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Good afternoon. Welcome to today's webinar entitled: Wetlands and pollinators: how water quality practices can benefit pollinators. My name is Jen Ryan and I am a natural resources specialist with the East National Technology Center and I will be your host.

I want to take a moment to remind participants that the use of this webinar is for information use only. Trade names does not guarantee the product by the U.S. Department of Agriculture. Nor does it insight endorsements from the national resource confidentiality service. With comparable products that are not named. With that we can begin.

I am pleased to now turn the webinar over to Mace Vaughan. Mace serves as the Xerces Society's Pollinator and Ag Biodiversity Conservation Program Co-Director, and as a Conservation Entomologist and Partner Biologist to the USDA's Natural Resources Conservation Service's (NRCS) based out of the West National Technology Support Center in Portland, Oregon. Mace has led Xerces' Pollinator Conservation Program since 2003 and has acted as a Partner Biologist to the NRCS since 2008. In his tenure at the Xerces Society, the pollinator program has grown from a small pilot project on California farms to a national program implementing pollinator conservation projects across the U.S.

Mace, you may now begin.

Thank you. I really appreciate that introduction. And all of your help putting this webinar together. Yes. As a reminder, we are going to address as many if not all of your questions. As Rae and Sarah are giving their presentations here today . Please feel free to put those questions in that Q and a pod point at the end of the webinar I will be facilitating those. We were doing our best to get to as many of those questions as we can. With that, I would like to introduce our speakers today. Kicking off is Rae powers. She is a her previous environmental work focused on protecting the functions and diversity of prairie ecosystems. Researching the impact of restoration, management and soil on these ecosystems. Experiencing the joys and trials of Native American plant production. Rae power has also worked on botanical and wildlife surveys and wetland delineation in the central and northern Great Plains. Currently she serves as a diversity society partner biologist working closely with the USDA natural resource conservation service and land owners of Nebraska and South Dakota. To create and protect pollinators using conservation programs. She will be followed by Sarah Nitze. She is really from central Iowa and a graduate of Drake University. She graduated from a bachelors in science and environmental science. She has experience in savanna restoration, native C propagation, private land management including the wetlands. Throughout the state of Iowa, currently Sarah Nizzi is a partner biologist with the and RCS working across the state of Iowa. Providing technical assistance to farmers, landowners, and conservation planners . Interested in conservation. She also has a spent a significant amount of time and also has Rae with training pollinators and pollinator habitat needs. Rae and Sarah Nizzi are passionate and they want to share

their knowledge and enthusiasm for this work. As I mentioned, I have been looking forward to this webinar for several weeks . With that, I'm very excited to turn it over to Rae Powers. She will start us off and yes, let us dig in .

Awesome, TY for that kind introduction. And Jennifer, for getting us kicked off. I'm going to have Jen bring over these questions let us get them out of the way. It will just take a few moments for her to bring them over. Go ahead and answer all four of these questions. That will really give us an idea of who you all are here today. What region of the country you are in. And a little bit about your experience with pollinators. And wetlands . let me give you a few seconds to get those questions answered. And TY so much for doing those.

The Northeast and the Great Lakes are represented today. I think we are slowing down but I will give you just a little bit longer. Awesome. Jen, can you pull those off for me? Lots of you have done pollinator work. That is awesome. Great. TY for doing those polls. That gives me an idea Hopefully you will learn something new about pollinators. I am Rae powers I am a partner biologist. And my focus today in Nebraska and in South Dakota with NRCS. We will hear from Sarah Nizzi who was focused in Iowa. We are going to try to provide a broad array of resources information. We are a little bit of focus with the Midwest and Plains focus today. We will focus also on those areas of wetlands. Let me tell you a little bit about the diversity society in case you are not familiar with our organization. We are a nonprofit organization that focuses on these small pollinators. They run the world. I am part of our pollinator team. That is our largest. Many of us are in partnership positions. With NRCS, working with biodiversity although we do have some pollinator items that are also working directly with this supply chain. We also have an endangered species team that focuses on threatened species. We do also work with aquatic invertebrates, monarchs and the bumblebees are a another group that we work closely with. We also have a small pesticides team. It keeps all of the rest of us up to date with the research that is going on with pesticides, new pesticides that are coming out. And how to handle the risk of pesticides of pollinators. Mitigating those risks. We also have expanded to do urban conservation. And communities, written decent. With focusing on the eastern monarch population and the Western monarch population. And bumblebees are another big group and we have community science happening. Here is a map. This is just our pollinator team staff. Our home offices in Portland, Oregon. But we have a pretty decent distribution going across the country. All of our staff and contact information is located on our website. If you see a name there? If you would like to collaborate with? Feel free to reach out to them on the website. Additionally, Sarah and I would also be happy to connect you with any of our staff. After this webinar if you're interested in doing some work together? Please, any of us, contact us and we will get right back to you. This is going to be our roadmap. For the next 45 minutes. We will try to keep it to about one hour. And hopefully we can talk together about 30 minutes for questions. I will talk quickly at a high level about what land basics art and diving into more details about pollinator basics. We will talk about wetlands for pollinators and a lot of different resources to find that information. I will tell you a few stories about pollinators and we will talk briefly about wetland management and how it pertains to pollinators and focus in on pesticide protection. And I will turn it over to Sarah Nizzi who

