landscape.

Really, what we are very focused on at NRCS then is ensuring we are not just current, state of the art, but even leading edge in many cases on the current state of agronomic and conservation science.

An example of what we have been working with our partners from edufield monitoring systems where we are really trying to understand beyond modeling—we are really trying to understand what is actually happening in real world agriculture and real world environments. When you put in place different crop rotation systems, residue management systems, tilling practices, nutrient management practices, what happens when you compare a treated field and an untreated field side by side? What happens to the surface water, and importantly, maybe you have installed a biorack as part of your ag drainage water management system. What happens to that tile water coming out of the line? Then over time, we can real-

ly scientifically, credibly understand when you tweak and manage your crop fields better, what is the ultimate result? Beyond something modeled, you are actually getting real world information, which you can then feed back to that land owner, to that customer, to that farmer or rancher. And that scientific knowledge then helps drive better landscape decisions, both on a farm, but then in this case, a watershed.

What we are looking at here comes out of Iowa, Sac County, Iowa, and this is a tributary of Black Hawk Lake. There is a producer, family operation, Linda Richie. And you can see here there is a lot of headcut going on in this tributary of the stream, and this reservoir is impacted by sediment loadings and intermittent loadings coming off farm fields. Well the NRCS, using that scientific knowledge we get from those in-field monitoring systems and our agronomic expertise can come into this landscape and prescribe practices that could transform that tributary from what would originally be a real threat to that reservoir, in this case, ensuring that clean waters continue to flow into that reservoir for that city's water supply, but also critically important in protecting those farm fields. They can stay productive over time and provide for the economic sustainability of that farm.

Similarly, you can come to a farm field like this—this could be anywhere in the Midwest where you have conventional tillage going on, not much protection to that soil. You get a heavy rain event and you are seeing erosion occurring and the gullies forming, carrying off that farm field literally tons of sediment, pounds of nutrients that is leaving that farm field. Using, again, that science based solution approach, you can come in, change the tillage practices, put in cover crops, and you can see what the effect is in terms of protecting the water as the water leaves the field. It is not carrying the sediment. It is not carrying those farm inputs. It is leaving all those really valuable components of agriculture in place to grow the cash crops we depend upon for our food supply.

We have used a lot of these scientific tools. What we see here is an image of Arkansas, and we have identified with state partners there in Arkansas where are small scale watersheds, where we know there are risks based on the soils, risks to water quality in Arkansas. And so you see, for example, up in the northeast part of Arkansas, northwest part of Arkansas, there are different river basins, the St. Francis River basin in the northeast part of the state. Over there on the border with Oklahoma, you see the Illinois River system. And I am proud to say, because of the voluntary contributions of farmers in these communities and the USDA conservation programs this Committee has funded and authorized, we have gone into these and over the last several years, put in place conservation practices on over 80,000 acres of cropland. As a result of these proactive investments, these stream segments are being de-listed. They were de-listed in 2014 off of the State of Arkansas's list of impaired waters. And this isn't something that happened in spite of agriculture, this is something that happened because of agriculture. Because of the positive, targeted approach that producers took, and the voluntary incentive-based conservation programs delivered, we were able to clean up these waterways and provide

cleaner water for communities, but also keep those productive lands in working agriculture.

Other success stories from around the country—this is out of South Dakota. This is out of south central South Dakota on the border with Nebraska, and it is the Keya Paha River watershed, and working counterclockwise from the upper right there, you can see where the watershed is located. And really, what the impact on these waters in the Keya Paha River was bacterial. There was too much *E. coli* and bacterial coliform colonies in the water column. And so we went in, we fenced up the creeks, we put in revegetated buffers. You can see in the lower left there revegetated buffers just 2 years after we went in and treated that watershed. And ultimately, partners there in the state went in there and monitored what was happening in the water columns. Beyond us modeling and saying we are doing good things, we are using science to actually track and give agriculture credit for the proactive solution, and you can see just over the course of 5 years, how we brought down and cut the *E. coli* bacterial counts by over ⅔, bringing it to meet the state's water quality standards for bacteria.

In Oklahoma, another success story. This is out of Pond Creek in north central Oklahoma in Grant County. This is a 60 mile stream segment on the Pond Creek, and the entire Pond Creek was listed, the main injuries to their creek were low dissolved oxygen counts, which is really bad for aquatic species, turbidity, which is basically the cloudiness of the water, there is too much suspended sediment in the water, and nutrients, too much nitrogen and phosphorus in the water, and bacterial counts, four injuries.

What you see here is the state went in and monitored what was happening in this watershed, and you can see in 2006 that in terms of the turbidity, 45—almost ½—50 percent of the monitoring results brought back exceeded the state water quality standards, and similarly for the bacterial counts, far in excess of what was tolerated under the state water quality requirements.

Well NRCS came in, invested over the course of about 8 years, over $4 million of private lands voluntary incentive-based conservation on the landscape. By 2014, in about 8 years, we have brought down—in terms of turbidity, there was zero exceedances of turbidity, and it met the state water quality standards for bacterial counts. This stream segment has been de-listed, and this is just one of 48 other success stories in Oklahoma in the past decade alone where USDA's conservation programs, working in concert and partnership with ranchers, are cleaning up the waters of Oklahoma and making those water systems and reservoirs healthier for both wildlife and for people.

Beyond targeting in small scale watersheds, what this is, is a map of a large watershed, a large basin. In this case, it is the Western Lake Erie Basin, which has been a national focus, in part, because of the concerns in the area and the lake area itself. Let me kind of unpack here what this picture is showing. We are using science to really understand what are the underlying properties of the soils in this basin, and in the watersheds there where it is colored red, kind of a pink color, those are soils where inherently they are very erosive, and also very porous. They are going to be a high risk of loss of sediment and nutrients from those farm fields from

surface flow. The green are watersheds or areas where there is low risk for erosion potential. As we are going to see over time here is from 2005 to 2015, we put in place 1.1 million unique acres of conservation practices in the Western Lake Erie Basin. You are going to see the points over time where using science, we have helped to work with farmers to target the right conservation practices, and these are just for the soil erosion practices. You are going to see the points appear here, and there are also colors associated with these points.

In just about a decade, an enormous unleashed potential here of conservation delivering in this landscape, targeting those high risk soils, locking them down, avoiding loss by controlling and trapping sediments before they leave the farm fields, and this is just in the sediment. We have other layers we could have shown you also, looking at leaching potential where we have also targeted leaching practices. But we estimate that these practices alone over the course of a decade helped reduce or prevent upwards of 970,000 tons of sediment loss are now not flowing into Lake Erie, and upwards of 10.4 million pounds of nitrogen and 2.4 million pounds of phosphorus are now not flowing into Lake Erie because of all three conservation programs delivered by USDA.

In addition, science is looking at Western Lake Erie Basin, there is a lot going on here in this line. Let me try and unpack it here. We looked at producers in two main categories, what is the health of your soils? Are you gaining carbon or losing carbon, the two main factors. And we looked at what is your level of conservation stewardship, high level of conservation stewardship or low level of stewardship? Interestingly, just looking at corn yield, the difference between folks that had high levels of soil health, they are gaining carbon, *versus* producers that were losing carbon, those guys, in terms of corn yield, had about 15 percent higher corn yield per acre, those guys with healthy soils, than producers that had unhealthy soils. You are getting a boost in yield, but importantly, in terms of phosphorus application, anywhere from 40 to 50 percent less phosphorus applied per year, resulting in—if you look at loss, upwards of 90 percent less phosphorus loss per acre, per year. You are getting a 15 percent boost in corn, you are applying a lot less fertilizers, you are saving ½ of your fertilizer bill, and you are losing 90 percent less phosphorus per acre. That, to me, is the definition of *sustainable agriculture.* You have economic sustainability, so your input costs are less. You are growing more corn, and you are protecting the waters of the local rivers and ultimately, Lake Erie.

But for us, what is next beyond targeting in small scale watersheds, large basins, we really are aware that the science is next is we have to start being able to target within fields. We have to understand where are the inherent risks within a crop field and where are we going to apply the right practice in the right place.

What you are seeing here is an example where NRCS's geospatial lab is able to develop these kind of maps for our field staffs where we look at the underlying soil profiles. What you see there on the left is a soil map of a farm field, and you can see it in the color coding the different soil types. And each one of the soil types has a different inherent capacity to both grow food and also

lose both sediments and nutrients. And so on average, this producer applied 36 pounds of phosphorus per acre evenly across his farm fields. But again, you can see on the right hand side there on the soil types is a vast difference between both yield, so as low as 109 bushel per acre on average, or as high as 217 bushel per acre on average, depending on the soil type. But critically, the key there is what was left in the field? The phosphorus was applied. What left the field in grain? If you have a risky soil, even though you may have applied on average 36 pounds, only 15 of those pounds are leaving in the grain. The rest are left in the field, potentially to leach or to be lost through surface loss.

If you were to apply through using precision conservation techniques, it really then allows our planters to come in and really talk about both application of fertilizer using precision ag technologies, but also even talking about maybe in some parts of the field you don't want to even farm. Why plant?

Let's start talking about some of the other USDA programs, like the Conservation Reserve Program or the easement program, where no matter what you do, that corner of the field, this inclusion, will never be profitable. Stop planting it, stop wasting your money on fertilizer. Let's put it into a conservation use.

We are also coming up with a new tool, conservation planning tool. We are trying to upgrade NRCS's planning capacities, so we are piloting this year a new tool that we are calling the Resource Stewardship Evaluation. What this is, is a lot going on there, but basically what we are trying to bring to a farmer or rancher is a hiring product. We are trying to say what is your level of stewardship for your soils? What is your level of stewardship for both water quality and quantity, air quality, and wildlife habitat? It is five basic metrics.

NRCS has had quality planning criteria for all those metrics, underlying capacity of soil condition, index, your wind erosion, water erosion, *et cetera.* We have normalized all these different tools and metrics to give back a producer basically a printout of what their level of stewardship is, what is your baseline level of performance, and then we can start to run different scenarios, different options for the producer, and give them a plan to date. It gives them back real time information on what their current level of performance is, and then gives them real time information on what different options and scenarios they want to do, where they can take their performance.

A real world example, this is out of New Jersey where we piloted this last year. You can see there on the left is a leased field. This is a producer that had an annual lease, a 1 year lease and rented it from a local unit of government. And you can see the condition of this land was not very good, bad soils, highly eroded, and impacting local water supplies. We went out and ran the evaluation tool on his operation. You can see in the dark green or the lighter green where his state was, and he was really not meeting the NRCS recommendation levels for management. He was about to lose his lease. He went back to the local unit of government and said, "Give me one more chance. I promise you I am going to do the right thing." He showed the lessor the NRCS evaluation and then what the plan to state was. He didn't just get a 1 year lease.

The county actually gave him a 5 year lease. Now that land is going to be kept in production. He put it into a rotational beef grazing operation, protecting the waters, but importantly keeping this land in active agriculture, contributing to the local economy and the local food supply.

Switching now to innovation tools, where we are going with our tool capacity. Through this Committee's leadership, we have a program called the Conservation Innovation Grants Program, CIG, which in my view is really the venture capital, if you will, of conservation where we are really taking high risk, high reward opportunities, providing 50/50 cost-share grants to far more organizations, universities, nonprofits, for-profit companies, all trying to advance innovative solutions, new tools, and approaches for conservation.

The gentleman here is Dennis Carmen, and he is from the White River Irrigation District in Arkansas. He partnered up with a number of other farmers, as well as the Environmental Defense Fund, California Rights Commission, Win Walk International, and some other partner organizations, including American Carbon Registry, and what they have come up with is an enhanced way to grow rice. They were focused on methane emissions and trying to reduce methane emissions from rice production, but also trying to save water. And they piloted different management techniques, and they came up with an approach that would reduce methane emissions by ½, a 50 percent reduction in methane gas emissions, but then also 18 percent water savings by maintaining or enhancing your yield in rice.

They then developed a protocol which they can then go to California, the California Air Resources Board has its greenhouse gas registry, where now they have developed the first in the nation ag crop based protocol where now rice farmers, whether they are in California or Arkansas, can sell credits to the California Air Resources Board. It is an additional revenue stream for rice country. This guy is not only able to grow rice, he is now able to sell methane credits to the California Air Board.

In Cape Cod, the Cape Cod Cranberry Growers Association, through CIG they have developed an online tool—it is an irrigation system management tool where they have centers out in the vines in the cranberry pond there where they are able to monitor in real time air temperature and different climatic conditions, and this is about better managing the irrigation of this cranberry production system. They are able to save per frost event, so they use sprinklers to spray the vines, much like wine, viticulture, you are protecting the vines during frost events, upwards of 9,000 gallons per acre, per frost event. Over the course of a growing season, this technology allows the producer to save upwards of 280,000 gallons per acre. Huge success story.

I talked about precision conservation. We have also invested in a lot of precision ag conservation solutions. This is an example. This is called Adapt-N. It is a collaborative of Cornell University, Pennsylvania State University, Perdue University, USDA Agricultural Research Service lab, Iowa Soybean Association, and some other partners. And there are different modules that we can provide for producers where it gives them real time information on

their application of nitrogen. It gives them in-season, in-field nitrogen application advice that takes into account climate, near real time weather conditions, the previous applications of manures and fertilizers, their soil types, their management systems. Ultimately, you are really trying to make each field and sub-component of a field profitable, maxing out your profit and minimizing loss. In this case, loss being both money and nitrogen. In the early pilots, they were able to save upwards of 20 to 30 pounds of nitrogen per acre, while protecting and maintaining yield.

Finally, soil health, as we have talked about previously, the Midwest Cover Crop Council in partnership with the Conservation Technology Information Center, CTIC, they developed a multi-state online tool. It is called the Cover Crop Selection Tool, where it is for producers in Michigan, Ohio, Indiana, Wisconsin, and Minnesota. You can go online. They have identified where their operation is, what their management system is, what their business objectives are, and the tool then recommends different cocktails of cover crop seed mixtures that are appropriate for their climate and a cropping system, but also help them apply these cover crops in a way that will be even more effective. And as we have talked, cover crops are really important and part of the overall conservation soil health management system.

This is a picture of a field from Indiana. Rodney Rulon is the producer, and this is his field. He is part of a family operation where they manage in total 600,000 acres of row crop in Indiana. They have adopted cover crops and residue management systems no-till system of operation, and he believes he is saving over $100 an acre by using soil health management practices. This is saving wear and tear on his field, saving fuel costs, his energy costs, saving fertilizer and other input costs. He is saving $100 an acre a year in cash, that is over $600,000 a year more profit in a year for his family operation.

We have also talked about how soil health and these cover crops can improve the resiliency of crop fields, and how by increasing the soil organic matter, it really creates—turns those crop fields into reservoirs where it can actually hold and retain water. If you look at, hypothetically, all cropland in the United States, if you increase the soil organic matter in the cropland of the United States by one percent, you are able then to turn those crop fields into underground reservoirs. You will be able to hold in those—just a one percent increase would increase the water holding capacity of the soils to hold the same amount of water that flows over Niagara Falls for 150 days. That is a huge amount of water.

What we are seeing here is out of Brookings County, South Dakota, side by side fields. One used convention tillage on the right. On the left, no-till high residue management. And you can see after a 1″ rain event, on the right you have heavy ponding. That producer has literally lost tons of topsoil. You can actually see where he has some of his beans coming up. They are out of the ground. On the left, the beans are looking really healthy, coming in. All the water has been captured and stored in the soils for later in the summer months when it is hot and humid, and that crop is going to need water.

The CTIC I mentioned earlier and ARS went out and surveyed producers in the Corn Belt, and if you recall back in 2012, there was a really severe drought, and asked one simple question: Did you use a part of your rotation, cover crop or not? And what they got back was okay, what was the yield, no cover crop, with cover crop. And what you see is corn yield in upwards of ten to fourteen percent boost in yield just by adopting cover crops as part of your rotation. Which to us is then a signal that those producers that have cover crops that are protecting the soils, feeding the soils, are improving yield and improving their bottom lines.

And finally, next generation partnerships. We have already talked, Mr. Chairman, Ms. Lujan Grisham, we have talked about the importance and the power of the Resource Conservation Partnership Program. I am really proud of NRCS's contribution to this, but more proud, frankly, about the robust response from the huge array of partners across the country. Sportsmen's organizations, universities, cities, counties, water utilities, hospitals, churches, I mean, you name it. There are over 2,000 different partner organizations that have come forward. Many of them have never worked in agriculture before, and they never really know how to approach agriculture. They are teaming up with ag associations, agribusinesses, farmers and ranchers themselves, to put in place really exciting conservation solutions.

Ms. Lujan Grisham, as you mentioned with the *acequias,* I am very happy to point out one of the examples of a project we already have rolling out here is the *Acequias* De Las Joyas, and this is an example that once you unlock the potential, they are ready to roll. And this is a partnership with the New Mexico Association of Conservation Districts, Interstate Stream Commission, they were ready to rock.

This is on a 300 year old *acequia,* you can see in this case it is an old, rusted out, inefficient or corrugated pipe, very leaky, not very effective. And we have already installed—you can see here a welded steel pipe. We are also relining the ditches, the irrigation systems with concrete, making it hyper-efficient. That means even more *parciantes* are going to be able to irrigate off this *acequia* simultaneously than previously, but also ultimately save a lot more water overall, so the system is going to be more successful. And this was installed in the end of January, so in a matter of months they were ready to roll and get solutions on the ground to be able to help this *acequia* for this coming growing season.

And then in South Carolina, we have had initially a pilot with the U.S. Endowment for Forestry & Communities. What you are seeing here is the Smith family. This is Alva and Martin Smith in Marlboro County, South Carolina. They are third generation farmers, limited resource producers. They have 400 acres, much of it is forested. And what we are doing in partnership with the U.S. Endowment, U.S. Forest Service, Center for Heirs Property, Federation of Southern Cooperatives, and some other partners, we are first helping families such as the Smith family come in and establish clear title, clear ownership to their lands. Once they have clear title, that unlocks the capacity to come work with USDA. We can them come in with our financial assistance program and put in place really effective forest management practices that are going to

improve the health of their forest for long-term timber production, giving them long-term economic benefits, but in the meantime, giving the community water quality benefits, fire protection benefits, air quality benefits, and at-risk species benefits.

And then finally, to me, which is really one of the historic partnership examples, and it is something that I hope they are going to be writing textbooks about, and this is really about how producers and a huge array of partners came forward and did something about the potential listing of sage-grouse out in the West. And I know it feels like this is past, but it is something that is so historic and something I am incredibly proud of. And this is something where NRCS was actually just a small component of it, so in the wake of the candidate decision where the sage-grouse is listed as the potential species for listing under the Endangered Species Act, we launched what was then the Sage-Grouse Initiative. We had over 100 different partner organizations come forward and be part of this, so it lost the NRCS identity and became a partner-led—really a huge success story.

This is a map. The green areas are inhabited sage-grouse range. The dark areas are what is called the priority areas for conservation. This was before we had a lot of really advanced tools. We had some pretty good tools for targeting, but we didn't have what we have now, what I will talk about in a second. What you are seeing here is then how the partnership, the locally led approach on this landscape targeted both financial systems, which are the aqua blue colored dots, and easements, which are the rust colored orange dots. And 100 percent of the practices were put in place in habited range. Three-quarters of the practices were in the priority areas for conservation. The scale is unprecedented. Just in 5 years, the partnership put in place 4.4 million acres of sustainable ranching practices across the West in 11 states. Over 1,100 producers stepped forward, volunteered, and want to be part of the solution.

What is here is then a new tool we just released last week. It is in partnership with Google. We are bringing Google Earth technologies that is allowing USDA conservation districts, conservation organizations to use the Google Earth capabilities. We have different data layers. I am not going to—don't worry, I am not going to walk you through what is going on here in this slide, but basically you can both work at a national level, regional level, state level, county level, field level, where you can zoom in, for example here, looking at what is going on in this landscape. In this case, one of the main threats for sage-grouse is conifer invasion, conifer encroachment, where these conifer and juniper are coming in and invading what was then at one point sage-grouse habitat, and turning it into a forested canopy. It is not very good for livestock. Conifer are really thirsty. They soak up all the ground water. They change the hydrology in those mountainous areas and choke out the seats and springs. But it turns out sage-grouse don't like trees either, because of the raptor perches, and as soon as the conifers come in, as little as a four percent tree canopy cover, the grouse are gone. We can use this tool, zoom in, identify areas where we want to treat. In this case, we come in like in 2012, you can see how we worked with a rancher, cut out his inholdings, cleared it of the sage brush. That is pretty impressive. What is more impres-

sive, though, is when we radio card a sage-grouse hen in Oregon and she flew south down in urban California for the summer, you can see where she hung out in the summer. This is a radio plotted chart showing where the sage hen spent her time, kind of on a shopping trip around the inholding, where apparently she read up on our sage-grouse initiative, sage brush initiative literature where, yes, she understood where she needs to go, where you cut out the trees, that is where I am supposed to hang out. She flew in and you can see how she went around and took advantage of the new habitat that just had recently been opened up, returned both for ranching, but in this case, for critical wildlife habitat.

If you take this kind of success story and you multiply that 1,000, it is an example of how ranchers really delivered unprecedented solutions in this landscape on a voluntary basis, and it is the view for me and my colleagues at NRCS that it is not in spite of ranchers, it is because of the American rancher that we did not list the sage-grouse in September of 2015.

Likewise, in Montana, where ranchers in Sentinel and Big Centennial and Big Hole Valleys, there is a fish. In this case, it is arctic fluvial grayling at risk. It is a candidate for listing in Endangered Species Act. It was down to the last 50 mile segment of the stream, and we put in place voluntary conservation practices with the ranching community.

You can see in this chart over the course of 5 years, the populations, depending on which subpopulation you look at, either increased 500 to 900 percent in 5 years. Result, not listed under the Endangered Species Act because of voluntary incentive-based conservation.

The Oregon chub, this guy should be wearing a cape, actually, because he is the first fish species in American history not to be taken off the endangered species list because it went extinct, because we brought it back from the brink. Voluntary USDA conservation programs made this possible. It was down to less than the thousandth chub left in Oregon. Wetlands reserve practices and acres restored, but also upland water quality practices were put in place. Today's fish population is 140,000 chub and growing taken off the endangered species list because of voluntary acts of conservation.

This is a story of love. This is the Louisiana black bear, which was listed—this is actually the teddy bear that President Roosevelt could not bring himself to shoot because it was so cute and charismatic—listed as endangered. It was down to less than 200. It was in separated populations that were not connected anymore, so they didn't have the opportunity to mate. USDA came in and put in place over 210,000 acres of bottomland hardwood habitat to reconnect those populations through CRP and wetland reserve opportunities. Today, the populations are reconnected, making highways of love where these bears are now back to over 800 bears and growing. Proposed for de-listing under the Endangered Species Act because of voluntary acts of land owners in the Arkansas, Mississippi, and Louisiana regions.

And ultimately, the Peter Rabbit, New England cottontail rabbit, again, because of private forestland owners in New England stepped forward, voluntarily put in place young forest restoration

projects on their lands, again, DOI earlier this past fall decided not to list this candidate species under the Endangered Species Act, not in spite of private landowners, but because of the voluntary acts of private landowners and the results they delivered in their communities.

Thank you, Mr. Chairman. I apologize for going over my time a little bit. Like I said, there is a lot more. This is enough I thought I could get away with. I appreciate your interest, and I am happy to answer any questions you may have. Thank you, sir.

[The prepared statement of Mr. Weller follows:]

PREPARED STATEMENT OF JASON WELLER, CHIEF, NATURAL RESOURCES CONSERVATION SERVICE, U.S. DEPARTMENT OF AGRICULTURE, WASHINGTON, D.C.

Science and Innovation in Natural Resources Conservation

Overview

NRCS is focused on delivering innovative, science-based assistance to producers to address their natural resource objectives in balance with their operational goals.

Science-Based Solutions

Cleaner, more abundant water for farmers, ranchers, their communities, and wildlife is possible when the right conservation practices are in the right places. NRCS is advancing a science-based approach to conservation through edge-of-field water quality monitoring. Edge-of-field water monitoring enables scientists and agricultural producers to quantify the impacts of conservation work on water quality.

Through the innovative *National Water Quality Initiative* (NWQI), NRCS and partners work with producers in high-priority watersheds to implement voluntary conservation practices that improve water quality while maintaining agricultural productivity. Since 2012, USDA has invested more than $100 million in contracts with producers participating in this initiative, leading to conservation systems placed on almost 500,000 acres in priority watersheds. Results in NWQI watersheds include de-listing of streams formerly identified as impaired on states' 303(d) lists.

Using science to focus conservation efforts to achieve the greatest benefit delivers more cost-effective results. The Conservation Effects Assessment Project (CEAP) is building a solid science-based foundation for the dialogue on conservation benefits. CEAP has demonstrated that conservation works, and that conservation systems applied in the most vulnerable areas deliver the greatest benefits. CEAP results are helping stewards target their conservation efforts to reduce nutrient and sediment losses from agricultural land.

