

Inventory and Design Opportunities for Pollinator

Please stand by for realtime captions.

Test, test.

Test, test.

Good afternoon everyone. We will get started in a few minutes. Let me know if you can hear me. I'm having a little trouble with the audio bridge. Welcome to today's webinar about the inventory and design opportunities for pollinator habitat a working man's. I am a natural resource specialist for the national resources conservation services national technology support Center. We will get started with the presentation but just a few logistical items. This webinar is being recorded. Participants joining our in listen only mode and all audio is being broadcast through your speakers. Computer and mobile headsets can help you with your audio quality and volume. We still want you to participate in today's webinar so please put your questions or comments into the Q&A part. You can submit questions or comments however questions will be answered at the end during the question and answer session. If you are having audio challenges note the relay captioning link provided in today's Lynx pod. The captions open in a new browser window -- window. Please note the status bar indicator to the right of help in the Adobe connect menubar. All green indicates your network connection a strong while orange or red indicates a weak connection. You will need a strong connection. If you wish to make adjustments to your view of the webinar you can make them using the options in the screen share window. If you choose to view the presentation in full-screen mode you will need to hover your cursor at the top of the window to return the option to normal view. You would need to be in normal Butte to see the Q&A pod to type in questions. You can download a PDF of the presentation slides located in the today's handouts pod. We also have additional resources you may find helpful. With that we will now begin.

I pleased to turn the webinar over to Christine Taliga. Christine is the pollinator need for NRCS with extensive experience a good application of vegetative practices and pet materials. You may now begin.

Thank you so much. It is my pleasure to welcome you today to today's presentation on pollinator habitat application and conservation. Mace Vaughan and Nancy Adamson work for the [Background Noise] at the natural resource conservation service regional technology support Center. Mace is a conservation entomologist and codirector of the pollinator program and Nancy is the senior conservation specialist. Mace and Nancy [Background Noise] support Center, support NRCS implementation that enhances the diversity on farms and other working lands. Today's presentation is the first of a two-part series for pollinator habitat implementation. Our presenters will be highlighting the basic pollinator habitat needs, tools for assessment and further consideration for pollinator habitat placement in the landscape. Future presentation on October 27th will cover the pollinator habitat information contracting and maintenance side of habitat development. Along with today's program for your reference is a resource document for pollinator conservation. We are offering continuing education credits for certified crop advisors, the society ecological restoration and society of American foresters. Throughout today's program you are welcome to place your questions in the Q&A pod. We will answer these at the end of the program and any questions we do not get to we will be summarizing and providing as a reference material in the following weeks. In the meantime we have some interactive plans for you that will provide presenters with a little more information about the audience. Let's go to the first question. I am hearing a fair amount of background noise so if you could please mute your phones or your listening device, that would be great. Let's start with the first question, where do you work? If everyone would please respond to our first question. It looks like we have everyone participating from NRCS and other agencies. Let's go to the second question. Have you planned or contracted pollinator habitat?

While folks are voting and going to hard mute all of the lines.

That sounds great. Do you want to provide instructions?

The instructions are in the presenter only chat.

With these polls be answered I would like to turn the program over to Nancy Adamson to discuss pollinator habitat needs and assessment tools.

Nancy, we are not able to hear you yet.

Third time is a charm. Thank you for your wonderful introduction and thank you for setting everything up. I am still seeing the polls on the screen. Okay.

We are course continuing to see a lot of declines in sex and other wildlife habitat around the world so I just want to thank everybody for all the work you are doing to help conserve biodiversity on our working lands.

Insects and other wildlife need the same things we do to thrive. Food and water, shelter and a healthy community.

Even though we often focus on pollinator habitat, the habitat we are installing is equally valuable for other agricultural beneficial insects. We use the term beneficial insects to refer to pollinators and predators and Paris Deutz like this syrphid fly that eats larva and other pests. In ecology everything has a role but the idea of beneficial insects is agriculturally oriented and we also say insects but we really mean other organisms that are beneficial for agriculture as well like spiders and things that aren't true insects. Some other terms for those things, we might call them natural enemies of pests or bio control agents. Some of us that work with row crop farmers, even though things like corn and soybeans, if they get pollinated, we might have as high 10% higher yields but for a lot of those farmers the big benefit of this habitat is reducing pest outbreaks.

When planting for pollinators and other beneficial insects it is important to provide pollen and nectar throughout the growing season. Trees and shrubs are important means bring. Riparian habitats are important during times of drought. Fall blueprints are vital for migrating insects such as Monarch butterflies. Most NRCS planting require three Summer blooming in three late summer to fall species in all of the pollinator oriented plantings. The more diverse, the greater diversity of insects and they in turn support a lot of other wildlife. Boom time varies quite a bit so you need to determine what is appropriate in your region. Focus on native plants as much as possible.