will talk about programs within the USDA. Practices for wetlands. She is also going to be talking about case studies with high quality wetlands, restoration, management processes across the country. And go over some additional resources. Here is a map of the case studies that she will be highlighting. This is where we will be looking at some dutiful photographs of and just a short while. This is a beautiful picture of these beautiful wetlands. They are a transitional land between terrestrial and aquatic systems. You are looking for those plants that love wet conditions. Another thing they were looking for our Hydro soils and also looking evidence of hydrology. Any time of the year or different growing seasons. This is a nonregulatory definition. It is used by NRCS . If you are new to wetlands and if you want more information? I think that Sarah has a slide. There is a training wetland session. It is a nine part learning session on wetlands. It is really great. Please dive in. You can learn more about wetlands and understand what we do. There is a huge diversity of wetlands across the country. A really wide expression of wetlands. Across the nation, there are highly variable . here is an example. There are wet prairies, farms, slumps, see blogs. Coastal wetlands, estuaries, floodplains . just a huge diversity of wetlands across the country. I do not want to give you any prospective information on specific types of wetlands today. I am just going to give you some information about pollinators. How they will use and how this wetland can benefit pollinators. If you have worked with wetlands before they provide a slew of benefits. Including things like flood mitigation. That wetland theory is one of these that they make the use of the phrase some wetlands, some of the time. They have done such nightwork of the time some wetlands, some of the time could be talking about floodwater. Also about stabilizing shorelines they can also sift through contaminants leading to a higher wallaby quality. They can even recharge some of our aquifers, groundwater. They also have enormous economic value. Recreation on wetlands is about 108 billion dollars in 2001. That is a big change for our economy. Also they can have some crop production. With rice and also contributed to our fishery systems. Coastal and river delta programs and also wetland vegetation can be important food stores for livestock. Officially, they are just excellent places to be. I do know what it is about the open standing or moving water that is so transfixing for humans. And it tends to draw us in. Of course what we are going to be talking about today is fish and wildlife habitat. These are incredible places for fish and wildlife. You will get a view of Nebraska. This is the sandhill crane migration coming through on the central flat here in Nebraska. If you have not been here to visit in the mark of March or April? I would highly recommend it. We get thousands visiting. I have seen these migrate through. 40% of all of our species live and breathe and wetlands. And three quarters of the breeding words birds - use these with federal listed species are dependent on wetlands. They are critically important for migration corridors, shorebirds. They provide habitat for amphibians, reptiles, birds, fish, aquatics invertebrates. They are also an important habitat for mammals. Some parts or all of their life cycles and economically providing this wildlife habitat is also important. For trapping, just muskrat alone. Was valued at over $70 million, annually. I was very surprised. That seems like a lot of muskrat. Commercial fishing and another important factor of our economy. 90% of our Southeast United States is dependent on estuary wetlands. They are a pretty important. These estimates vary but most sources are pretty clear that at least 50% of our global wetlands have been lost since the 1700s. This estimate is almost 87% of our wetlands have been lost since that time period. Here in

the United States, we see that since 1985. But we have not reversed that trend and we are slowly losing wetlands. Additionally, some of these lost estimates have not taken into account areas that are also flooded areas heard there are also aggregation of wetlands that affect quality or function but they do not impact the quality or the function. We know that there is a lot of ongoing threats to wetlands . including leading to species we are constantly battling things like canary grass and climate change can also impact wetlands. As well as logging, urban development and overgrazing can be damaging to our wetlands. The future of wetlands is at risk. This is also echoed in trends that we have seen with insect diversity. We have seen widespread decline. There is been an increasing number of studies. Insects and also species that were pretty cosmopolitan and common just previously. We have seen large to Klein. And the monarch butterfly is a big design and example of that. Pairing those two together makes it sent to protect these items, together. Let us talk a little bit more about pollinators. Their diversity, habitat and lifecycle so we can get a better idea of how wetlands can play into that decline of pollinators. How we can compare them together, pair them together, and conserve both. We talk about these mean groups of insects and pollinators. These are all here on these slides. These main groups that is a an adorable bumblebee. Representing all of our bees. These are efficient pollinators. There is a group of pollinators that eat nectar and transport nectar for their lifestyle. They are good at collecting it, moving it with modified structures that are particularly great for moving it around. They are great pollinators because of that. I will dive more to these in the following slide. But I want to focus on these other groups while we are hanging out here on this slide. On the top middle there is a wasp. There are a lot of wasps. Globally, there are about 30,000 identified was species. However, the diversity there are probably 100,000, globally. Wasps are visiting flowers and eating nectar and pollen as adults. They are feeding their young other insect material. There are parasite wasps where the egg is laid on the veneer of a host insect. At egg hatches. It devours that insect host. Sometimes from the inside. Just one of the very many horror stories of insects. We could have a full genre of horror movies based on insect stories. Also there are predatory wasps. Wasps are stinging and paralyzing insect prey and bringing those back to the nest for their young to feed on. When these hatch, they are doing some type of pest control. This past population also is impacted. These are important pollinators for plants and crops. If you can see on the upper right side, there is a fly. I have really fallen in love with flies, recently. They are just so cool and they do so many different things. They are everywhere. There are 160,000 identified to species, globally. The estimates of fly species, diversity between 400,000 minus 800,000 and experts think that there are 1 million species. That just sort of blows my mind. We have probably identified and named only less than 10% of flies in the world. They are really an underappreciated pollinator. Because of their diversity and abundance. We know that about 71 of the 150 fly families are visiting flowers as adults. They are using nectar. They are using food resources. Additionally, they are some of the pollinators that are drawn to those flowers. Those flowers even sometimes smell bad. They can transmit that. And they will typically lay their eggs on that and tricking. They are also drawn to Albertine habitats. There is a temperature buffer and a little bit of a warm shelter for flies. It is important for those species. Also, if you like chocolate? You can think of fly. At times it is difficult to appreciate them but it next time if you bite into a chocolate bar?