The Resource Stewardship Evaluation Tool (RSET) is designed to help producers assess how their farm or ranch is operating, the value of conservation already in place, and to identify areas they may want to improve and practices they may want to implement and the results they can expect. Piloted in FY 2015, RSET is already helping producers better manage their conservation objectives. In 2016, NRCS will expand the use of RSET in selected NWQI watersheds.

Innovative Tools and Technology

NRCS invests in cultivating science though Conservation Innovation Grants (CIG). Since 2004, approximately $236 million has been awarded to over 630 national projects that have addressed a diversity of natural resource concerns, such as demonstrating more efficient ways to manage nutrients, reduce on-farm energy use, increasing irrigation efficiency, and accelerating the development of water quality trading and greenhouse gas markets.

CIG projects are delivering a wide range of new tools and opportunities for conservation, from decision support tools to precision nutrient application and cover crop options that benefit soil health. Using farm bill programs, NRCS also has been accelerating adoption of soil health practices and helping producers advance soil health management and build resilience in their production systems. These benefits lead to greater resiliency to adverse conditions such as drought but also boost yields and bottom lines.

Locally Led, Partner-Driven Stewardship

Science-based solutions and innovative tools are also supporting the locally led approach. NRCS is advancing innovative partner-driven conservation through the *Regional Conservation Partnership Program (RCPP).* Created by the 2014 Farm Bill,

RCPP is a locally led conservation approach that is already showing results. Now in its second year, RCPP has demonstrated high demand, with over 2,000 partners leading nearly 200 projects nationwide. All told, in the first 2 years of the program, NRCS will have invested about $500 million while another $900 million is being brought in by partners to address locally defined, nationally significant natural resource issues. For the next round of RCPP funding, NRCS will challenge partners to consider environmental markets and conservation finance systems with agricultural opportunities.

NRCS also is using science and innovation to drive new partnerships that benefit agriculture and wildlife. Consider the NRCS Working Lands for Wildlife (WLFW) partnership and the unprecedented voluntary collaboration over the past 6 years to restore public and private rangeland and young forests on private land. In part because of these voluntary efforts, the U.S. Fish and Wildlife Service has either delisted or taken off the candidate list six species since September 2014—determining that these populations were now healthy enough that they did not warrant Federal protections under the Endangered Species Act (ESA).

Summary

New science and innovative tools and technologies are helping to forge stronger and broader partnerships that are generating benefits for agriculture and the environment. Recent accomplishments demonstrate that the nation's farmers and ranchers can achieve production and operational goals in balance with the natural resource objectives that benefit rural communities and the nation as a whole.

POWERPOINT PRESENTATION


USDA
United States Department of Agriculture
Science-Based
Solutions

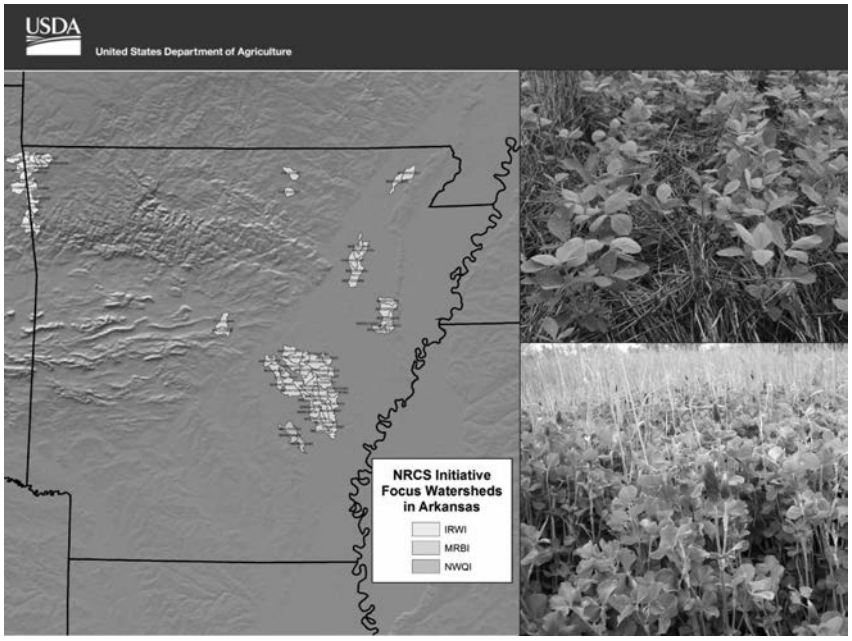

USDA
United States Department of Agriculture
Precipitation gage
Digital camera
Gaging station
Crest-stage gage
H flume
Wingwall

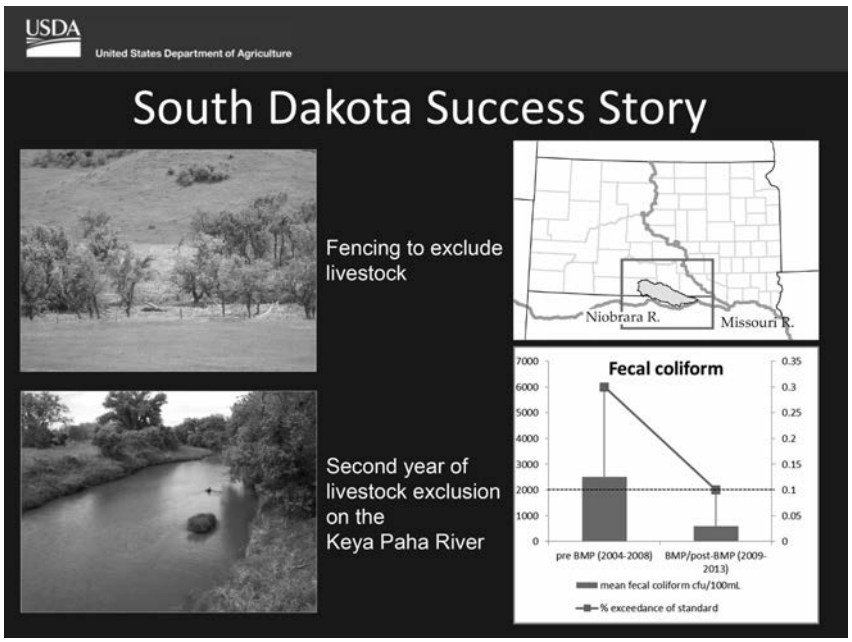

USDA
United States Department of Agriculture
Before

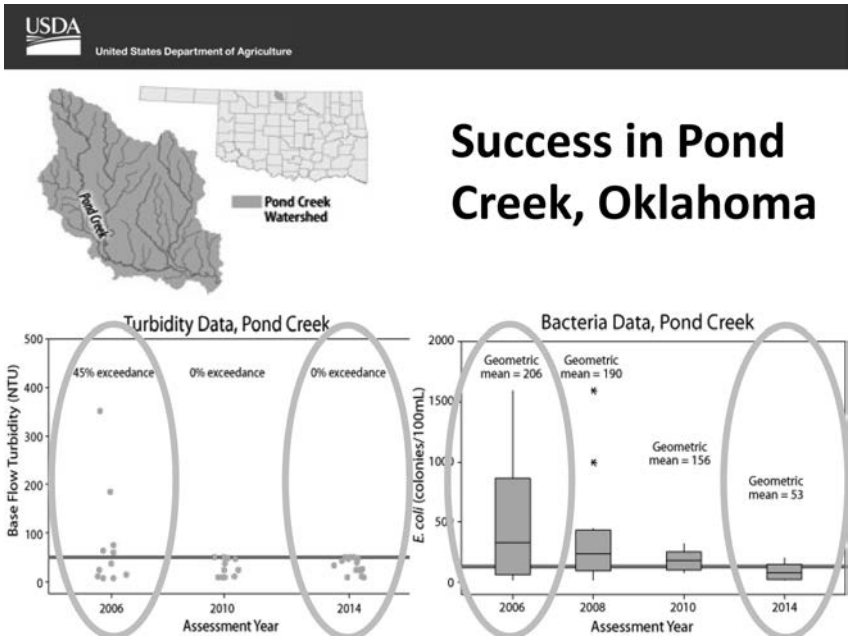

USDA
United States Department of Agriculture
After

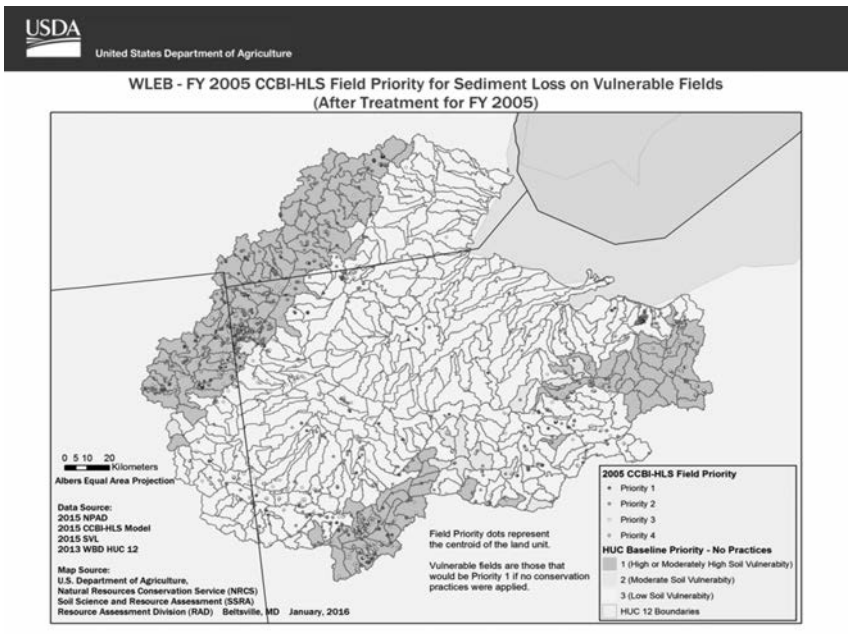

USDA
United States Department of Agriculture


USDA
United States Department of Agriculture


USDA
United States Department of Agriculture
NRCS Initiative Focus Watersheds in Arkansas
IRWI
MRBI
NWQI

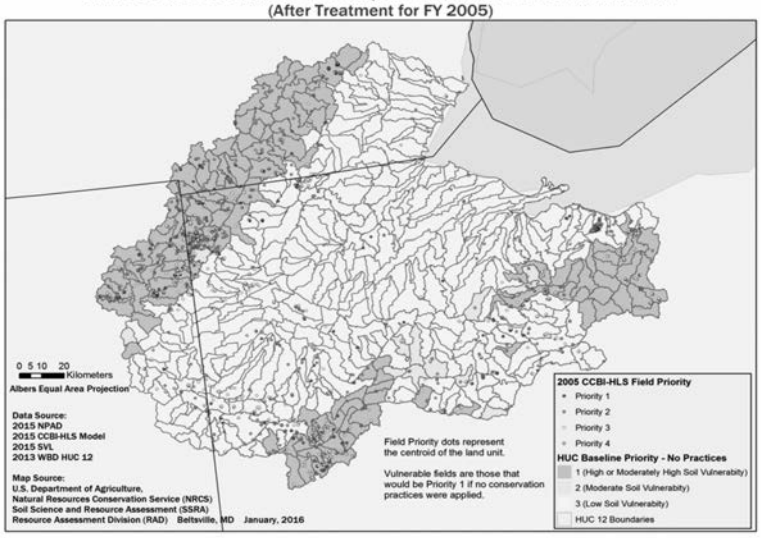

USDA
United States Department of Agriculture
South Dakota Success Story
Fencing to exclude livestock
Second year of livestock exclusion on the Keya Paha River
Niobrara R.
Missouri R.
Fecal coliform
7000
6000
5000
4000
3000
2000
1000
0
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
pre BMP (2004-2008)
BMP/post-BMP (2009-2013)
mean fecal coliform cfu/100mL
% exceedance of standard


USDA
United States Department of Agriculture
Pond Creek
Pond Creek Watershed
Success in Pond Creek, Oklahoma
Turbidity Data, Pond Creek
Base Flow Turbidity (NTU)
45% exceedance
0% exceedance
0% exceedance
2006
2010
2014
Assessment Year
Bacteria Data, Pond Creek
E. coli (colonies/100mL)
Geometric mean = 206
Geometric mean = 190
Geometric mean = 156
Geometric mean = 53
2006
2008
2010
2014
Assessment Year


USDA
United States Department of Agriculture
WLEB - FY 2005 CCBI-HLS Field Priority for Sediment Loss on Vulnerable Fields
(After Treatment for FY 2005)
0 5 10 20
Kilometers
Albers Equal Area Projection
Data Source:
2015 NPAD
2015 CCBI-HLS Model
2015 SVL
2013 WBD HUC 12
Map Source:
U.S. Department of Agriculture,
Natural Resources Conservation Service (NRCS)
Soil Science and Resource Assessment (SSRA)
Resource Assessment Division (RAD) Beltsville, MD January, 2016
Field Priority dots represent the centroid of the land unit.
Vulnerable fields are those that would be Priority 1 if no conservation practices were applied.
2005 CCBI-HLS Field Priority
Priority 1
Priority 2
Priority 3
Priority 4
HUC Baseline Priority - No Practices
1 (High or Moderately High Soil Vulnerabilty)
2 (Moderate Soil Vulnerabilty)
3 (Low Soil Vulnerabilty)
HUC 12 Boundaries

USDA
United States Department of Agriculture

WLEB - FY 2005 CCBI-HLS Field Priority for Sediment Loss on Vulnerable Fields
(After Treatment for FY 2005)



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Benefits of Healthy Soils with Comprehensive Conservation in the Western Lake Erie Basin

Soil Carbon Trend	Comprehensive Conservation Plan	Corn Yield	P added	P lost	N added	N lost
		(bu)		(lbs		
Gaining: Healthy	Complete	**175**	**15**	**0.7**	**180**	**22**
	Incomplete Over fertilized	176	30	3.1	230	30
Losing: Poor Health	Incomplete Under fertilized	***152***	***8***	***2.3***	***120***	***36***
	Incomplete	157	26	6.2	190	55
BASIN AVERAGE		**168**	**18**	**1.9**	**160**	**27**

USDA United States Department of Agriculture

Comprehensive Planning and Precision Agriculture

Corn Yield according to Soil Types

Mapunit	Corn Yield (bu)	P in Yield (lbs)
GlqC2	109	15
Es	176	25
BmA	181	25
BmB	182	25
Pe	217	30
AVERAGE	193	27

Fields are made of soil with variable needs:
- One rate can over apply and under apply P needs.
- Areas of high erosion mixed with those with high leaching.
- Precision soil testing for top yields, reduced input costs, and reduced water quality impact

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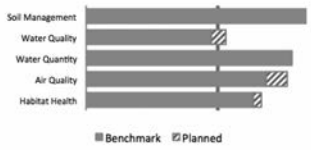
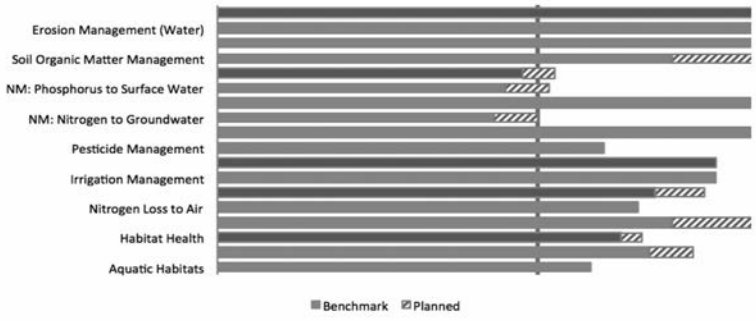
Resource Stewardship Evaluation

Cropland Stewardship Objectives



Cropland Stewardship Achievement




USDA
United States Department of Agriculture
Empowering Producers
New Jersey Farm
corn, soybeans
conversion to hay
Tenant farmer used RS to address landowners resource concerns and stay farming
Cropland Stewardship Achievement
Erosion Management (Water)
Erosion Management (Wind)
Soil Organic Matter Management
NM: Phosphorus to Surface Water
NM: Nitrogen to Surface Water
NM: Nitrogen to Groundwater
Sediment Management
Pesticide Management
Irrigation Management
Nitrogen Loss to Air
Soil Carbon
Terrestrial Habitats
Aquatic Habitats
Benchmark
Planned
16


USDA
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Innovative Tools and Technology


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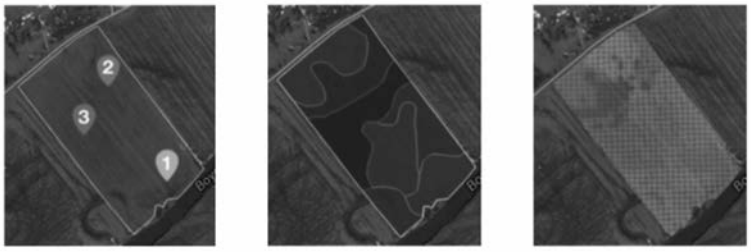

Point-Based	Zone-Based	Grid-Based
Fast, easy, N recommendation either flat rate, by manual or soil zone, or for different scenarios	Fast, powerful variable rate recommendation with user-defined or automatically created management zones	Comprehensive 60x60 foot gridded recommendation with unlimited geometry for each input layer, captures full in-field variability
N-Alert Enabled	N-Alert Enabled	N-Alert Enabled
	Exportable Prescription	Exportable Prescription

Image from adapt-n.com

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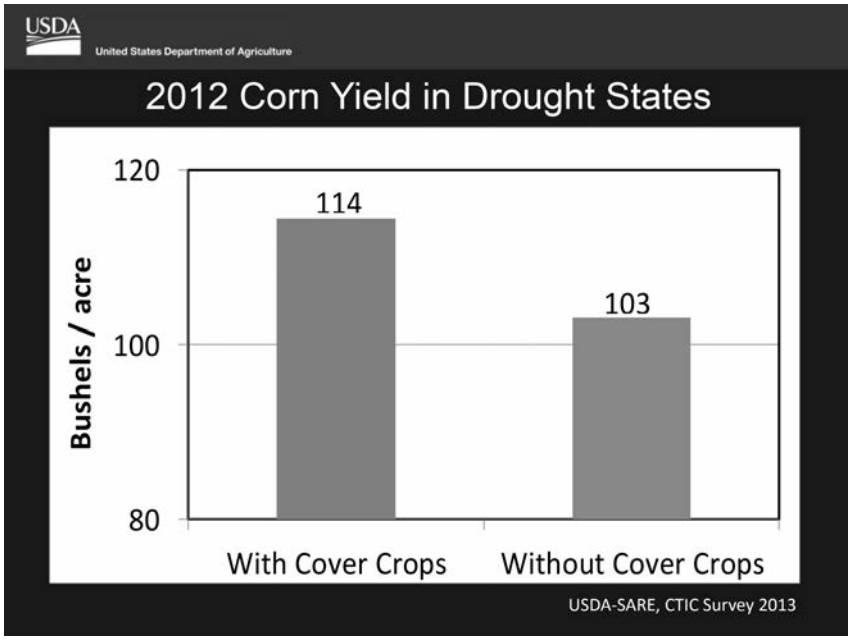
USDA
United States Department of Agriculture


USDA
United States Department of Agriculture
No-Till
Conventional
Tillage


USDA
United States Department of Agriculture
2012 Corn Yield in Drought States
Bushels / acre
120
100
80
114
103
With Cover Crops
Without Cover Crops
USDA-SARE, CTIC Survey 2013


USDA
United States Department of Agriculture
Locally-Led,
Partner-Driven
Stewardship

USDA
United States Department of Agriculture

REGIONAL CONSERVATION PARTNERSHIP PROGRAM

Putting Partners in the 'Driver's Seat'

Created by the 2014 Farm Bill, the Regional Conservation Partnership Program (RCPP) is a partner-driven, locally-led approach to conservation. It offers new opportunities for USDA's Natural Resources Conservation Service (NRCS) to harness innovation, welcome new partners to the conservation mission, and demonstrate the value and efficacy of voluntary, private lands conservation.

RCPP's TOTAL IMPACT since 2014

2,000+ partners working with NRCS.

199 high-impact projects that covers all 50 states and Puerto Rico.

More than **$500 MILLION** invested by NRCS.

Around **$900 MILLION** matched by partners.

All told, NRCS plans to invest up to **$1.2 BILLION** in RCPP through 2018.

With partner match, that's at least **$2.4 BILLION** for conservation.

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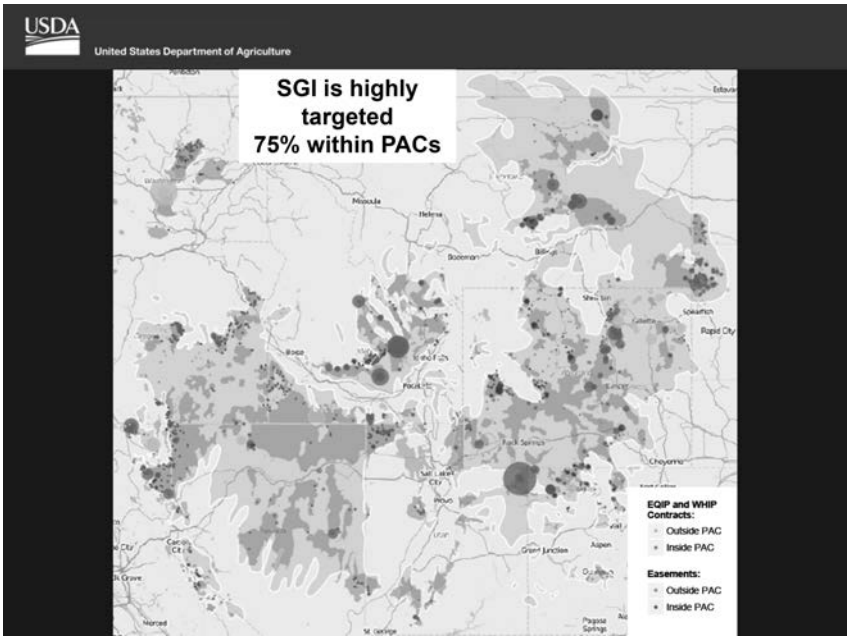
United States Department of Agriculture

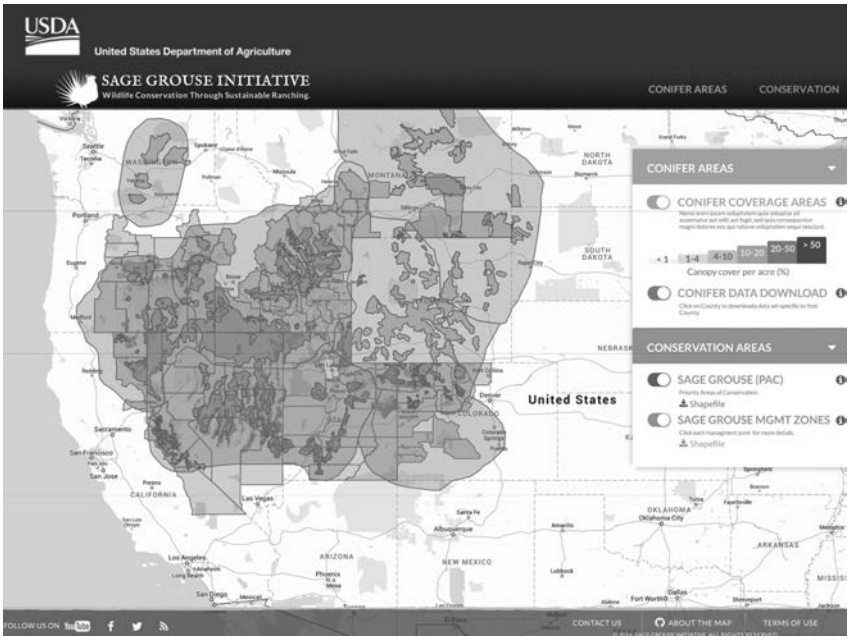
Acequia de Las Joyas

- **300 year old system**
- **Principal source of crop and rangeland water in northern New Mexico**


