

Zoom: PSC Virtual Training 2026: CHUY-7631 - info@pollinator.org

Participant: Wordly [W] English (US)

[W] Just a note about the Q&A period.

[W] There are a lot of questions that get asked each session, more than we usually have time for.

[W] So not everyone's questions will get answered.

[W] But you can email us at stewards@pollinator.org.

[W] If your question was not answered, and we'll try to respond to you as soon as we can.

[W] You can also scan the QR code on this slide, or use the link we sent to you in the chat or by email.

[W] If you'd like this webinar translated in your preferred language.

[W] As always, please engage with respect and kindness in the chat.

[W] And as mentioned on all of our previous sessions, we suggest that you write down in point form or 1 to 2 sentences, the key takeaways from each training while you're attending live, and this will make it easier when filling out the step one form when it is sent to you in April.

[W] Okay, so we have three guest speakers joining us tonight.

[W] Jordyn Phelps is the B city, Canada Canada program coordinator for Pollinator Partnership Canada.

[W] His passion for pollinators was sparked as an undergraduate at Western University in London, Ontario, Canada, where he studied animal cognition and learned about the incredible feats of learning and memory that bees and other small brained but mentally mighty pollinators are capable of.

[W] He went on to complete a master's of science at Western in Neuroscience, where he studied how exposure to common pesticides impacts the ability of bumblebees to learn about and gather food from flowers.

[W] Welcome back Jordan.

[W] Andy Grinsted is the senior conservation manager at Pollinator Partnership.

[W] Andy grew up in Indiana, where he developed an enduring fascination for nature and exploration in the dense hardwood forests of the Hoosier National.

[W] He completed a master's specializing in ecological restoration.

[W] He has worked in the Northwoods of Minnesota, Great Plains of the Dakotas mountains and foothills of Colorado, expansive deserts of New Mexico and cascading gorges of upstate New York, a common theme throughout his career has been community engagement and volunteerism in support of natural resource management initiatives.

[W] Welcome, Andy and Hannah.

[W] Franklin is the project coordinator at Sierra Integrated Services.

[W] Hannah has held a deep appreciation for the natural world since childhood, which led to her obtaining a bachelor's of Science and Master's of Science in Biological Sciences from Sacramento State University.

[W] Her undergraduate research investigated the molecular basis for tolerance to climate change induced stressors in red abalone, and her thesis work studied the drivers of a genetic mutation related to tumor formation and antibiotic resistance development in a bacterial model system.

[W] She has worked in utility vegetation management over the last few years, where she brings her unique molecular perspective to solving landscape level challenges.

[W] Her current role is as a project manager for Sierra Integrated Services, a land management company providing services to utilities and private and public landowners on the West Coast.

[W] Welcome, Hannah.

[W] Okay, so that's it for our introductions.

[W] We'll get right into the presentations and we'll start off with Jordan.

[>> W] Sounds great.

[W] Thanks for the introduction, Anthony.

[W] See if I can share my screen.

[W] How's that looking?

[>> W] Looks good.

[>> W] Perfect.

[W] Thanks, everyone, for being here today and for your interest in supporting pollinators.

[W] I was speaking last night, so if you attended yesterday's talk, hopefully you're not sick of me yet.

[W] If you did attend yesterday, you heard me speak about what residents can do to support pollinators in their communities.

[W] And tonight I'm going to switch gears a little bit and talk about what can be done from the perspective of municipalities.

[W] So I'm going to be speaking more to that audience directly today.

[W] But of course, there will definitely be overlap for yesterday, I spoke to what residents can advocate for, and today I'm speaking about what cities and towns can do.

[W] As Anthony mentioned, I coordinate the City Canada program at Pollinator Partnership Canada, so I have the privilege of seeing many different approaches being taken in different municipalities across Canada.

[W] So I'm going to divide the talk into three main sections to talk about habitat creation in municipalities.

[W] Some habitat management considerations, and also empowering residents to create habitat, which generally involves policy and programming, and is a really important component of this.

[W] So I'll start with creating habitat and municipalities.

[W] This talk is fairly brief, but 10 to 15 minutes.

[W] So I'm going to be keeping things pretty high level focused on kind of the breadth of actions that can be taken, rather than getting too deep into the nitty gritty of habitat creation.

[W] Sarah's talk yesterday and the talks after me will get a little bit more into depth on this.

[W] So this is mostly going to focus on kind of different types of habitat projects and some considerations for them, as well as different ways to get residents involved.

[W] So first, one of the most common and basic types of habitat projects within municipalities creating native plant gardens.

[W] These can be created in parks, downtown areas with high foot traffic.

[W] Ideally their signage, so people can see these gardens and learn about them.

[W] And then also in residential areas, pretty much they can be created anywhere that there's space.

[W] There's lots of considerations I could go into about how to create these spaces.

[W] But as I mentioned, Sarah provided a lot of really good info last night on this, so I recommend you check out that if you're looking for details on pollinator gardens.

[W] Next, we've got edible gardens, orchards, and food forests.

[W] These are a win win for pollinators and people.

[W] They provide pollinators with lots of food in the form of pollen and nectar, and they provide us with fresh produce.

[W] So for these, you can think of fruit trees alongside lower growing fruits and veggies.

[W] The pictures I've got here from Grand Prairie, which is a city in Alberta, and they actually have an edible landscaping policy.

[W] So they're intentionally integrating more and more fruit trees year after year, and residents are actually able to kind of gather food freely from these, so supports pollinators and also provides food to residents.

[W] If your municipality has the resources, larger scale naturalization projects can really give a boost to local pollinator populations.

[W] These spaces also help to restore landscape functions more broadly, boost biodiversity, minimize maintenance costs in the long run, and provide residents with much needed access to nature and its restorative benefits.

[W] So for these, you can think of parks, roadsides, shores, utility lands again, anywhere there's space for them.

[W] These these are fantastic.

[W] So the image on the left is from the Meadow project, which is a really great naturalization corridor project that's ongoing in the Toronto area.

[W] And the picture on the right is a picture from Guelph, Ontario of a hydro corridor restoration.

[W] Create habitat networks.

[W] So rather than just simply creating habitat, try to think strategically about creating patches of habitat that make the entire area accessible, rather than having more isolated pollinator spaces, a really good way to go about this is to create a pollinator habitat map.

[W] The one I've got on the slide here is a really good example.

[W] This was created by Pollinator Paradise Project in Hamilton, Ontario.

[W] So you can see they've got all kinds of dots across the map.

[W] It shows residential gardens, community gardens, lots of different types of gardens.

[W] So that way they have a good idea about where these different pollinator spaces are and strategically can create new ones in areas where these gaps exist on the map.

[W] And lastly, for this section, something I'm particularly excited about dedicating municipal resources to native plant propagation.

[W] As I mentioned in yesterday's talk, if you were there, often valuable greenhouse space is devoted mostly to growing non-native ornamental plants that don't have as much ecological value, and we are starting to see municipalities devote greenhouse space and staff labor to increasing native plant stocks, in some cases through V city.

[W] So a really good example of this.

[W] Guelph, Ontario, started a pilot program back in 2019 and now grows over 80 different native species in their greenhouses.

[W] And they've got a really good loop going where they collect seed from local plants in the fall, grow them in the greenhouse, and then integrate those plants into the pollinator plantings year after year.

[W] So it's a really good way to kind of make these plants a little bit more cost effective.

[W] Once you have a good system going and there's a similar program that's happening in Whitby, Ontario, as well.

[W] Now I'm going to touch on a few municipal habitat management considerations, but I'm not going to spend a ton of time on this section.

[W] Main point I want to make is it's not enough to just create habitat.

[W] There needs to be a plan in place to make sure that it succeeds over time.

[W] So here I wanted to really briefly highlight integrated vegetation management as a broad strategy to protect native plant communities.

[W] This tends to involve targeted methods of controlling invasive species, such as by mechanical or chemical means, reduced or strategic mowing to promote native plant success, and many more things that are beyond the scope of my 10 to 15 minute talk.

[W] One I mentioned yesterday, if you're at my talk.

[W] Urban development habitat standards, this is really important.

[W] This is a way for municipalities to make sure they're considering pollinators as they grow.

[W] This can include things like minimum requirements for having native plants integrated into new urban development projects.