You are able to realize that they are a very critical insect and pollinators in our world. They also pollinate apples, pears, strawberries and ale whole lot of different things. A large number of flights also have larvae that can be in other insect population control. Let me get off my tangent on about flies but I will put a plug in for the secret life of flies . if you want to read more? A really good book. It is in my bathroom right now. Now, let us go to the bottom row. Moths and butterflies, those are also important pollinators. They tend to be less efficient because they do have a longer legs and not as Harry. So they're not collecting as much but they can be really important for a unique pollinator plant relationship. There is also the relationship with a moth to Western Prairie fringe orchid relies on just a few species of moths for its pollination. There are some pretty cool stories. Additionally, they are just really attractive. People tend to really like moths and butterflies. They can be a good poster species for our pollinator. And also, monarchs are beautiful but there are some of our earliest pollinators. Those ancient lineage plants. If you have ever been out near the Goldenrod Falls? You can easily see how the Goldenrod Beatles are swarming and moving through that pollen from sunflower to sunflower. Those are our six main groups of pollinators. Let me talk a little bit more about wild be es these are great because of the diversity of habitat. Let us hone in on wild bees let us remember that the divisive and diversity and how cool they are. Worldwide, we have about 20,000 species of bees. 5200 and North America and 3600 species in the United States. You can see that there is a wide variety of sizes, shapes, colors. They are just a really unique group of insects. Most of our native bees are solitary. This is the lifecycle for a typical B ee. She is pollinating and is exposed to collect pollen for her own fuel but also excavating that site. There is an underground site and she is making a ball of pollen and nectar. She is laying an egg. Hatching. And you can see that it is merging underground and when those temperature and light conditions are right. That cycle repeats. This adult lifecycle is pretty brief. It can be anywhere from just three-6 weeks. And males, can even meet, eat, die. And when we think about these those are really in the majority of the lifecycle they are in a nest. If we want to support pollinators? Habitat is really the key. That is the case for many endangered species. We want to provide food, nesting, overwintering sites and let us talk about the food component a little bit more. Habitat throughout the growing season is really important. That's the diversity of bees and other pollinators really means that we need to have flowers on a diverse array of flowers for that entire growing season. Here in Nebraska, we are thinking March 15th to October 15th. I want something to be blooming and more than one type of something to be blooming for that entire period because of these amazing and magical time is marrying. Some are active in spring, summer, and later in the year. I know in my region and other regions in the springtime. Shrubs are really critically important. They provide a really diverse and an abundant array of flowers. And some of our early herbaceous are pretty sparse with flowers . thinking about planting tribes in screed trumps scrubs. Supporting trees and scrubs can be very important for drought tolerant. We also want to flowering plants for monarch butterflies and migratory insects. Blooming time varies making sure to take advantage of that diverse plant community will help provide other food needs for other parts of their lifecycle. Some of our native bees are pollen specialist. They can only feed their young a certain type of pollen. There are a list which are wetland, or sometimes okay with wet feet. There are a lot of plant species that support those. But just to be aware of those relationships will

help when you know what to build for a habitat for a pollinator. You also want to think about host plans for butterflies and moths. They are typically eating plant material in their lover stage. There is also a lot of relationships that can eat a wide variety of plant materials. Let me highlight some resources. From that need to be lifecycle, they were excavating and having a nest underground. Most of our solitary bees are nesting underground. They often look like a and nest but some can build a deterrent around their exit hole. Sometimes there are chambers that are aligned with excretion and some can even can resist flooding . there is a wide variety. We can talk about that more, later. Most of the native bees are nesting in a system of a stem. There are excavating sites and important to think about those standing resources above ground for our native bees . this is a view of the inside of a stem nest. She can separate these with a variety of materials. If you see a stem with a hole and sometimes a closure? You might have a bumblebee babies. And these form colonies. They are still pretty different from our honeybees. The honeybee is annual . but this can build up to about 200 a few hundred workers. That colony will all die off at the end of the year. The Queen will remain for the winter and start a new colony next year. Those are often at ground level. Certainly, the native Queen nesting at ground level is sort of three levels of nesting. Giving them some nice protection. You want to think about above the ground area. A bumblebee nest is at ground level. Thinking about things like brush piles, rock piles and having some woody and hit the stems. And also an area that is undisturbed for overwintering. Perfect for egg laying. Hopefully, you can learn all about a pollinator habitat and lifestyles. Why these wetlands can be really great pollinator habitats. Healthy wetlands can definitely support a diverse of native plant communities. Including rare plants. That pollinator relationship is crucial. Often they are one of the only undisturbed areas and an area that is usually an altered landscape. If you're working in the Midwest? You can see that green spot in the middle of the corn and soybean desert. It might want to be the only places in a long time where there are resources for pollinators and other wildlife. There could also be places that is an otherwise a canopy. You could have a flowering, herbaceous plant. These can be great places for pollinators, bees, wasps, all of the above. The one thing that I would like to emphasize is the use of a wide variety native lands. Those can fill in so many spaces across the wetland and across the gradient. A lot of these projects that I work on our pollinator benefiting. These are associated with uplands. The ones that we think about the most is those plants that have wetland indicator status. Obligate upland, and these are typically going to be upland. However that transitional zone there are eight ton of amazing flowering native plants that fit into that category. If there facultative and also moving into the shallows. There are floating and emerging plans that provide flowers and other resources for pollinators. That could be included. Shallow water habitat could be the least inclusive for pollinators. At least on the projects that I have worked on. There is practically never a flowering plant included in that shallow water category. Because this is such a broad audience I want to give you some resources and laces to find list of these plans. How you can compile your own list of wetlands plants that would be great for pollinators. If you work for NRCS you are probably familiar with the USDA plant and the incredible database. There is tons of plant information. You can look up different species on USDA plants. Here is there is Verbena, you can see this list of tabs at the top. It has more associated information. If a plant species as a wetland indicator status it will have a wetland tab. You can click that. You will be able to see that