Plantings also include early successional and conservative species. Conservative species like wild indigo or Rattlesnake master are present in habitats that need disturbance to thrive overtime. A native prairie is burned periodically or and understory in a longleaf pine ecosystem for those quote unquote conservative species to persist need disturbance over time. We often say early successional but in terms of plant traits, early successional is species that would dominate planting for the first few years. Also be sure they are appropriate for site conditions, soil moisture, pH and sunlight. Avoid treated it's [Indiscernible] include regionally appropriate host plant. If they are interested in certain butterflies you want to include those. We also have specialist these so if they are interested we have the information in the additional resources.

About 70% of bees nest in the ground or 30% nesting cavities or rotting wood with the exception of Applebee's and honeybees most are solitary so they are single moms that emerge and locate a big nest, collect food for their young in his mud, leaves, resins, oils and pebble for nest cells. These collect nectar and pollen while wasps as adults also collect nectar and pollen but they will collect other insects to feed their young. For example some wasps will collect stinkbugs and lay an egg and their young will hatch inside the stink bug and eat it from the inside out. In terms of being solitary and not dangerous to be around, they are very similar.

Here is an example of bumblebee nesting areas and bumblebee slope in a place that is good for mice. Underneath large grasses, in a brush pile, someplace warm and dry for their young.

When managing for wildlife habitat, we want to be sure one not to disturb one third or one quarter of the habitat at any one time. Depending on the equipment available a site may need to be burned or mowed annually. If you in the east, our trees go very quickly in one year so if you have to mow every year try to break up that disturbance through the year, maybe late winter and early spring and avoid the bird nesting season. This slide highlights some of the things that are important to leave in the landscape like snags and dead trees. This waddle was built at a local native plant garden in North Carolina and they wanted to make the garden look a little neater but preserve these stems that house a lot of insect overwinter and are also important for birds and other wildlife because they are feasting on those insects.

Many native bees are pollen specialists. There is a specialist mining be on Willow and a lot of act as have pollen specialists. These are a little different than butterflies. [Indiscernible] pollen specialist bees eat a particular kind of pollen but they might collect neck her from different plants. You can find lots of information provide host plants for butterfly larvae are important and everyone is familiar with the importance of native milk weeds and those milk weeds are excellent plants for lots of other bees and wasps. There other specialist butterflies that require host plants as well.

Now we are going to move to talk about assessing habitat and designing improvements. When you are working on the planning process you need to recognize existing habitat and identify habitat deficiencies and prioritize habitat improvements based upon land owner goals. We have a bunch of tools. Each state usually has a set of wildlife habitat evaluation guides you can find in the field office technical guide. For those of you not with NRCS the hold field office technical guide has been revamped and is much easier to find things in their so I encourage you to check it out and use the search feature. I think Mace actually has a teacher of it so you will be able to see that.

In an area where you are installing Monarch butterfly habitat or if there is interest you need to use the Monarch wildlife habitat evaluation guides that are appropriate for your region and those are found on this website. If you search NRCS and monarchs, that page will come up and there's a ton of good resources.

Xerces has some habitat assessment guides and these are wonderful tools for helping landowners understand different aspects of what chat insects need. That is a little different from the wildlife they have been focused on in the past. I remember visiting Louisiana years ago and the state biologist at the time pointed out a lot of the folks we might be talking to might not be that interested in pollinator habitat but they were interested in other wildlife and in habitat improvements we make improves the diets for lots of other species. These habitat assessment tools, I would take them out into the field and go through it with the landowner and bring it back to the office and fill it out with more details so it is a guide for planting over time. They might not want to do everything the first couple of years but over time if they are looking for more ways to enhance habitat this is a great place to look. We have different tools available for natural areas and range lands and now we have a new one for guards -- gardens and parks. It goes through these but -- [Indiscernible]. It includes nice illustrations of all of those features to help people look at the landscape from a pollinator or natural emanating -- enemy point of view. We have other beneficial insects and this one focuses on the habitat features that might be slightly different for things like beetles and bugs. One of our big focuses is leave the leaves. A lot of insects overwinter are in leaves so that is something that comes out here. It is really important as part of your habitat assessment process, check and see what the existing feedback is and NRCS has the tool developed that was originally designed for wetland restoration. It looks at a site and you try to see the existing feedback and if it would be better to manage that area to let the existing feeds germinate and thrive or sometimes there are plans that are already there that have been suppressed through shade and other things so maybe bending the trees were using prescribed burning would help restore those areas better than planting.

Now we will switch over to Mace.

Thank you Nancy. Give me a second. I'm using a different format so I'm just going to share my screen. I think you should all be saying that now.

Thank you Nancy and thanks everybody for joining us. We have got 500 people on. This is a great opportunity and we are really excited to share this with you. As Nancy gave you an overview, this is kind of the pollinator 101 and helping you initially ground ourselves in different habitat elements. Food, pollen and nectar, host plants, shelter in terms of nest sites and not to mention other wasps and beneficial insects. As I was thinking about preparing for this webinar, I wanted to inspire all of you with a wide variety of options for how to think about those habitat needs and the wide range of ways you could get that habitat into a farm landscape. I really want to dive into that and think about other beneficial insect or just amongst us, other wildlife habitat examples with this pollinator focus we could bring into a farm landscape. I want everybody to take a look at this image. Hold on one second. I want to make sure this is sounding good.