[W] It can also include incentives for developers to go above and beyond.

[W] There's often minimums, but it's really good to also have incentives.

[W] And this can include things like creating a native plant garden, green roofs.

[W] Minimize artificial nighttime light.

[W] So particularly the overall quantity and the intensity of light.

[W] This can be done by favoring warm colored bulbs, fixtures that minimize glare and ideally, motion sensors so that light isn't on when when it's not needed.

[W] Artificial nighttime light has been shown to have negative effects on nocturnal pollinators, including moths, and has impacts on ecological functions much more broadly than.

[>> W] That.

[>> W] DeLay yard waste collection in your municipality if possible.

[W] DeLay kind of cleaning up gardens and yard waste pickup until temperatures are consistently about ten degrees Celsius for a couple of weeks.

[W] This is kind of a rule of thumb that we use so that hopefully most pollinators will emerge from from the plant material by then, of course, this also applies to management of municipal native plant gardens.

[W] And this is something we haven't really seen many municipalities do.

[W] We're really trying to promote delaying yard waste collection.

[W] So that it can also kind of be an educational opportunity for, for people to learn about, to find out, oh, there's not going to be yard waste pickup and then wonder why and then learn.

[W] It's about this.

[W] So Toronto tried to do this a few years back and ultimately council didn't move forward with it.

[W] But it's kind of a forward thinking idea.

[W] We've been considering and promoting.

[W] So if your municipality is interested in doing anything like that, it could be a really cool educational campaign.

[W] And lastly, I'm going to talk a bit about what municipalities can do to support residents in efforts to create habitat.

[W] Often, municipalities have strong goals to support biodiversity, so it is really important that they do what they can to bring residents in to help them achieve those goals.

[W] It makes them much more achievable.

[W] When you have residents on board.

[W] One big one that we're seeing come up again and again lately is the importance of having lawn bylaws that don't restrict habitat creation on esthetic grounds.

[W] So one of the major issues with lots of existing bylaws is that they include pretty vague language.

[W] So think of words like messy, unkempt.

[W] These are terms that can be subjectively interpreted by bylaw officers.

[W] So it kind of makes it unclear for residents what they can and can't do with their yards, depending on how things are being kind of enforced locally, especially considering these bylaws were generally created with conventional turf lawns in mind, not with pollinator gardens that have plants and kind of varying heights, and lots of different diversity in mind.

[W] So turf lawns, while many people do enjoy them, they don't tend to provide much value to pollinators beyond the occasional plants that might pop up, but also invasive species might pop up too.

[W] So there's I'm not going to get into.

[W] No, mom, it's definitely a complicated topic, but it's really important that bylaws make it possible for people to take more ecologically mindful approaches, whether that's someone that wants to naturalize their whole yard, or whether it's someone that wants to have kind of a neat, contained pollinator garden, and then also some turf grass that's being used for recreation.

[W] Because turf grass is great for recreation, we want people to be able to do kind of either of those things, depending on what what they're going to enjoy.

[W] So overall, we recommend advocating for bylaws that focus on the health of people and plant communities, ideally by having an explicit list of prohibited plants.

[W] That includes noxious plants and invasive species.

[W] So just plants that are kind of presenting a clear threat.

[W] And then of course, maintaining restrictions on plants that that block out pedestrian or a driver's sight line.

[W] That's also a genuine threat to human health.

[W] That's important to be in there.

[W] If there is going to be a height restriction, that should ideally be focused on turf grass specifically, and then turf grass should be very clearly defined.

[W] So that that's not applied to, for example, other grasses.

[W] The city of Toronto changed their bylaw 3 or 4 years ago, and they integrated a lot of these changes.

[W] So if you do work for a municipality and you're interested in reviewing your bylaw, that is a really good one to start out with.

[W] You can also check out the Ecological Design Lab at Toronto Metropolitan University.

[W] They've got really great reports where you can see different examples of of bylaws.

[W] So going beyond kind of the the front yard, it's also becoming more common to allow residents to plant on sidewalk strips or boulevards, that chunk of land between the sidewalk and the road, where there's often not a lot going on.

[W] So checking out Boulevard Gardening bylaws is also a really good idea.

[W] Provide pollinator habitat grants and rebates.

[W] One of the barriers to residents creating habitat is the cost of native plants, and by offering these grants and rebates, municipalities can significantly reduce this barrier either by kind of making them free or reducing the price.

[W] To some extent, we see this happening in Canada through pollinate two grants in Toronto, where community groups can apply to receive a grant to create pollinator habitat, and also through Collingwood's Bees and Trees rebate program, where people get 50% back on native plant purchases up to \$300.

[W] Another option for municipalities to provide native plants is through giveaways and subsidized sales.

[W] And this is a really good way to kind of get the right kinds of plants accessible to residents.

[W] It can often be difficult for residents to know which plants to plant and where to find them.

[W] So especially if you're able to kind of do a giveaway or a sale and kind of either a downtown area or somewhere that tends to be really accessible to people, especially by public transit, this is a good way to get people involved.

[W] Often nurseries can be a bit of a drive, so this makes getting native plants a lot more accessible for people.

[W] Richmond Hill in Ontario is one example of a municipality that does a yearly native plant sale at a subsidized rate, and there's lots of other examples of this too.

[W] And then one action that I wanted to touch on that I don't see happening in too many municipalities, but it is happening in some places, is offering garden consultations to people that want to create a pollinator.

[>> W] Garden.

[>> W] Often people are interested and they want to take this step, but they don't know where to start.

[W] They might have questions like what plants are going to work in my yard, given my soil type, the level of sun in the area I want to plant some.

[W] So if you can have somebody from the municipality that can can go in person and visit, see the area and provide recommendations.

[W] This can really empower people to take that step.

[W] The city of Guelph in Ontario has a program like this called the Healthy Landscapes Visits Program, where they do just that.

[W] Staff will visit your home, provide recommendations.

[W] So that's a really cool one that we're seeing and finally provide opportunities for residents to get involved in habitat creation and management within the municipal habitat areas.

[W] This one's really a win win.

[W] Provides residents with opportunities, often for residents, especially that live, for example, in a high rise building, they might be able to do balcony gardening but don't have lots of opportunities in in a yard, for example, to do gardening.

[W] So this allows them to get more involved.

[W] And it also provides the municipality with often much needed support when it comes to planting and maintenance.

[W] So one example here is the city of Waterloo in Ontario.

[W] I touched on this example yesterday.

[W] They've got a pollinator working group that's led by municipal staff and provides lots of opportunities for residents to get involved in planting habitat maintenance.

[W] Also, community engagement, like you can see from this picture with our table here.

[W] And the city of Waterloo has a form on their website that residents can go to and easily sign up to become a part of this group.

[W] All right.

[W] That is all I have.

[W] Hopefully this information was helpful and I will be happy to answer any questions at the end of the session.

[>> W] Great.

[W] Thanks, Jordan.

[W] All right.

[W] Now we'll go to Andy.

[>> W] All right.

[W] Screen.

[W] All right.

[W] How are we looking?

[W] Looks good.

[W] Great.

[W] All right.

[W] So yeah.

[W] Thanks, Anthony.

[W] And hello to everyone here tonight.

[W] I'm here to talk about habitat creation and enhancement as it relates to land managers.

[W] So we'll start with some management modification opportunities.

[W] And we'll conclude with an overview of restoration and habitat creation.

[W] Maybe there we go.

[W] So to start this presentation, I wanted to quickly define a couple of terms.

[W] The first is ecological restoration.

[W] So this is the process of recreating, initiating or accelerating the recovery of a disturbed or degraded ecosystem.

[W] Typically this is to a natural or a native state, but it can apply to a wide variety of project types, a wide variety of scopes of work conditions, etc. and on the other hand, we have habitat enhancement.

[W] This is often used as a management objective of a restoration project to incorporate the manipulation of existing features and landscapes within, with the purpose of improving ecological function.

[W] So.

[W] So really knowing these definitions isn't necessarily integral to the success of your projects, but it is good to keep in mind as you think about the bigger picture.

[W] I want to quickly review some habitat enhancement actions that you, as land managers can take.

[W] Not because all projects require a full blown restoration and sometimes simple changes really can make big impacts.

[W] The theme of this section is to incorporate integrated vegetation management.