wetland status for different regions of the country. Here in the Great Plains, that is listing the characteristics of the plant. This is great if you have a plant list from AC defender. You are able to find that wetland indicator status. Decide if it is appropriate for a project. But I do not want to highlight the wetland status search only. On the left side, let me show you on the left side. Can you see that? This wetland indicator will bring this page up. You can sort these plant list by the growth habit, state distribution, wetland region, and even a route to only obligate wetland plants. If they really need a wetland to survive. Or even a facultative, any category that you want. That is an incredible resource. The Army Corps of Engineers has a national wetland plant list. I have not explored this extensively. But they even have YouTube videos on wetland plant. They have their own ways to generate plants based on these same characteristics. It looks like a really great resource as well. There is another place for you to identify great plant species for wetlands. I even have more resources for you. I just to break up the list of resources. Let me tell you a couple of cool stories. These are about pollinators and wetlands. This is such a cool be. It is megachile addenda . it is often called a resin B, leaf cutter be. This is in particular is pretty widespread throughout the United States. He can be seen on this slide. This is a ground species fee. They have a shallow nest site and in joy prefer Sandy nest sites. These nest sites are often flooded. Those not can provide and even survive a flood up to four months and that is crazy. These little babies are surviving underwater for a long period of time. There are a lot of underground nests can even tolerate flooding for a couple of days. But this is a standout species in terms of a B that is living and working in wet conditions. Megachile addenda is an important pollinator. They are great at visiting those cranberry pollinator sites and bringing that pollen back to its nest site. It is a cool photo. These photographs are coming from the U.S. GS which is an amazing photographs of these. This amazing species of megachile addenda. What makes this story even more cool! It is this species. These are a little bit similar to the brown headed cow bird. This cuckoo can terminate other be nests. Leaving there own to hatch. Coelioxys immaculata this almost looks like a ninja be. This is not collecting its own pollen resources but it is stealing those nest sites. We know that this coelioxys immaculata is also being able to tolerate flood conditions. This young will also survive those extremely wet conditions. It is just pretty crazy. Another type of really cool species macroposis nuda. That is one of our native blue stripes. Macroposis nuda is visiting this loose stripe. This blue striped is not produce any nectar it just produces pollen . it also produces a floral oil. Looking more closely at this be we can see that there are some unique homing structures on the hind legs of the bee. She is able to collect that oil from the plant. She also has modified hairs that act as a sponge. This will also collect those floral oil. It is exclusively feeding this to her young and she moistens the pollen balls with the floral oil. Instead of that pollen. We also know that those floral oils are used to line her underground nest sites. It provides some protection. This is a really unique relationship between this species and our native plant. Finally, this is a story of our native species. This law they will eat plant materials. Including many of our natives such as these can be important for our butterflies and moths with hesperia otte. Talking about butterflies and moths and other pollinators, this eco-regional Ridge vegetation application. FHA Ecoregional Revegetation App is a really incredible tool. I cannot pilot it enough. This is a tool for design for highway plantings, you can even inflict, enter your eco-region. It has an amazing information base on information with

months of bloom, soil moisture, salt tolerance and also shows an entire amount of pollinator information. It will of the biodiversity of the pollinator, and if the larval species are known it will even include Monarch butterflies. That is an excellent place to go to find out which plant species are supporting a wide variety of larvae species. Which ones are great for pollinators. Another place to find this is on the butterflies and moths of North America. This is coming at it from another angle if you already know your target species? You can enforce the data with the larval host plants and even show the species. There is a birds list of birds and moths that are in your area. You can even submit data on that site. I am wrapping up soon, I promise Sarah Nizzi. Quickly, wetland management for pollinators. I am going to keep it really broad. There are a couple of challenges .1 if you are managing for an entire variety of target species. They have different needs and management timelines. I just want to bring up some of these main concepts that we think about with management for pollinators on a lot of different areas that we want to mean and create a refuge. We do not want to disturb their habitat. This will allow an area for those pollinators to be re-colonizing. If an area has a disturbance. Overall, just be mindful of some of the negative impacts of management to pollinators. Things like overgrazing, burning, treading . that could strain that aboveground vegetation. Some of our bumblebees and nesting bees are likely to be killed by those management practices. Also we will have that immediate loss of food, resources for our pollinators right on-site. Just giving you a small burn could even be destructive for our underground nest sites. Just be aware that those are going to be impacted if you're doing a current management activity. We do know that the overall benefit of the benefit community is great for pollinators. Maintaining those disturbances and making sure that you are doing things like brush control if you are in an area where there are trees? And also targeted control for a burn option should be considered. This could be an entire universe for a pollinator. They are never going to go off of that management area. Try to think about how we can mitigate some of those risks for these pollinators. One important thing that we need to be cognizant of especially and wetlands is protection from pesticides. Especially when we are in an agricultural area. Thinking about how we can dispense that spray from our habitat and having a buffer is crucial. If you just do not want to spray those last several rows of crops. One group of pesticides that are particularly soluble and even a seed treatment prophylactic. That could move to seat areas in a variety of methods. Even a bigger buffer from those applications or can also be at risk. Here are a couple of maps. This shows neonicoticid pesticide use. Finally, mosquito pesticide. If you are pressured to do mosquito management from your community. It is important that mosquitoes are a key species and many wetlands they can even be pollinators. And we have soluble items for mosquitoes. Some of these items can be including surveillance, source reduction, early intervention for mosquito management. It can be hard to appreciate mosquitoes. Especially in the summer point but I will tell you this story about where we used to work in. This bog orchid is pollinated by a past mosquito or can be a pest mosquito. However, this species often gets whacked onto the eyes of these mosquitoes. Hopefully you can find it in your heart to appreciate the important role of mosquitoes for pollination and for a whole lot of other things platanthera obtusta. I went a little bit over so I'm going to hand it over to Sarah Nizzi. She is going to talk about good programs and good practices.