I would love for you to look at this farm landscape. I want you to think about it. This could be the East Coast or the Midwest. Probably not California but I want you to look at it and where you might incorporate habitat into this landscape. I'm going to go through a bunch of examples and at the end of examples I'm going to go through, which are going to be generic, they will cover a whole range, I will be walking through those but in the end I'm hoping you all might type in ideas maybe I have missed or things I noticed a lot of you have done pollinator projects are ready, are the things you have done that may be we overlook where we can capture some of that so at the end we will go to that chat box. Look at this image and keep it in mind. I would love to get your input on things you maybe have done I didn't cover.

When thinking about pollinator habitat, particularly with work with NRCS and thinking about Farmville conservation programs, when we work with planters and farmers and ranchers ideally we are thinking not just about pollinators but other natural resource concerns and other multiple benefits for the habitat we put in the ground. That is a great way to do more than one thing at once. What I'm asking people to do is the opposite. If you're working on cross water waves or filter strips or putting in buffers or windbreaks. As you think about these practices that are meant to help protect water quality or buffer against the pesticide or screening, noise reduction or wildlife habitat. Increased crop isolation distances or even beautify a farm landscape, thinking about conservation or natural resource goals but think about pollinators and beneficial insects and hone in on wildlife and biodiversity. I'm going to approach all of these examples from a pollinator perspective but in each of these we are thinking of multiple benefits and in your conservation work, why don't we do this in a way that is highly beneficial, not just to water quality in sediment and nutrient capture but supporting pollinators.

The obvious example that always comes to mind and has for the last 20 years are these wildflower meadows. Bringing Prairie back to the landscape. Obviously this is the way to incorporate high quality pollinator habitat into the landscape. Whether we are and in -- New Hampshire or the Midwest, using practices like the new wildlife planting habitat practice. I'm going to talk generic about the type of habitat but point to conservation practices as an anchor. For those of you that work with farm build conservation programs to give you something you should know about like the for 20 practice which is not yet available in

every state, there are a number of practices or practice standards that can be used. Going back whether we are in the Midwest or the East Coast, these are habitats seated on the ground. You also can plant things in particularly in drier environments like Eastern Washington where this photo was taken where we are going to need probably need irrigation to get a better practice established. There are a lot of ways we can bring herbaceous wildflowers into a landscape. I stuck this in the corner of a few of our slides. One thing Xerces has done with funding from the natural resource conservation service through a grant is to develop a third party certification for farms and farmers and food products that want to promote they are doing really good work for pollinators so we set up a suite of standards and we work with the third-party certifier whether you are in Maine, California or Oregon and they can certify whether they are meeting the criteria. Several habitat photos are taken from farms that are now certified so I thought I would throw that out there it is another potential benefit for a land owner but also something to know about into look for. Just going back, getting wildflowers incorporated into the landscape, obviously this is an important way to get pollinator habitat into a landscape. This can take so many forms. This is adjacent to a blueberry field in Oregon where you've got poppy and lupines and having that succession of bloom through time so we are supporting pollinators throughout the growing season. In some states we are still using the conservation cover practice standard for a variety of reasons which I will not going to now but traditionally for NRCS folks up until the advent of wildlife habitat planting we were using the conservation cover 327 practice. I apologize for the quality of this that I love the story. We have got farms that abuse this conservation practice to incorporate native grasses -- grasses into and under planting. That segues into native grasses in the mid-to late summer when the grapes are coming on for protection . This is an example of native plants and wildfires -- wildflowers and grasses. Here is a landscape where adjacent to a crop field we put in this habitat but moving forward there are other places where we can incorporate habitat. Pivot corners, this is an example from the [Indiscernible] valley of eastern Washington where this has been planted so pivot corners provided interesting opportunity that field borders. You can see if field border and then you cross over this block to another field border. They have separated 40 acre planting blocks with a field border full of native wildflowers design for pollinators and beneficial insects. It is an interesting landscape. Field borders don't necessarily have to be full of native wildflowers and grasses. They could be clover or some other less expensive low-cost easy to plant mix as well. One thing I want to make clear across the landscape when Nancy was talking about the habitat assessment guides they help us think about what resources are available across a wide area. Not all of your forage needs to be in one place. You can have a field border of Clover and maybe that is matched with early blooming wildflowers and shrubs that might be on a forest edge or maybe you have got another piece of habitat. What I want to encourage people to think about is there may be low cost ways to incorporate something into the landscape that would have a benefit. Ideally would be for native habitat but sometimes just getting in so Clover will do a lot. You see a lot of bees and not expensive or hard to do.