USDA
United States Department of Agriculture
CAT 279D

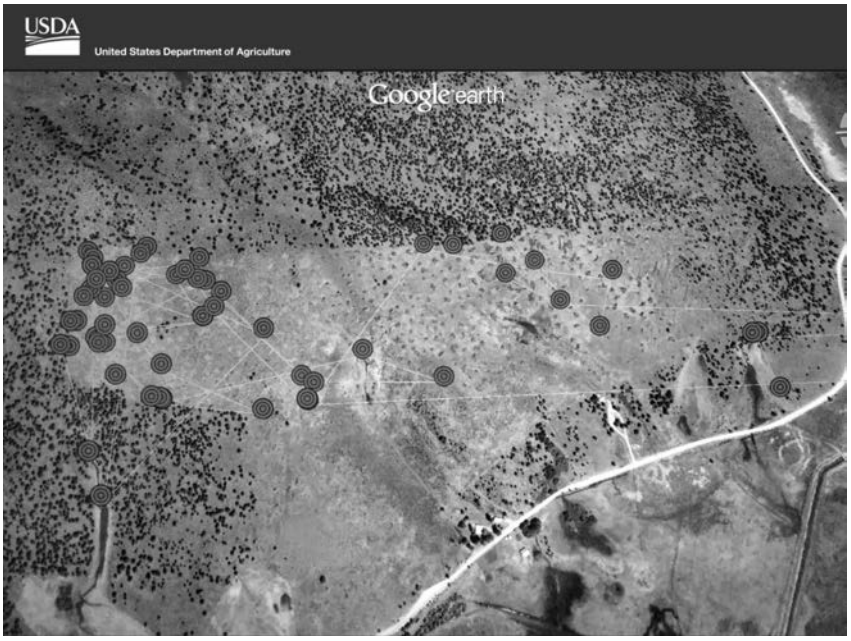

USDA
United States Department of Agriculture

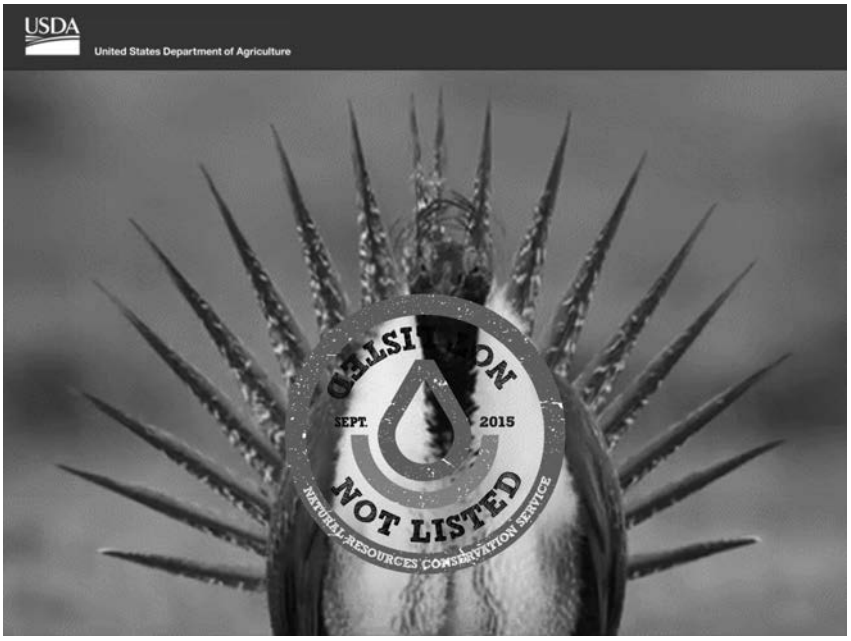

USDA
United States Department of Agriculture
SGI is highly targeted 75% within PACs
EQIP and WHIP Contracts:
Outside PAC
Inside PAC
Easements:
Outside PAC
Inside PAC


USDA
United States Department of Agriculture
SAGE GROUSE INITIATIVE
Wildlife Conservation Through Sustainable Ranching.
CONIFER AREAS
CONSERVATION
CONIFER AREAS
CONIFER COVERAGE AREAS
< 1
1-4
4-10
10-20
20-50
> 50
Canopy cover per acre (%)
CONIFER DATA DOWNLOAD
CONSERVATION AREAS
SAGE GROUSE (PAC)
Shapefile
SAGE GROUSE MGMT ZONES
Shapefile
United States
CONTACT US
ABOUT THE MAP
TERMS OF USE


USDA
United States Department of Agriculture
2004


USDA
United States Department of Agriculture
2012


USDA
United States Department of Agriculture
Google earth


USDA
United States Department of Agriculture
SEPT.
2015
NOT LISTED
NATURAL RESOURCES CONSERVATION SERVICE


USDA
United States Department of Agriculture
Grayling Abundance
Spring Age 1+
APRIL
2015
NOT LISTED
NATURAL RESOURCES CONSERVATION SERVICE
NOT LISTED
Effective Number of Breeders
Total Capture
1000
900
800
700
600
500
400
300
200
100
0
2007
2008
2009
2010
2011
2012
2013


USDA
United States Department of Agriculture
DELISTED
MARCH
2015
DELISTED
NATURAL RESOURCES CONSERVATION SERVICE


USDA
United States Department of Agriculture
PROPOSED DELISTING
MAY 2015
PROPOSED DELISTING
NATURAL RESOURCES CONSERVATION SERVICE


USDA
United States Department of Agriculture
SEPT. 2015
NATURAL RESOURCES CONSERVATION SERVICE

The CHAIRMAN. Well Chief, thank you so much, and we really appreciate your presentation. Congratulations for what you have accomplished what the Fish and Wildlife Service hasn't been able to do. When it comes to endangered species, you have set a great model there.

I am going to take the liberty of the first 5 minutes of questioning.

Chief Weller, one of the most innovative programs in my opinion to come along in some time is the Regional Conservation Partnership Program, and that was a key component of the House's Conservation Title. One of the main purposes of the program was to help producers in meeting and avoiding the need for national, state, and local natural resource regulatory requirements related to agriculture production.

My question is straightforward. Do you think the program is helping producers deal with the regulatory requirements, and can you give us some specific examples of projects that are doing so?

Mr. WELLER. The short answer is yes. It is going to help and be tremendous, and what is really the secret of the sauce here is that instead of NRCS determining what is the species or official wildlife determining from the national office, this is where we are going to go work, what the program does is it gives local partners, local communities, local farming, ranching communities, forestland owners to step forward and say, "You know what, we are concerned about," in the case of your question, "regulatory impacts or risks we have in our area, and here is the help that we need." It really puts them in the driver's seat to design projects to meet their water quality or air quality or habitat concerns.

And then it allows opportunities for other partners, whether private organizations, both for and nonprofit organizations to step forward and leverage their capacities, their sack of tools, their boots-on-the-ground know-how, and then buddy up with NRCS and go out and get after it.

Again, coming back to the sage-grouse example, there is at least two RCPP projects that I am aware of, maybe three, which specifically calls out Endangered Species Act concerns where it is in Colorado, Oregon, and Nevada where we have RCPP projects in place that are being partner led, locally led, but it specifically is to address sage-grouse restoration needs. And again, it is because of the concerns about needing to maintain positive momentum to head off at the pass any cause for listing of the greater sage-grouse in the future. That is one example. There are others in the long leaf pine ecosystems of the Southeast where there are a lot of species, whether the red cockaded woodpecker—tortoise, and then there are all sorts of aquatic species, different mussels and fish that are at risk for listing also under the Endangered Species Act, and then specifically call out the importance of RCPP to leverage USDA and non-Federal investments to restore the long leaf pine ecosystem, for both forest product production, but also importantly for habitat for both at-risk and game species.

I think at least about ⅓, if you look at all 199 projects, and they self-identify what the resource concerns are them. Off the top of my head, it is about ⅓ of our projects to date where they specifically call out at-risk species habitat as one of the core criteria why they want this project to be successful.

The CHAIRMAN. Thank you. In addition to the farmers and ranchers, there are some 22 million family forest owners who own over ⅓ of our forests and who grow almost 50 percent of the wood that we use in the United States. Unlike farmers and ranchers, often these owners aren't actively engaged in their land management, and we know that if they aren't actively managing their land, that this can cause issues such as insects, invasive species, non-invasive species, disease, infestations, wildfire threats. What innovative approaches is NRCS using to reach these owners and get them involved in production as well as conservation?

Mr. WELLER. We talked a little bit about RCPP, but there are efforts also outside of that one program authority where we are really trying to work with State Foresters, but also non-Federal partners. Like in this case, it could be the U.S. Endowment for Forestry. There is a whole collaborative of folks, for example, like in the long leaf pine ecosystem again, that are focused on restoring the health of the long leaf pine forests. I mentioned in New England and your forests as well where there is a locally-led approach, whether it is a wildlife organization or forestry group. They have the ongoing expertise. They have the people in the field that can really help us reach those private landowners that we may not have relationships with, yet.

I am proud of our partnership, actually, with another Federal agency, in this case, the Forest Service. Historically, our agencies have sort of been ships passing in the night where we perhaps may not have worked as well together as we should have. We are now trying to be much more mindful and purposeful of working together

on both sides of the property line, so when we go into a community, into a forest or a county or a watershed, we want to make sure if the Forest Service were going to go in and do wildfire treatments on their side of the property line, we also then get the private landowners access to EQIP and other financial assistance so they, too, can treat their forests. That whole basin is then protected and restored. And so we have almost over 40 projects now across the country where NRCS, Forest Service, State Foresters, and other partners are coming in, all contributing our money together, working on both sides of the private property line and the public property line to restore the health of the whole forest, treating it as a true forest as opposed to just different property owners.

The CHAIRMAN. Thank you, Chief. My time has expired.

I now recognize the gentlelady from New Mexico for 5 minutes of questioning.

Ms. LUJAN GRISHAM. Thank you, Mr. Chairman, and thank you, Chief Weller, for your enthusiasm about the range of possibilities and that collaboration and voluntary efforts can produce real results. I really appreciate that, and I am hoping for the same kind of environment on looking at ways to use our agro-ecosystems to capture atmospheric carbon. Actually, New Mexico State University and one of their research scientists, Dr. David Johnson, has been looking at this issue very specifically. And so far, there are some key findings from his research, that the restoration of beneficial soil microbial communities and the relationships that they develop then with plants builds, in fact, healthy soils that can capture significant, is the operative word, *significant* amounts of carbon from the atmosphere and can also reduce the rate of which soil microbial communities respire this carbon.

My understanding is that he is currently reaching out to EPA for an agreement to explore this biotechnology and recognition of the increases in soil carbon as legitimate carbon offsets. I am interested in hearing whether NRCS has been working with EPA to promote soil carbon sequestration.

Mr. WELLER. We have been working very hard on soil carbon sequestration. I would not say we have worked with EPA, but we have worked with land-grant extensions with a lot of stakeholders in the agricultural community, and this is really part of our bigger perspective on soil health, where we are trying to understand better the biota that live below the surface soil as microbes and critters that live below the surface, and how important they are for helping plants in both pulling in the carbon, but also attenuates the residue and basically mulch it down and transform that plant residue into soil organic carbon.

And while we have a pretty good understanding of it, it is actually a burgeoning field. We are really partnering with a lot of scientists at both USDA and outside of the department, and the university research community to better understand those properties. We also have partnered with organizations to help, much like with the example I had on rice methane, where better management, for example, of pastures and grazing lands, how can livestock operators also take advantage of carbon markets. And so we have, again, through the Conservation and Innovation Grants Program, we have had some grants that help invest in that, help develop the

protocols, so that if you have a grazing operation, how much carbon is actually being pulled out of the atmosphere by those pastures, by those rangeland vegetation, and ultimately store it in the carbon soil profile as carbon, soil organic carbon. And ultimately then, selling those credits to a carbon exchange.

And so one of the first examples of that was in North Dakota in partnership with General Motors. General Motors actually purchased and retired tens of thousands of carbon credits, based on these protocols that the Conservation and Innovation Grants helped develop. And so this is then payments from General Motors that ultimately end up with grazers, so they are ultimately going to get additional revenue source if you keep those working lands working.

Ms. LUJAN GRISHAM. Can you give me, Chief Weller, kind of an idea about what the annual grant could look like? I mean, how much money are we spending across the country, roughly?

Mr. WELLER. Across the country? On that one example, it is just the initial pilot. GM didn't release how much money they spent on it, but it was in the millions of dollars. And ultimately, those ranchers are going to be getting an annuity payment. It is modest——

Ms. LUJAN GRISHAM. This is exactly what I want to hear, although I would encourage you to work with all Federal agencies so that you have the same kind of effort where we don't traditionally work as well as we could, certainly, in leveraging the Federal partnerships, taking the models that you have used in the community and making sure that they apply across all the different Federal jurisdictions.

But I am really interested in finding a way to move beyond—and it is not a complaint—move beyond a pilot and think about programmatic aspects with some specificity and some tools and resources. And I have only—this always happens, Mr. Chairman—only 30 seconds left, but if you could follow up with us about some of those ideas and strategies so that this Committee could look at whether or not we can partner with you to make sure that they are available to more states and more communities, because I think that this is a real viable aspect and could really do a whole lot to reach your ultimate goal of healthy soil.

So thank you very much, Chief. I appreciate it. I yield back with 6 seconds. Can I credit those?

The CHAIRMAN. You can get credit for those.

Ms. LUJAN GRISHAM. Okay. Thank you, sir.

The CHAIRMAN. I don't know what you will do with them, but you can get credit for them.

The gentlelady yields back. I now recognize Mr. Benishek from Michigan, for 5 minutes.

Mr. BENISHEK. I thank you, Mr. Chairman.

Thanks, Chief Weller, for being here. I, too, think that this RCPP model is really the way to go, and to me, I have seen similar public-private partnerships do a much better job in delivering the service that they are trying to deliver than government regulators. To me, a lot of times in Washington when the government starts doing things from so far away, they don't take into account the regional and local concerns, and by having a public-private partnership, if

it is for charitable works or nutrition or soil conservation, getting all the people involved and showing them how this is an advantage to them, providing leadership, that is really the way to go with all government, or a large majority of government services. I am happy that this seems to be successful.

The question I have is now that this is started, you have done a couple rounds of conservation projects. How is it going? How have things changed since you have been there? Tell me, have you learned anything? Is there anything that we should do differently with the next farm bill, or what are some of the challenges that you are seeing that maybe could make us do something even better the next time?

Mr. WELLER. Well, what I have seen is really an evolution. We have done two rounds of awards, and we are actually about to hopefully release the announcement for the third round in the near future, in the next couple weeks. We feel we have really positive momentum, and the response from partners across the country have been great, so for every dollar that we could award into a project, a partner project and the demand was seven, eight-fold for that $1. It is very competitive. Which to me just shows that there is huge unlocked potential, untapped potential that really we can better harness, but people are also very excited. When you give them an opportunity to really take the lead and to design projects that work in their communities to your point, you are going to have much more enduring and a quicker success.

So from the first round, both——

Mr. BENISHEK. It is a better way of doing things than regs, simply regulating from Washington, as far as I can see.

Mr. WELLER. From our experience, we are inherently a locally-led agency, so we really take to heart, first, understanding what the farmgate, what that producer wants to do in that community, that county with the local work group wants to do, and what are the priorities in that state. Really that is our history and our culture at the agency, but it fits well to a point you are making, yes.

Mr. BENISHEK. Can you name a particular challenge or problem that some producers are quoting that are making them hesitate to join this? Has it all been positive?

Mr. WELLER. From what I have heard, it is, but I don't want to overstate it is all positive. Of course, there are growing pains and some projects are quicker out of the gate than others. But, holistically, if you look at the projects, the overwhelming number of projects have been successful. Some producers, though, may be reluctant in a state like Michigan where they hear about this, but they are not sure who these partners are. They haven't heard of them, or they just don't want to work with—it could be they don't want to work with the government, they don't want to work with NRCS, or they don't want to work with a different partner for whatever reason. That may be a reluctance. And so what the program still allows the producer, if they don't want to work directly with the RCPP partnership, they can still come to the local conservation district and still get access to assistance directly that way.

There are ways that the Committee has built into the program so that you don't necessarily have to work with the partnership,

you can work privately as an individual as well. Overall, I have heard the feedback from both our staff, but also producers around the country. It has been positive.

Mr. BENISHEK. Well do you agree with me and my assessment that this public-private partnership and voluntary conservation is a better way to conserve our land and improve production for farmers?

Mr. WELLER. I will say that a voluntary approach is a great way to do conservation.

Mr. BENISHEK. All right. I will yield back the remainder of my time. Thank you, Mr. Chairman.

The CHAIRMAN. The gentleman yields back.

I recognize Mr. Peterson, for 5 minutes.

Mr. PETERSON. Thank you, Mr. Chairman.

Chief, I want to talk a little bit about this P.L. 83–566 situation. Apparently the appropriators had asked you for a list of projects, and you didn't get it to them for a while and now you have given them one. Is that part of why there wasn't any appropriation, because they hadn't gotten these project lists before, or do you know why they didn't?

Mr. WELLER. I do not know why they did not include appropriations for P.L. 83–566 in the 2016——

Mr. PETERSON. Do you know why the Administration didn't request anything in the budget?

Mr. WELLER. I don't know specifically why, but I can surmise. The President, to point in the 2016 budget, requested $200 million for P.L. 83–566, for the Watersheds Operations Program. Seeing that it was not successful, the Appropriations Committee did not appropriate any money to the program. In the 2017 budget, the President's budget includes no money for P.L. 83–566, but instead of taking money—in this case, $200 million for P.L. 83–566, for the first time what the President has done, not just President Obama, but a President, has not chipped, has not cut the farm bill conservation programs. There is zero cut to the EQIP Program, zero cut to Conservation Stewardship Program, zero cut to the easement program. It is the first time that has ever happened in a budget, which, easy to understand, Mr. Peterson, then for the budget process, they had to find money to make that happen. It was a decision, in the end, where to put that money and instead of P.L. 83–566 where it didn't get appropriations, they decided to keep that money in the farm bill programs.

Mr. PETERSON. Well, we appreciate the P.L. 83–566 or the RCPP that was designated up from the valley there. They are using some of that money for planning for these P.L. 83–566 projects, and there are 12 of them that are in process. I have been in a couple meetings here in the last 2 months where they have been working on these, but they are not in your plan here, so I don't know if that is because they are not completed yet or what. But, one of the concerns they have and I have is if there going to be money for these once the planning is done, which is going to be in a year or 2. And what is the prognosis for money for P.L. 83–566 going into the future, do you think, in terms of funding, because there is a lot on both sides of the border. This is what people want to use to try to help manage this flooding situation.

Mr. WELLER. Historically, it has been a hugely successful program. As you are probably aware, we helped install over 12,000 projects and facilities around the country in 48 states, so it has a very proud heritage. Unfortunately, it hasn't been funded. We have not received appropriations for 7, 8 years. But if you look back at the success of these projects, it has been very effective. A resuscitated, renewed program would be really powerful, and that is, in part, why the President included it in his 2016 budget, but also through your leadership, it is in RCPP, which is why we are now having some success at least doing the engineering work on those facilities, peach facilities in the Red River Valley.

Regarding the future, whether there is going to be future resources, that is up to both Congress in appropriations, and then for that specific project, they can reapply for the next phase so when we get ready for construction, they would be eligible to come back and reapply for RCPP funds in the future. It is a competitive program, but it is a great project. I can't guarantee, but they were successful——

Mr. PETERSON. I am moving ahead with the hopeful attitude that it is going to work out.

Mr. WELLER. Yes.

Mr. PETERSON. One of the other things that came up that is a continuing frustration is the lack of coordination between NRCS and the Corps, and there was a Memorandum of Understanding that was done between the Corps and NRCS back in 2012, and I thought this had all gotten worked out. And so I go to this meeting in January and find out that the whole thing has broken down and is not working. Why can't we get to a situation where we can have the Corps and the NRCS come to a determination? I thought your guy in Minnesota had it worked out that the Corps was going to go along with whatever NRCS came up with, and then I find out that she wasn't doing that. They have wasted 2 years screwing around with this deal, and you have another situation where they have been trying to get some kind of conservation gateway to try to get things worked out between you and FSA and RMA, and that is, I am not sure, working either. Can you help us get to a way that we can get these projects approved?

Mr. WELLER. I can't specifically speak to what is happening with the Corps. I can only manage what I can manage, which is the NRCS side of that relationship, but I hear you, and I will follow up with our——

Mr. PETERSON. You work with those folks, right?

Mr. WELLER. I have met with the Corps commander recently about that MOU from the national perspective, but as you understand it, it really depends on which Corps district you are in, and each district is different. It sounds like you need to do some follow-up with the Corps.

Mr. PETERSON. You understand now and hopefully people understand why some of us are so concerned about this *Waters of the U.S.,* because if that thing goes through and we have 300 more pages of regulations, you think we have a problem now, because this will just give an opportunity for everybody to not agree to anything.

So anyway, whatever you can do to help us with that would be appreciated.

Mr. WELLER. Will do.

Mr. PETERSON. And if you can get our projects on the list, it would help. Okay? I yield back.

The CHAIRMAN. The gentleman yields back.

Mr. Allen from Georgia is recognized, for 5 minutes.

Mr. ALLEN. Thank you, Mr. Chairman, and thank you, Chief, for joining us. Obviously, you are very proud of the things you have done and thank you for your presentation. Obviously the improvement you made in a lot of these properties is pretty amazing.

One of the things that you talked about how the working relationship that you have with farmers and ranchers, and how it has proven to be a great benefit to conservation. About ⅓ of our forests, about 50 percent of the wood in the U.S. is owned by owners that aren't actively engaged in land management. And we know if they are not actively engaged in this process, that problems can happen like insects, diseases, infestations, any wildlife threats, and that sort of thing.

What is NRCS using to reach these owners and get them involved in the production, as well as conservation?

Mr. WELLER. Trying to identify who those non-operating land owners are, the absentee landlords, is a challenge for us and it is really, particularly on the conservation stewardship side, to your point, when they are not there on the land it is hard to know year to year what is actually happening in your forest or in your fields.

So we have tried some examples in some other states, not in the Southeast, but in the Midwest an initial try at this in three different states where we worked with the Farm Service Agency and we sent out mailers. They have lists of who the landlords are, and so we figured out who were the folks we wanted to actually touch, we hadn't heard from in a while. And we tried different methods, basically postcard mailings, to reach out to these landlords, and tried different techniques to try and get their interest. We actually had a pretty good response from folks. Once they understood that we really wanted to talk to them and were not there to take something and we are actually here to offer something, we received a pretty good response.

Mr. ALLEN. Yes.

Mr. WELLER. But a lot of times, as you know, those landlords also live out of state, so it is about reconnecting them back to their land or their property, and then trying to work out—we either go through their tenant, and oftentimes through their tenant is the best way to reach those landlords, equipping them with the tools—whether it is like that resource stewardship evaluation I showed earlier where you empower the tenant to then go to the landlord and say here is what I am going to do for your property. I will make it even better. Or I would like to flip that around and also try out working with the landlord, do you know what happened to your property while you were away? Here is where your property is being managed and where would you like to take it?

So trying to identify who those folks are, trying new techniques to get their attention, and then equipping the tenants with great information so they can then go talk to their landlord about invest-

ments maybe they can both jointly make to enhance the value of the property through better soil quality, or better forest health. We are trying a lot of different techniques, but it is a challenge that I will admit we are not yet fully up to speed on.

Mr. ALLEN. What sort of impact into that group are you making? Is it substantial impact, or is there still a lot to do?

Mr. WELLER. There is still a lot to do. It has been pretty modest so far.

Mr. ALLEN. The pine straw industry is big in my district in Georgia, and of course, we have over 400 potential species in the South to be listed on the endangered species list in the coming years. Well, some of our pine straw folks are a little concerned about this, as well as, some things that crop up from time to time. As far as those industries, are you working with the folks in that industry and what kind of things are we doing so those folks can continue to do business?

Mr. WELLER. Yes, we are. We are trying to work with the timber and the pine straw industries, understanding the importance for local cultural practices, but also economic opportunities. The best form of conservation is one that actually improves the bottom line of a landowner or business, and that is going to be the most enduring conservation treatment. And so it is helping, whether it is our previous conversation, an absentee landowner, or to the actual landowners who are there on site and working with the industry, how do you ensure the health of that forest so it can produce the pine straw long-term? What are the different practices, then we can come in to either do tree stand improvements, prescribe fire to ensure you are treating the undergrowth understory, but also ensuring the health of those forests, fire breaks, other practices we can put in place working with the industry and where to site those practices. Where are the priority areas that for the industry is important to restore the vitality of those stands? There are a lot of different ways we can approach it and tackle it, but yes, it is critical that we understand what the priorities are of industry, and if there are opportunities and then leverage. Does the industry know the contact information for a lot of those landlords, landowners, and they have ways to reach out to them and encourage them to participate in our programs in ways that we can't. It is a great collaborative approach.

Mr. ALLEN. Good, good. I am glad to hear that. Thank you, Chief.

Mr. WELLER. Thank you.

Mr. ALLEN. I yield back.

The CHAIRMAN. I thank the gentleman.

Chief, thank you so much for your leadership. One of the issues that citizens follow, and rightfully so, they evaluate, they scrutinize government. We talk a lot about programs and today, you have talked a lot about outcomes, and we all appreciate that. Measurable outcomes, in terms of what is the return on investment for all the work that we try to do within the farm bill, providing tools for you, your agency, and talking on behalf of all the Members that are on this Subcommittee, we appreciate the fact that you are a good steward in the work that you do, and you are looking for outcomes, looking to deliver outcomes, just not promulgate or continue busi-

ness in the way we have always done it in terms of programs, and that is greatly appreciated.