[W] I know Jordan touched on that earlier.

[W] Incorporate it into your protocols.

[W] So the definition I show on this slide is from the US Environmental Protection Agency.

[W] But in general, IVM is the practice of making holistic decisions with the environment in mind while utilizing a variety of chemical, biological, cultural, mechanical and other treatments.

[W] So any management decisions that you make will fall within this umbrella of integrated vegetation management.

[W] So what are some of those actions?

[W] How can you support habitat just by modifying your management.

[W] I'll share some examples here.

[W] But but make sure to do some additional research to find opportunities that work best for you and the lands that you manage, for starters, I'll say to be selective with the use of herbicides.

[W] Be selective in how you use them, where you use them, be selective in when you use them.

[W] So for example, you could avoid using herbicides or pesticides on on pest prone plants.

[W] Consider other means of management.

[W] So there's biological options.

[W] There's there's mechanical options.

[W] You can rip them out if you can get them by the root, that kind of thing.

[W] Another option is to not spray while target or adjacent plants are in bloom.

[W] And always make sure to follow the label instructions and to make sure to review the environmental concerns that are identified for each of the chemicals that you're using.

[W] Next, you can modify your mowing practices.

[W] So for example, you can mow safety strips along roadways rather than the entire right of way.

[W] You can reduce mowing to areas where vision or safety is sensitive.

[W] You could mow just to protect assets rather than an entire site, or you could delay mowing until there's reduced pollinator activity in the area.

[W] If you have medians, you could consider reducing the number of times that you mow them.

[W] Maybe you could get away with just once during the summer.

[W] Similarly, rights of way are often prime for habitat and decreasing active management in these areas will save money as well as support pollinators.

[W] Next is to incorporate native plants wherever feasible.

[W] Local pollinators are adapted to utilize these species.

[W] And on top of that, native plants are often adapted to the climate and the weather of your area, so they may thrive relative to certain non-native species.

[W] Otherwise, if you're beginning any new construction projects, you could consider revegetating with the native seed mix or plant plugs, rather than the typical or traditional cool season grasses.

[W] Finally, I want to say you can use your networks.

[W] You can take advantage of social media.

[W] So share your projects in their outcomes.

[W] Share the reasons that you're modifying your management, share the pollinators that you're seeing as a result of adapting your management.

[W] Knowledge is a powerful tool.

[W] And if people and people may be more receptive to the work that you're doing, if they understand what we're doing and why we're doing.

[>> W] It.

[>> W] And I'll follow this section with a case study that for a project that Pollinator Partnership did in California with a number of partners to create habitat through vegetation management.

[W] The purpose of this project was twofold.

[W] It was to create vibrant pollinator habitat, increasing populations of of ecologically and agriculturally important pollinators, and secondly, to test alternative methods of landscape management for success in enhancing pollinators.

[W] The goal was to create a landscape management plan that could be used by other utilities to provide mutual benefits to the utility, benefits to the customers, and important wildlife such as pollinators.

[W] Some of those benefits were low growing native plants under utility lines.

[W] They were fostering goodwill among industry and communities.

[W] They were lowering the utility's carbon footprint and increasing natural beauty of the site.

[W] The project included treatment strips along the right of way, with one treatment being management as was usual, which will mainly was mowing and the other treatment was for pollinator habitat, where maintenance was altered.

[W] It included targeted herbicide application to woody and invasive forbs, and reduced mowing.

[W] Bees were assessed in the two treatments with visual observations and nest blocks, as you can see on the screen.

[W] And these are the results of the study.

[W] If you look at the green bars, that's the business as usual treatment, and the white bars are what the team found in the areas that had management for pollinators specifically.

[W] And monitoring showed that honeybee abundance was the same in the two treatments, but that there was both greater abundance and greater richness of native bees.

[W] Utilizing the areas that had management that promoted native plants.

[W] This is to show that sometimes making relatively small modifications in your existing management can make a huge difference in the quality of the habitat at your site.

[W] So now let's say you actually are wanting to create an entirely new habitat at a site.

[W] The rest of this presentation will provide insight on how to address this, but many of the considerations here on certainly apply to enhancement of existing habitat, especially with site evaluation, preparation and maintenance.

[W] All right.

[W] So the society for Ecological Restoration provides just countless resources for for a variety of restoration projects.

[W] And as such, they've developed this series of standards, which you can see here, and principles which we'll get to in a minute to help with improving a project's impact.

[W] So planning should be the first phase of your projects.

[W] This will provide the theory, the prescriptions, the methodologies for the restoration, and it will inform the project throughout its lifetime.

[W] A restoration plan can include a number of different things, but should at the very least include one an assessment of need.

[W] So what gaps exist between the current and desired states or outcomes?

[W] And two, it should include specific interventions and actions that address that need and will achieve your goals.

[W] Next, with implementation, we're talking about the actual actions that are carried out to restore or rehabilitate the ecosystem.

[W] The implementation phase is based largely on the previously developed plan and design.

[W] Next is monitoring, documentation, evaluation, and reporting.

[W] Aside from site preparation, this is one of the most important aspects of any restoration project.

[W] Every action after the initial implementation should be based on adaptive management.

[W] What are you seeing in the field?

[W] What worked?

[W] What didn't work?

[W] How can we modify or adapt our actions to improve the effectiveness of the restoration plan that we created?

[W] In the onset of the project?

[W] And finally, here we have the maintenance standards that will assist with long term effectiveness.

[W] It's essentially the answer to how will you change your management based on those monitoring outcomes.

[W] So with these general standards in mind, Ser also has developed a set of principles to help achieve your goals.

[W] Projects should seek to address this list of considerations to the best of your ability.

[W] All right.

[W] I'll flow through.

[W] Blow through these, I promise.

[W] First, does the project engage?

[W] Engage stakeholders?

[W] It should acknowledge a variety of interests and recognize that there are great diversity of stakeholders to engage with, to provide mutual benefit for both nature and society.

[W] Second, does the project draw from many types of knowledge?

[W] So, like engaging stakeholders, the project will benefit from drawing from past learned experiences from acquired practitioner knowledge from traditional and local ecological knowledge and science.

[W] Thirdly, is the project informed by native reference ecosystems while considering environmental change?

[W] Many restorations use these reference models or reference ecosystems to guide the final outcome, and when done correctly, this improves potential for resilience, adaptation, and evolution into the future.

[W] Fourth, does the project support ecosystem recovery processes?

[W] This could be rephrased, I think, to ask, does the project enhance potential for natural recovery or ongoing natural recovery processes by plants and animals interacting with their environment?

[W] Five is the project assessed against clear goals and objectives using measurable indicators?

[W] This is referencing the planning and design phase that we touched on in the previous slide, so make sure to have a clearly defined vision.

[W] Goals and indicators to measure progress or success over time.

[W] Six does the project seek the highest level of ecosystem recovery possible?

[W] This is an investment, right?

[W] So it only makes sense to aim for the highest practicable level of recovery that's appropriate to the project.

[W] Circumstances.

[W] Seven Will the project gain cumulative value when applied at large scales, regardless of scale, restoration projects are beneficial, especially when taken into context with other projects that have occurred or are planned to occur in the surrounding area.

[W] However, you know, projects at larger scales are sometimes what is needed to make a real impact or to address larger sustainability needs.

[W] Finally, number eight is the project a part of a continuum of restorative activities?

[W] Large scale outcomes, like I noted earlier, can be optimized through restoration, implementation, and it's important to remember that many types of projects will contribute to conservation.

[W] They'll contribute to carbon sequestration, the provision of ecosystem services.

[W] Many projects will improve human health and do so much more.

[W] So with these principles guiding your planning process, you have a solid foundation to continue to improve through the lifespan of your restorations.

[W] All right, so you've got your vision, you've got your goals, and you've started planning the restoration or habitat enhancement project.

[W] How might you evaluate a site as a part of this planning process?

[W] Some things that you might consider include the soil type.

[W] So sometimes agricultural fertilizers provide for nutrient rich soils, which may actually be less suitable for restoration of species that are adapted to nutrient poor soils.

[W] Additionally, some soils may be more prone to wind erodibility, some dramatically change the water holding capacity or the water availability to the plants.

[W] Maybe your soils are super low pH.