We could take the idea of a field border or a filter strip and incorporate native wildflowers. This was planted with poppies and hidden in a bunch of shrubs that are meant to capture the runoff coming in from the adjacent vineyards. Increasing filtration and grabbing excess sediments and nutrients and providing habitat for bumblebees in the landscape. Here is an irrigation canal in California. We have got these offers and a nice hedgerow planted alongside of it. Accomplishing the goals of a filter strip or maybe this adjacent riparian cover and supporting pollinators. I want to talk about hedgerows. Hedgerows may be relatively familiar. There have been hundreds of miles of pollinator beneficial insect hedgerows that have been planted in California over the next decade or so with supportive the NRCS. Nancy and I and our colleagues at Xerces and at the NRCS are thinking more about opportunities for hedgerows because it offers the straightforward relatively easy way to get pollinator habitat into a landscape and beautify a landscape. I think it is a useful practice that helps people take that step into native shrubs and wildflowers because you can incorporate native wildflowers into hedgerows as a way to get people engaged in pollinator conservation in a way I think is pretty straightforward. This is one of my favorites, one of the largest organic almond farms in California. They have put in thousands of feet of hedgerow along their farm roads. This is a conventional almond orchard that is also certified doing the same thing. Even small diversified organic farms, we have got it access road and adjacent to their tunnels they put a 500 foot long hedgerow in that landscape in southern Idaho. We go to Eastern Oregon into this cherry orchard, again running simple hedgerow of things meant to support pollinators. Going back to California some of these hedgerows can be monstrous in scale. You can see this long-running hedgerow along this riparian wet area. This is part of a buffer for this slew that runs through this rather enormous Allman orchard. It will be a really significant chunk of habitat and that landscape. I don't feel like folks in the Midwest and East have thought much about hedgerows. This is again running along the road that fits nicely into the landscape and part of beautifying the farm and the landscape. Nancy also worked on this diverse hedgerow in North Carolina close to the NRCS technology support Center and again diverse planting and set up in a place running along the road so it is visible and yet out of

the way. I just feel like hedgerows are great opportunity to incorporate pollinator beneficial habitat. Something I think a lot of folks in the Midwest and East haven't thought about as much but offers some great opportunities. Coming back to this idea of riparian cover, there are a number of practices weirdest herbaceous borders or forest buffers or streambank stabilization, by protecting riparian corridors we can protect water quality and also create this pollinator habitat. Even if you are just going out there and it is long a riparian area or May. Cranberry bog and a water holding pond, they are good for helping jumpstart bumblebee queens in the springtime. You can ask your local nurseries for mail willow plans. Willows have male and female plants. The mail plants are releasing pollen and it is the early spring pollen that is desperately needed by our Spring emerging pollinators. Mining bees like this when you, if we could ask our nurseries to tag those plants that are males and take cuttings from those plants to plug along any riparian or wet area has quadrupled the benefit. And throw extra seed if you happen to be worried about willow seeds. Male willow plants, ask for them by name. Riparian areas can be places you've got this late season forage particularly in drier landscapes. Plants that like to have wet feet but they bloom prolifically in the late summer and early fall and make for a nice picture when you out there with your kid. Like those riparian areas are helpful, and also wetlands. In the West we are working to get as much milkweed planted as possible to support the Western population of the monarch butterfly which is in dire straits and willow ends at being places where milkweed has a greater chance of getting established. It is not the greatest picture but the seasonal wetland on an organic farm in southern Idaho went in and planted a bunch of milkweed in the milkweed is growing and it really likes to have wet feet and helps it establish well. It has been established -- a challenge but thinking about wetlands is a great way to do that and reemphasizing the point wetlands really help us with that late bloom. When we have got wetlands in and around our farmlands it is a great place to get that bloom in the landscape. When I think about the Midwest and the East, some of those letter areas also have plans like Golden Alexander support plans that like things a little wetter that come out in the early spring. The Prairie pothole region of the Dakotas, the wetland borders we have got an enemy of other plants not abundant in the landscape at in-depth being important. Wetlands overall just provide great opportunities. For those of you that work with programs like the wetland reserve program or today the ag conservation easement program, those programs target funding toward wetland restoration. And I think affords a great opportunity to incorporate pollinator plants and native plant biodiversity and good an official insect habitat into a range of landscapes. I can't say enough good stuff about wetlands. I want to shift gears away from practices that for the most part have focused on native planting into think about cover crops and how we can incorporate pollinator habitat. The cover crop crack this and cover crops in general if they are allowed to bloom afford a great chance to incorporate may be a break in the cropping or the past cycle and an ability to work on soil health and produce a bloom from buckwheat, clover or mustard to add a flash of plants into our landscape. These can be incorporated in a wide range of places. Here is a clover understory edit orchard. Having a cover crop, again you are in California. Maybe plantings like this crimson clover into this farm in North Carolina or may be some relatively inexpensive native plants and getting those planted in the landscape. Since there are a wide variety of ways to do that. One effort we have providing help with is our hope the NRCS cover crop practice will have an updated purpose starting hopefully in the new fiscal year that puts a spotlight on pollinators and an official insects for that practice standard and hopefully that will help us build scenarios.

Even without conservation practices or financial assistance, you can just put in strips of wildflower that can cheaply and easily go in to add additional bloom to that landscape.