So thank you for being here today, and thanks for your continued leadership.

Mr. WELLER. Thank you very much, sir, and I hope it gives this Committee some comfort, but also the taxpayer comfort that their resources are being used wisely and well. Thank you.

The CHAIRMAN. Thank you very much.

I would like to welcome our next panel of witnesses to the table. I will give you a few minutes to get settled in, and then we will proceed.

[Recess.]

The CHAIRMAN. I want to welcome our panel, and thank you so much for each of you of taking the time of coming here to present on this topic today. It is my pleasure to introduce our next panel of witnesses to the table.

We have Ms. Rachel Dawson, Senior Manager, Delaware River National Fish and Wildlife Foundation, Washington, D.C.; Mr. Frank Price, Owner of Frank and Sims Price Ranch in Sterling City, Texas; Mr. Rich Bowman, Director of Government Relations for The Nature Conservancy in Lansing, Michigan; and Mr. Kent Rodelius, Vice President of Agricultural Drainage Management Coalition in Willmar, Minnesota.

Welcome to each of you. Witnesses are reminded that the Members have your written testimony, and thank you for that. We had that ahead of time, and remind you to limit oral presentations to 5 minutes. All written statements are included in the record.

Ms. Dawson, please begin whenever you are ready.

STATEMENT OF RACHEL DAWSON, SENIOR MANAGER, DELAWARE RIVER, NATIONAL FISH AND WILDLIFE FOUNDATION, WASHINGTON, D.C.

Ms. DAWSON. Sure, thank you.

Chairman Thompson, Ranking Member Lujan Grisham, and Members of the Subcommittee, as the Senior Manager for the Delaware River Program, thank you for the opportunity to appear before you today to discuss the National Fish and Wildlife Foundation's, NFWF's, agriculture partnerships in the Delaware River watershed.

Established by Congress in 1984 to leverage public-private investments, NFWF currently works with 15 Federal partners and more than 45 corporate and foundation partners to conserve fish, wildlife, and their habitats. To date, we have funded nearly 15,500 conservation projects across all 50 states and U.S. territories, 900 of those alone in the last fiscal year.

Today, I would like to share with you some of our innovative work with farmers, ranchers, and foresters.

Three years ago, the William Penn Foundation of Philadelphia formed a partnership with NFWF, Drexel University's Academy of Natural Sciences, and the Open Space Institute to design and help implement an innovative voluntary initiative to improve water quality and habitat health across the Delaware River watershed.

The watershed crosses four state borders and provides drinking water for 15 million people, including in Trenton, Philadelphia,

Wilmington, and ½ the population of New York City, and it provides a vital habitat for fish and wildlife and unparalleled recreation.

To restore and protect these resources, the William Penn Foundation launched the Delaware River Watershed Initiative in 2014 with an initial 3 year, $35 million investment, which targeted eight sub-watersheds for focused restoration and conservation. Selected through an unprecedented assessment of on-the-ground potential to improve water quality, these sub-watersheds will serve as real life laboratories in which concentrated restoration and conservation will be strategically implemented, leveraged, and monitored.

Local partners have worked together to develop plans to implement the initiative, and accelerate adoption of practices that improve and protect water quality. Chief among the strategies for most of these sub-watersheds is expanded NRCS voluntary forest management and farm conservation practices.

One-size-fits-all conservation planning isn't an option for the region's diverse agriculture communities. Farms tend to be small, often fewer than 80 acres, and ownership is very complex. From the leased and rotating farmland in southern New Jersey to Plain Sect farmers wary of government cost-share programs in southeastern Pennsylvania, we have a great variability in landowner and producer dynamics. And despite its position in a notably urban corridor, the region serves as a smorgasbord of agriculture production. From the Garden State's vegetable farms, orchards, and nurseries, to Pennsylvania's mushrooms, dairy farms, and tobacco fields, and to New York's vast private forests critical for clean water, it truly has it all.

As the initiative partners got to work on strategies to address the challenges of such variability, the launch of the Regional Conservation Partnership Program, RCPP, was a remarkably timely opportunity tailor-made to deliver expanded conservation with a complimentary water quality benefit. Additionally, it was one that was particularly responsive to the aforementioned diversity.

In late 2014, NFWF in partnership with the American Farmland Trust and other partners was awarded a 5 year, $13 million RCPP to address water quality through the Delaware Watershed Working Lands Conservation Protection Partnership. Of particular importance, the partnership is leveraging $17.6 million in resources from partners for a conservation impact that amounts to more than $30.6 million.

There are four main reasons why we are excited about the RCPP opportunity in the Delaware watershed. First, the partnership helps efficiently expand delivery of important farm bill conservation and forest management programs in the region. Second, we are able to increase technical assistance in important places by growing the capacity of both traditional agriculture organizations like conservation districts, and partner nonprofits who are honing their ability to work with projects and landowners. Third, and perhaps most importantly, RCPP affords the partnership an opportunity to work with NRCS to design applicant criteria and adjust ranking so that cost-share funds are available to the projects and places that will have the most benefit for water quality. And finally, the RCPP in Delaware is an excellent example of the power

of leveraging private and public resources to do the most good. We are able to help producers achieve their conservation goals, while also utilizing private funding to incentivize, for example, implementation by landowners who prefer not to use government funding or to test innovative methods like conservation vouchers, bonus payments, and higher rates of cost-share for implementing the highest priority practices.

In only its first few months, the project is on its way towards its initial 5 year goals to work with 1,100 landowners to implement conservation on at least 16,750 acres and to improve management of 20,000 acres of working forests. This partnership has the potential to dramatically accelerate conservation and to build a stronger, more capable network among the agricultural communities and local nonprofits in the region.

While my testimony today is focused on the Delaware River watershed, let me close by mentioning NFWF's numerous other leveraging efforts to advance voluntary conservation on working lands. Among them are the Monarch Butterfly Conservation Fund, a partnership in Kentucky with Altria to help transition tobacco growers to continuous no-till, and the Gulf Coast Migratory Bird Habitat Initiative. In the interest of time, those details are included in my written testimony.

And again, Mr. Chairman and distinguished Members of this Subcommittee, thank you for the opportunity to appear before you today, and I am happy to answer any questions you may have. Fifteen seconds.

[The prepared statement of Ms. Dawson follows:]

PREPARED STATEMENT OF RACHEL DAWSON, SENIOR MANAGER, DELAWARE RIVER, NATIONAL FISH AND WILDLIFE FOUNDATION, WASHINGTON, D.C.

Chairman Thompson, Ranking Member Lujan Grisham, and Members of the Subcommittee, thank you for the opportunity to appear before the Subcommittee on Conservation and Forestry and to provide testimony regarding the National Fish and Wildlife Foundation's (NFWF's) agriculture partnerships in the Delaware River watershed and elsewhere across the country.

Introduction to NFWF

NFWF was established by Congress in 1984 to catalyze public-private investments to conserve fish, wildlife, and their habitats. Since our creation, NFWF has become one of the world's largest conservation grant-makers. We work with both the public- and private-sectors to protect and restore our nation's fish, wildlife, plants, and habitats.

NFWF supports conservation efforts in all 50 states and U.S. territories. Our projects are rigorously evaluated and awarded to some of the nation's largest conservation organizations, as well as some of the smallest. We neither advocate nor litigate. Instead, NFWF specializes in bringing all parties to the table—individuals, government agencies, Tribes, nonprofit organizations, and corporations. Together, we protect and restore imperiled species, promote healthy oceans and estuaries, improve working landscapes for wildlife, advance sustainable fisheries, and conserve water for wildlife and people. NFWF currently works with 15 Federal partners and more than 45 corporate and foundation partners.

In Fiscal Year 2015, NFWF funded nearly 900 conservation projects across the nation. The Foundation awarded $87.6 million in Federal funds, $449,000 in other public funds, and $38.0 million in private contributions, leveraged by $119.7 million in grantee match.

Since its inception, NFWF has funded nearly 15,500 conservation projects, awarded $955 million in Federal funds, $857 million in non-Federal funds, and leveraged $1.7 billion in grantee match for a total conservation investment of $3.5 billion.

Today, I would like to share with you some of NFWF's long history of working with farmers, ranchers, and foresters. We have supported targeted outreach and

technical assistance to farmers to accelerate the pace of conservation, leveraged farm bill funding with private investment, demonstrated on-farm benefits of conservation, and achieved targeted species-specific and water quality outcomes. In total, NFWF has leveraged more than $61.2 million of USDA's Natural Resources Conservation Service (NRCS) funds into over $228 million in on-the-ground conservation.

Enhancing Voluntary Conservation in the Delaware River Watershed

Delaware River Watershed Initiative

Three years ago, the William Penn Foundation (WPF) of Philadelphia formed a partnership with NFWF, the Academy of Natural Sciences (ANS) of Drexel University, and the Open Space Institute (OSI) to design and help implement an innovative voluntary initiative to improve water quality and habitat health across the Delaware River Watershed.

The Delaware River has a 13,500[2] mile watershed that crosses four state borders and provides drinking water for 15 million people, including the cities of Trenton, Philadelphia, Wilmington, and ½ the population of New York City. At 330 miles, it also is the longest undammed river east of the Mississippi, providing vital habitat for fish and wildlife and unparalleled recreation opportunities for the 8+ million people who live and play in the watershed. But, like many watersheds across our country, communities here are also grappling with water quality challenges in the face of growing pressures from development and other stressors.

Launched in 2014 with an initial 3 year investment of $35 million from the William Penn Foundation, the subsequently-named "Delaware River Watershed Initiative" (DRWI) carefully targeted and prioritized eight sub-watersheds for restoration and conservation investment. These were selected based on an assessment of the severity of current and potential threats to water quality, as well as the on-the-ground potential of local organizations to do something about it.

These focused sub-watersheds are to serve as on-the-ground laboratories in which restoration and conservation will be strategically implemented, leveraged, and monitored.

Seven of the eight priority sub-watersheds are dominated by private forests and farmland, and local partners—with support and assistance from NFWF, WPF, ANS, and OSI—have collaboratively developed and driven strategies to accelerate adoption of restoration and conservation practices that improve and protect water quality. Chief among the strategies for most of these sub-watersheds is an emphasis on expanded voluntary forest management and farm conservation practices in concert with NRCS.

Agriculture in the Delaware Watershed

There is substantial diversity among private landowners in the region, often presenting a challenge to one-size-fits-all conservation planning. Farms tend to be small and ownership is complex. For example in New Jersey, food and agriculture is the third largest industry, but the average farm size is only 80 acres. Much of the farmed land in the region is leased, which necessitates engaging both farmers and landowners in discussions about conservation. Plain Sect farmers, who are less likely to participate in government cost-share programs, predominate in areas of southeastern Pennsylvania. In addition, there are a number of small operators involved in producing and supplying locally grown foods for direct marketing.

Agriculture acreage is mostly in a corn/soybean rotation with wheat; however, there is some striking variation among producers across the watershed. As the Garden State moniker would suggest, vegetable farming is common in eastern and southern New Jersey, along with perennial crops like blueberries and peaches, sod, and nursery production. In Pennsylvania, tobacco production continues to be a significant cash crop. Livestock operations are spread throughout the region and consist mainly of small- and medium-sized dairies. Poultry houses are becoming more numerous in northern Berks County, and the surrounding area includes a sizeable number of equine operations. Mushroom production is a unique feature of the agricultural economy in Chester County, where more than ½ of the mushrooms produced in the United States are raised.

The upper portion of the watershed is largely private forest and is the source of much of the watershed's exceptionally clean water. The majority of family forest owners are near or past retirement age, and these tracts are especially vulnerable to degradation, fragmentation, and development. In addition, many larger forest tracts are owned by hunting and fishing clubs or organizations that host summer camps. There are high rates of seasonal use and absentee landownership.

As the partners of the DRWI began to develop and implement collaborative strategies to address these challenges, the launch of the Regional Conservation Partner-

ship Program (RCPP) was a remarkably timely opportunity tailor-made to deliver a conservation program with a complimentary focus on water quality. Additionally, it was one that was particularly responsive to the aforementioned varied landscape and landowner characteristics throughout the region, as well as the local priorities and strategies specific to each priority sub-watershed.

Delaware Watershed Working Lands Conservation Partnership

In late 2014, NFWF, in partnership with American Farmland Trust and a dozen other partners, was awarded a 5 year, $13 million RCPP from NRCS for the *Delaware Watershed Working Lands Conservation and Protection Partnership.* Of particular importance, the Partnership is leveraging $17.6 million in cash and in-kind resources from partners, including significant match from the William Penn Foundation's investment in the DRWI.

Additional collaborators and supporters of the RCPP include: Cape Atlantic Conservation District; Berks County Conservation District; Chester County Conservation District; North Jersey Resource Conservation and Development (RC&D); Stroud Water Research Center; Coalition for the Delaware River Watershed; Natural Lands Trust; The Land Conservancy; Partnership for the Delaware Estuary; Berks County Conservancy; New Jersey Water Association; Pinchot Institute for Conservation; Brandywine Conservancy; Wallkill River Watershed Management Group; Catskill Forest Association; Delaware Highlands Conservancy; Pennsylvania Department of Conservation and Natural Resources; New York State Department of Environmental Conservation; New Jersey Forest Service; and the American Mushroom Institute.

This RCPP project is designed to address water quality as the primary resource concern in the Delaware Watershed. Secondarily, the project will prioritize efforts to reduce forest fragmentation and habitat degradation in the headwaters, and protect water quantity in the lower reaches of the basin, which is a growing concern as aquifers experience overdrafts from irrigation.

The partnership is guided by a comprehensive approach to voluntary agricultural and forestland conservation at the sub-watershed scale, drawing on the assessment and targeting performed to establish the DRWI. In areas dominated by farmland, the partnership builds on the NRCS models for minimizing pollution at the source, and maximizing nature's ability to slow and filter polluted runoff (including "Avoid, Control, Trap" and the "Four Rs" nutrient management concept). Farmers can reduce polluted runoff through practices to minimize excess fertilizer and pesticide use, control erosion from exposed soils and barnyards, and treat nutrients by restoring wetlands and forested streamside buffers.

In forested areas, the partnership assists landowners in developing and implementing forest management practices that improve forest health and resilience, while protecting water resources.

Broadly, the partnership aims to improve the delivery of technical assistance to landowners by growing the capacity of traditional agriculture organizations such as conservation districts, while also working with a large network of community-based nonprofits to improve how they work with the agricultural community to deliver voluntary conservation.

For example, the partnership is supporting new technical assistance staff in three conservation districts in Pennsylvania and New Jersey, as well as at the North Jersey RC&D. These positions will specifically reduce the bottleneck in implementing cost-shared conservation by focusing on whole farm conservation planning and practice design. This support has been especially well-received in New Jersey, where conservation districts are largely focused on erosion and sediment control programs and have limited (and often overloaded) staff devoted to agriculture.

Private matching funds are being used to provide training and funding to local land trusts and watershed organizations so that they can continue to build the pipeline of projects and hone their outreach skills. These organizations often have strong landowner relationships but lack knowledge and understanding about how landowners can access cost-share funding and which conservation practices are most cost-effective at achieving water quality outcomes and on-farm benefits for any given farm. Armed with training and assessment tools, these organizations are key allies in accelerating the pace of conservation.

A key element of the RCPP design that will be critical to its success is that the partnership is able to establish criteria used to rank and prioritize the allocation of cost-share funding. For the Delaware RCPP, projects are given priority if they occur in one of the DRWI priority sub-watersheds and will improve water quality. The partnerships also are able to give greater priority to projects addressing the greatest local needs. For example, in Pennsylvania, the local partnership has prioritized livestock operations that are within 100–200′ of a stream or wetland. And in southern New Jersey, they have prioritized irrigation projects that conserve

water and projects that improve groundwater recharge for the Kirkwood-Cohansey aquifer.

The partnership is enhanced with dedicated and flexible implementation funding from the WPP and other sources to incentivize participation by producers. The use of private funding provides streamlined access to implementation funding for some practices and encourages participation by some landowners who prefer not to use government funding. Private funds also are being used to test innovative incentives like conservation vouchers, bonus payments, and higher rates of cost-share in exchange for implementing the highest priority practices. We have found early on that the blend of this targeted, private investment with the RCPP is driving conservation to the places it is needed most and can have the greatest impact.

In only its first few months, the project is on its way toward its initial 5 year goals to work with 1,100 landowners, to implement conservation on at least 16,750 acres, and to improve management of 20,000 acres of working forests.

Indeed, the *Delaware Watershed Working Lands Conservation Partnership* has the potential to dramatically accelerate conservation, and to build a stronger, more capable, network among the agricultural communities and local nonprofits in the region.

Other Successful NFWF Agriculture Partnerships

NFWF has dozens of examples of programs across the country that leverage public and private funding to accelerate the pace of voluntary conservation on working lands. For example:

Monarch Butterfly Conservation Fund

In 2015, NFWF formed a public-private partnership to restore monarch butterfly habitat. Over the past 20 years, the North American monarch population has plunged from one billion to less than 60 million, due mostly to loss of critical habitat. The partnership, which includes the Fish and Wildlife Service, NRCS, several state Soil and Water Conservation Districts, the Texas Farm Bureau, and Monsanto, is establishing critical monarch habitat in nine central states by enrolling private landowners in the Conservation Stewardship Program and the Environmental Quality Incentives Program. In its first year, the Monarch Butterfly Conservation Fund awarded $3.8 million to 23 projects that will restore over 50,000 acres of monarch habitat on working lands.

NFWF has just been awarded a new $5.6 million Monarch RCPP that will expand the program and spread the focus.

Money, Water, and Wildlife in Kentucky's Tobacco Country

NFWF is partnering with Kentucky NRCS and Altria to help transition tobacco growers to continuous no-till. Kentucky has been a leader in adoption of conservation tillage practices that improve soil health, reduce polluted runoff, and reduce fuel and labor costs associated with tilling; however, tobacco growers have been late to adopt no-till because of technological barriers. This partnership has supported technical assistance positions in two conservation districts, and also used private funding to purchase equipment that can be rented out to farmers who are not ready to make the significant capital investment in a practice that is unproven on their farm. In addition to providing vital private funding, Altria is able to use its relationship as a tobacco buyer to initiate conversations with otherwise uninterested landowners.

Gulf Coast Migratory Bird Habitat Initiative

In the days following the *Deepwater Horizon* oil spill, NFWF and NRCS worked with farmers, ranchers, foresters, and private landowners across the Gulf states to create over 500,000 acres of wetland habitat for migrating waterfowl. Because of this initiative, millions of migrating birds had access to non-oiled or threatened habitat. This valuable partnership continues with rice growers and other farmers in the Gulf region. NRCS and NFWF have established a goal to partner on $100 million worth of projects over the next 5 years.

Conclusion

Again, Mr. Chairman and distinguished Members of the Subcommittee, thank you for the opportunity to appear before you today to share just a few of the innovative conservation efforts of NFWF partners and grantees. I am happy to answer any questions you may have.

The CHAIRMAN. You did fine. Thank you very much, and actually, you have great details on those three other programs that you

touched on very quickly that is included in your written testimony, so thank you for that.

Mr. Price, go ahead and proceed whenever you are ready.

STATEMENT OF FRANK PRICE, OWNER, FRANK AND SIMS PRICE RANCH; MEMBER, NATIONAL CATTLEMEN'S BEEF ASSOCIATION, STERLING CITY, TX

Mr. PRICE. My son and I operate a ranching enterprise, raising sheep and cattle, as well as a hunting operation based on Sterling City, Texas. My son and I have run the ranch, which dates back to 1876, with two goals in mind. The first is that the ranch must be operated on standalone basis, where we follow a strict budget and expect the operation to show an annual profit. Our second goal, like many other ranchers, is to leave the land in better condition for future generations. We serve to make our ranch land sustainable, which increases productivity, even after the land is utilized for grazing.

Ranching in west Texas comes with its fair share of difficult times. However, we have been able to keep our operation sustainable during those hard times by utilizing voluntary conservation programs and applying management practices that enhance the operation. Drought is a common problem in west Texas, and it requires adaptability and forward thinking to maintain the resources on the ranch.

In 2011 and 2012, we were challenged with one of the worst droughts in the generation, 100 consecutive days of 100° or higher, a total rainfall of 5½″ for the year. Water was virtually nonexistent, wildfires were prevalent, but we were able to survive and remain sustainable because of our grazing management practices and the opportunity to work with the NRCS's voluntary conservation programs to improve our ranch and make our grasslands resilient.

By utilizing the conservation planning of the NRCS and the National Grazing Lands Coalition, in addition to the development of innovative grazing technologies, we have increased perennial grasses on the ranch, improved ground cover, greatly reduced soil erosion due to both wind and water, reduced labor inputs, and ensured adequate forage for the livestock and wildlife populations on the ranch. Furthermore, by implementing these programs, we were able to keep expenses down by lowering feed, fuel, equipment, and labor costs, improving profitability of our operation.

Through the help of NRCS and voluntary conservation programs, we have been able to make our ranchland more drought tolerant. We have achieved that by installing groundwater storage systems connected by an extensive pipeline system, and improved our grasses on the ranch with utilizing brush control. We use a variety of ways to reduce brush by including prescribed burns, mechanical, and chemical treatment. We leave the large trees in place to create a savannah-type range land. The resulting increased water availability, grass cover, and shading properties of the savannah landscape improves the welfare for the livestock, wildlife, and the ranchmen alike. It is truly a win/win situation.

When wildfire came through our ranch in 2011, we had to rebuild miles of fencing. EQIP gave us the opportunity to reposition

some of those fences to better adapt to our grazing program. One of the reasons EQIP has become popular among ranchers is because it is a working lands program, conservation programs that enhance the land's production do not limit its use for both the ranchers and conservation of our resources. CSP, Conservation Stewardship Program, is another program that I use to improve my land, water, and wildlife habitats.

The biggest point I would like to make is that voluntary part of conservation programs is what really makes it work for ranchers. We have had excellent success in using these programs, but just because the practices work for my family does not mean it is right for everybody. It is important that we keep these programs funded to safeguard their continued success, and above all else, these programs must stay voluntary.

I believe that economic activity and conservation go hand in hand, and we are always looking for new innovative conservation programs that will have tangible benefits for the environment and help improve our ranching lands. USDA's conservation programs have been a great asset to cattle producers and it is important that these programs continue to be implemented in the same practical, producer-friendly, voluntary manner for years to come. Together, we can sustain our country's natural resources and economic prosperity, ensuring our way of life for future generations.

I appreciate the opportunity to visit to you, and look forward to answering any questions you might have.

[The prepared statement of Mr. Price follows:]

PREPARED STATEMENT OF FRANK PRICE, OWNER, FRANK AND SIMS PRICE RANCH; MEMBER, NATIONAL CATTLEMEN'S BEEF ASSOCIATION, STERLING CITY, TX

Good afternoon, my name is Frank Price. My son and I operate a ranching enterprise, raising cattle and sheep, as well as a hunting operation based in Sterling City, Texas. I am a member of the National Cattlemen's Beef Association and am testifying before you today representing the many cattle feeders and family ranchers, who each have a stake in protecting the environment. Thank you Chairman Thompson and Ranking Member [Lujan] Grisham for allowing me to testify today on voluntary conservation in agriculture.

U.S. cattlemen own and manage considerably more land than any other segment of agriculture—or any other industry for that matter. Cattlemen graze cattle on approximately 666.4 million acres of the approximately 2 billion acres of the U.S. land mass. In addition, the acreage used to grow hay, feed grains, and food grains add millions more acres of land under cattlemen's stewardship and private ownership. Some of the biggest challenges and threats to our industry come from the loss of our natural resources. The livestock industry is threatened daily by urban encroachment, natural disasters, and government overreach. Since our livelihood is made on the land, through the utilization of our natural resources, being good stewards of the land not only makes good environmental sense; it is fundamental for our industry to remain strong. We strive to operate as environmentally friendly as possible, and it is through voluntary conservation programs that ranchers will continue to be a proud partner with the government to reach our environmental conservation goals.

My son and I represent the fourth and fifth generations of the Price family to ranch in west Texas. Our Ranch dates back to 1876, when my great-grandfather began ranching at the age of eighteen. We now operate on 68,000 acres of land spanning across four counties in west Texas. My son and I run the ranch with two goals in mind: the first goal is that the ranch must be operated as a stand-alone business, where we follow a strict budget and expect the operation to show an annual profit. Our second goal, like many other ranchers, is to leave the land in better condition for future generations. The primary way we are able to preserve the land, as well as our ranching heritage for future generations, is through innovative practices and voluntary conservation programs.