[W] They're very acidic and they need to be remediated.

[W] Next is land use history.

[W] So anthropogenic.

[W] Excuse me, anthropogenic impacts can leave long lasting legacies.

[W] So how will the restoration overcome previous management actions at the site?

[W] Adjacent land use.

[W] So similarly, how will nearby land uses impact your goals and outcomes?

[W] For example, if a nearby area is hit heavily with herbicides or pesticides regularly, perhaps that can drift over to your project.

[W] Next, we have hydrology.

[W] How much water is naturally available to the plants that you install?

[W] When is that water available?

[W] Where is it available?

[W] At what depth is that available?

[W] Some.

[W] Just some things to consider for when you need to come up with an irrigation or maintenance plan for the long term.

[W] Next, we have aspects so slopes can have a huge impact on the project.

[W] They can change the amount of light that hits plants during the day, and for how long that lights around.

[W] They can change how much precipitation hits your project area, and just so much more.

[W] Last in this list here we have existing vegetation.

[W] So is the site heavily infested with invasive species that you need to remove before anything else can be done?

[W] Or on the other hand, is there nearby desirable species that might serve as a source of propagules within your site?

[W] Ultimately, what I'm getting at here with this list is that you should always make a site visit.

[W] You can observe things that you'd never even even considered, or you may turn out that current conditions are better than what you thought.

[W] And lastly, just a note here that GIS, geographic information systems are valuable tools.

[W] With them you can view aerial photography over time.

[W] You can review vegetation in situ, and in the past you can model your interventions into the future.

[W] Whatever your level of understanding, try to incorporate GIS in some way.

[W] Another aspect of planning is the design of the project.

[W] We'll do just a quick review here.

[W] As I know this is covered in other modules in the PSC training.

[W] So generally speaking, pollinators need a diversity of plant species.

[W] They need diversity in structure and stratification both horizontally across the landscape and vertically vertically into the various layers of vegetation.

[W] And they need spaces to cover and nesting.

[W] So some amount of open or bare ground, you may have the opportunity within a site to take advantage of microhabitats where certain environmental conditions, like hydrology are different from other areas of the same project.

[W] Additionally, as you're designing your project, it's good to account for availability of desired species, either as seed or as plugs.

[W] Or, if you're lucky, maybe you can find and propagate plant material from existing vegetation at the site.

[W] An example may be willow cuttings, where with certain species, you can easily just cut a whip from a larger plant, you can shove it in the ground near water and it'll grow.

[W] Another example might be an area that's relatively undisturbed or or has recovered naturally from past disturbance, where you can collect seeds from your desired species.

[W] Thereby, therefore, you're maintaining your local genotypes.

[W] Again, this information can be captured during a site visit as you're evaluating the site.

[W] Sometimes it may be important for you to maintain the local genetics of certain plants just to ensure agreement with local pollinator species.

[W] So you can do this with careful and detailed seed and plant purchases, or by collecting your own material.

[W] As I just mentioned.

[W] With this in mind, it would behoove you would benefit you to track bloom times for the plants that you put into your project.

[W] The same species sourced from two different parts of the country may bloom at completely different times, therefore not cross-pollinating and abetting the potential for decreased plant fitness and abundance into the future.

[W] All right, so now we're about to move from theory into practice.

[W] I just wanted to identify these three concepts before moving forward.

[W] So with regards to site preparation, sometimes you'll hear about the three P's the planning patience and the persistence with planning.

[W] Some questions to ask yourself are what type of work is needed for the site?

[W] How much work is needed for the site?

[W] What equipment or what tools do you have available?

[W] What about contractors?

[W] Are they available for patients?

[W] This takes time and sometimes pollinator plantings need more to work, more work to maintain than a more traditional prairie type restoration.

[W] They often require highly diverse species mixtures, patches of bare open ground like we mentioned, and more.

[W] Just know that it's important to remember your goals and to reduce competition as much as possible throughout the process.

[W] A common anecdote in certain parts of the country is sleep creep leap, and this is used to describe the slow visual growth progression for some perennial species, persistence kind of goes hand in hand with patience.

[W] Persistence will pay off.

[W] Weed control can be challenging, but the more diligent and persistent you are, the more impactful and beneficial the project will be.

[W] And same goes for monitoring.

[W] So site preparation is often overlooked or it's not adequately addressed, but it's just so important.

[W] So how do you do it?

[W] How do you prepare a site for planting?

[W] There are a number of philosophies or approaches to take here.

[W] I'll give you a basic overview so that you can go out and do research for your site.

[W] But we can generally divide projects into two categories the small.

[W] So those areas that are about an acre or less and large, anything bigger than about an acre.

[W] Some examples of small projects include school gardens, education or demonstration habitats, residential lawns, that kind of thing.

[W] Larger projects get into converting agricultural fields and rights of way, or maybe large areas that experienced a large disturbance event.

[W] Either way, there are a few options depending on the scale of your project.

[W] Organic options for site preparation are more easily applied at smaller scales, and I'll detail just a couple of those shown on the screen.

[W] So the first is Solarization.

[W] This is the process by which you use the sun to heat the soil and kill off existing vegetation.

[W] With this method, we want to take advantage of greenhouse effect, which can lead to prolific germination of seed and growth due to increased heat and humidity.

[W] You'll basically, you'll cover an area with.

[W] With clear plastic sheeting, you'll secure it tight to the ground and you'll have it extend just beyond the edges of your target project area.

[W] Importantly, we don't want to use black or opaque plastic.

[W] This is called occultation, and it's essentially just shading things out, which takes longer, which is not solarization.

[W] This process of solarization will probably take 6 to 8 weeks depending on temperatures.

[W] Obviously, the cooler it is, the slower it'll be.

[W] But again, be persistent.

[W] Weeds can grow fast.

[W] So to address this, you're probably going to need to repeat the process at least twice to compete to combat newly available seed bank or weed growth each time.

[W] Hopefully the amount of regrowth will decrease.

[W] Sheet mulching is fairly self-explanatory, so with this technique, you'll kill existing vegetation to prevent germination by smothering with a thick layer of mulch.

[W] Often, the recommended approach is to incorporate layers into your mulching.

[W] So, for example, an inch or two of nitrogen based materials like grass clippings.

[W] Then carbon based materials like wood chips, then nitrogen, then carbon until you have about six inches of mulch or more.

[W] If you plan to seed after employing this technique, it's best to scrape away some of the top layer if you're transplanting, scrape away some of that top layer.

[W] If you're transplanting live plants, you can plant directly into the top layer.

[W] This is a technique that is best employed at small scales, just due to the resources that are required.

[W] It can be relatively quick, or it can take a few seasons to really take effect.

[W] So on the other hand, larger scale projects may take advantage of tilling or soil inversion methods.

[W] By tilling, I'm really talking about repeated shallow cultivation.

[W] This method kills weeds in the top profile of the soil by repeatedly cutting and dislodging them with cultivators, and through disking and harrowing.

[W] This can be repeated as many times as is needed throughout the year or multiple years.

[W] Just to make sure that you've appropriately weakened existing vegetation or pulled from the existing seed bank.

[W] I should note that this technique is best for sites with low weed pressure, so you could till ten times in a season and cool season.

[W] Grasses may still persist.

[W] Soil inversion is similar, except that the first step is to take a moldboard plow through the area to invert the soil before tilling with shallow disking.

[W] This exposes the lower fertility soils that are better for wildflowers.

[W] So then we have smother cropping, which is is kind of better suited for sites with low to moderate weed pressure.

[W] Excuse me.

[W] This is a method of weed control where temporary cover crops are grown for the purpose of weed suppression.

[W] The cover crops that are selected will likely grow quickly above ground, and they'll smother out the weeds that are beneath them.

[W] So.

[W] So this can take upwards of 1 to 2 years to be successful.

[W] But after the cover crop is done, it's important to manage the plant residue that remains on the site.

[W] So you can either till it into the ground, you can use it as a secondary mulch for longer term preparation plans, or you can remove it completely from the site.

[W] A good example or a couple examples of crops that are commonly used for this method include buckwheat and lacy phacelia.

[W] Just because they're fairly aggressive.

[W] Finally, the other option for both large and small scale projects is to use herbicides.

[W] This will be a quick discussion on herbicides.