Other practices that includes thinking about the cropping system itself is Allie cropping and put into verse shrubs for berries or nursery market plants. Maybe legumes that provide nectar and pollen. We might also switch gears a little bit and also think less about planting habitat and more about exposing habitat. Nancy pointed toward this with the idea of thinking about the planning process it is important to have a sense of whether or not you have seeds in the seed bank ready to jump up if for example you able to open up light or create the open safe or that early habitat for example for all of a sudden you get have a variety of high-value pollinator plants jump up. This is a farm in eastern New Hampshire where they have got a hay meadow on the left and they took this forest edge and pushed back. Up in the feet they pushed back came this bloom of goldenrod and native wildflowers and shrubs that pretty much in the first year provided a nice transition to the forest and abundant forage for pollinators. One can do that thinking about forestry practices. You is a whole suite of practices, some of these I will come back to. You can use these management practices to open a potentially that seed bank and get an abundance of wild flowers and shrubs. We have got a colleague in Oklahoma who has a small acreage that looked like this a couple years ago full of Eastern red Cedar. They took out the red Cedar, I don't have pictures of what it looks like today, but I do know he has had in this case wildflowers jump up in abundance. This idea of breasts -- brush management is being used a lot to create monarch habitat and pollinator habitat just by daylighting the seed bank and seeing what will come up in the

follow-up to removing those invasive species that have moved in. Thinking also about the forested landscape. Silver cholla is getting a lot more attention or grazing management and using grazing as a disturbance tool to maintain open habitat and knockback grasses to have wildflowers flourish or alternatively to bring a lot of livestock in and disturb the site interior prescribed grazing plan get that site a lot of rest and time to recover so you got your bluebonnets coming up in the aftermath of may be a heavy graze and thinking about how we manage grazing that were encouraging diversity and abundance and allowing plants to bloom which is important to think about when we think about using disturbance as a tool. Sometimes we get focused on maintaining the community and an overall diversity of plants but if are going to benefit pollinators we have to think about the bloom time and those pollen and nectar needs.

We could switch from this native range setting here in Texas to dairy pasture management in Wisconsin. Wisconsin NRCS has been a real leader at least in my work to develop and implement pasture management plans that incorporate these same practices. Over seeding with red clover or alfalfa and then increasing may be the number of paddocks and increasing the rest time so you allow the forged legumes to have a greater likelihood of coming into bloom and they are able to produce that bloom for a period of time and have the benefit for bumblebees that produce more forage in the landscape for the cows. Maybe the forage quantity is a little less but the quality is more and you have got more resilient pasture and a greater root depth which helps those pastures be more drought resistant, lots of benefits that can come about.

To cycle back around to the idea of management, one thing that is valuable is recognizing need to have quality habitat. Here is a photo from southern Idaho late season. You've got a mix of milk weeds and pretty nice sagebrush habitat. How do we take similar habitat and protect it. When thinking about pollinator conservation and practices on the ground and thinking about integrator pest and pollinator management. We don't have time to go into great detail but whatever we could be doing to help landowners and help them implement the use of a wide variety of practices like good sanitation and crop rotation and conservation bio control and focusing in on plant health to avoid problems so we can avoid having the potential risk of chemical controls and how we use these tools to prevent drifted and insecticides from getting into our habitat. We can also be pretty directed and create vegetative barriers as a way to help minimize or reduce pesticide risk. Build plant side [Indiscernible] things like conifers that are really helpful to grab any drifting insecticide dust or sprays in the landscape. Nancy and I have work with the national forest to center over the years to put guidance on this and we will have those in links here and in the handouts online to help you understand how to drill the drifted barrier to help capture drifted from adjacent land and protect habitat or even buffers for say an organic farm.

I wanted to wrap up by focusing on managing existing habitat. Whenever we have got decent quality landscape or gone through a lot of work, review [Indiscernible] intermediate disturbance whether it is fire or grazing and balancing the timing and scale with the needs of the plant community and the pollinators that are present is important to keep in mind. Dealing with small habitat patches gets to be onerous but not managing the whole site at any one time is one way to think about that. May be managing a third or half of the site with the burn so we maintain refuge habitat or a place where pollinators a safe and able to move into the existing habitat.

I told you I was going to come back to this and we talked about the idea of opening up and daylighting or pushing back forest edges. Planting hedgerows. Wetlands or prairie planting or plantings along roadsides. What are other practices that may be I have forgotten that you all would like to suggest that may be helpful to think about? Hopefully you can all see in the options category things you have done that may be think I haven't covered that would be useful ideas. Jen if you wouldn't mind if it is possible to widen that option box. I'm going to chat about these a little bit as they come up. The idea of crop interceding. One thing NRCS is interested in right now is something called conservation crop rotation which is like crop seating but incorporating a pollinator friendly crop into a rotation and also this idea -- you guys are amazing, adding diversity into a cropping system. I have seen folks planting under crop in the understory of corn and sunflowers and clover and other things growing up in the court understory so when the corn was cut they are ready to jump up so in a way that might be crop interceding. Fire breaks and forest areas as a way to read dates -- reduce fire risk and incorporate herbaceous wildflowers. Stormwater or bio retention basins, definitely. We have got a farm in Oregon that put two high tunnels and they needed a swale between the space. What a great spot to put plants that like their feet a little wetter that might be able to jump up. Milkweed loves that kind of habitat. That is a great area. What areas enter fields that could do a bit more buffering. Definitely. Anything we can be doing, I want to see those buffers be full of native wildflowers but if they need to be mostly grass, that is okay. Which is trying to get diversity and do the best we can. I think about that, how do we manage the forest for the greater benefit of pollinators so they could use those glands. We are looking at this in cranberry bogs in the Northeast. Can we push those forest edges back to increase that interaction and maybe create safe places away from insecticide use from which bumblebees and things