All right. Thank you. Wonderful job Rae on those slides and a beautiful photograph and great information. I am Sarah and I am a partner biologist in Iowa. I work with landowners to implement pollinator habitat across the entire state. I do education, outreach in our state. I am going to spend the duration of this webinar specifically talking about conservation programs related to wetlands. I will also go over some examples of wetland projects that have incorporated pollinator habitat. Finally, I will cover additional resources. I am going to apologize just very briefly. I have a nine-year-old dog who is very sick. If you're hearing anything strange in the background? That is probably him and I apologize. Moving on. There are many conservation programs that we can use to put wetland practices in our landscape. The first one that I often think about is agricultural conservation easement program. This is a large umbrella. There are a lot of different programs that fall under this category. But I will only be covering the wetland reserve easements today for the sake of time. Relevancy also. There are a few other programs that can cover wetlands also. However, WR E is a great long-term conservation at producers can and roll in. These easements can be permanent. They are forever. They cannot be anything else. And RCS will pay up to 75 Dash 100% for the cost of these permanent easements. Developers can offer also to have a not permanent but a very long-term easement or contract of 30 years. There are also shorter contracts. They do not get as much cost share but NRCS can still pay upwards of 50-75% of the restoration cost. I should also mention that this program has been also a NRCS program. They provided financial and technical assistance for this. In Iowa, these are pretty popular programs. These are popular along the river corridor's. I will mention that, later. Probably you are probably familiar with the most common conservation programs is CRP. The conservation reserve program is administered by the Farm service agency, FSA. They do all of the eligibility, billing, cost share, paperwork behind the scenes. Office work. And RCS, the role that we play is anything technical. On the ground assistance, NRCS, with permits, management, et cetera. That is where we come in. Once again, this is a program that has a large umbrella. There are a lot of other programs falling under it. I am only going to speak on the more common ones four times sake. We have the general sign-up and the continuous sign-up and there are multiple practices that fall under each of these categories. It does differ how they are executed. The short window of opportunity could only be open for just a few weeks at a time. We are also in a nontraditional state at the moment. General therapy is still a available but it could just and at any point. That also differs that if it is a ranking system. Applicants are competing against others in order for their application to be accepted. Continuous . just as the name suggests, it is offered at a certain times. Several months, any producer can come in at any time and sign up for this practice. There is no ranking or no competition associated with that. Many of our wetlands and water quality practices fall under the continuous sign-up branch. With both of these categories they are long-term contracts. Generally, 10 to 15 years depending on the practice. There are a number of different therapy practices that can be addressed. Diversity through wetland restoration or management. These practices may differ. This is compared to where you are in the world. For example in the Midwest. This wetland restoration and CP 27/28 are really common. Other parts perhaps the southeast of the United States. You could explore CP 31. There could be also be other options listed that could be relevant to your region. Under this big umbrella of CRP is another popular

program the conservation reserve enhancement program. This is different from the examples of the continuous general sign-up. There are Federal and nonfederal funds used to execute these projects. CREP is really meant to target specific states or national conservation concerns. Many states have some form of CREP. It could be a certain region of the state. Or even a few states together such as sharing a large watershed. Typically wetland programs are used but also native wetland practices are used such as tree establishment. Needed perennial vegetation or non-native perennial vegetation can also be used with CREP. This NRCS administers the environmental quality incentives programs. This is a Stepstone for people that are curious. Perhaps if they do not have a lot of practice using wetlands on their land this is a great way to get their feet wet to see what works for them. Each addresses a wide variety of resources, concerns. From air quality, air quality, soil health two in adequate habitat. For even terrestrial or aquatic life there is something for everyone who wants to do some tort of conservation. There are a number of ways that these can work with wetlands, restoration. Producers are given a one time flat rate payment. There are no annual payments. That is what we are accustomed to with CREP but this is a reimbursement to exercise the practice. These could be more short-term of three, five years even one year depending on the proctors upwards of 10 years. The conservation stewardship program is also administered by NRCS and is intended to reward producers who have been successful. If they have an able to implement the tools and practices successful in the past. If they are using these in their operation and comfortable with it. They also have an operation that they are comfortable with. They have figured out what system works for them in order to be profitable. NRCS will look at the entire operation. Multiple fields, potentially multiple tracks. We gather a lot of information. Basically we need to have the entire story of the operation in order to put that information into a tool. It will then generate information and let us know where we could have gaps. Or even where we could be making improvements. CSP differs. You do get annual payments. You are able to renew. This is a ranking process so it is not guaranteed. The opportunity, however, is still there. Those contracts can be at least five years. In my experience I do not know a lot of folks that are utilizing Please stand by for realtime captions. . CSP for specific wetland practices. But we wanted to give out a few examples of how they could be . or even if they are for water quality that is available. Perhaps there are other folks in other regions that are utilizing CSP in this way. But the best bet is to contact your local USDA service Center. If you are not dissipating in the farm program or have not established a relationship with your service center? I highly recommend it. They would be able to work with you to get into the farm program. They will let you know all of the eligibility requirements. You will get that hands-on help. This will be helpful trying to implement this and they are also experts on what is going on, locally. There could be special programs or initiatives for just your county, or just your region of the state. Or even just your watershed. That is your best bet to get the best, most relevant information. All right . now we are going to switch gears and move on to case studies. Rae has already done a really good job of outlining how wetlands can be critical habitat. And even a hot spot for pollinators in areas that would otherwise be lacking habitat. Wetlands are also incredibly diverse. Wetlands also have the scale of diversity of upwards of a tropical rain forest. We are going to take a journey around the country and showing you some examples of projects where we have implemented pollinator habitat