[W] I'll just bring up a few considerations for you here, but I want your main takeaway to be that you should always confer with a licensed professional herbicide applicator, to come up with a plan that's appropriate for your site and for the existing vegetation, and for this specific environmental and ecological conditions that may occur there.

[W] For some sites, initial preparation and maintenance methods like hand-pulling, solarization, smothering can be feasible.

[W] Just do your best to use an integrated vegetation management approach to site preparation and maintenance.

[W] Now there are a variety of herbicide types, and they're not all necessarily mutually exclusive.

[W] So generally speaking, broad spectrum herbicides work on a wide variety of weeds.

[W] Selective herbicides work on a narrow range of weeds.

[W] Contact herbicides, destroy plant tissue at or near the point of contact, so they generally don't spread around the plant, and they require even coverage coverage in their application.

[W] Systemic herbicides move through the plant's circulation system and can be injected into the plant last in the list residual herbicides.

[W] These can be applied to the soil and they can.

[W] They destroy by root uptake.

[W] So they they tend to remain active in the ground for, for a bit longer, a certain length of time.

[W] But they can control germinating seedlings if that's your goal.

[W] All right.

[W] So back to site preparation.

[W] How can we apply what we just discussed to our practices.

[W] What I want to drive home here is that different herbicides and application methods should be identified based on the vegetation and ecological conditions of your site.

[W] Plans for herbicide as a method of site preparation should prepare for multiple applications over multiple seasons, sometimes even multiple years, depending on on your weed pressure.

[W] The specific chemicals that are utilized should be based on plant biology and growth, and it's important to be as strategic and as purposeful as possible.

[W] Additionally, it's it's also important to recognize that some sites may require heavier, more indiscriminate applications, and some may take advantage of more targeted spraying in conjunction with other site preparation methods.

[W] As we discussed earlier.

[W] So because you're enhancing or creating new habitat, it's crucial to limit exposure to pollinators.

[W] And the best way to do this is to follow label instructions.

[W] Additionally, you can keep an eye out for periods of lower temperatures when bees or other insects may potentially be less active.

[W] On the other hand, you know these same periods may produce dew, which actually cause some chemicals to remain wet on the plant for longer, therefore being more toxic the next morning.

[W] So again, do your research, read the labels.

[W] But to kind of reiterate my point here, you should match the specific actions to your target species and your project goals.

[W] So to round this out, here are a few final thoughts for site preparation.

[W] First, no two projects are exactly the same.

[W] However, you may find that some of the techniques that work best for you are also applicable across multiple scenarios.

[W] With that said, site preparation largely depends on the existing vegetation at the site, as well as the size of the project that you're working with.

[W] So any amount of habitat enhancement creation is better than none at all.

[W] Just just remember that.

[W] And lastly, similar to my first point, steps for establishment are essentially the same from small to large projects.

[W] The difference being that smaller projects have the advantage of more care per unit area than larger ones typically do.

[W] All right, so you've made your plan.

[W] You've prepared your site.

[W] Now you're ready to plant something.

[W] This is the fun part, right?

[W] A couple of things to consider as you prepare for seeding.

[W] First is the potential for seed predation or granivory.

[W] So what creatures exist at your site that might take advantage of this freshly seeded cornucopia before the cold winter comes?

[W] Second is irrigation.

[W] Not all sites will need supplemental water, but what are your plans in case of drought?

[W] If you plant live plugs, how will you keep them from desiccating or drying out?

[W] And thirdly, kind of along those same lines is the weather is the weather and climate, climate changes dramatically based on your geographic region, based on topography, elevation, so many things.

[W] So take the time to research these things to incorporate into your restoration plan before discovering challenges in the field.

[W] Now, when it comes to actually seeding a site, there are three general methods that you'll you'll hear about regularly, and those are drill seeding, broadcast seeding, and hydroseeding.

[W] Drill seeding is typically the preferred method for this.

[W] Due to its high success rates.

[W] So with this method, a no till seed drill is calibrated to plant seed directly and accurately into the ground at specific depths.

[W] Generally, you'll utilize the planting depth about twice the diameter of the seeds that you have, but it's important to remember that you likely won't plant a seed too shallow, but you can almost certainly plant a seed too deep.

[W] So for this reason, try to calculate the planting depth according to the smallest seed in your mix.

[W] Next is broadcast seeding, which is easier for larger projects because you can utilize machinery like a UTV or a small tractor, or you can distribute the seed by hand, usually a carrier agent like sand, sawdust, clay, cat litter.

[W] These things are added to the seed mix at a 1 to 1 ratio to help the seed distribute more evenly across the site.

[W] After the seed is broadcast out onto the site, it may be necessary to follow up with a packer or similar to improve that seed to soil contact.

[W] Since you aren't drilling it directly into the ground.

[W] Also, broadcast seeding typically requires an increased seed application rate of about 50% relative to drill seeding.

[W] Thirdly, hydroseeding is less common for large projects but can be quite successful if you have room in your budget for the additional cost.

[W] So with this method, you're you spray a slurry of water seed and in some kind of mulch in a binding agent onto the site using a high pressure tank or a hose with both broadcast seeding and hydroseeding, it's recommended that the ground be textured before implementation so that you can assure good seed to soil contact.

[W] Hydroseeding may also require an increase in seeding rate.

[W] It just depends on the slurry mixture components or the distribution method that's employed.

[W] There's a number of ways to go about determining your seeding rate, but a good rule of thumb is to aim for 30 to 60 seeds per square foot.

[W] Often, rates are expressed as a factor of seeds per pound or pounds per acre, where lower seeding rates can be employed at sites with low weed pressure or low chance of runoff.

[W] While high rates will improve the competitive advantage of your desired plants.

[W] All right.

[W] So now that you have your site seeded, what's next?

[W] It's maintenance, as is the theme of this presentation.

[W] Here are some considerations as you move on to the next phases of your project.

[W] So really what are you maintaining?

[W] What is the goal of your project?

[W] Are you wanting to control a natural succession?

[W] For example, invading shrubs and trees and reducing the more aggressive species?

[W] Management practices will typically disturb succession, which is the natural progression of a site in order to maintain, in this case, herbaceous communities.

[W] Do you want to maintain diversity?

[W] If yes, you know you can consider interceding or introducing live plant plugs later down the line.

[W] Or do you want to manage for specific benefits?

[W] But this begs the question, you know, what benefits are you looking to maintain?

[W] Some examples include forage or food resources, nesting, brood rearing, bedding or cover, as well as winter protection.

[W] So my ethos for maintenance tends to be do a little bit each year.

[W] Each year you can find an action to accomplish that feeds into your larger goals.

[W] So make maintenance a regular thing for you or your team.

[W] The next thing to consider is what actions will you be taking?

[W] I like to think of this in terms of processes.

[W] So in the short term, the first couple of years post implementation, you'll be focusing on weed control.

[W] And this is accomplished generally by focusing on irrigating, weeding and mowing the site.

[W] Though irrigation may not always be necessary, especially in eastern parts of the country where water is much more available and accessible.

[W] It's important to have a plan for drought or for the hottest parts of the growing season.

[W] If you implement cover crops for some other cropping, for example, you'll likely want to keep consistent irrigation to make sure that those plants are successful.

[W] Most native plants will be adapted to the conditions of the area that they're implemented, and keeping irrigation to a minimum may actually favor those native adapted species over the weedy plants that often have higher soil moisture requirements.

[W] Weeding can be accomplished by hand at smaller sites, with manual removal at small to large sites or with targeted herbicide applications.

[W] The goal here is to make sure that weed populations do not grow, and instead they decrease over time.

[W] Thirdly is mowing.

[W] This is an important part of every restoration project.

[W] So during the first growing year, some managers will mow the entire site down to eight inches.

[W] Each time the vegetation reaches a foot or so.

[W] This won't damage the small perennial natives you just planted, but it will knock the annual weeds and prevent flowering and seeding of your undesirable established weeds.

[W] In the second year, you'll probably mow the site 1 or 2 times, especially if the weeds continue to be a problem.

[W] You can mow the entire site, or you can spot, mow, and heavily infested sections.

[W] Just make sure to remove the mowed debris.

[W] Otherwise, a thatch layer will build up, which can smother the young plants that are growing beneath.