can come out. Planting in clumps or groups. That might be something to think about informal landscapes. You've got these farm equipment said and farmhouses. There is something to be said for creating habitat and those landscapes and planting native or non-native shrubs and trees and wildflowers that can be of benefit to pollinators. All of that is possible and could use a practice like tree and shrub planting from the NRCS to bring a bit of money to get that in the ground. When designing habitats, if you only doing small plantings, lumping things together is pretty nice and have a nice walk of flowers come into bloom at one time. Pivot corners. Companion planting, some of the photos I showed with the Crimson clover tech 10 with a variety of say diversified plants is really good but even planting in general. I don't know a ton about that but putting together plans like tomatoes and carrots and allowing things to go to bloom in the landscape is really good. A lot of septic grounds you don't necessarily want trees moving in so maintaining an open habitat is a good way to go. Dry environment is tough. One thing I did not talk about that is getting a lot of attention in the West, people are working on game bird conservation and the idea of rewarding stream corridors and using cheap methods to hold back a little extra water. Maybe like a row of stones in a small slew or reentry or drainage area that when you do get a rain event it holds back a little water and makes it easier to get herbaceous plants and diversity into dry landscapes. Putting in devices that are meant to just slow the water in a more perennial stream and make it easier to have beaver move-in and create wet meadows that used to be so abundant in the West. Anything like that that can help create a little more wet habitat in a dry landscape. Tail water return ponds. I have got good pictures from your neck of the woods. You have got a habitat teacher. You've got an agronomic teacher meant to capture sediment in these tail water ponds before it goes into adjacent sloughs or waterways. What a great place to ring those ones with high pollinator habitat. Native plantings instead of weed whacking. No till and crop acres. No till can do a couple of things. If you think about having a no till system that tries to have plans growing all the time that is the potential to bring more bloom into the landscape. When you think about the ground, we have got these nesting and crop fields. That can go a long way to Fort helping to support a few more nests in the landscape. Reduced tillage practices will have all of these great agronomic goals and agronomic benefits and offer a fantastic opportunity to support a few more nests is. Cover crops. The challenge there is how do we have cover crops allow them to choose species good for pollinators to manage that bloom so we are not necessarily dropping in seed that could interrupt next years cycle. I am a huge supporter of bringing in something that would jump up fast after a small grain harvest to get more bloom in the landscape. Riparian buffers for sure. Let's move to Iowa and get those waterways buffered up. Crop tree management, release the trees valuable for wildlife [Indiscernible] digging deeper into eastern and midwestern hardwood forests. So many of those trees like the cherry and the maple provide of pendent forage for pollinators. Thinking about forest management, whether it is crop trees or native trees in the landscape, there is a lot to be said for thinking of that and identifying trees of value for pollinators. A tree is like a three-dimensional meadow. If you have got [Indiscernible] acres and acres of wildflowers in one giant standing tree so we shouldn't overlook trees in the landscape. The forest service in the West is thinking a lot about that right now and those right of ways whether they are roads or powerlines I didn't talk about much but PowerLite and pipeline right-of-way is something that needs to be maintained and provide great opportunities although frankly in a farm system there used to grow cocktail but this right of ways provide lots of opportunities. Gardens and landscaping for sure. This idea of buffers between urban and ag areas. The wetland picture I showed, this is here, how do create something that could be the suburban landscape that is against the wetland against [Indiscernible] have the interface cleaner and nicer to help beautify that interaction between urban and ag areas. It is a good idea and an important thing to think about. This gets at the beautification example. Can we help beautify the area and beautify the interface between the farm and adjacent urban areas. Wider space allowing more light and more understory plants potentially. Enter planting beds. Downed would for sure, particularly in the Midwest and East will we have got a lot of bees that will move into writing would. -- Rotting wood. One thing we were talking about yesterday with the cranberry folks you might push the forest edge back and maybe shrubs aren't jumping up so can we enter plant high-value shrubs into like the open area interface and enhance that. I love the idea of prairie strips. The one challenge to think about is to make sure we are minimizing insecticide exposure risk but what a great way to capture sediment and nutrients and at the same time bring corridors of pollinator habitat into a farm. Contour buffer prairie strips is a good practice into make sure we protect that habitat from exposure.