Ranching in west Texas comes with its fair share of difficult times, as it does for my fellow cattlemen across the country. However, we have been able to keep our operation sustainable during those hard times, by utilizing voluntary conservation programs and applying management practices that enhance the operation. Drought is a common problem in west Texas and it requires adaptability and forward thinking to maintain the resources on the ranch. In 2011 and 2012, we were challenged with one of the worst droughts in a generation. Water was virtually nonexistent and wildfires were prevalent. But we were able to survive, and remain sustainable, because of our grazing management policies and the opportunity work with the NRCS's voluntary conservation programs to improve our ranch and make our grasslands resilient. These voluntary programs were a great benefit to many producers who, quite frankly, would not have survived without them.

One way we made our ranch drought-resistant is by installing above ground water storage systems, connected by an extensive pipeline system, and by recycling rubber tires as drinking water troughs. This ensures our livestock and wildlife have adequate and reliable water throughout the year.

We graze our cattle with a carefully managed grazing plan that we developed with the Natural Resources Conservation Service (NRCS) and the National Grazing Lands Coalition (NGLC) utilizing their conservation planning capabilities. We have learned that when you utilize a flexible, planned grazing program at a conservative rate, leave grass cover after you move out of a pasture, and give the rangeland adequate recovery time, you will grow more grass with limited rainfall. Through cooperation with state and local agencies, in addition to the development of innovative grazing strategies, we have increased perennial grasses on the ranch, improved ground cover, greatly reduced soil erosion due to both wind and water, reduced labor inputs, and ensured adequate forage for livestock and wildlife populations on the ranch. Our grazing strategy is a big part of why we've been able to keep the ranch resilient and sustainable. Furthermore, by implementing these programs we are able to keep expenses down by lowering feed, fuel and equipment costs, thus improving profitability of our operation.

Another key to improving the grasses on our ranch is brush control, which we often do in partnership with NRCS. We use a variety of ways to reduce brush including prescribed burns and mechanical treatment. We leave the bigger trees in to give the grasslands a savannah effect which also provides shade for the cattle, improving their welfare.

We are strong advocates of prescribed fire on the rangeland. We try to mimic the fire conditions that nature learned to deal with hundreds of thousands of years ago. It is a very good tool within our tool box of land improvement measures. NRCS and the GLCI have provided valuable assistance in our burning endeavors.

The Environmental Quality Incentive Program, or EQIP, is a cost-share program that rewards and provides incentives to producers for implementing conservation practices. When wildfire came through our ranch in 2011, we had to rebuild miles of fencing. EQIP helped us do it. One of the reasons EQIP has become popular among ranchers is because it is a working-lands program. Conservation programs that keep land in production and do not limit its use are best for both the ranchers and conserving our resources.

Another working lands program is the Conservation Stewardship Program. CSP rewards those of us that have been conservationists and have spent the time and money in the improving of our land, water, and wildlife habitats. CSP offers cattlemen the opportunity to earn payments for actively managing, maintaining, and expanding conservation activities like cover crops, rotational grazing, ecologically-based pest management, and buffer strips..

NRCS personnel are a tremendous resource for the ranchmen. In recent years local NRCS personnel are prevented from going to training sessions given at the Society of Range Management and Grasslands Conservation Initiative meetings. We as ranchmen must have well informed NRCS personnel to move forward with innovative conservation practices. They are our first go to source of knowledge.

The biggest point I'd like you to take away from this hearing is that the "voluntary" part of the conservation programs is what really makes it work for ranchers. We've had success using some of these conservation programs, but just because this system works for us does not mean it's right for everybody. It's important that we keep these programs funded to safeguard their continued success, and above all else—these programs must stay voluntary. A one-size-fits-all approach that accompanies top-down regulation does not work. If these programs were to become mandatory, the rules and regulations that farmers and ranchers would be subjected to would make it harder for them to utilize the unique conservation practices that help their individual operations thrive.

I believe that economic activity and conservation go hand in hand and we are always looking for new, innovative conservation programs that will have tangible benefits for the environment, and help to improve our ranching lands. USDA's conservation programs have been a great asset to cattle producers and it is important that these programs continue to be implemented in the same practical, producer friendly, and voluntary manner for years to come to ensure that cattlemen will continue to have the ability to do what we do best—produce the world's safest, most nutritious, abundant and affordable protein while operating in the most environmentally friendly way possible Together we can sustain our country's natural resources and economic prosperity, ensuring the viability of our way of life for future generations. I appreciate the opportunity to visit with you today. Thank you for your time, and I welcome any questions you may have.

The CHAIRMAN. Mr. Price, thank you so much.

Mr. Bowman, go ahead and proceed whenever you are ready for 5 minutes.

STATEMENT OF RICHARD BOWMAN, DIRECTOR OF GOVERNMENT RELATIONS, THE NATURE CONSERVANCY, LANSING, MI

Mr. BOWMAN. Great. Thank you for having me, Mr. Chairman, Ranking Member. I am really pleased to be here. I wasn't sure at 6 o'clock when it was 14° and blowing snow sideways in Michigan that I was going to make it, but we did get here.

I want to give you a slightly different view on conservation and innovation at The Nature Conservancy. While we have agricultural projects all around the country and of other countries, I am going to focus on our work in Michigan.

One of the challenges that we face is that conservation isn't cheap. It has to be paid for, we make our living based upon the fact that members and donors believe that we are making a difference, and this is why they write us a check and give us that money. And so we ask ourselves all the time the question, how much conservation is enough, and how effectively are we actually getting conservation done? And as a result of that, we have made a lot of investment in recent years in tools, and rather than showing slides, I actually have up on the screen live one of the tools that we developed that we used in a project in a watershed in Michigan we did jointly with Coca Cola. They actually provided us some private funding for this, and they were interested in buying water offsets for the water that they were using to make product, and we said well, you can do it by paying farmers through agricultural conservation. They said no, you don't understand. We don't want to buy conservation practices, we want to buy gallons of water. And so what this tool actually allowed the technician to do out in the field is to sit down with the producer in their living room, just like this, and zoom into their farm and zoom into a field, and fairly quickly go in and select a producer's field. They went, did this, and then when they selected the field, the tool brings up a pull down menu. This predates Google Earth, so this is actually based on our GIS and the NRCS's soils maps and topography maps, and it tells you the size of the field and the relative parcels, and then you just go in and tell how you are currently farming the field. We will say conventional row crop agriculture, and the producer is considering switching to no-till, and when you tell it to calculate in about ½ a second how much the increase or decrease in groundwater recharge will be as a result of that practice on that field. And this

project was paying farmers $1.60 per thousand gallons, or something like that.

And so as Mr. Price mentioned, conservation ultimately is a business decision for the producer, and they decided whether or not they were willing to make that change, based upon that payment. And that actually allowed us to get the fields where we had either the most impact, because the payment was the highest, or fields where well we didn't get as much impact. We didn't pay very much for them, and in my written testimony near the end, I talked about what I think the next opportunities for conservation are. And if there is any weakness to the way we practice conservation right now, it is the fact that we pay for practices in hopes of an outcome, instead of paying for outcomes regardless of the practice. And in order to pay for outcomes, as Chief Weller so eloquently talked about, we have to develop the scientific knowledge to quantify those outcomes. Mr. Benishek, we refer to them as those response curves. If you take two aspirin to make your headache go away, don't 20 aspirin make it go away faster? Well, maybe not. Maybe there actually is an appropriate level of conservation to apply to a site. And then also really thinking about how we specifically deploy tools.

The last thing I would say is in order to really magnify our conservation impact, we have another tool that I am not showing you today, because it is a little more complicated, but we have put it into the hands of about 120 certified crop advisors in the Saginaw Valley of Michigan, and they are now talking about conservation as part of the farmers' entire management program. That is an RCPP project where we then make a referral to NRCS for the technical and financial assistance for those growers who are interested in those conservation practices.

And with that, I would be happy to answer any of your questions when we get to that portion.

[The prepared statement of Mr. Bowman follows:]

PREPARED STATEMENT OF RICHARD BOWMAN, DIRECTOR OF GOVERNMENT RELATIONS, THE NATURE CONSERVANCY, LANSING, MI

Chairman Thompson, Ranking Member Grisham and Members of the Committee:

Thank you for inviting me to testify. My name is Rich Bowman and for the past 10 years I have served as the Director of Government Relations for the Michigan Operating Unit of The Nature Conservancy (TNC). Prior to that, I served for 6 years as the Executive Director of Trout Unlimited in Michigan and started my career in policy almost 30 years ago as a member of the Staff of the Michigan Farm Bureau. I am also a fourth generation farmer from Michigan and while I have not actively farmed for a number of years, my brother still manages the home farm in southern Michigan and I believe it is hard to seriously care about the stewardship of natural resources without taking an interest in agriculture and forestry.

The Nature Conservancy is one of the world's leading conservation organizations, with over 3,500 staff working in every U.S. state and 35 other countries on every continent on the planet and a mission to protect the broad array of natural systems upon which all life depends. Everyone associated with TNC takes pride in the fact that we are a non-confrontational, solutions oriented organization. We stick strongly to our values, but also recognize that at the end of the day if we haven't solved the problem, being "right" about the issue has a hollow ring at best. We also are committed to basing our work on sound science and we put our money where our mouth is. Over 25% of our staff are Ph.D. scientists and are global leaders in their area of expertise. They challenge our assumptions and test our work to make sure our supporters resources are used on work that is replicable, meaningful and impactful.

In Michigan, we have over 50 staff and manage nature preserves and reserves totaling over 33,000 acres including a commercial forest reserve in the Upper Peninsula that encompasses over 26,000 acres.

Additionally, we have helped the State of Michigan, as well as Federal and private partners secure conservation on over 300,000 additional acres through easements, acquisitions and management agreements. And we have worked with many private forest and farm land owners and managers helping them improve the health and productivity of their property.

Being in the heart of the Great Lakes, TNC has had an ongoing interest in the health of our aquatic systems, and with agriculture occupying nearly 40% of Michigan's land area, how agriculture is practiced can have a profound effect on the health and function of our lakes, streams and the Great Lakes.

Almost twenty years ago we started with a small demonstration project with a few growers in one watershed in central Michigan. Today we are leading a conservation partnership in the Saginaw Bay Region in Michigan that includes the watersheds of six entire rivers, and partners with over 100 Certified Crop Advisors, dozens of agronomy suppliers and purchasers of ag products and the Natural Resources Conservation Service to eliminate any ag related water quality concern that could limit the health of the aquatic organisms in those river systems. And that is only one of dozens of projects that TNC as a whole has in ag regions around North America and globally.

The topic today is innovation and technology and I am going to share with you three innovations we are bringing to agricultural conservation and the technology we are continuing to develop to support those innovations. I will close with a few observations about how we could speed the pace of innovation through policy.

An innovation is by definition nothing more than a new solution to an old problem. So let's start by defining the problems around which we want to innovate. They are:

1. How much Conservation is "enough"?
2. Every field is different, but how they are different matters.
3. There aren't enough "boots-on-the-ground" helping farmers practice conservation.

How Much Conservation is "enough"?

Many of us in the conservation community have promoted as the idea that we can never have too much "conservation". Some individuals have legitimately challenged this idea by saying unlimited conservation is akin to saying if two aspirin are good to make ones headache go away, then 20 must be better. The real problem here is the lack of a clear definition of the conservation outcome we want to achieve and the understanding of the "treatment" to achieving that outcome.

The innovation we developed in Michigan is something we call an "Ecological Response Curve". Fisheries scientists have studied fish response to water quality for years. And starting about 15 years ago, USDA through the Natural Resources Conservation Service initiated a program called the Conservation Effects Assessment Program (CEAP). The purpose of CEAP is to specifically quantify the relationship between conservation best management practices (BMP's) and the impact those BMP's have on ecological services like water quality and wildlife. By taking the CEAP data on a practice(s) impacts on water quality and aligning it with fish community response to water quality, our scientists could draw a relationship where they could say how many acres in a watershed need to be treated with specific practices to achieve a healthy fish community; in essence the equivalent of how many aspirin you need to take to make the headache go away for a watershed. We are currently working with USDA and other partners to complete this same type of analysis for the Western Lake Erie Basin.

Our scientists were able to refine this analysis even further, in partnership with the CEAP scientists, by determining which water quality component was actually the limiting factor on the biological community on every stream segment in all of the watersheds in southern Michigan and Wisconsin. This understanding becomes key because if farmers are applying (and taxpayers are supporting) practices to reduce nitrogen, and the limiting factor is phosphorus, we can spend a lot of time and money and not solve our problem; to extend the medical analogy, aspirin is good for a headache, but maybe not very effective for heartburn.

Every Field is Different

In 2007, TNC in Michigan and the Michigan Farm Bureau held a meeting to discuss the conservation title of the farm bill to see where we might work together. To our mutual surprise, we agreed on almost every policy concept except one, the

"targeting" of conservation programs to specific watersheds or geographies. Our colleagues from the Farm Bureau told us it wasn't that they disagreed that problems might come from a specific area or that some fields contributed more to problems than others, it was that their members didn't feel that the science behind targeting was field specific enough to justify giving a benefit to one member over another. This conversation became the basis for our second innovation.

The Institute of Water Research (IWR) at Michigan State University had been working with the Army Corps of Engineers to develop GIS based models to predict where sediment was coming from. We approached IWR and asked them if they could incorporate factors into the model about sediment and nutrient loads and build a tool where we could analyze the impact of specific practices on specific fields. The result is the Great Lakes Watershed Management System (GLWMS).

The GLWMS is a publicly available web-based tool that allows anyone who wants to use it to do an analysis of the changes in groundwater recharge as well as sediment and nutrient loading to the nearest body of surface water based upon the application of one or more conservation best management practices. GLWMS also has the ability to aggregate the total of those changes on a watershed or sub-watershed basis. This means our ecological response curves can tell us how much we need to do to get a healthy fishery in a watershed and GLWMS can tell us how much a specific practice in a specific field will contribute, and by keeping track of what is done it can tell us how close we are to solving the problem.

The GLWMS is currently available in four watersheds in the Great Lakes region, the Saginaw Basin in Michigan, The Fox River Basin in Wisconsin, the Western Basin of Lake Erie in Ohio, Indiana and Michigan and the Genesee in New York. The web address is *www.iwr.msu.edu/glwms* or simply put "Great Lakes Watershed Management System" into your favorite search engine and then go in and play around with the tool. While it takes a little knowledge of field based conservation practices, it is a relatively intuitive site.

Not Enough "Boots-on-the-Ground"

Early in our work in agriculture in Michigan, we funded a technician in a local soil and water conservation district office. While the technician did good work, we soon realized there was a limit to the number of farmers that the technician could talk to and we needed to increase the number of growers we could reach and influence, something within our organization we call project leverage. For many in the conservation community, the answer to this problem is a lot more public funding for a lot more technicians. While this works in theory, the reality of the financial limits of government probably don't make this pragmatically unlikely.

The solution once again came from a partner, the Michigan Agri-Business Association (MABA). MABA leadership had heard about the work we were doing with CEAP, ecological response curves and the GLWMS and they approached us and suggested we partner on a proposal under the newly created Regional Conservation Partnership Program. We would bring the defined outcomes and site specific analytic tools and they would bring the boots on the ground in the form of over 100 Certified Crop Advisors who would discuss conservation best management practices with their customers, which are virtually every farmer in the Saginaw Bay region.

Additionally, we are trying to use the innovations we develop to make the "boots-on-the-ground" we have more efficient. We used the GLWMS to pre-screen and identify fields in the watershed that have the highest potential for positive conservation impact and provide that information in the form of maps to Certified Crop Advisors so they can pre-plan their visits with their grower customers. And we are working with our tool developer, IWR and NRCS to find a way to import data from GLWMS into the application material a grower must fill out to receive cost-share financial assistance from the NRCS. It is our aim to eventually have a system where the grower and his crop advisor could determine the appropriate conservation practices, apply for financial assistance and submit all the required documentation without the grower having to physically make a trip to a USDA service center.

This project is new, just initiated over the last 11 months, and is an experiment in the delivery of conservation technical assistance. It is not without its growing pains. We are managing through the suspicion of the government agency field staff of the motivations of the private-sector and their commitment to "Getting it right" and the reverse suspicion of the private-sector towards the government agency staff of not caring about the business realities they and their customers face and the bureaucracy of government. We are seeing these suspicions diminish as we work together to stand this project up and are confident that as we all learn about each other's constraints we will solve future problems as they arise.

One Final Innovation

One of the weaknesses of our current voluntary conservation program is that they don't have a mechanism to really take into account the business realities of growers. The closest we have come is land set aside programs where growers bid to enroll land and we accept the lowest bidder. This gives us the most acres for the least dollars, but simply retiring or treating acres may not solve the environmental issues we wish to address. In farm country it was commonly know that farmers put their least productive land into conservation uses and keep their best land in production, which is how they maximize their return on investment. The problem is, some of that land that is really productive may also provide significant conservation benefits, but should we pay more if we get more.

In our Saginaw Bay work, we have some non-NRCS money that we are using to incentivize farmers to put in conservation best management practices on a Pay for Performance basis. Using the GLWMS, we analyze the increase in groundwater recharge or decrease in sediment load and then offer a payment based on those outputs, (gallons of water or tons of sediment). We don't care how the farmer farms, what we care about, and pay for, are the result of what he does. We believe that calculating the unit of output and then pricing it, is in the long run the most cost effective way to get the conservation outcomes we need.

Thank you for your attention, I would be happy to answer any questions.

The CHAIRMAN. Okay, Mr. Bowman, thank you very much.

I now recognize Mr. Rodelius for 5 minutes of testimony. Go ahead.

STATEMENT OF KENT RODELIUS, VICE PRESIDENT, AGRICULTURAL DRAINAGE MANAGEMENT COALITION, WILLMAR, MN

Mr. RODELIUS. Mr. Chairman and Ranking Member, thank you very much for this opportunity to speak with you today. I am here representing the Agricultural Drainage Management Coalition. I spent the last 30 years in the drainage industry traveling the Midwest. Today, I would like to give you a brief overview of water table management, and tell you about some exciting innovations.

So what is water table management, or subsurface tile drainage? There is a flash drive in your testimony I sent that has a video of how this really works.*

There are three important components to a system. Commonly, plastic pipes called tile are installed beneath the surface of agricultural fields to collect water. These tile lines are usually buried 3′ to 4′ deep and spaced about 40′ to 80′ apart. These lines are laterals that then run into main that conveys the water to the outlet. The outlet is where the main empties the water out of the field, usually into a ditch.

So why install tile? Why is this practice so widely used? Here are a few of the benefits.

The number one reason is increased yield. Farmers get a 15 to 25 percent increase in production. Tile reduces soil erosion and keeps the topsoil on the land. It stores water in the soil profile, and can reduce flooding. Farmers can plant earlier in the spring and harvest on time in the fall, and by managing their water, farmers are able to better utilize the potential of their seed and other inputs. It is far more economical to increase production through tile than to farm more acres.

The NRCS has long held that subsurface drainage is the best management practice. In the 1940s through the 1970s, the USDA

*__Editor's note:__ the video can be seen at: *https://www.dropbox.com/s/yay97i8ampancx7/Ag%20Water%20Management%20101%20.mp4?dl=0*.

had a vigorous cost-share program to encourage farmers to install subsurface drainage. It is estimated that during that time period, more than 50 million acres were artificially drained. These systems are still very effective in managing the water table, and increasing crop production.

The 1985 Federal Farm Bill introduced conservation compliance. A new swampbuster provision was adopted. Any producer in the farm program could no longer drain a wetland. Landowners have continued to install tile, but now for the purpose of managing water and crop production. Any current drainage work requires permits and is highly regulated by several agencies. Tile drainage is often viewed as the culprit for nitrogen and phosphorus in our water. You need look no further than the Des Moines Waterworks lawsuit. But most of these nutrients would move into our water bodies, even if there was no tile.

Currently, there are about 300 million acres of cropland in the U.S. About 100 million of those acres have some type of artificial drainage. But are there new and better ideas we should consider for drainage systems?

The ADMC was started in 2003 to find solutions and practices that improve and maintain agronomic production while producing environmental benefits. Today, we have developed new technology and innovations that allow us to install smart drainage. With these new systems, we can harvest and treat water before it exits the system. A variety of drainage water management practices can dramatically improve the environmental outcomes. These practices help to reduce the risk of farmers losing their crop, improve wildlife habitat, reduce the risk of flooding, and minimize the loss of nutrients. The following practices are smart drainage solutions. All of these innovations allow us to capture and treat water and remove significant amounts of nutrients. They are controlled drainage, saturated buffers, woodchip bioreactors, and sub-irrigation systems. We can also retrofit these practices on many acres of existing tile systems.

The NRCS and the ADMC have a great working relationship. In 2011, a Memorandum of Understanding was signed between the ADMC and the NRCS. This memorandum calls for the ADMC to train and certify technical service providers to help with the implementation of smart drainage technology for water management practices. Many of these practices are eligible for NRCS cost-share money.

In conclusion, the challenge we face is to feed nine billion people while maintaining water quality and economic viability on the farm. We need to implement these innovative conservation practices using smart systems of drainage water management. These practices are proven and cost-effective in enhancing water quality on working lands.

Thank you.

[The prepared statement of Mr. Rodelius follows:]

PREPARED STATEMENT OF KENT RODELIUS, VICE PRESIDENT, AGRICULTURAL DRAINAGE MANAGEMENT COALITION, WILLMAR, MN

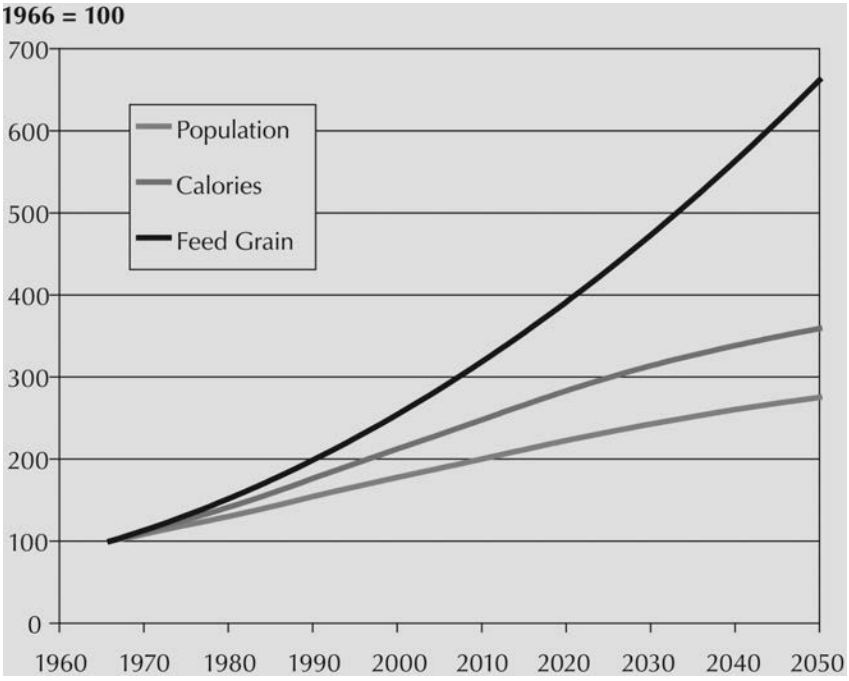
Mr. Chairman, Ranking Member, and Members of the Subcommittee, thank you for the opportunity to testify before you today. I am Kent Rodelius, Vice President

of the Agricultural Drainage Water Management Coalition [1] and am here today representing that group. I am also the Agricultural Sales Manager at Prinsco and Chair of the Associates for the National Land Improvement Contractors of America. The purpose of the ADMC is to promote public and private partnerships committed to improving water quality, wildlife habitat, and agronomicsthrough water management, research and education.

I have personally worked in the drainage industry traveling the Midwest for the past 30 years.

It is estimated that we will soon have nine billion people in the world to feed. And demand will grow well beyond just population growth.

Three Indicators of World Food Demand



Source: Iowa State, Bruce Babcock.

We have the land resources, technology and seed varieties to feed the world but without managing our water we will not be able to meet this challenge.

The key question of our time is how to address this need while maintaining a productive environment. Can we manage the tension this creates, such as hypoxia zones and harmful algal blooms that are occurring in areas like the Gulf of Mexico, Western Lake Erie Basin, Chesapeake Bay and other, with challenges like that exemplified by the Des Moines Water Works Clean Water Act lawsuit and other environmental questions.