[W] In the long term, we switch mindsets from specific tasks to management adjustments and objectives.

[W] We can think about protecting, adapting, and disturbing the site.

[W] You'll want to continue to protect the planting from things like weeds from nearby pesticide drifts, from adjacent properties from browsing and herbivory, and more.

[W] So to do so, you'll adapt your management based on results from monitoring, as we'll discuss in just a bit.

[W] And then there's disturbing.

[W] This is where you can be creative and find what really works for you.

[W] There are a number of tools at our disposal to accomplish a disturbance regime for a site, and each can bring diversity in intensity and in impact.

[W] So three common tools include mowing, prescribed fire, and grazing.

[W] I want to also note here, though, that herbicides may also have their time and place in your management.

[W] Mowing can be helpful, can be a helpful way to manage invasive shrubs and weeds and prairies.

[W] It can be useful in wildflower meadows and rangelands, but it can also be tough on insects, especially their eggs and larvae, since they can't escape the mower.

[W] So to minimize the impact on pollinators, it's best to mow in the fall or winter when flowers are blooming.

[W] Also, try to mow in a patchwork pattern over several years, making sure that no one area gets mowed more than once in a year.

[W] If you can use a flushing bar and slow down the mower so you can protect wildlife even more.

[W] What you need to consider with this approach is thatch buildup.

[W] As I touched on earlier, it's probably a good idea to remove the mowed debris from your site unless you plan to burn it in the future, which would hopefully take care of that thatch for you.

[W] Next is prescribed fire, prescribed burning fire is Mother Nature's way of managing certain ecosystems, and prescribed fire is our way of keeping that natural process under control and useful.

[W] Prescribed burning can achieve several goals, notably keeping the vegetation at a stage that is beneficial to our target wildlife.

[W] So controlling, controlling succession.

[W] As we touched on earlier, it can be utilized in a variety of landscapes.

[W] Excuse me, including agricultural properties.

[W] It can promote increased plant diversity.

[W] It's an effective tool for invasive plant management as well.

[W] Burning at different times of the year can change the results too.

[W] So your timing is important.

[W] For example, dormant season burns may support increased pollinator, pollinator activity and plant pollinator interactions in some systems by resulting in little to no selective damage to any one group of plants.

[W] So cool season species, warm season species, that kind of thing.

[W] Well, spring burns may better control cool season grass invasions, thereby supporting improved wildflower density and diversity.

[W] Lastly, here we have grazing and you'll often hear this as the term conservation grazing, grazing supports similar goals as the other methods that we discussed.

[W] Diversifying habitat structure, reducing grass dominance, suppressing invasive plants, and so on.

[W] Here, though, the choice of livestock may alter your impact, and often you'll see cattle or bison as the preferred tool.

[W] It is important to control the grazing, to spread out trampling and avoid chronic overutilization by the livestock.

[W] Grazing strategies can be developed with professionals to meet your objectives, and they'll often call for grazing during different seasons each year or modifying stocking rates based on performance and rangeland health.

[W] Grazing can be implemented in conjunction with prescribed fire for strong results.

[W] So now, what can you do to improve existing habitat?

[W] We covered backyard landscapes in another module.

[W] So here let's focus on other land management, particularly in natural areas in larger habitats.

[W] The reality is sometimes a shift in your management actions is all it takes to improve existing habitats.

[W] So for management actions in natural areas, first, consider planning ahead for pest and vegetation management.

[W] There may be opportunities to avoid herbicides and pesticides entirely, or to time them in accordance with pollinator needs at your site.

[W] Next, you can consider adjusting your management to emphasize support for rare or endangered pollinators.

[W] These species often need tailored practices based on their life history traits like avoiding fire for certain butterflies or protecting nesting sites for rare bumblebees.

[W] In the long run, in maintaining a variety of habitats in refugia is key to supporting all pollinator populations in these areas.

[W] If possible, diversify plantings with interseeding supplemental seeding and planting to further enhance your habitat, and you can use this opportunity to address specific management goals like filling in large bare ground patches or improving relative abundance of certain functional groups, or integrating more uncommon species into the site, or really anything else that might be accomplished by introducing additional plants.

[W] Also, think about the bigger ecosystem picture.

[W] Look beyond your site and consider the surrounding management matrix to improve habitat connectivity, think about what are the cumulative effects of your actions that we touched on way back in the planning phase?

[W] Lastly, disturb the disturbance.

[W] Keep your management practices like mowing or prescribed fire patchy.

[W] Keep them random.

[W] As we discussed on the previous slide.

[W] Now let's talk about roadsides and rights of way.

[W] There's often concern that roadside habitats might harm pollinators, but studies, you know, they don't definitively quantify the costs and benefits, while risks do exist, it's likely that the benefits outweigh them, but always make decisions based on what you observe at your site.

[W] For these areas, the best approach is similar to other habitats where you can reduce mowing frequency, make it patchy focus efforts and resources on roadsides or corridors that connect fragmented habitats.

[W] A great idea is to use dead and downed debris to your advantage, like stems and branches for nesting and protection, even if it may not be esthetically pleasing to everyone, just so long as it doesn't create safety hazards.

[W] Less maintenance can often be more beneficial, especially when it comes to supporting pollinators.

[W] Finally, if you're managing a historic or cultural site, there's a unique opportunity to support pollinators while also focusing on education, outreach and advocacy.

[W] While this may be covered more in depth in another module, I want to emphasize that maintaining existing habitat isn't always about planting new species.

[W] These spaces allow you to be strategic by implementing by emphasizing other ecological features like water sources or nesting structures alongside the plantings to support pollinators.

[W] I mentioned earlier that we would touch on adaptive management.

[W] So here's a super quick overview for you.

[W] Monitoring is just so, so important in order to determine one, the effectiveness of your management and two, which additional management practices are needed in order to achieve your goals.

[W] And in this way, you can identify problems to address before they become overwhelming.

[W] Best practice would be to monitor your planting throughout the planning cycle, and this will help to maximize benefits and prevent problems.

[W] During monitoring sessions, you can track and record plant establishment and flowering time.

[W] You can keep an eye out for drought stress in your plants, and you can identify weeds before they set seed.

[W] You can monitor pollinators while you're planting is blooming in order to count, identify, and record activity.

[W] If more detailed pollinator monitoring is desired, professionals like Pollinator Partnership can design a monitoring plan and methodology specific to your site.

[W] So by monitoring and evaluating regularly and by documenting your findings over time, you can support and establish metrics to measure success of the project and to take action to correct or support trends as they become apparent.

[W] All right.

[W] So I hope you enjoyed this presentation and had a few takeaways or considerations for improving your management.

[W] Thanks for taking the time to listen.

[>> W] Amazing.

[W] Thanks, Andy.

[W] And now we'll go to Hannah.

[>> W] All right.

[W] Let me pull my slides up.

[W] Okay.

[W] Can you see my screen?

[>> W] Yep.

[W] Looks good.

[>> W] Okay.

[>> W] And it just needs to go into presentation mode.

[>> W] There we go.

[W] Are we good?

[>> W] That looks good.

[W] Thanks, Hannah.

[>> W] Okay.

[W] Awesome.

[W] Well, thank you guys for having me today.

[W] I'm really excited to share some of the amazing work that's happening at Pine Hill Preserve.

[W] Just as a fair warning, I'm going to be throwing a lot of information at you pretty quickly, but I'd be happy to follow up with anyone in the Q and A or at a later date as well.

[W] So a little bit just about my background before we get into things.

[W] So I am formally trained as a biologist, mostly have done research with genetics and red abalone and bacteria.

[W] So if you ever need something to put you to sleep at night, I would highly recommend my thesis.

[W] Also, just enjoy being out in the natural world and interacting with various animals, which kind of has led me more to my current career path.

[W] I decided I didn't want to be stuck in a lab all day, so currently I am a project coordinator at Sierra Integrated Services.

[W] We are a land management company that contracts for utilities and other public and private landowners on the West Coast primarily.

[W] So we do like a combination of herbicide treatments, mowing, other manual mechanical removals, things of that nature.

[W] And we really specialized in more nuanced landscape management projects, which is where we've gotten to be involved with Pine Hill Preserve.

[W] So while I give you a little bit of background on the preserve itself, here's some cool places and things I've gotten to see recently just for you to enjoy.