Invasive are always something we need to think about. We need to do with them first. We will cover that more in October as we talk about the design and planning process but it is a great point. It is not always true we just remove plants and good things come up. Keeping cover on the soil at all times, even if they are just clover or something. What them borders and farm ponds. Contour buffer strips. Planting trails and roads into forests is a great idea. Riparian focus is a great way to do things. A row of common some flowers. Provides [Indiscernible] self-medication. The are for bumblebees super plans and that really benefits them so that is

something to think about. Creating pollinator projects for landowners. This day loss of ideas helps to think about this a ton of stuff that is not expensive. It is a challenge to track it but frankly [Indiscernible]. In places like area -- planted good plans holding soil on deep slopes in you can use plants that benefit the pollinators. There are tons of great examples. Solar arrays. Edge habitat. So much of our native range is high quality habitat and if we spend time thinking about good range management, managing for drought resistance and resilience. Managing to allow Bloom to happen, we don't need to see it in the high quality native range, we manage high quality habitat. The idea of ceding roads. Landings. You guys are a wealth of great ideas. I hate to cut it off but I think I'm going to just so we are able to make sure we have got time to answer some questions. I think people can scroll through it. Such a wealth of ideas and I apologize for those who chimed in later on but just great.

Let's head to the home stretch so we have got time to answer a few questions. Nancy has put together a list of resources that will be an attachment when this is on conservation webinars.net. There are number of resources I want to point you to. One thing we developed with the NRCS is a simple brochure on farming for pollinators that in a way hits that when I covered. The variety of ways we can incorporate pollinator habitat into a farm landscape. You can download a PDF from this website or the Xerces website . If you need copies, let me know. We have another one for beneficial insects too but let us know if you want copies. I just can't say enough about the resources developed by the NRCS. This note I authored a few years ago [Indiscernible] farm bill programs provides a great outline. Even though this is about the 2014 farm bill, it is useful in how to use programs. A number of these conservation practices I have talked about already and there are resources available online but I want to come back to the field office technical guides. If you go to this website down here, everything each state has developed for pollinators or monarch butterflies is generally available online. Everything from implementation requirements or specification -- there is just a wealth of information. When you get to your state if you go to the keyword search and hit pollinator you will be able to pull up the relevant materials. If you don't work with the NRCS but curious about information look for information for your state and adjacent states. If you are in Pennsylvania there may be stuff in New Jersey that may be helpful. Five years ago I was not a fan of the technical guide in these days I really am.

At Xerces we spent the last 20-25 years building tools to help you do pollinator conservation work. Everything from habitat assessment [Indiscernible] the whole suite of resources. There is a wealth of information. Habitat installation guides and check this is. Everything for farmers to homeowners. It is really meant to meet you where you are at and meet your needs no matter what you landscape. A number of books we have put out over the years to help in this process as well. Everything from attractive [Indiscernible] these are mostly available through your local bookstore. I just want to say thank you. We are donors supported nonprofit.

Why don't we tackle your questions or burning things that might be out there. Thanks for rolling with me. Chris, maybe I would turn it over to to help facilitate if that is okay.

Thank you Mace. That was an incredible overview of pollinator habitat options in landscape settings and really appreciated everyone's participated that in the brainstorming session that enrich the program. It was wonderful to see your participation. There were a few questions came out in the chat and one was the issue with planting non-native tropical milkweed. I would discourage planting tropical non-native milkweed as they can become invasive in your area and get released into natural areas and cause disruption with natural ecological processes. There is a variety of native milk weeds. We would strongly encourage you to go from the native milk weeds and if the nursery is out, request them because that is positive feedback to the nursery industry. Anything to add on that Mace?

The only thing I would add the other issue with the tropical milkweed is if you're in the southern United States it does not die back. What that means for monarchs, there is one disease in particular that leaves us behind Edwin tropical milkweed doesn't die back in new monarch butterflies land they can become infected so it is another reason to avoid using tropical milkweed and to focus on natives.

I'm not seeing a lot of other questions. We had a great brainstorming session there that really contributed to the placement of pollinator habitat in the landscape settings. Is there anything Nancy you would like to add that you came across during the second part of the program?

I see Angie was asking about converting existing hay fields into pollinator habitat. We have a bunch of new resources on our website and one is a guide on options for organic site prep. It has a whole set of tools for timing in different regions of the country and all the information is free online. If you type in Xerces and organic you will probably jump to the page. There are links in the additional resources page. If you have any trouble finding it just right to me and I would be happy to send that to you. We also have another document about seating into while fire Meadows. -- Wildflower Meadows.

Chris, I'm worried you might not be looking at the right Q&A pod because a bunch of questions are coming in. I can hit a couple of them. Marcos wrote a couple of questions about irrigation. Irrigation can be an issue

in the arid West, is a good information for pollinators? For pollinators I wouldn't worry about it too much. If you're interested in helping beekeepers having some clean Shallowater in the landscape is helpful for honey beehives. When it comes to habitat particularly in the West we will put drip irrigation on hedgerows and I recognize that can be a challenge but oftentimes if we choose drought tolerant plants we can put it a couple years of drip irrigation that could go a long ways in getting the plants well established to take the irrigation off. In general would try to think about management or re-wedding landscapes or tying into existing irrigation. Planting tail water ponds if there are places where there is extra irrigation water being captured and a potential habitat area we can take advantage of some of that extra water. It is important to think about what is needed for that.