Managing Agricultural Drainage Systems

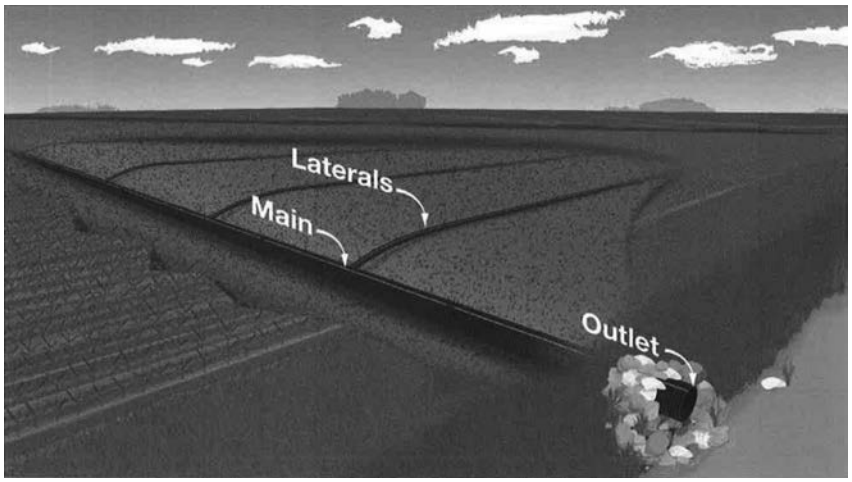
Today I would like to share with you some history and information on the current status of water table management in the U.S.

It is critical that we all have a basic understanding of water table management or sub-surface drainage systems.

Agricultural drainage systems are designed to manage the water table below the ground surface. Commonly plastic pipe (generally called tile) is installed beneath the surface of agricultural lands to collect water. Those lines then run into a main that

[1] The ADMC is a collaboration of agricultural producers, agricultural industry corporations, conservation groups and others to advance water quality and agricultural productivity. *http://admcoalition.com/*.

conveys the water out of the field. These mains eventually have and outlet; usually a ditch.



The Egyptians and Romans are credited with some of the earliest drainage. Later on, the Northern Europeans developed extensive systems for drainage, and, as Northern Europeans immigrated to the Unites States they brought the practice of tiling with them.

One of most significant development in drainage came as a result of the great Dust Bowl that occurred during the 1920's and 1930's. As a result of the vast amount of soil erosion caused by

From the 1940's through the 1970's, USDA had a program called the Agricultural Conservation Program (ACP). It was administered by the Agricultural Stabilization and Conservation Service (now the Farm Service Agency) with technical assistance provided by the Soil Conservation Service (now the Natural Resources Conservation Service). During this time period USDA promoted drainage of farm land as a best practice to conserve soil and improve farm viability.

This program provided cost-share that helped farmers pay the cost of wetland drainage. It was estimated that during this time period there were over 57 million acres drained. Much of this happened in the Midwest and great tracts of land came into production.

So the question can be asked why all this drainage?

The simple answer is economics and crop production.

Here is a brief list of why people drain or manage the water table on their land:

1. Increase yields—15 to 20% increases;
2. Reduce soil erosion—keeps topsoil on the land;
3. Reduce phosphorous loss;
4. Store water in the soil profile—soil acts like a sponge—reduces flooding;
5. Allow timely planting and harvest; and
6. Reduce salinity (salt levels) of soils.

However, the landscape changed dramatically with the implementation of the 1985 Farm Bill. This introduced the "Swampbuster" provision and Conservation Compliance.

The new Swampbuster provision effectively ended Federal incentives to drain wetlands and made USDA program benefits contingent on farmers **Not** draining or manipulating wetlands.

It is important to understand that today new drainage on farmland in the U.S. has virtually stopped and farmers know to ask NRCS for a wetland determination to make sure they don't inadvertently run afoul of Swampbuster.

With drainage water management, we are not talking about draining wetlands but rather **Managing** the water on land that is already drained and upon which it is appropriate to install modern drainage.

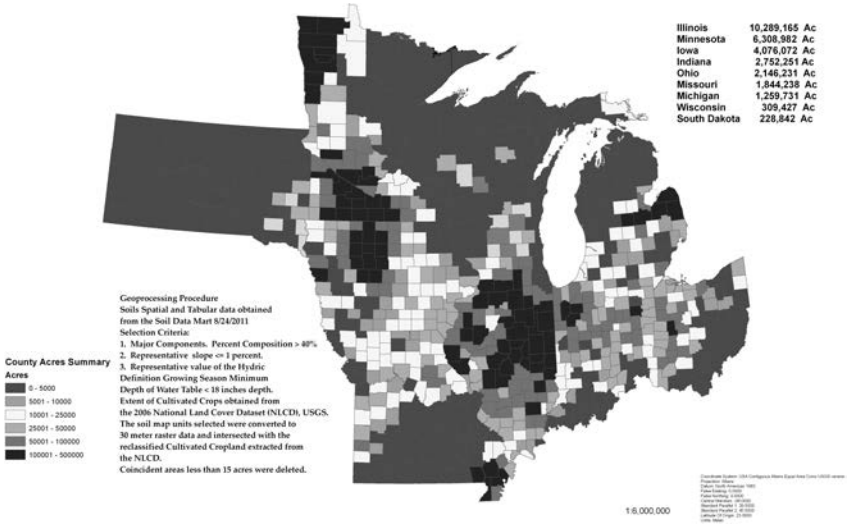
[*The Extent of Farm Drainage in the United States, Figure 6.* Percent of STATSGO map unit drained.]

The graphic above shows the percentage of drained land in the U.S. and some groups are challenging farming practices and seeking solutions to water quality issues. Farm groups are looking for answers as well.

And finding answers is the reason the ADMC was formed in 2003. Our goal is to find solutions and practices that help maintain and improve agronomic production while at the same time providing environmental benefits.

Of the 300 million acres of row crop lands in the continental U.S., approximately 100 million acres has tile drainage. As the chart below illustrates, in just nine states in the Upper Midwest, the NRCS estimates that approximately 30 million acres would benefit from DWM with existing technology today.

Cropland Suitable Drainage Water Management



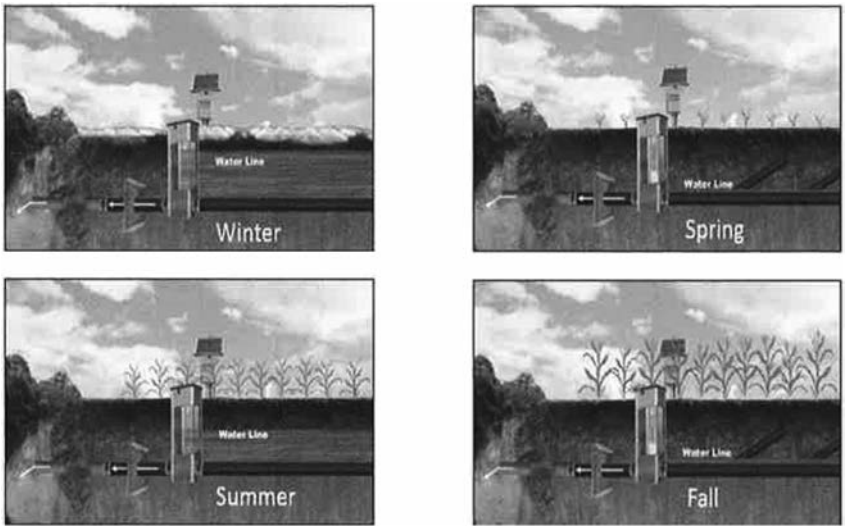
[February 1, 2012. Central National Technology Support Center. Fort Worth, TX Map 2012–42.]

Managing drainage systems encompasses a set of conservation practices that can be implemented on a large scale that will produce equally large scale beneficial re-

sults such as improvements in water quality, flood reduction, wildlife habitat, and, for many practices, increases in farm economic viability and energy efficiency.

Highlights of projects the ADMC has been working on:

In 2006 we received a large Conservation Innovation Grant (CIG) from NRCS to demonstrate and assess the benefits of Drainage Water Management. This practice holds water back in the soil profile with a control structure on the outlet. The graphics below illustrates how water can be managed year round to maximize both crop production and environmental benefits.

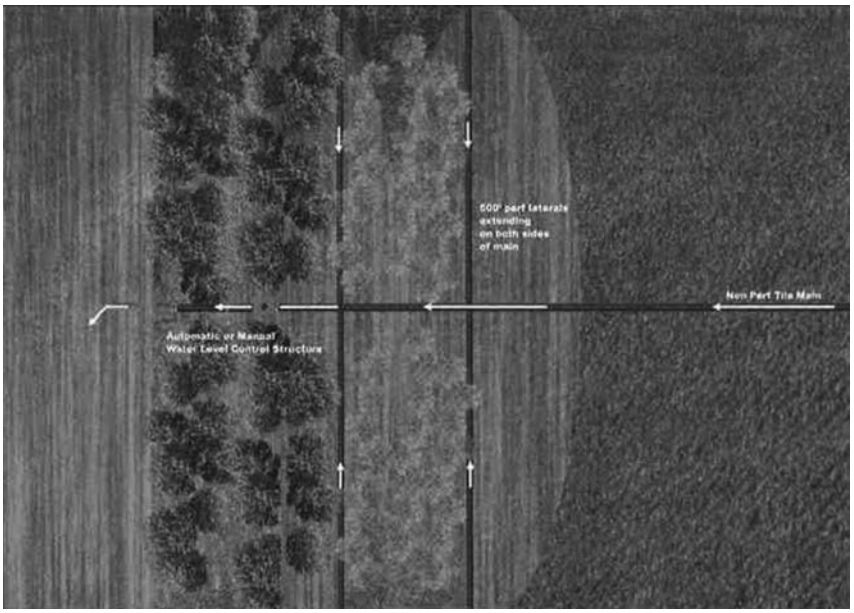


We have been able to significantly reduce the nitrates in the water coming off these fields. Often we see a reduction of nitrates of 45% or more.

We received another CIG grant in 2011 to demonstrate and quantify the benefits of saturated buffers to denitrify water in buffers along ditches and stream banks. As the Committee knows, across much of America we have built thousands of miles of buffers around agricultural fields to improve environmental outcomes. But typically only surface runoff runs through the buffer, most of the water circumvents the buffer by running through tile lines.

Saturated buffers, a new practice developed by the Agricultural Research Service, directs water into the buffer where habitat is enhanced and water quality vastly improved.[2] Saturated buffers will not work everywhere but they are one of the most cost effective tools available for improving water quality. I note, however, there is no on-farm benefit, so incentives will have to come from off the farm to support widespread adoption of this practice. NRCS is currently developing a conservation practice standard for financial assistance. Additional incentives could come from payments for ecosystem services and other market mechanisms. The graphic below provides an overview of how a saturated buffer functions.

[2] Data generated from this project indicates that properly designed saturated buffers can reduce nitrate concentrations in discharge waters below the limits of detection with modern analytical techniques! That is amazing performance at low cost. The cost of installing a saturated buffer is simply to install a control structure and seep lines to distribute water into the buffer. These findings are fully reported in "Demonstrate and Evaluate Saturated Buffers at Field Scale to Reduce Nitrates and Phosphorus from Subsurface Field Drainage Systems" December 15, 2015.



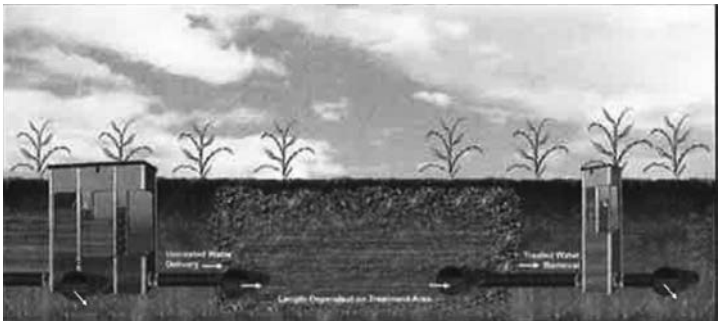
In 2011 the ADMC signed a Memorandum of Understanding with the NRCS to train and certify Technical Service Providers to help with implementation of approved practice.

In addition, we are studying and implementing practices such as Bio Reactors and sub-irrigation.

Bioreactors provide the habitat for bacteria that can "digest" nitrates and strip them out of the water. They perform much like wetlands in this regard. They have the advantage of not taking land out of production.

An operator can farm right over top of a bio reactor. Again the environmental return on investment is high,[3] but, again, there are no on-farm benefits so outside incentives are required if this practice is to be widely adopted.

Schematic of Bioreactor

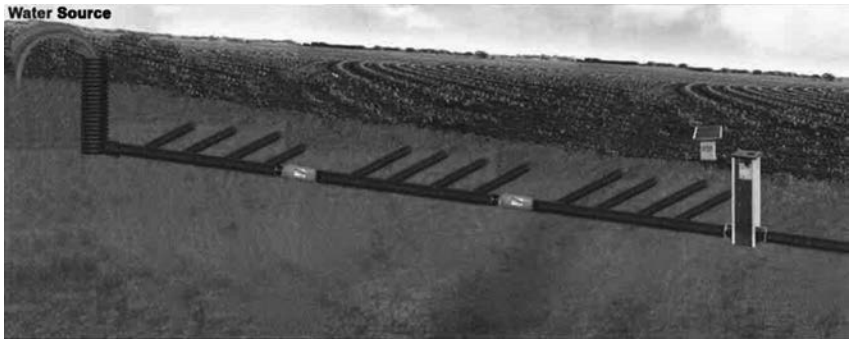


Sub-irrigation uses the same tile lines that take water out of the fields in times of excess and provide back into the growing zone during times of drought. With minor modification in the design and installation, the same system can move water out of or into the field. This eliminates the need for two systems to provide irrigation or drainage—a substantial capital saving. But the savings go well beyond that. Sub-irrigation uses less than ½ the amount of water of conventional irrigation. In addition, Sub-irrigation allows the capture of tail water and enables the reuse of

[3] *http://web.extension.illinois.edu/bioreactors/design.cfm*.

that water (and any nutrients it may contain) to support crop production. Reusing the water further strips nutrients that previously were lost from the system; improving both water quality and crop production at a substantial savings to the producer.[4]

Sub-Irrigation



The NRCS has been an amazing partner on these projects. Currently they are writing practice standards so much of this research can be adapted. We are grateful for our relationship with the NRCS.

I would briefly like to comment on a couple of additional key benefits of managing these systems: flood reduction and risk reduction.

To foster flood reduction, we can manage tile lines to hold water and thereby store water in the soil profile. Not only can we close one valve to hold water in one field, but we can link these systems together. We can operate them remotely—and they can be operated as single systems or as a group. In fact, we can link not only fields, but whole farms and even a watershed to hold water in the soil. For example, a large low pressure is moving across the Midwest and threatens flooding—say in the Red River—we can actually hold water in the soil profile on hundreds—even thousands of acres. The water held in the soil would decrease any flooding and it can be done tomorrow; we don't have to wait decades for permits.

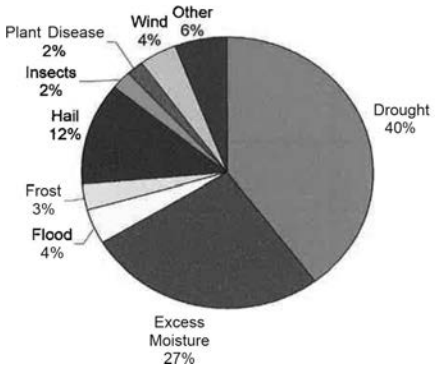
But holding the water back in the field could cause crop damage and farmers would need to be compensated for any losses—perhaps through a downstream flood reduction fund. But it is unquestionably less expensive to hold the water in a field than to pump out a town and pay for restoration, or to build a large impoundment area that takes land out of production and away from agricultural producers and requires ongoing public management expense. With this approach, a farmer has a new "commodity" to sell and a new market.

Finally, I call the Committee's attention to reducing risk associated with agricultural production. We are already embroiled in a conversation about the crop insurance system. But let me point out a bright light where there will not be controversy—and where there is need for action. A very substantial portion of crop loss is caused by either too much water or not enough. We can take huge bites out of these risk variables through practices such as managing tile lines and sub irrigation.

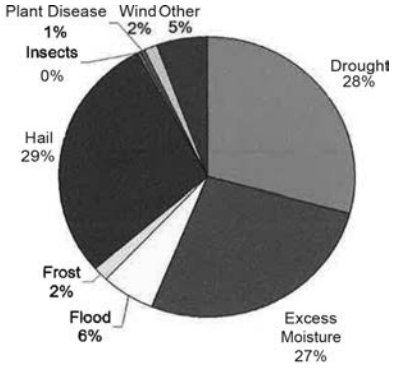
[4] *Economics of Controlled Drainage and Sub-irrigation in Selected Missouri Soils,* M. Nussbaum, J. Hester, J. Henggeler, ASABE Online Technical Library, June 10, 2013.

Reducing Risk

Corn Loss Iowa Post WWII



Soybean Loss Iowa Post 1950



Charts courtesy of Chad Hart, *Managing Risk in Agriculture,* Iowa State University, June 2013.

As you can see from these charts, over ⅔ of corn loss has come from too much or too little water. Likewise these variables have accounted for over ½ of soybean loss in the past sixty years in Iowa. We can foster boarder adoption of these beneficial practices, and reduce the burden on taxpayers and costs to producers if we adjust the premiums to farmers who adopt and use these practices.

As I stated earlier—we must manage the tension to feed the growing world population and also provide water quality solutions.

In these uncertain times when farm prices are unstable and manufacturing and skilled jobs are at risk, this again is an opportunity. This is American technology, developed and made right here in the USA. Expanded utilization of these practices will not only improve agricultural profitability and the environment but create thousands of good paying jobs that stay at home. Our export position will be strengthened and recovery in the Heartland expanded.

Just a few reminders in closing:

1. The world's population continues to grow and must be fed.
2. Managing water is an essential factor in all crop production.
3. We have the luxury of excess water on much of our cropland.
4. Water quality matters to everyone.
5. The suite of practices know as Drainage Water Management are some of the most cost efficient and effective ways to improve water quality and many of them contribute to other goals like expanded production, wildlife habitat and flood reduction.
6. Water Table Management is still the "Best Management Practice"

Thank you for your kind attention.

ATTACHMENT 1

LAND AND WATER

Vol. 59, No. 6, November/December 2015

Drainage Solutions

Innovations in Water Management To Improve Crop Productivity and Water Quality

Several key innovations are coming on line to dramatically improve both agricultural productivity and water quality by management of water flowing through tile lines. The first of these is Drainage Water Management where water is held in the field during the dry periods of the growing season and during fallow periods to improve productivity, and water quality. The second is Sub-Irrigation, which uses the same subsurface tile lines used for drainage to irrigate crops. These two systems

can dramatically improve farm economic viability and cost-effectively reduce nutrient loss to waterways.

With the exceptional growth in demand for agricultural production to meet growing populations, higher expectations on diet, and provide fiber and fuel for the 21st Century we will see a massive intensification of agricultural lands. To achieve these objectives of protecting environmental quality and raising agricultural productivity we have to revolutionize our agricultural production systems. We simply have to be more efficient in our use of land and water.

Drainage Water Management Overview

Of the 300 million acres of row crops in the Continental U.S., approximately 100 million acres have artificial drainage. This is not drainage of wetlands, but systems to reduce the amount of water in the field, particularly during early season for planting and initial plant growth, and harvest. Drainage removes water that could impede germination and allows the soil to warm earlier, improves field trafficability during wet periods and significantly increases yield. While there may be some environmental benefits like reduced rill erosion and resulting soil and phosphorous loss, these systems can foster increased loss of nitrogen from fields and reduce the water holding capacity of a watershed.

The Natural Resources Conservation Service (NRCS) has identified that with existing technology, over 30 million acres in ten Midwestern states alone would benefit from Drainage Water Management. (DWM) DWM has been shown to be one of the most cost effective techniques to reduce nutrient loss from agricultural lands.[1] This practice also has the advantage of increasing yields, particularly in drought years.

DWM refers to controlling the flow of water discharged from tile lines to improve environmental performance and agricultural production. Without controls, tile lines drain water and associated materials from fields around the clock year round. However, drainage typically is only needed during part of the year, and closing off drainage during most of the year will significantly reduce nutrient loss and improve yields.

Automated instrumented DWM site—note how little land is taken out of production.

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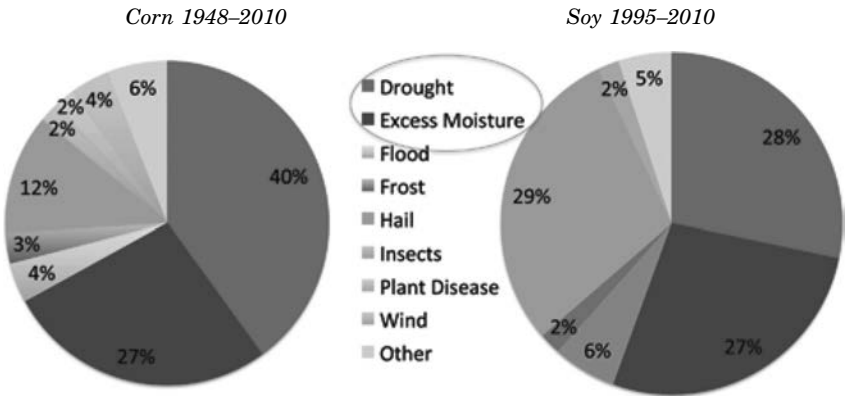
[1] Kieser, *et al.,* noted just the environmental benefits (not including agronomic benefits) to be substantial. "Assuming a 30 percent nitrogen load reduction, the costs for a retrofit would be $0.66/lb to $0.93/lb and the costs for a new installation would be $2.86/lb to $4.17/lb.* (*xii*) Jaynes, *et al.* (*xiii*) estimated at of $1.23/lb when the costs were applied over a 20 year lifetime at a 4% interest rate, and found this price to be cost-competitive with other nitrogen removal practices. For example, constructed wetlands cost $1.48/lb, fall cover crops cost $5.02/lb, and bioreactors cost $1.08/lb to $6.88/lb. (*xiv*) Advances in technology are likely to reduce the cost of DWM implementation."

* **Editor's note:** the references [(*xii–xiv*) reformatted to be footnotes 12–14] refer to the endnotes in the following attachment, *Drainage Water Management Implementation Costs.*

The golden rule of drainage management is "Drain only what is necessary to ensure trafficability and crop production—and not a drop more." That means during the fallow season, tile lines should be shut off. This allows water to stay in the field, nitrogen uptake to occur by any cover crop or residual in the field and denitrification to occur by bacteria in the soil. In addition, after the crop has become established, it is prudent to reduce water (and nutrient loss) by selectively managing tile outflow to hold water in the field just below the root zone of the crop. This increases agricultural productivity and reduces nutrient loss.

By managing tile lines typical nutrient loss can be reduced by about ½. Less nutrient application is required as the nutrients are held in the field instead of lost through water drainage. Production is increased, particularly during dry years when crops are stressed by lack of water and nutrient availability. It's a "win win" for both the producer and the environment. Input cost can be reduced, yield increased and water quality protected. Secondary ecosystem service benefits like flood reduction, wildlife habitat improvements and greenhouse gas emission reductions can also be achieved.

Causes of Crop Loss



Charts courtesy of Chad Hart, *Managing Risk in Agriculture,* Iowa State University, June 2013.

DWM does not require land to be taken out of production. An automated system can be monitored and managed remotely. The capital investment to install DWM has a life cycle of 50 to 100 years making it one of the best production and environmental management investments available. Design and installation of controlled drainage is eligible for financial assistance from the NRCS. This practice can be implemented on over 30 million acres with existing technology—as identified by NRCS.

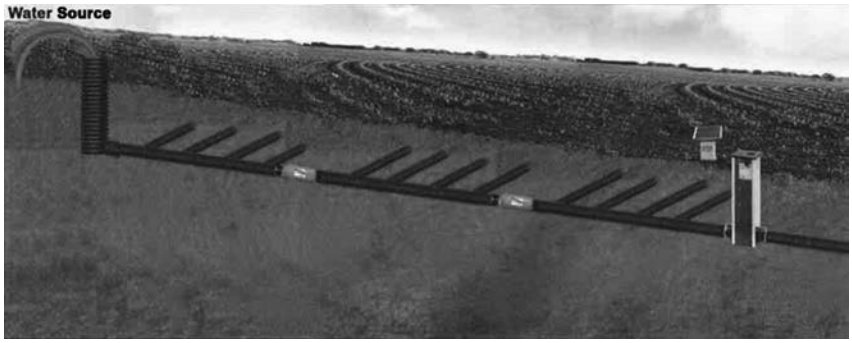
Sub-Irrigation

A new emerging practice is to use the same tile lines to also provide irrigation. The same infrastructure that removes water during times of excess can be used to put water into fields during periods of drought. Sub-Irrigation requires only modest changes from DWM: (1) a slightly upgraded tile system that allows for more close management of flow, and (2) a pump to raise water to the highest point in the filed where it can be introduced into the tile system.