to a new or existing wetland. In California, this staff and also NRCS and the LAN order have been working with an existing easement. This was a very large, existing easement. The land owned or wanted to provide more pollinators and beneficial insect habitat. In 2017, they began this project. It was just one year, they have already been able to gain the benefits of enhancing that with native species. A few examples of natives that they incorporated into this projects are the sunflower. The yellow gold field, and also the common madea. I am not familiar with native California species but these are tolerant. This is a seasonal wetland. Although it is a very large easement it is only holding water certain times of the year. For relatively short amount of time. Another example is in South Dakota and they have been working since 2017. They have been working to enhance their WRE seed planting with native plants. They have been purposeful in their seed mixes to ensure that this will move forward. They will have a native plant component represented and they will also go back and enhance any existing you are E plantings with native plants. They have created a seed mix tablet waste on their ecological site. This is for planters to use to make it easier to implement. They are partnering with other organizations to create native Monarch seed mixes for the WRE seed mixes. This is contingent and indicative of the higher seed mix for WRE. Iowa is doing the same thing, since 2017. We have been using native plants and monarch seed mixes for our WRE plantings. These are two examples where they have incorporated David plans. These are associated uplands. It has been widely successful. Luckily for us we are really spoilt. We have local native seed availability. We can really benefit from that. And thinking of a smaller area, this WRE project or even a smaller planting. We mentioned earlier about plantings and wetland and the diversity. Even a wet prairie will count towards a diversity of a wetland. Here is just an example of a recently funded project. It is a wet meadow. You will notice the most prominent species that you can identify is the purple. That is iron weed. That can definitely tolerate wetness and harsh conditions. Another cool project in New Jersey is this site. It was restored. It was really with just one particular species in mind. The Audubon Society and other partners got together. The restored this for the bog turtle. The bog turtle is the smallest turtle in the United States and also one of the most rare turtles in the United States. It is a New Jersey speed species and also a federal state species. Although their intention was a bog turtle habitat they have incorporated native plants. Therefore, there are multiple habitat benefits simultaneously happening. In order for the bog turtle to survive it needed to have a wide variety of diet needs. It will feed on snails, worms, insects. Even seeds. Incorporating native plants and diversity will make sure that there is much availability of that as possible. Again this is a multi-benefiting multi-species project. I also wanted to include an urban example. These landscapes are often found in agricultural or more rural areas. Certainly there are more times when it could be beneficial to enhance an area within the city. This is an example from Ohio. On the left, you can see the before. This was basically a site that they considered a wetland but it was a very segregated area. It was not functioning . it was not diverse. It was not really serving a purpose for wildlife. Or even for water retention or filtration for water quality. A private company enter the scene on 2012 to completely restore the site. Looking at the after photo you can see that they increased the overall acreage of the wetland. It was a large area that also increased for the wetland. Here is some excellent post restoration photos. They were able to incorporate 100 native plants of herbaceous, shrubbery's,

trees, enzymes. They used seeds and plugs to accomplish this. Since then, restoration has also done aquatic and vertebrate monitoring. As well as providing outreach and education to the general public. While restoring the wetlands and making it more diverse and larger. They were not only able to provide a more wildlife habitat but the wildlife function functioned more as a wetland should. It was gone from just holding water to just two days at a time to being able to hold water for up to five days at a time. That is really serving more of a purpose for flood mitigation, water retention and hopefully being able to have water filtration. They also took time to make sure that the public could interact. With this beautiful interaction of walkways, pathways and all that good stuff so people can appreciate the beauty. I just thought that it was just too cool of an example to not share with you all. With that, I want to wrap up with our resources toward if you might not be as familiar? Our website has a plethora of information everything from organic site prep, bumblebees, to how to collect your own wildflower seed. And he everything in between. We have a regional plant list. Basically anything for anyone. I want to specifically highlight this publication. Rae and I will be doing this webinar going in depth about this publication. If anybody is interested? May 6. Just to shine a light on this because it is giving a sense of how many resources we have for site prep, planting. How to establish seed mixes, et cetera . this tool provides tools on how to evaluate your site. It will monitor the site. It will help guide you to see what is the most appropriate for management so you can have long-term success. And you can maintain that diversity for a long time. We have a community science be monitoring tool. This is a great tool to provide you with these native groups. It helps you to identify them. Some characteristics of these groups and even give use a protocol on how you can track them with your area. If it is a managed area or if you have other areas. Rae also mentioned this earlier. This is where you can find information to get engaged with wetland training series. This is from NRCS and it is open to the public. This link at the bottom is how you can reach all of that really great information. Really dive into wetlands for the public. This is a great resource from NRCS . Also, take time to acknowledge all of our many, wonderful partners, supporters, donors and individual members. We do not do this work in isolation . it takes many hands in the village to ensure that we are able to do the great work that we do. If you are not currently a member we really encourage you to become one. Individual membership provides one third of our revenue it makes a critical difference. This allows us to continue to do important work and share all of this important information with all of you. With that, we will take time for questions and thank you so much.

All right. Thank you, Sarah . thank you, Rae. Those amazing slides and a great presentation. There have been a view of the bigger picture questions as I have been answering since we have gone along. You can see that some of these have come up in the Q&A. Some of these are relevant for the overall talk. Sarah, Rae . Let us just dive right in. One of these questions that I thought was particularly interesting. For the context of this webinar is what about methods? What is the Met best method, for seedlings and wetlands? This was from the New Jersey example. What are some of these best techniques for getting seeds or plant started in wetlands?

Statistically, do you know from the New Jersey example?