[W] So Pine Hill Preserve is a federally managed plot of land in El Dorado County, California, which I'll show you on a map in a moment.

[W] It's a collection of about 5000 acres that is classified as a preserve based on various rare, threatened, endangered or other special status plant species that reside there.

[W] And there is a portion of an electric transmission right of way that runs through a part of that preserve, which is where we've gotten to be involved with the management.

[W] There.

[W] So here's a map just to orient ourselves on the pan on towards the bottom left there is the California State Capitol building.

[W] So kind of right in the heart of the city of Sacramento.

[W] And if we move about 30 to 40 miles northeast of that, that's where Pine Hill Preserve is.

[W] So where we're talking about and the actual strip of right of way that we manage really isn't super large in the grand scheme of things.

[W] I think collectively it's about 20 ish acres, but the unique insight site conditions that exist there and the novel management that we're doing make this a really special project to talk about.

[W] So I want to go over a few of the management considerations here, which will give you a little bit more background on the site itself as well.

[W] So first and foremost, we have a responsibility to create safe and reliable electrical conditions through managing vegetation.

[W] So we have 230 kV lines that run through this site that provide power to hundreds and thousands of community members.

[W] So we definitely want to make sure we're managing vegetation in a way that's conducive to supporting.

[>> W] That.

[>> W] Also want to reduce wildfire risk, not only to protect those assets, but also our surrounding communities.

[W] Although the site is in a very fairly rural area, it would be considered a wildland urban interface.

[W] So we do have communities close by, and it's also considered an extreme fire risk zone by the California Public Utilities Commission.

[W] As I've alluded to, we also have an obligation to protect those special status plants that are on the preserve.

[W] And going a step further as well, we also want to think about how are we being good stewards of the landscape in general.

[W] And then lastly, we want to ultimately develop best management practices, not only in regards to the preserve.

[W] A little bit of foreshadowing.

[W] The preserve has historically not allowed any herbicide to be applied there.

[W] So we're hoping through this project that we can continue to test that and develop that and develop those best management practices.

[W] And then also, for those of you who are familiar with this industry, may know that we have a lot of long standing data on the East Coast relative to how right of ways impact the surrounding ecosystem, but we have less robust data here on the West Coast.

[W] So we're hoping that this project can ultimately be a small contribution to.

[W] that and how we achieve these goals simultaneously is through big shocker integrated vegetation management.

[W] So this is using, you know, a combination of various vegetation management techniques in a site specific manner to achieve your desired goals.

[W] And we're also hoping through this project that we can demonstrate that you can achieve these simultaneously.

[W] You don't necessarily have to pick and choose between different management considerations.

[W] So what exactly has IBM looked like at our site?

[W] So the first large scale disturbance that really occurred here was this large wildfire mitigation project where this portion of the right of way and others through the region was completely masticated.

[W] So this was part of a wildfire mitigation project in partnership with Cal Fire.

[W] And this really gave us a blank slate to kind of determine how best to manage the right of way moving forward.

[W] So this is just some satellite imagery that just shows you the scale of that work and how dramatically it really did change that landscape.

[W] So in terms of our follow up treatments, our ultimate objective for this is to create this mosaic like habitat that limits fuel build up by eliminating large clumps of woody, flammable species that are characteristic of the shimmies.

[W] Chaparral eco type, and also targeting those more invasive species like medusahead, goatgrass, brome, things of that nature.

[W] And simultaneously protecting those rare plants and promoting biodiversity in the region in general.

[W] So how do we accomplish this is through a combination of manual removals and also chemical spot treatments.

[W] So I think this image in the center here does a really good job of illustrating this selective approach.

[W] So you can see that the redbud on the right there was clearly treated with herbicide, while the one on the left was able to remain intact to support those biodiversity metrics.

[W] So this is pollinator partnership.

[W] So of course I wanted to touch on some specific practices that we utilize to support our pollinator friends.

[W] So in the pre-planning phase, as you all can imagine, there is a ton of collaboration that occurs with various federal, state and local agencies.

[W] And we ultimately come to a decision on how best to manage this property.

[W] And this is outlined in the Federal Energy Regulatory Commission license that the utility has to operate within that region.

[W] We also have independent botanists come out and flag our special status plants, which you can see in this image here prior to any treatments that are being done.

[W] So our applicators can really easily identify what species need protection.

[W] And the botanists also inventory those species.

[W] So we have a record and we can reference that in determining how exactly our treatments are impacting those species.

[W] In regard to timing, we'll start with time of year.

[W] We try to make our applications when most of our pollinator friendly plants have senesced, albeit there are things that bloom year round in California.

[W] But we do our best.

[W] Right now we're at biannual treatments occurring in the July and November ish time frames.

[W] During the day of application.

[W] We stick to early mornings as well to.

[W] Outside of those peak foraging times for our pollinators.

[W] For chemical selection, we are only using herbicides that are on the federally approved list.

[W] We're also taking the time to choose active ingredients and adjuvants that are not known to increase non-target uptake.

[W] And then we also add a color dye to our mix.

[W] So we can really clearly tell what's been sprayed, not only to support a efficacious application, but also to improve safety for anyone who's moving through that area.

[W] So we're also only employ licensed applicators to do this work.

[W] We try to also keep the crews consistent year to year.

[W] So they're really familiar with those site conditions.

[W] And we're also seeking the oversight of outside pest control advisors and qualified applicators.

[W] Of course, we are following all label directions on our pesticides for a safe and effective application.

[W] And even using lower rates where possible, to prevent drift, we use large droplets, low spray pressure, and we're performing spot treatments.

[W] So it's not like a big broadcast boom sprayer.

[W] We're really taking the time to move through that area and selectively pick out things that were undesirable.

[W] And of course, we're only applying in appropriate rain, wind and other environmental conditions.

[W] We also have buffers that we observe around our protected species, which is outlined in that license I mentioned.

[W] And then we also have another added layer of protection through the use of physical shields, which you can see in this photo here.

[W] So the really crucial piece that our last presenter touched on as well is monitoring.

[W] So this includes not only shortly after the application to observe any acute effects, but really the important piece here is establishing these multi-year studies where you can really get to see what are the long term trends and variables that are influencing the ecosystem.

[W] And for this, we partner with outside organizations like Pollinator Partnership, ePrix, and local institutions as well.

[W] So Sacramento State is doing a lot of work on this site and have been really great partners throughout this.

[W] And they bring their unique perspectives and credibility to this work as well.

[W] And then in general, from a broader ecological standpoint, by creating this early successional plant habitat, we aim to promote the number of species that we support and ultimately support a wider array of pollinators.

[W] So now I want to get into a little bit about some data.

[W] We have to show how our treatments have been impacting our species, starting with our special status plants.

[W] So here's kind of just a timeline to keep us all oriented in terms of treatments that have been done there.

[W] So in 2020 was when that mastication occurred.

[W] And then beginning in 2023, up until present day is when we've had those biannual herbicide treatments and selective manual and mechanical removal has been happening since the transmission lines were installed.

[W] So here is the survey plant survey data from 2020, just prior to the mastication.

[W] Contrary to the satellite imagery here, our yellow, orange, and green polygons represent our three special status species.

[W] And here is the survey data from June of 2024.

[W] So as you can see here, our populations of our rare plants have seemed to expanded since then.

[W] And although we can't really make any cause and effect assumptions in terms of if our treatments are leading to this, we can say that at least the herbicide part of it isn't having any adverse acute effects on our rare plants.

[W] So of course, we are planning to continue to collect this data so we can observe some more definitive trends, but we can infer that by opening up that canopy and reducing that competition, that we are supporting those rare plants.

[W] Here are some images of some pollinators that we've seen on the preserve and in particular on our special status plant species.

[W] We are currently working with Pollinator Partnership and Sacramento State to establish some more long term, robust pollinator studies.

[W] And kind of a tangent.

[W] But in the bottom left photo there, I don't know if a pollinator made that.

[W] I'm really curious if anyone has any idea what left that structure on one of our trail cameras.

[W] So please put that in the comments if you have any idea.

[W] Okay, back on track.

[W] So taking a more of a zoomed out approach, we also have captured some really amazing animals that are very ecologically important to California.

[W] These photos are from a project that's ongoing with Sacramento State.