There is a question that says what if weeds like [Indiscernible] are important for pollinators, is there a way to convince local weed management boards some of these more widespread things can be okay? In general we don't want to support invasive species and most states have their own invasive plant list. For [Indiscernible] recommend planting some native alternatives. For fissile [Indiscernible] fissile [Indiscernible] it is detrimental in restoration projects. Many native thistles are helpful to pollinators. The Xerces society has a great conservation webinar to knowing your native thistles. There are many native alternatives that know the non-native invasive species noted as obnoxious weeds. We definitely need to stay away from that.

There is one other question from Peter, can you discuss the impacts of non-native vegetation on native pollinators? We could spend a long time discussing this but lots of non-native plants are fantastic for pollinators. Mace covered some of the cover crops but when we talk about invasive plants, not everybody is familiar with that but part of the definition is it reduces the biodiversity in the habitat it is invading. When we reduce the diversity of plant species, that is reducing the diversity of insects but there is a plant that isn't invasive, oftentimes it can be valuable to pollinators and other insects but native plants have a lot of other connections in our environment we don't fully understand so when we use native plants we are supporting a lot of relationships that may be we don't know about. One of the things I'm excited about is people are able to document where they are seeing insects on different plants and maybe an insect that depends on pollen and nectar from a certain plant also depends on a particular plants [Indiscernible] blends into that species so there is a lot of connections between native pollinators and native plants and lots of other insect relationships with native plants we don't fully understand. We like to promote this connections. As long as it is not invasive there is lots of good uses for non-native plants as well.

Nancy, there's another good question, [Indiscernible] how have you dealt with planting these in range lands with [Indiscernible] I can't remember if this was something mentioned, but in some work with the ARS experimental station that deals with poisonous plants, there have been extremely few cases of poisoning livestock related to milkweed and only in extreme cases where there was no grassland forage left on the landscape and only milk weeds were remaining handing providing no food alternatives to grazing animals, most grazing animals will avoid plants that are poisonous to them or only graze on them at stages where they are not poisonous. Milkweed on rangeland are of minimal effect to livestock poisoning as far as I know. Mace, do you know anything else?

I think that is 98% debt on. They said in talking with those scientists they haven't seen anything with cattle since the Great Depression. I spent five years asking every range management specialist I could about this. The only stories of milkweed poisoning I was able to get involved sheep getting into some very narrow leaf milk weeds that were more toxic and being fed upon by animals [Indiscernible] a little more tolerance for things that probably don't taste very good. I went to a site where watched a bunch of cattle choose milkweed to the nub and everybody looked fine. There is a lot of cattle that will feed on milkweed flowers all the time. It just does not seem to be a concern. But definitely watch out maybe for you sheep. Poisonous plants also depend on other choices for the animals in question. I think what you are getting at, so long as you are managing your range so you don't only have an entire stand of milkweed left, you are generally find. Bring on the milkweed.

We have a great overview of questions here. Cheryl asked, are there any milk weeds you should not plant together? I've read [Indiscernible] common milkweed and going to plant other species but don't want to contaminate my established common milkweed.

I am not an expert in the hyper cessation of the milkweed species but I can tell you many species grow together on the landscape and they have their own niche in the ecological habitat so it depends on if you are planting milkweed species in the close setting such as enhancement planting or if you are planting milkweed on a broader scale, several acres in size. Many milk weeds can cooccur on a larger landscape level and they find their own niche in terms of moisture levels and preference to soil type so they do find their own micro niche in the landscape and it isn't generally an issue to plant several native milkweed species on the landscape. Nancy, do you have anything to add?

No, that is good. I would may be recommending using plugs for some species and that might not be available via a seed. Jen, will the recording and or do we have a little more time?

We have a little bit more time. The captioning will be shutting off soon.

Nancy, thank you so much. How about if I wrap it up and we take the rest of these questions and come up with answers and post them in a few weeks on the conservation webinar website. With that I would like to thank you all for your contributions in the brainstorming and these great questions you have provided that we have had a chance to take a stab at. We hope today's presentation provided you with a well-rounded overview of pollinator habitat needs, assessment tools and habitat placement in the landscape. I would very much like to thank you expert speakers Mace and Nancy who work tirelessly to help facilitate biodiversity on agricultural landscapes and their work with NRCS and in their work with the Xerces society so thank you. As a reminder I would like to let you know our second part of this pollinator habitat development program, the contracting and maintenance component will be offered October 27th. We hope to see you again at another session and hope you will bring your questions and interactive interest to that session as well. The replay of this program should be available in the next two weeks and we will also provide today's presentation with slideshows and a summary of the questions following the program when we post the information. Thank you so much everyone. Jen, any closing comments?

On behalf of the USDA and natural resources conservation service, thank you to Christine, Nancy and Mace for taking time out of their schedules to provide an excellent presentation about the inventory design opportunities for pollinator habitat on working lands. And thank you again to everyone for attending and with that I will close out the webinar.

[Event Concluded]