I do not have any specifics on the execution method of any of those case studies. I do not know the statistics, intimately. I will say that broadcast seating especially for areas that you can get the equipment in. It is done here in the Midwest and likely in other places as well as other areas. If it is not obtrusive you can even hand broadcast seeds. I do not claim to be a wetland expert but I know that there are conversations. These conversations can be with engineers. This is allowing free, natural seepage happening in those areas. This could also help to spark some natural vegetation. Or even potentially using plugs in those areas.

Excellent.

I would like to add that in some places you can even make it easier if the soil is frozen? You can use a seed drill. Keeping it however, still close to the surface.

What an excellent point.

There is also hydroseeding which is also great for wetland.

All right. And just a quick note that there is a link to these slides in the handout pod. Some of these questions could also be addressed by just looking at these. It looks like I've been able to open up those okay. I just wanted to make sure that everybody had that link. Some of these comments that came in on on drone seedings. What are the native plant requirements for CREP? Years ago, there were no requirements to plant native plants. How has that changed from today? Sarah?

Yes. I would say that in terms of native plants. Certainly, that varies from state to state. Some states have more seat availability, data feed availability than others. With CREP, there is some leniency . Not just nationally, but in that regard also. Certainly, I have not been around long enough in this field. But there is a push for more diversity of native plants. We have graduated from just two or three native grasses. Now we have grasses and wildflowers. There are, at least in Iowa, practices that require native plants. But our pollinators can also be planted with introduced plants. It is really buried on the goal, the budget of the producer. How diversity want that to be? How particular do you want a seed mix to be, all natives, for example. I would say that for the most part, at least 90% of our CRP are 100% native.

Rae?

I would concur. I think it is highly variable. I do not think that there are any requirements with the CRP and the handbook. Just hitting those bloom. But I think that most states would emphasize the use of native plants. I know that here in Nebraska we have restricted the use by non-natives. I think that it probably varies state-by-state as Sarah mentioned.

Here is a pretty practical wetlands question. This is from Wisconsin. If you cannot answer from that state? But maybe just a general reply. What is your top 10 wetland plant species for pollinators . perhaps a few specifics?

Yes.

Maybe your favorites! Lala

Okay. Okay. I would just say proudly say that a bigger tick pollinator in a wetland situation. Some of our sneeze weed, those are some of your favorites and I think that is tolerant and Wisconsin. Some of the native men's mints . And what else? Seed box are also great flowering for wetlands. All of those have pretty wide distributions. At least those could also be adaptive in Wisconsin. Sarah?

Yes. There could be other lobelia, a cardinal flower, mints way, and New England asked her. Astor. And even a sunflower. Even wet tolerant sunflowers.

I put a plug in for Willows.

Yes. Yes.

And even a special focus on if you are talking to a nursery? Looking for a male willow plant. The mail will plant will do double duty. If you have a male plant and a female plant . but the mail plant will do a production of pollen early. Other specialists come out with the mail plant. Those of the hot ticket. If you are doing restoration work on a regular basis? And if you have a source that you are looking to use? Flowering, right now . I would selectively choose the mail plants. But if you work in a landscape area like cranberries? Even in a cranberry bog. Using a male willow plant will dramatically reduce the seeds that could be coming out from those plantings. Just something to think about. I am a big fan. And this is coming in from Brittany. It is important to utilize and establish plant material and to wait for it to dry out? She is referring to perhaps referring to waiting for a wetland to dry out.

Utilize a set material like plugs?

I am thinks so. I am interpreting that as plugs.

I think it depends on the situation. And the desired plant species composition. A lot of the what the wetlands is established for just seed. But some have shown that there are some pretty difficult to establish just from seed. I know that some characteristic and species have been difficult. So we have ended up just using plugs in that area to get them growing from seed. Where as others, just popped right up from seed. I think it just varies. If you need plant or plug. If you have competing vegetation? Or if you have a different challenge? For the growing habitat that could also dictate your choice.

Another favorite plant is turtle head. I also quite like. It is also a great host plant for butterflies. Just throwing that out there. This was a question I thought was interesting. There are a number of companies like General Mills that are investigating about carbon questions. Have we seen funding going to projects that increase pollinator habitat? As private investors are looking for a carbon investment. Let me quickly tackle this. We are over a funding question. I think that we have seen more of that. People have seemed to make a strong connection with what we do as a nature-based solution to climate change. Climate change resiliency. A lot of that involves permanent perennial plantings. We definitely could be doing that in a way that is addressing these concerns. A lot of these companies are doing more and more about that. There were some other questions up about regenerative. Those infield practices are protective of adjacent wetlands. In all of these cases, I think that it is a great place to add additional biodiversity, and additional habitat for wildlife. Just because of the landscape. There are a lot of questions and here is a fun question. How about a beaver pond? We have had a couple of beaver pond related questions come in. Rae?

I have never thought about a beavers in all of my years. In the same context. I do not know if I know how to answer that.

Sarah?

Yes. I guess that I would agree . [Laughter] in the same sense, that it is essentially they could be damning something up and changing the hydrology. That could be detrimental to certain plants. But it might be there or might not be there. But is similar to what Rae mentioned, that is a very interesting question. But I have not thought about it.

Probably a little bit of a balance, right? Just damning water up could be destroying something with that pollinators. They are also creating new opportunities for different plants to be a pollinator.

I think that it is landscape dependent. As a former wetland ecologist I have seen and research seating areas being flooded by a beaver dam. In many cases, they of the great potential. They can create their own ecosystem engineering. Their habitat, the wetlands, the more that in the West particularly the dry west. The increased wetted area in our dry landscapes are critical. This can create more of abundance and diversity for our landscapes. Beavers really do a ton. What we think in the West is wetting up a large area but in a landscape that is more heavily developed? Where these wetlands are so much more tighter and constrained. So yes. The potential to flood out a surge in areas of habitat and create changes. But there are such important engineers. I quite like that. Let's see. We are just going to keep cruising along. The question from Michelle. Xerces does it partner with anything?