[W] And I think it also brings up a really good point that by creating this early successional habitat, we're ultimately creating these habitat corridors for these animals to travel in which they wouldn't wouldn't have been there previously.

[W] So we're supporting connectivity in that way.

[W] And I think taking a more broader look at the ecosystem is a good metric for its overall health.

[W] So lastly, I just wanted to mention that although we take a more indirect approach to supporting our native plants on the preserve.

[W] By reducing competition from our undesirable species, there are more direct ways that you can contribute to promoting natives, and this is probably all dependent on your unique goals and site conditions.

[W] But these can include things like habitat restoration, transplantation, or even seeding.

[W] But what all of these strategies have in common is this underlying approach of utilizing integrated vegetation management all the way from the site preparation to the long term management phases.

[W] So that's where we have really seen our desired results.

[W] And it's also the most cost effective and efficient long term as well.

[W] So and this has been supported by decades and decades of research in this industry.

[W] So not a novel point I'm making, just something I wanted to reemphasize at the end here.

[W] So here is my contact information for anyone who's interested in following up with me after this presentation.

[W] And these photos, here are of our three rare plant species that occur within our right of way.

[W] So there's more protected plants in the preserve in general.

[W] But this is what we have here.

[W] The photo on the right is the El Dorado Mule's ears.

[W] This is a endemic species, meaning it grows here and nowhere else in the world, which is really amazing.

[W] At the bottom left is the Lane's Butterweed, which is federally listed as threatened.

[W] And there's also a little critter on that.

[W] I hadn't even noticed that until then.

[W] And then our last species is the Bisbee Peak rush rose, which is considered rare.

[W] And ultimately more research is needed to be done on that to see if it needs to be listed or not.

[W] But thank you all so much for your attention, and I'd be happy to answer any questions anyone.

[>> W] Has.

[>> W] Thank you so much for sharing that work.

[W] It's amazing.

[W] We'll do one quick last housekeeping slide and then we'll get right to questions.

[W] So we have one more technical habitat session tomorrow, Thursday, March 12th.

[W] And this will be focused on pollinators in an agricultural landscape.

[W] With that, let's pass things over to Avery to lead the Q&A session.

[>> W] Hi there everybody.

[W] And thank you again for your wonderful questions.

[W] And to Jordan, Andy and Hannah for their wonderful presentations.

[W] So I'm going to start with a question from Keisha.

[W] And she's wondering what should municipalities do to balance the need to protect and enhance pollinator habitat while also keeping their residents who are allergic to certain pollinators or have concerns safe?

[W] This is sort.

[>> W] Of a jump.

[W] in.

[W] for sure.

[W] Thanks for the question.

[W] This is a really good question.

[W] I think a really important thing with this is education, because there's a lot of bees out there that that don't sting and aren't likely to sting.

[W] We're never going to be able to kind of completely address this because because we need our pollinators and biodiversity.

[W] But half of bees actually can't sting.

[W] All the male bees don't sting at all.

[W] And when, when we look at all the different bee species out there, a lot of the solitary bees tend to be really unlikely to sting.

[W] It's more just some of the social species.

[W] And then in that case, a lot of the time, those are bees that are kind of trying to defend their nest.

[W] So definitely don't go near any nests, whether this is bees or wasps.

[W] Often bees do get mistaken for wasps.

[W] And a lot of the time people people think they're maybe being approached by a bee and it's a wasp.

[W] But I'd say kind of avoid nests because social bees are trying to kind of defend their nest, and they may be more likely to sting kind of in that pursuit.

[W] Also, try not to have any kind of strong scents.

[W] I can maybe attract some.

[W] And a lot of the time, bees are kind of just going about they're more interested in flowers.

[W] That's where they're collecting their, their food from versus some wasps that are actually more interested in the food that we're eating.

[W] So I would say definitely stay away from nests.

[W] Be aware that most bees aren't going to sting if you're a municipality, try to educate kind of around that.

[W] And we do have a really good brochure on the Pollinator Partnership website.

[W] It's called No Fear of Stings.

[W] And I'm sure we can, I can track down the the link and put that one in the chat too.

[>> W] And Keisha, I believe I just sent you an email yesterday with a whole explanation on, on how this all works and some good methods to go about it as well.

[W] So yeah, let me know if that answers your question in that email and I can help further.

[W] If you need.

[>> W] Awesome.

[W] Thanks, team.

[W] Now I'm going to move on to a question from Bonnie.

[W] I aimed at Andy.

[W] She says our city has some open space that has high levels of arsenic, mercury, lead and other hazardous material in the soil.

[W] Do you know any strategies or specific programs that deal with bioremediation of urban soils?

[>> W] Yeah, remediation.

[W] It's a whole field of study and often very site specific.

[W] I don't know if I have any resources off the top of my head that would be specific to your site.

[W] If you want to email me, I'm more than happy to respond later as well.

[W] But yeah, bioremediation.

[W] So using plants to your advantage to kind of bioaccumulate the, target toxin from the soil in the plant body is often used.

[W] I would recommend that you look into common remediation practices or a common term is reclamation for like mined land sites that often have to deal with these similar issues in the soil prior to, to implementing a restoration.

[W] So that's kind of a vague answer, but it's always, you know, in ecology, it depends.

[>> W] Thank you very much.

[W] Now we have another question.

[W] Do you have any tips for successfully.

[W] Pardon me for successfully removing invasive plants or weeds without using pesticides.

[W] In my municipality, invasives are typically removed with targeted applications of glyphosate, glyphosate.

[>> W] Glyphosate, glyphosate.

[>> W] Sorry.

[>> W] No worries.

[>> W] It's not sprayed on large areas, but directly applied to stems within seconds of cutting them.

[>> W] So do you have any general tips for removing weeds without pesticides?

[W] I can jump on that one too.

[W] Yeah.

[W] So so in that case, you know, they're doing a cut stump treatment or similar for woody invasive plants like probably buckthorn or something like that.

[W] Bush.

[W] There are a number of ways to address weeds mechanically.

[W] So pulling them out, there's a weed wrench, you can grab that rips things out of the ground.

[W] Any of those, those steps that I included in the small scale site preparation part of my, my presentation.

[W] So smother crop or smother cropping was large scale, but smother cropping, solarization or occultation, any of these, these kind of more organic site control methods are all targeting weeds.

[W] So I guess the important approach is to, to take, to take many options into consideration, not just herbicides.

[>> W] Thank you.

[W] And now a last question that I think we have time for tonight.

[W] We had some questions about like the real difference between working on an individual level and with municipalities and different stakeholder groups.

[W] So questions about cost benefit analyzes incremental cost for the next level of incremental benefit, the laws of diminishing returns.

[W] Like how do these ideas factor in differently when we're working with large scale land versus our backyards?

[W] Hanna or Jordan?

[>> W] I mean, I, I can try to answer this a little bit.

[W] So I come from more of the like large scale background.

[W] And even in that case, we're extremely budget dependent.

[W] There's also the matter of being conscious about where the money is even coming from in terms of producing credible studies or credible results down the line.

[W] So if you have a utility funding, all of the research that's going on or all the restoration, then you may get a little bit of side eye when you're presenting amazing results at the end, you know?

[W] So I think it's all about just choosing the right partners, looking into different programs that are grant programs.

[W] We also partner with local nurseries and things like that who do free plant giveaways.

[W] So there are definitely options available.

[W] It's just seeking that out and, you know, just continuing to share the work that you're doing to get more of that recognition and understanding from those different.

[>> W] Groups.

[>> W] Thank you so much, Hannah.

[W] And with that, I'm going to pass it back to Anthony to wrap up our session.

[>> W] Thanks, Avery.

[W] And again, I know we still have some questions that are left in the Q&A box.

[W] And please anyone, anytime more than welcome to send those questions to stewards at org.

[W] And we'll try to get back to you as soon as we can.

[W] But yeah, what a great session tonight.

[W] Thank you to our guest speakers, Hannah, Jordan, Andi.

[W] Amazing presentations and thanks, Avery for leading the Q&A.

[W] And thanks to all you, all of you for joining us tonight.

[W] We have one more technical habitat session tomorrow on agricultural landscapes.

[W] So we hope to see you there.

[W] And I hope you enjoy the rest of your night.

[W] Thanks, everyone.