Sub-Irrigation has several advantages over conventional irrigation. First, it uses about ½ the water. There is no evaporation as the water is sprayed on the crop because water is put proximate to the root zone where it is needed instead of on the surface. Second, Sub-Irrigation uses less than ½ the energy. Less water is moved to meet plant requirements so less water is pumped. In addition, the only energy required is to deliver water to the highest point in the field for introduction into the tile system. With Sub-Irrigation gravity rather than an "energized" system distributes water through the field. Control structures within the field (*i.e.,* float operated valves that require no separate management or energy inputs) provide for even water distribution. Third, the same infrastructure system that removes excess water is used to provide irrigation removing the need for two water management systems.

Sub-Irrigation can be economically implemented with existing technology on up to 6 million acres today. If water drained from fields during wet periods can be stored

on site, the economics and environmental outcomes of this practice can be further improved. Nutrient rich drainage waters can be treated in wetlands or ponds and can be reused for irrigation.



Schematic of sub-irrigation distribution of water into cropped field. Graphic courtesy of AgriDrain.

On-Farm Benefits

In addition to reducing environmental impact, these practices have significant economic benefit for producers. DWM and Sub-Irrigation can contribute to substantial yield increases. They can reduce input costs from savings in nutrient, energy and water. These practices can also take a huge bight out of the risks farmers face every time they plant a crop.

By utilizing these water management systems, tremendous risk can be taken out of crop production. For example, 65% of corn loss in Iowa since the Second World War has been from either not enough water or so much that the crop is flooded out. 55% of crop loss since 1950 for soybeans is from the same causes.

Another on-farm benefit is to deliver enhanced ecosystem services. Ecosystem services are the goods and services provided by nature like clean water, abundant wildlife and other valuable "products" that make life possible or increase our enjoyment of it. There is growing acceptance that people are willing to pay for these services and some markets are emerging. Hunters are commonly willing to pay for the right to hunt on a farm and greenhouse gas markets are operating around the world. There are many ecosystem services delivered by DWM and Sub-Irrigation like flood reduction, water quality, greenhouse gas reduction and wildlife habitat improvements that are highly quantifiable and readily can enter into ecosystem service markets. As markets develop and are more broadly operated, ecosystem service products may offer a new class of assets that farmers can produce and derive income from.

Conclusion

There are significant on farm benefits from installing DWM and Sub-Irrigation including but not limited to increased agronomic production, reduced input costs and reduced risk. There are also significant off site benefits including reducing nutrient loss to waterways, reduced flooding and other ecosystem services. If ecosystem service markets develop it may be possible to for commerce in those activities to add to the economic viability of farm operations. Likewise, early voluntary action that reduces environmental impact can help reduce pressure for regulation and reflect positively on agricultural producers. **L&W**

By Dave White & Alex Echols

DAVE WHITE, *President,* Ecosystem Services Exchange

Dave was Chief of the Natural Resources Conservation Service from January 2009 to December 2012, where he led, directed, and managed the nation's largest private lands natural resource conservation organization. In addition to his work with NRCS, White was detailed to Iowa Senator Tom Harkin's office in Washington, D.C., where he helped craft the conservation title of the 2008 Farm Bill and to Indiana Senator Richard Lugar and helped develop the conservation title of the 2002 Farm Bill.

ALEX ECHOLS, *Executive Vice President,* Ecosystem Services Exchange

Alex started his career working for the Senate for 12 years, writing key conservation programs like the Conservation Title of the farm bill and an extensive rewrite of bilateral and multilateral foreign aid programs. He spent 6 years at the National Fish and Wildlife Foundation as Deputy and then Acting Executive Director. In 2001, he set up a consulting firm to help industry, landowners, the conservation community and government deliver more conservation for dollars invested.

ATTACHMENT 2

Drainage Water Management Implementation Costs

Abstract

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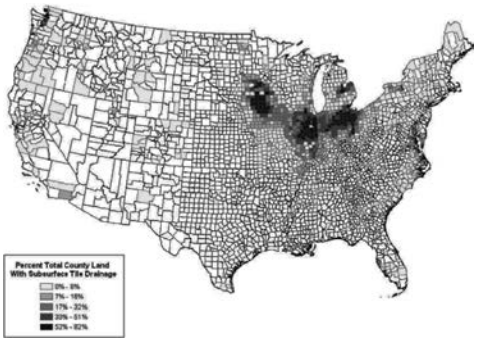
Build-up of the current agricultural drainage network began during the 1870s as part of a national land reclamation policy. Since then, drainage has been both criticized and praised. Overall, agricultural drainage enabled previously marginal land to become highly productive and profitable farmland.[1] However, intense drainage also contributed to negative environmental impacts, including substantial losses of wetlands and wildlife habitat.[2]

Subsurface drainage lines act as conduits of nitrate—the mobile form of nitrogen—to surface waters. Under natural conditions, nitrate-laden water passes through the soil profile and is removed, at least partially, through denitrification. In fields with subsurface drainage, tile lines intercept the water before denitrification can occur. As a result, subsurface drainage effluent contributes to excess nitrate loading to surface waters, which can lead to water quality impairments.[3] *Figure 1* illustrates the estimated extent of subsurface drainage.[4]

Figure 1. Subsurface Tile Drainage



Sources: 1992 National Resources Inventory and World Resources Institute.

Extent and location of subsurface drainage, as estimated by Sugg, 2007.[4]

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[1] Strock, J.S., P.J.A. Kleinman, K.W. King, J.A. Delgado (2010) *Drainage water management for water quality protection.* JOURNAL OF SOIL AND WATER CONSERVATION 65(6): 131A–136A; and USDA. Pavelis, G.A., Ed. (1987) *Farm Drainage in the United States: History, Status, and Prospects.* USDA–ERS Miscellaneous Publication Number 1455. Washington, D.C.

[2] USDA, 1987.

[3] Dinnes, D.L., D.L. Karlen, D.B. Jaynes, T.C. Kaspar, J.L. Hatfield (2002) *Review and Interpretation: Nitrogen Management Strategies to Reduce Nitrate Leaching in Tile-Drained Midwestern Soils.* Publications from USDA–ARS/UNL Faculty. Paper 263. Accessed January 31, 2012 at *http://digitialcommons.unl.edu/usdaarsfacpub/263*; Mitsch, W.J., J.W. Day, J.W. Gilliam, P.M. Groffman, D.L. Hey, G.W. Randall, N. Wang (2001) *Reducing nitrogen loading to the Gulf of Mexico from the Mississippi River Basin: Strategies to counter a persistent ecological problem.* BIOSCIENCE, 51(5): 373–388; and Randall, G.W., D.J. Mulla (2001) *Nitrate nitrogen in surface waters as influenced by climatic conditions and agricultural practices.* JOURNAL OF ENVIRONMENTAL QUALITY, 30: 337–344.

[4] Sugg, Z. (2007) *Assessing U.S. Farm Drainage: Can GIS Lead to Better Estimates of Subsurface Drainage Extent?* World Resources Institute, Washington, D.C. Accessed January 20, 2012 at *http://pdf.wri.org/assessing_farm_drainage.pdf.*

Nitrate export through tile lines can be reduced by implementing drainage water management (DWM). One such practice involves installing a device that controls the volume of water leaving a field. These controlled drainage devices can be adjusted based on the season and drainage needs. The control device can adjusted such that water tables drop prior to planting to allow the fields to become sufficiently dry for equipment access. Subject to producer desires and time constraints, the device can be used to adjust water levels throughout the growing season. Then after harvest, the water level is raised to minimize drainage during the non-cropping season.

DWM reduces nitrate export by reducing the drainage volume from tile drain outlets as opposed to reducing the concentration of nitrate in the effluent. Most of the nitrate reductions from DWM systems occur when drain flow is reduced during the non-cropping season. In humid temperate regions, approximately 88 to 95 percent of nitrate loss through conventional tile drainage occurs during the fallow period.[5] DWM systems allow the producer to raise the drainage outlet and bring the water table near the surface, thus reducing flow volume and nitrate losses during the non-cropping season.

DWM implementation has been shown to substantially reduce nitrate losses from farm fields, thereby contributing to water quality improvements. Jaynes, *et al.,*[6] estimated DWM could be implemented on 11.9 million acres of cornland in the Midwest. Of these lands, 7.2 million acres were located in the Upper Mississippi and Tennessee/Ohio watersheds, which drain to the Gulf of Mexico. Within these watersheds, DWM could reduce nitrate-N loading to the Gulf by 114.4 million pounds.[7] This amounts to a reduction of 15.97 lb/acre. From 2001–2005, an average of 1.8 billion pounds of nitrate-N per year were transported to the Gulf.[8] Based on this loading estimate and the DWM reduction estimate of 114.4 million pounds from Jaynes, *et al.,* implementing DWM on all suitable lands in the Upper Mississippi and Tennessee/Ohio watersheds could reduce overall nitrate loading to the Gulf by 6.4%.

Costs of implementing DWM vary based on site characteristics, drainage system design, and the type of control structure installed. One study estimated costs could range from $65/acre for a new installation on a 6″ main to $88/acre for a retrofit on a 12″ main.[9] Annualizing these costs based on a 15 year lifetime and a 19.8 acre treatment area, estimated costs ranged from $6.73/year on a 6″ main and $9.08/year on a 12″ main.[10] Cooke, *et al.,*[11] estimated $20–$40/acre for a retrofit installation and $89/acre for a new system in complex topography. Assuming a 30 percent nitrogen load reduction, the costs for a retrofit would be $0.66/lb to $0.93/lb and the costs for a new installation would be $2.86/lb to $4.17/lb.[12] Jaynes, *et al.,*[13] estimated a cost of $1.23/lb when the costs were applied over a 20 year lifetime at a 4% interest rate, and found this price to be cost-competitive with other nitrogen removal practices. For example, constructed wetlands cost $1.48/lb, fall cover crops cost $5.02/lb, and bioreactors cost $1.08/lb to $6.88/lb.[14] Advances in technology are likely to reduce the cost of DWM implementation.

A simple analysis was conducted to estimate the cost of DWM under various scenarios and assumptions. Whereas the estimated cost of $1.23/lb from Jaynes, *et al.,*[15] was for a 20 year period, the analysis conducted here uses similar assumptions

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[5] Drury, C.F., C.S. Tan, W.D. Reynolds, T.W. Welacky, T.O. Oloya, J.D. Gaynor (2009) *Managing Tile Drainage, Subirrigation, and Nitrogen Fertilization to Enhance Crop Yields and Reduce Nitrate Loss.* J. ENVIRON. QUAL. 38: 1193–1204.

[6] Jaynes, D.B., K.R. Thorp, D.E. James (2010) *Potential Water Quality Impact of Drainage Water Management in the Midwest USA.* PROCEEDINGS OF THE 9TH INTERNATIONAL DRAINAGE SYMPOSIUM HELD JOINTLY WITH CIGR AND CSBE/SCGAB, June 13–16, 2010, Quebec City, Canada.

[7] Jaynes, *et al.,* 2010.

[8] EPA (2007) *Hypoxia in the Northern Gulf of Mexico: An Update by the EPA Science Advisory Board.* EPA–SAB–08–003, USEPA, Washington, D.C.

[9] Agricultural Drainage Management Coalition [ADMC] (2011) *Drainage Water Management for Midwestern Row Crop Agriculture.* Conservation Innovation Grant 68–3A75–6–116 Report.

[10] ADMC, 2011.

[11] Cooke, R.A., G.R. Sands, and L.C. Brown (2005) *Drainage water management: A practice for reducing nitrate loads from subsurface drainage systems.* pp. 27–34. PROCEEDINGS OF THE GULF HYPOXIA AND LOCAL WATER QUALITY CONCERNS WORKSHOP. Sept. 26–28, 2005, Ames, Iowa. *http://water.epa.gov/type/watersheds/named/msbasin/upload/2006_8_24_msbasin_symposia_ia_session2.pdf.*

[12] Cooke, *et al.,* 2005.

[13] Jaynes, D.B., K.R. Thorp, D.E. James (2010) *Potential Water Quality Impact of Drainage Water Management in the Midwest USA.* PROCEEDINGS OF THE 9TH INTERNATIONAL DRAINAGE SYMPOSIUM HELD JOINTLY WITH CIGR AND CSBE/SCGAB, June 13–16, 2010, Quebec City, Canada.

[14] Jaynes, *et al.,* 2010.

[15] Jaynes, *et al.,* 2010.

but only considers upfront capital costs for a 1 year period. Jaynes, *et al.,* determined that 7.2 million acres of cornland in the Upper Mississippi and Tennessee/Ohio watersheds were suitable for DWM. Within these areas, 20 percent of DWM implementation would be retrofits and 80 percent would be new installations.[16] A retrofit was assumed to drain 11.86 acres while a new installation would drain 19.77 acres. Both the new and retrofit practices had a unit cost of $1,100, and new installations included an additional cost of $32.53/acre.[17] Applying these assumptions, a basic analysis indicated the total cost of implementing DWM on 7.2 million acres of suitable cornland in the Upper Mississippi and Tennessee/Ohio watersheds would be $638 million ($89/acre). The cost of retrofit installations would be $133 million ($93/acre) and the cost of new installations would be $505 million ($88/acre). The unit costs of nitrate-N reductions achieved by implementing DWM on all suitable cornland in the Upper Mississippi and Tennessee Ohio watersheds would be $5.81/lb for retrofits and $5.52/lb for new installations, with a weighted average of $5.58/lb. These are based only on initial capital costs and 1 year of nitrate-N reductions. The unit costs for a 5, 10, and 20 year project lifetime are estimated to be $1.24/pound, $0.67/pound, and $0.37/pound, respectively, using a 4% discount rate and assuming operation and maintenance are 2.5% of the capital costs.

Drainage water management (DWM) can be an effective strategy for reducing nitrate losses from farm fields. DWM structures allow the producer to control the water level in the soil. When the level is raised during the fallow period, substantial reductions of nitrate loading to surface water can be achieved. The costs of DWM can be competitive with other management strategies.

- ***7.2 million acres*** *of Midwest cornland is suitable for DWM in the Upper Mississippi and Tennessee/Ohio watersheds.*
- ***1.43 million acres*** *of this cornland* ***(20%)*** *could be served by retrofits and* ***5.73 million acres (80%)*** *by new installations.*
- ***114.4 million pounds*** *nitrate-N could be reduced if DWM was implemented on all 7.2 million acres.*
- *DWM could reduce nitrate losses by* ***nearly 16 pounds/acre.***
- *Total costs of implementing DWM on all 7.2 million acres would be* ***$638 million ($133 million for retrofits and $505 million for new installations).***
- *Retrofit costs are estimated to be* ***$93/acre,*** *and new installations are* ***$88/acre,*** *with a regional* ***weighted average of $89/acre.***
- **First year nitrate-N reductions from DWM using only capital costs are estimated to be *$5.58/pound (weighted average); $5.81/pound (retrofits), and $5.52/pound (new installations).***
- Nitrate-N reduction costs for a 5, 10, and 20 year project lifetime are estimated to be $1.24, $0.67, and $0.37/pound, respectively.

(These numbers are derived from Jaynes, D.B., K.R. Thorp, D.E. James (2010) *Potential Water Quality Impact of Drainage Water Management in the Midwest USA.* PROCEEDINGS OF THE 9TH INTERNATIONAL DRAINAGE SYMPOSIUM HELD JOINTLY WITH CIGR AND CSBE/SCGAB, June 13–16, 2010, Quebec City, Canada.)

DWM implementation costs potentially could be offset by a yield increase or covered through a water quality trading (WQT) program. Any potential yield increase would depend on the specific application of controlled management. A yield increase of 1.68 bushels/acre for a 6″ main and 2.27 bushels/acre for a 12″ main would offset the control structure expense, assuming $4/bushel corn.[18] A WQT program could provide producers with a method of payment for implementing DWM. With the adoption of nutrient criteria, some municipal wastewater treatment plants (WWTPs) will be required to reduce nitrogen discharges. These plants could meet their regulatory compliance goals by purchasing nitrogen reduction credits from producers implementing DWM. In many cases, nitrate reductions achieved through DWM would be highly cost-effective compared to achieving reductions through WWTP upgrades.

ATTACHMENT 3

Managing Agricultural Drainage Flood Mitigation and Associated Ecosystem Benefits

ANDREW MANALE, M.S., M.P.P.

[16] Personal correspondence (2012) with D.E. Jaynes confirmed that new and retrofit installations were assumed to have equivalent reduction efficiencies.

[17] It was not specified by Jaynes, *et al.,* (2010) as to how they derived these annualized costs for nitrate reductions associated with DWM. As such, some of the numbers included here differ from those reported by Jaynes, *et al.,* (2010). The cost analysis could be adjusted to include data that might better represent the current status of DWM technologies.

[18] ADMC, 2011.

What It Is and Why You Should Care

Agricultural drainage water management (DWM) entails managing the flow of subsurface water on agricultural land. By reducing the volume of water that drains from land, temporarily storing runoff, and slowing or altering the timing of the flow of runoff, DWM mitigates the risk of downstream flooding. Retaining or retarding subsurface-flow water in soils at critical times of the year when soils rebuild also reduces the movement and discharge of nutrients that otherwise would pollute rivers and streams.

Conversion of wetland or poorly drained soils to agricultural use or enhancement of the agricultural productivity of marginal, heavy "wet" soils has generally involved installing subsurface tile drainage lines. These lines, as they have conventionally been constructed, lower the water table and drain water quickly from the fields to local ditches, streams and rivers, reducing the waterlogging of soils. Depending upon the porosity of the soil and the level of the watertable, they can also reduce the volume of surface runoff. By directing and retarding water flow through soils, they can change the timing of peak water flows. Depending upon the nature of storm events, the contour of the land, and the characteristics of the watershed, such changes in the timing and volume of water flows can reduce or contribute to downstream flood impacts.

To farmers the advantage of subsurface drainage has been earlier cropping, reduced risk of root damage, and greater crop yield. Improving the productivity of the land for agricultural use comes at a societal cost when uncontrolled drainage inadvertently contributes to downstream water flows and leads to on-farm loss of nutrients, such as nitrates and phosphorus, that degrade downstream water quality. By regulating water flows through control of the timing and volume of its release and thereby retaining water from extreme events on the land, DWM contributes to public safety from flooding and protects water quality.

Studies in the Red River Basin and elsewhere find that tile drainage can both mitigate or contribute to the severity of flooding. Whether or not tile drainage is a boon or a cost depends upon the ability to manage the drains. Regardless of whether or not tile drainage contribute marginally to downstream flow and flooding, DWM can, by allowing for controlled reduction or management of flow, provide a means for significantly reducing downstream water volume and increased water levels associated with flooding. Modeling and actual field trials suggest that properly time in-field retention of stormwater can reduce peak flows. In conjunction with surface berms and outlet gates such as ditch risers, tile drainage controls enhance the amount of water that can be stored per acre, in some circumstances up to 3 acre-feet (Manale, JSWCS 2000, 2006). Through the inclusion of structures, such as roads and culverts, in an overall system of water management, DWM can hold multiple acre-feet of floodwater for timed release of runoff when it is less likely to contribute to high flood stages.

Drain Water Management techniques can mimic natural systems, such as wetlands, for slowing the flow and storing of water. Just as a wetland provides a suite of ecosystem services, DWM, by allowing for management of soil functions in agricultural systems to build soil, enhances the delivery of their environmental benefits, such as carbon and nitrogen sequestration, and ground water infiltration. Over longer periods of time more water is retained in the upland areas of watersheds and less water is available to contribute to rising downstream flood levels.

Farmers themselves benefit from DWM from healthier, more drought resilient soils and retention of more nutrients in the soils. Healthier soils require fewer fertilizer inputs.

Healthy, productive soils and less outlay for fertilizers mean more income for farmers.

Yet, despite the advantages to farmers, market conditions and government policy alter the calculus for installing DWM. High commodity prices encourage farmers to expand production to marginal lands. Federally subsidized crop insurance shields the farmer from the risk of producing on marginal land. And improvements in soil quality, and hence economic return, accrue over many years, whereas the additional cost of DWM is today.

There are a number of policy options to encourage the greater use of DWM. A traditional approach is to subsidize the installation of DWM where new tile drains are being installed or to pay for modification of existing tile drainage systems. Just paying to have the control devices installed does not however guarantee that the devices are maintained and used, particularly when controlled drainage and water retention on the land is most needed in time of flooding or high flood risks. Easements and land purchase can be expensive, such as what has been the policy in New York State to protect the city of New York's water supply. Newer approaches involve advanced options contracting and paying for ecosystem services. In the former, called

options contracts for contingent takings, flood control authorities contract with farmers to manage floodwaters on their land in the likelihood of extreme weather (RFF, 2008). They are insured against loss of revenue should doing so lead to reduced yield or increased costs. In the latter, farmers are paid for storing floodwater on their lands as an ecosystem service. The more water they store, the more they earn.

New Federal policy developments will lead to increased interest in DWM and temporary storage of floodwaters on agricultural lands. Under the Federal Water Resources Development Act of 2007, the White House has issued new requirements, the Principles and Requirements, that lay out broad principles guiding how Federal agencies develop and implement water investments, including the maintenance of existing projects (White House 2013). The new requirements specifically call for nonstructural and watershed approaches that examine how the larger landscape can be managed to achieve public safety and other desired public outcomes. DWM and temporary water retention on agricultural lands are consistent with these new principles for flood mitigation.

[References]

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Manale, A. *Waffles are not just for breakfast anymore.* JOURNAL OF THE SOIL AND WATER CONSERVATION SOCIETY, 2006.

Resources for the Future. *Options Contracts for Contingent Takings. 2008. Benefits to farmers.*

White House, Council on Environmental Quality. *Principles and Requirements for Federal Investments in Water Resources.* March 2013.

The CHAIRMAN. Thank you, sir. Thank you for your testimony. Thanks to all members of the panel for your testimony.

I will take the liberty of the first 5 minutes of questioning.

Ms. Dawson, we were talking about return on investment. I want to say, I have a lot of respect for my predecessors who had the vision to establish the National Fish and Wildlife Foundation. The collaborative efforts have come as a result of that, so thank you for your service. Plus, you have the most fun acronym in Washington, NFWF. What can I say?

My question for you: much of the United States has recently had the worst drought in history. Fortunately, Pennsylvania has not seen as much damage to our agriculture production as folks, certainly, in the West have. What are some of the issues that you have seen in Pennsylvania over the past few years that have impacted conservation and agriculture overall?

Ms. DAWSON. It is true, Pennsylvania is quite blessed with something on the order of 40″ of rain per year, so that is pretty remarkable and a great resource for agriculture in the state. But farmers there are certainly not immune to challenges. Perhaps what we see most significantly is when use changes. That can have a huge dynamic on hydrology and the way agriculture is done in the state, and we want to keep our working lands working, so we are very dedicated to finding ways to get solutions that help keep farmers on the land.

We are also seeing issues with invasive species and new pests in our forestry work. This is a huge challenge that we are working in partnership to try to find solutions to, but continues to be quite a behemoth in conservation. And as we have talked a lot about today, managing soil health is going to have a lot of impact on our ability to manage that water, manage flooding, and also keep nutrients on the land where they can do the most good. We are working to implement solutions with our agriculture partners to be big pro-

ponents of managing for soil health so we can benefit both the farmer and the ecosystem at the same time.

The CHAIRMAN. Thank you.

Mr. Price, some folks have the mindset that if you take cattle off the land, it will be better for wildlife and everything will go back the way it was before we ever showed up. What are you thoughts on that?

Mr. PRICE. I am extremely concerned to—through the antiquities. Of course, much land is being taken out of production, taking livestock off the land. A major design of the system over hundreds of thousands, millions of years, using the animal impact and fire to rejuvenate those lands. Before man came along, we had fire. We had droughts. We had wet spells. We had extreme cold. We had extreme heat, and we had huge herds of buffalo and of other wildlife. Can you imagine 10,000+ historians say 50,000 to 60,000 buffalo in one herd coming across the landscape here in Washington, D.C. before the buildings were here? In modern day terms, it was devastating. There was nothing left. But nature designed her plants, mainly the grass species, to put on fresh tillers when that fire impacts them, when the animals bit them off, laid on them, stomped on them, whatever, and then it rejuvenated itself. You can take land that is totally out of use by wildlife or livestock, and the grasses get old. They get marbling, then they die.

In New Mexico at Las Cruces, at the research center there in the 1930s, they fenced off an area, put no livestock on it. At the time, it was a really good light grama grass cover. Today, that grama grass exists as much in desert as any of the rest of it, due to the lack of animal impact. The animal impact is so important for the future of our western United States, and those brittle environments for certain. And so we must utilize our livestock, properly managed, to rejuvenate these lands. It is the only resource we have, because I don't think we can go back to pre-man conditions. I don't think anybody wants to move back to Europe or Asia or Africa, or wherever they came from, and that is the only way we can reenact those conditions.