NRCS provides a partnership but our within that funding. We also also target and support conservation efforts as well as NRCS . Any conservation district within the same area where we have people on the ground. Even more broadly. It is funded from NRCS as far as we are concerned can be directed towards a district and conservation

planning work as well. Because the district is so often a critical and valuable partner on that work with NRCS. It goes hand in hand with the work that they do. Let me just goes through some of these questions. Let me see. We have addressed that one. Here is a big picture question. Actually it is a specific question how much of an issue this is in the Midwest? It is certainly an issue in the East. How can you get rid of frag mities? How can you get rid of those? I have not thought about these in a wild but it comes often. Sarah, is this an issue in Iowa? Maybe Rae can answer this too.

Yes. It is an issue. I do not know how big of an issue but there is definitely, they are here. They are dominating the landscape in some cases. I guess that if you do not have access to heavy equipment or waiver. I am not sure if I have a great answer. I would think that fire could potentially be a tool. But I don't know . I have not dealt with this species, myself. Hands on to know how it responds to that but I know that there are other species that grow very hot and it could be a big concern. Rae?

Yes. We certainly struggle with frag mighties in Nebraska. Most of our efforts have been to eradicate it from areas of the Platte River. Those are mainly from migratory birds. That has certainly required heavy equipment. It is practically like a tank and a tank that can go into the river and do some manual removal of frag mighties. Also being able to get into areas within herbicide. Some areas are not even able to reach that area within herbicide. Herbicide could be part of the equation. I am not sure how effective it is because frag mighties is so fast growing, talent plant. That is a tough one.

How big, how big are these groups of bees? Talking about briefly, we have 20,000 species of bees, worldwide. 3600 species of bees in the United States. I wanted to make sure that you got those statistics. And this is a good question. Related to that, there was a question early on on how many bees are nesting, individually in some of these plant stems that we were talking about earlier. That would be about 30% of the 3600 B species. If you want a management for those you can cut those stems if you're doing that stem management. You can leave those hard stems if they are wildflowers or even pithy stems leaving those a few feet high. Even wildflowers are leaving all Lowe's pithy. Ruth asks, can non-farmers get a permit from NRCS . For a conservation requirement. Let me quickly answer that. The answer is no. NRCS forms that conservation funding it is for working plants, farms, and if those land owners are making income off that land. Sorry Ruth.

Can I interject?

Yes.

Ruth, maybe check locally. Perhaps at a state level to see if there is any other opportunities for any other options. For example, we have a Iowa seed share program. If they are eligible. It may or may not exist. When we are continuing to explore.

Great.

I think that there is a link that was a training link. I think that those are on the slides. Angela, she can email us.

I think that the wetland series is restricted to just federal employees. You have to sign in. I do not know if it is available .

Our staff, we have been able to get onto some of those resources. But you are right. Some of those are just geared towards federal staff. We want to see if people are interested? Maybe we can provide more availability. Let us know. Here are some broad questions. Here is an interesting question from Brian. And maybe will take just one, two more questions but we will wrap it up. With all of the surrounding landscapes. Sarah, where do you think this healthiest soil is with the entire land base?

What a great question. That photo was taken and Iowa. Let me look at it again. These are very productive soils but that does not always necessarily translate to a healthy soil. If a soil is supporting sociobiology. If they are doing and have all of the structure and all the components of a good soil. I would say that perennial vegetation would have a better soil. But that is a bold statement? I am not sure. I do not know if I made that clear. But it is an interesting observation to point out. That is really about land. I do not know if this is an early spring or early winter photo. A lot of it is very susceptible to the elements.

I am looking for our last question. I am looking for one that is not too big. There was a question that I think is worth talking about. Charles was asking is there an opportunity to put solar projects with NRCS? Just for that electricity management and managing habitat. I do not think so but I wanted to turn that around. Sarah? Rae?

I feel like this came up with the partners recently about a similar project. With a NRCS enrolled area. I do not remember the resolution. I think that we were looking into it. That was the last that I heard. I am not clear if that is a compatible program.

My guess is that they're going to be major permit issues with that. Anything with a development that is going to be on a wetland in the restoration of the wetland. I think that is going to be fraught with permits and challenges. That is going to be difficult to manage. I think that it would be a challenge, Charles. To get that lined up and I think there are opportunities for pollinator habitat under solar areas. But as we mentioned, I do not know how well we are going to see the way for that to combine. Excellent. There are a number of other questions that have come in. I am putting a few of these. There are notes about frag mighties. I have tried to put that into the chat pod. Just so people could see those notes also people mentioned that there are a lot of different state programs. They could be geared toward nonworking land. That is something that we can look into. With your state and Department of Commerce and Department of Fish and wildlife, the print Department of natural resources. Another one that came up that Jeff noted was the Pennsylvania metal program. That is one that we have done a lot of work with. With that, we are going to wrap it up. Any events that seem really burning. Or critical. We will get it out and address those at a later date. I just want to say thank you

for Sarah and Rae for all the work that you put into this. Thank you for all the participants that stuck around for the Q and a. And of course, to Jen for all of your work to set up and manage the logistics. Jen?

Thank you. On behalf of the USDA, the conservation service I wanted to say thank you to Rae, Sarah, for providing an excellent presentation today. About wetlands and pollinators. Our water practices can benefit pollinators. Thank you everyone for attending today's webinar. Participants, do not forget to provide your feedback. If you select this, please return to your open browser window. You can continue this process for this conversation webinar. This will conclude our webinar presentation. [Event concluded]