The CHAIRMAN. Thank you, Mr. Price. I am going to go ahead and yield back. We will get another round, but let me just say that, I know from the previous Subcommittee hearing that we had on healthy soils and other healthy soils opportunities forums I have been able to sit as a part of, clearly there are some practices that show and document how livestock helps to stimulate soil growth, soil production, and healthy soil. Thank you.

I recognize the gentlelady from New Mexico, for 5 minutes.

Ms. LUJAN GRISHAM. Thank you, Mr. Chairman, and thanks to the panel. We really appreciate your level of expertise and participation in these hearings so that we can better navigate, as a Committee, how we support you and support USDA to make a difference.

Mr. Price, in your testimony you mentioned how helpful NRCS is and that the personnel there are an incredible resource for ranchers. And some of the New Mexico ranchers and the Tribal communities have expressed to me that navigating NRCS programs can be very difficult, especially for small producers, because they don't really have the staff or resources to apply for multiple

programs or loans or grants. I have also heard that some producers may get a grant, so they might be smaller and still manage to get a grant, but because there is no technical assistance components to those grants, it can be very difficult for them to successfully implement their projects without further assistance from USDA. And as a user of those programs, can you talk to me about some ways that we can make conservation programs more user-friendly so that all producers, irrespective of their size, can benefit from the investments that we have worked to make available.

Mr. PRICE. Some of this issue goes back to 1985. The highly growable lands, the NRCS personnel were sent to attend to that and look at it in detail. It took them away from—on us ranchers, I am sorry, to study these issues, to talk to us about them. We didn't have that expertise for land planning, conservation planning. That is where National Grazing Lands Coalition came into effect. It was formed in 1995, which was put in there for our grassroots, boots-on-the-ground program where they could help us understand the issues. I strongly believe that right now, NRCS needs to be able to train those personnel in their offices, the local offices, that can tell us the story, help us understand.

Right now, a lot of people think that EQIP, NRCS is based on getting money from the government. That is a huge part of it, when we are proud to have that opportunity for that, but we have to have education from those NRCS personnel. One of them told me a while back in pretty simplistic terms. He said instead of giving you fish, we want to teach you how to fish. And that is huge.

Ms. LUJAN GRISHAM. I appreciate that. I agree with you that that sort of education and technical assistance needs to be driven back down to the local level and make that available.

In addition to that partnership, what changes or improvements can you recommend to NRCS that better supports the innovation that we have talked about today for these conservation practices? I have put you right on the spot, that will teach you to be part of the panel. We want to solve all of these problems.

Mr. PRICE. I am not known to be real quick on my feet.

Ms. LUJAN GRISHAM. I am sorry. We are delighted to have you here. Your experience makes a difference, and if there are things that come to you, that is very helpful to us. If there are things that you want to bring back to us, but it really is the work that you do that makes a difference in all of our abilities to help every producer engage in a productive way.

Mr. PRICE. And that is one of the things the NRCS people I have worked with in the past, they have always struggled with why don't all of these ranchers just jump on board and take part in it?

Every one of us ranchers has a different lifestyle. We have different goals. I love what I do, and I get excited talking about what I do, but a lot of ranchers, that is not their focus. That is not what they do. How you convince other folks to participate, in particularly, more intensive grazing programs, it is very important on how we move forward with our grassland. So many times we utilize that money and then we don't emphasize grazing management. That needs to be a huge part of it. We need to look at that harder as to how we convince people. We can't take forces on them, but if the Federal Government is allowing us to utilize their dollars for

help, they should say, "Okay, Frank, we really need you to focus more on grazing management so that work that you have done can be more productive with the future."

Ms. LUJAN GRISHAM. All right. Well I appreciate that partnership developing aspect, so thank you for your response.

Mr. Chairman, I yield back.

The CHAIRMAN. The gentlelady yields back.

I now recognize the gentleman from Michigan, Mr. Benishek, for 5 minutes.

Mr. BENISHEK. Thank you, Mr. Chairman.

Mr. Bowman, hey, good to see you.

Mr. BOWMAN. Good to see you.

Mr. BENISHEK. I am always happy to see you the other day at the Great Lakes meeting that we were both there for a while there, and I was happy to hear about your work, this conservation plan, and then your example with the water table work that you are doing. And you also in your written testimony talked about this Michigan agribusiness, developing a partnership with them. Can you tell me more about how that works?

Mr. BOWMAN. Sure. We have identified a suite of ten NRCS practices that have field-based practices that have the most positive impact on water quality, and we have put those into a tool similar to this one that allows the certified crop advisors when they are meeting with their customers to use that tool to talk about different production scenarios and how they can integrate conservation into those production scenarios. But one of the important things, and my fellow witness, Mr. Price, would appreciate this, is that we don't lead with the cost-share. The conservation has to make business sense for the producers' operation, and then we share with them, there may be financial assistance available if you are interested, but you ought to farm this way anyway. And there are some producers that don't want to participate with the government because they have their reasons, and we actually have some private pools of money that we have put together where we can cost-share on practices using that private money, that then don't have some of the application requirements that you—that the producer has to go through with public money.

Mr. BENISHEK. Well, you also mentioned in your written testimony about how some of the government agency people had some reluctance to work with the producers a little bit, too.

Mr. BOWMAN. Oh, I have to be careful. I don't know if the Chief is still here, but the fact is is that when we first proposed this project and said we are going to have certified crop advisors talking about conservation with their producers, we ruffled some feathers among some of the agency folks out in the field because they sort of said well, that is what we do, and the fact is, they are the technical experts on conservation when it comes to applying those conservation practices. But, in order for us to be most effective, maybe we don't need them out there recruiting the growers. Maybe we need them helping the growers with the actual execution of the practices, and we can use other folks to recruit the growers.

Yes, we are going through some growing pains with this project, but we are going to come out on the other side all right.

Mr. BENISHEK. That is good to hear. You might have heard my comments with the Chief there. These private, nonprofit partnerships along with the businesses, it just works better because there is better communication between all the parties, rather than having the government make an edict about, "You have to do this," and then they don't really know what they are talking about because they are not right there on this farm or on the land. And this approach leads to a much better result.

Let me just end by asking that question. How can we make this better? In the farm bill, were there policies there that helped you out or made it better?

Mr. BOWMAN. Well, there is one item and we are in discussion with NRCS on this right now, and this is a little bit of a cultural change for the agency. When they work with a grower, the first thing they go do is go out and develop a conservation plan for that farm. And that can sometimes be involved for both the agency and the grower to get through all of that. One of the things we are asking for is actually sort of an exemption from that conservation planning requirement, because in our RCPP proposal, we had to already say what the resource concern was we were addressing. We had to already say how we were going to address it, and we had to put in place a protocol to screen that only the fields that were actually addressing it would be eligible for the cost-share. And so if we have a grower that has never done anything with the government before and we are saying to them why don't you try doing this filter strip or this drainage control structure on this one spot, and then we turn around and they say well, you have to have the staff person come out and do this conservation plan and do all that kind of stuff. Maybe we can make a little bit easier entry for them into these programs by looking at some different ways to get them in.

Mr. BENISHEK. All right, thank you. I am out of time. Thank you, Mr. Chairman.

The CHAIRMAN. I thank the gentleman.

Mr. Peterson, you are recognized for 5 minutes.

Mr. PETERSON. Thank you, Mr. Chairman.

Mr. Rodelius, how much of the tile that is being put in now has structures associated with it?

Mr. RODELIUS. There is actually very little tile being put in right now that is controlled drainage, that they are actually holding water back in the soil profile. I think we estimated it at about 20,000 acres. It is really quite a process to get it approved and to get it into practice.

Mr. PETERSON. So, getting the structures approved is quite a process?

Mr. RODELIUS. The problem is there aren't enough technical service providers. There aren't enough people to assist farmers in the process.

Mr. PETERSON. And so most of the time, it is not happening?

Mr. RODELIUS. Most of the time it is not happening. I would agree with that.

Mr. PETERSON. And the biggest problem is it is just too much work, too complicated?

Mr. RODELIUS. It is a lack of understanding of the process. Going out and telling the story, what needs to be done and showing the benefits is something that we really have to get more involved in.

Mr. PETERSON. Is the cost-share adequate that is being offered for these if they do get through the process?

Mr. RODELIUS. It is an encouragement to the farmers and producers are really not very quick to buy into a cost-share on a lot of those things. The biggest thing that we could do is get people to do a cap on 30 year conservation activity plan so they could look at their farm and see what practices might be available, what might work on their farm. It gives them an overview of what could be done, and there is pretty good cost-share money for that.

Mr. PETERSON. Up in the valley, where I have talked about potentially tiling a lot of that, it would probably need structures with it. Would the farmers tile their land and include a structure if we took care of it through the conservation partnership or something?

Mr. RODELIUS. I think that area is really well situated for that practice. The flatter it is, the better controlled drainage will work.

Mr. PETERSON. And they probably have a better understanding of what the reason for doing this is as well.

Mr. RODELIUS. Absolutely. They have been surface draining for so long, they understand how water moves.

Mr. PETERSON. But you could use the structures to significantly improve water quality and solve some of these other issues that people have if it was more widespread, is that not correct?

Mr. RODELIUS. Absolutely. We can dramatically reduce nitrogen and phosphorus in the outflow.

Mr. PETERSON. You probably aren't aware of this, but we are having this big controversy or discussion in Minnesota over these buffer strips because the governor came out and was going to require 16½′ buffer around every ditch in Minnesota. It has caused quite a commotion. At one time, it was 50′. You can imagine, 50′ on every ditch.

So with these saturated buffers, which I guess went through some pilot program and now is, I guess, an accepted practice, is that correct?

Mr. RODELIUS. There is an interim standard for saturated buffers.

Mr. PETERSON. In interim practice?

Mr. RODELIUS. There is no cost-share, yes, but the practice is being quickly adopted.

Mr. PETERSON. Are the folks that are working on the buffer strips in Minnesota aware of this, and is this something that is being considered in whatever they are doing out there?

Mr. RODELIUS. The Agricultural Drainage Management Coalition has held several workshops and onsite events to show that this practice does work and how minimally invasive it is to a farm practice. To put a controlled structure out on a buffer strip and then to put some tile lines out, the minimum 300′ up to about 1,000′, we can denitrify and dig phosphorus out of a lot of water.

Mr. PETERSON. Well, we have, and that is my understanding, too, some work to do, because the people that I have talked to that are involved in this, some of them that are supposed to be knowledgeable, have no idea about this whatsoever. They just think this is

some kind of a wacko thing that I am talking about. We have a lot of work to do to get people to understand.

Mr. RODELIUS. If we have that buffer initiative in Minnesota and it would be criminal not to put this practice on those buffers. It is really important that we consider that, that initiative that we can put buffers and saturate the buffer. It is a great wildlife land. There are a lot of wins on that end.

Mr. PETERSON. I went to the Ducks Unlimited banquet, and the Ducks Unlimited guy got up and made this speech about how we have to stop this tiling because they are destroying all the wetlands and the wildlife in the country. What are they still living in the 1940s or what is going on? How can anybody be making a speech like that? He is one of the leaders in Ducks Unlimited. Is that propaganda that they teach these people, or what?

Mr. RODELIUS. Well, it seems like everybody likes bad news, and people, not all the time, but most of the time when you see those type of publications, they show a big white cap slew and they say we have to stop wetland drainage. You haven't been able to drain a wetland for multiple years, but if it sells memberships and if I had a week to live I would want to spend a few days of it duck hunting.

Mr. PETERSON. We have a lot of education to do and we appreciate you coming out and spending some time with the Committee today.

Mr. RODELIUS. Thank you.

Mr. PETERSON. I yield back.

The CHAIRMAN. I thank the gentleman, and now recognize the gentleman from Georgia, Mr. Allen, for 5 minutes.

Mr. ALLEN. Thank you, Mr. Chairman, and thanks to our panel for being here today and kind of giving us some insight on what we are trying to do as far as conservation is concerned.

Mr. Price, specifically relative to your operation, there are people in this town that think that the cattle industry is bad for the environment and bad for the land, and that the wildlife would be far better off without the cattle industry. Do you have any thoughts about that, and what are we doing in the National Cattlemen's Beef Association to change the perception out there?

Mr. PRICE. Yes, sir, and I am proud to discuss the animal impact on the land, which is extremely important. We can't go back to those pre-man times and have the huge herds of wildlife crossing the country, and as we take land out of production with no livestock and turn it into strictly wildlife areas, I can show you places in my home county that haven't had livestock on them for 50 and 60 years. They are turning into a desert. The lands right next to them, they are being ranched properly and proper grazing management are flourishing for our country. Granted, it is a drier environment than a lot of places, but so we have to keep that animal impact on the land and the only way we can do that is us livestock men, cattlemen through proper grazing management.

We, in my opinion, the environmental enthusiasts I call them that think that we ought to just take all of the livestock off the land, they are polluting it, we are their best resource. All we have to do is tell them our story and get them to where they understand it. As we increase the strength of those grass systems and the root

systems get deeper covers, we stop the soil erosion from wind and water. It takes that bad old CO_2 out of the air and through photosynthesis what does it do? It turns that carbon dioxide into oxygen, puts it back out in air and puts the carbon in the soil where we can raise more grass. It is a win/win situation and we just have to get practiced enough at it to move ourselves forward.

Mr. ALLEN. Industry-wide, are all of our cattlemen doing it the right way, or is there still a lot of work to be done there?

Mr. PRICE. We have made some huge mistakes in the past. My great grandfather in 1876 started his ranching enterprise. From records that we have, he grazed from five to six times more animals per acre than we can even think about doing now. He wasn't doing it to abuse the land. It was a pristine grass story you hear, and boy, this grass is going to produce forever. We can't hurt it. He didn't realize he was making a mistake. Early on, he recognized that he wanted this land to continue on the family. A little off the subject, he sold ½ of his land when his children came of age to his children, and the way they paid for it was through the sales of the wool. It was a good deal for everybody, but he wanted to move on into the future.

So we made mistakes. We have to admit we made those mistakes. I make mistakes on a daily basis. Let's learn from it.

Mr. ALLEN. Yes, Thinking about endangered species, are you all having the problem with the wild hogs in Texas like we are having in Georgia?

Mr. PRICE. They are potentially the worst environmental problem we have. We have to figure something out.

Mr. ALLEN. We have to do something.

Just a week ago, we had the Administrator of the Environmental Protection Agency sitting right there in your seat, and we were talking about the WOTUS rule, *Waters of the U.S.* From what you understand of that, if you had to get a permit due to the WOTUS rule, do you have any idea what kind of effect that would have on your operation, what kind of impact?

Mr. PRICE. I am afraid it would decimate the livestock industry in our area. I have land myself that is up on the top country. I have some what we call plow your lakes. Once every 10 to 15 years they will have water in them because there came a huge rainfall. This year, by gosh, we got water and still have some water in them. It rained 9½″ in 1 day. But it scares me to think that through the *Waters of the U.S.* rule that they can come in and make us get permits for doing basically anything, if they let those rules perpetuate. It is a scary situation for us ranchmen. We need to stop that.

Mr. ALLEN. Well right now the courts are in our favor, and we have an injunction against it, but thank you for your time, and all of you for your testimony, and I yield back.

The CHAIRMAN. The gentleman yields back.

I will take the liberty of just another round for anybody that would like. I will start that out with Mr. Bowman. Tell me about the pay for performance model TNC is using in the Saginaw Bay area. It sounds pretty interesting. Can you expand on this?

Mr. BOWMAN. Sure. We have a calculator very similar to the one that I just showed you that actually estimates the amount of sedi-

ment and nutrient that enters the nearest surface water body, and that is actually important because some hills run down towards a river or a stream or a ditch, and other hills run down to a low spot in a field. We are only interested in the places where it actually runs into water. And in using that tool, we can calculate from applying field-based practices what the estimated reduction in tonnage is. We actually use the NRCS' universal soil loss equation to so that calculation, and then with money that we have from a couple private donors—actually the Method Corporation that makes salt products and Green Mountain Coffee have both given us grants for this work. We put a price on that sediment, and I am sorry, I can't tell you what that price per ton is right now, but we say to the producer if you are willing to make those changes, here is how much we will pay for you to make those changes. It is a pretty simple program.

The CHAIRMAN. Simple, but effective. Sometimes less is more.

Mr. BOWMAN. Sometimes less is more.

The CHAIRMAN. Yes, thank you.

Mr. Rodelius, thank you for your testimony, in your written testimony and your oral statement, you have laid out a really strong case of what we are doing today in terms of agricultural drainage is different from the days in the past. The benefits of that, you have laid out nicely in terms of preventing erosion and retaining water within the soil profile, what is it, the ten to fifteen percent increase yield in terms of crops.

You referenced the implementation of swampbuster and its impact on drainage management, and because of this policy, *drainage* is often used as a bad word. Can you talk more about the conservation benefits of proper drainage management? And also, you discussed a consequence. What are the consequences of the land when excess water is not properly managed?

Mr. RODELIUS. In the Midwest, we have the luxury of excess water. A lot of our soils are saturated. Much of the time when we want to go in and plant, what the tile system does is really kind of heal the land. If we have high water tables, we have a lot of salinity that we have that we can move out of the water, out of the soil by tiling. By putting control structures in we can hold water back in the soil profile and denitrify. One of the most important things about holding back some water and being able to utilize some water is that when that crop needs water badly, we don't need that soil drained that far, so if we can hold some water and make it available when the corn is silking or when the pods are filling on the beans, it is an incredible bump in production and it doesn't take any more inputs, it doesn't take any more chemicals, it doesn't take anything more to do that, so the upside of drainage, I have been doing this for over 30 years and I have yet to meet anyone who is sorry they tiled. It is such a wonderful and cost effective method of managing.

The CHAIRMAN. It doesn't take any more acreage to get that increased yield for our farmers as well.

Mr. RODELIUS. Correct.

And it is like an annuity. It is year after year after year.

The CHAIRMAN. Thank you. I will yield back and recognize the Ranking Member. Any additional questions?

Ms. LUJAN GRISHAM. Thank you, Mr. Chairman.

Ms. Dawson, you discussed how the role of your organization is not to advocate or litigate, but to create a collaborative, if you will, to bring all the parties to the table. And I am definitely interested in hearing more about some of the successful agricultural partnerships that you mentioned in your written testimony. The Monarch Butterfly Conservation Fund and the Gulf Coast Migratory Bird Habitat Initiative.

Unfortunately, in my opinion, too many still believe that efforts to protect endangered and threatened species or species' habitats always ends up hurting farmers and ranchers, and prevents them from working their lands, but it is clear to me that farmers and ranchers are not the enemy and we should be enlisting them as productive partners and allies in helping us protect endangered species and their habitats.

How can we eliminate this misconception that we are always at opposite ends of the spectrum and that we can, in fact, work together on these issues?

Ms. DAWSON. That is a great question. Again, we don't advocate, and that does make it difficult for us to play an active role in dispelling that myth, but we believe that by perpetuating our partnerships, by growing them, by increasing the role of partners and our voices at the table to do good work, we are able to get practices implemented on the ground that advance habitat restoration and that make for more resilient landscapes. And we are really able to let the work speak for itself.

And by doing that and by increasing our ability to demonstrate what we are able to do by working in partnership with farmers and ranchers in the ag community, by increasing habitat on those lands or making it more friendly to those species, we are able to promote that concept in that way.

With respect to those other geographies where we are doing a lot of other great work, unfortunately I am very narrow in my scope for my specific geography, but we would be happy to give you more information on those projects as well.

Ms. LUJAN GRISHAM. That would be great. I mean, we all—and I know that it is just the two of us right now, which I appreciate that the Chairman did for a much larger representation of this Committee and Members of Congress. We all have pressure about making sure we are doing the right thing for those species, and we are supporting and advocating for our producers and our ranchers and farmers.

What else can Congress do that minimizes what could be, and too often is, natural tension that creates a more harmonious environment where people really are and motivated to work together and do many of the kind of problem solving aspects that each of you have talked about in your testimony today? What can we do?

Ms. DAWSON. You have seen some great examples here today of folks coming to the table to work together to find innovative and special solutions to some of our problems. I think that consistent support for those programs that have enabled that is going to be of paramount importance, going forward. Continuing support for EQIP and other farm bill conservation programs makes it possible for a lot of us to deliver and engage in the practices that we want

to see on landscapes. And enabling NRCS and other organizations to do demonstration projects so folks can see it enacted in real life, I think that that makes such a big difference when people can see the kinds of things that maybe Mr. Price is doing on his land. We can see those in action and people can see that it works and we are able to get more interest in things that way.

And then continuing to work with community-based organizations, the folks on the ground who are doing the work, they are the ones who are experts in what is really needed. Instead of any kind of top down approach, it is really great to be able to engage the people who are doing the work who are engaging locally who can drive the planning and the strategies from that side of things.

Ms. LUJAN GRISHAM. Thank you.

Mr. Chairman, I yield back. That is like a minute and almost 10 seconds credit I have.

The CHAIRMAN. Well if the gentlelady will yield, I would like to open up to the other three members of the panel to——

Ms. LUJAN GRISHAM. I yield, absolutely.

The CHAIRMAN.—answer that question as well. What can we do, in being forward looking, I think we did a pretty good farm bill, but before we know it, it will be time to start on the next one. Any critique on things we can do differently, or new ideas that we haven't addressed? What should we do or what shouldn't we do?

Mr. PRICE. I don't know what you should do, but the Great Plains—and that covers a whole lot of country—developed and functions as a grazing and fire-dependent vegetative ecology. Lack of either disturbers, and that includes the fire and the grazing, changes the vegetative dynamics and subsequently limits the habitat for livestock and wildlife. In other words, as I have said before, we are changing our environment from lack of animal impact and you look at some of these endangered species, the sage-grouse, the monarch butterfly, the changes of these rangelands turning into a brush-type desert habitat that is what is causing this, and we need to portray to the public and through NRCS is a tremendously good way to do it, or the USDA, what has happened and what we need to do to resolve it, and push it as hard as we can. We are literally looking at the desertification of the Great Plains. And we are pretty darn close to being there already.

The CHAIRMAN. Mr. Bowman?

Mr. BOWMAN. I have one for you that will be really hard, and it is hard because you are in the public spotlight. Our trustees, on a regular basis, will ask us what we tried that didn't work, and my brother still farms. He tried growing 20 acres last year. It was a complete disaster, the worst thing he ever did, but he tried it. And producers try things, the private-sector tries things, the not-for-profit sector tries things, and it would be a really interesting set of testimony, albeit a risky set of testimony, to ask the agencies to come in and say so what did you try in the last year that didn't work, and what did you learn from it? That is the only way we change these programs is by trying things and recognizing that some of them aren't going to work. I'm still not sure our RCPP proposal is going to work. We are going to get some good stuff done, but whether or not we get to the outcomes we want to get to, I

don't know. It is an experiment. It is a new way to deliver conservation, and figuring out how to try some of that stuff.

I managed a nonprofit that was rehabilitating housing in an urban area with HUD grants, and every month I had to submit a monthly report and every month, that report came back from the person whose job it was to review that, because something was wrong on it. And frankly, I spent more time filling out reports than I did rehabbing houses, and was grumbling about it to one of my older mentors, and he said what you have to understand is that that individual will never get in trouble because you didn't get any houses done, but they will get in trouble if they get a bad GAO report. And that is the culture that you are fighting, that you have to figure out how to change, how to enable that risk taking.

The CHAIRMAN. Understood. Thank you very much.

Mr. Rodelius, any input?

Mr. RODELIUS. I would just like to remind all of us that we live in the midst of a very productive bunch of soil. We have some of the best soil in the world. Only 11 percent of the soil in the world is arable, and of that, very little of it is highly productive, and we have to manage the tension of farming that land to its maximum and healing that land at the same time. I would really encourage the NRCS to keep helping people help the land, and let's find ways to work together toward that end.

The CHAIRMAN. Okay, thank you very much.

I yield to the gentlelady for any closing remarks.

Ms. LUJAN GRISHAM. Mr. Chairman, I don't have any specific closing remarks. I appreciate the panel, and I really appreciate the closing sentiments and your allowance of extra time to talk about the power of learning from our mistakes, not being so risk-adverse, and to taking every opportunity to collaborate and work together.

So thank you very much for the hearing today, and thank you very much to the panel for staying so late. We appreciate you very much.

The CHAIRMAN. Just seconding all the comments of the Ranking Member. Thank you for coming here and sharing your expertise. Chief, thanks for sticking around. That is why USDA is my favorite agency. You guys are in it for the long haul. You and Chief Tidwell, consistently, are engaged and when we are doing something, you are here for the second panel, and we recognize that and we really, really appreciate it.

Under the rules of the Committee, the record of today's hearing will remain open for 10 calendar days to receive additional material and supplementary written responses from the witnesses to any questions posed by a Member.

This Subcommittee on Conservation and Forestry hearing is now adjourned.

[Whereupon, at 4:55 p.m., the Subcommittee was adjourned.]

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