

Ep3_pollinators_final

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SPEAKERS

Liz Woodhull, Alison Adams, Jason Mazurowski



Alison Adams 00:06

Welcome to Restoration Roundup, a monthly podcast that explores recent research on, new and emerging best practices for, and stories about riparian forest restoration. I'm Alison Adams, I'm the watershed forestry coordinator with University of Vermont Extension and Lake Champlain Sea Grant and I run the Watershed Forestry Partnership.



Liz Woodhull 00:24

And I'm Liz Woodhull, a junior at UVM Rubenstein School of the Environment and Natural Resources, studying environmental studies and parks, recreation and tourism.



Alison Adams 00:47

It's well known that honeybee populations are in crisis and that this spells danger for many pollinator-dependent crops. There are of course agricultural practices that can be harmful to bees and other pollinators. And the ecologist in me would be remiss if I didn't mention that there are many other pollinators including many species of native bees. Using certain pesticides like neonicotinoids is one harmful practice many of our listeners have probably heard about, and there are also agricultural practices that can be helpful to pollinator populations including restoring riparian areas. So today we're learning more about the interactions between riparian areas and pollinators with Jason Mazurowski. Jason is an ecologist and naturalist specializing in native pollinator conservation. In addition to teaching courses in field ecology and native pollinators as an adjunct instructor at UVM, Jason has recently been working on the concept of bee friendly solar power, and has also been involved in a 10-year bee monitoring study in the Intervale with UVM's Gund Institute for Environment and Audubon Vermont. So welcome to the podcast, Jason!



Jason Mazurowski 01:43

Thanks. Thanks for having me.

A

Alison Adams 01:45

So we're gonna jump right in with some questions. And I think Liz, you're gonna take it away.

L

Liz Woodhull 01:50

Can you tell us a little bit about how you got interested in pollinators and what brought you to this work?

J

Jason Mazurowski 01:55

Yeah, so I really have not been working with pollinators that long, only about three years now. I was finishing up grad school in 2019, and my advisor knocked on my cubicle and said, there's this pilot study that they're looking for someone to head up at the Gund Institute. Sounds like you'd be the right person for it. I had done my master's on bird conservation. And so it sounded intriguing. It was bird and bee friendly solar. And I didn't know anything about pollinators at the time, but I met with the Gund director, Taylor Ricketts. And he reassured me and convinced me that working with pollinators was easy and fun, and I'd pick it up rather quick. Yeah, I think it was somewhere around the end of that season, when I finally got a chance to see my specimens up close after they had been pinned, and I was looking at them under a microscope that just captivated me in a way that no other-- working with any other organism had ever done. So working with native bees and seeing the diversity, and just how colorful they are, and like the variety of habitats and lifestyles that were there, it was like this whole other world that I had never seen before. So from that point on, I was hooked. And they hired me back and keep doing so to do pollinator work.

A

Alison Adams 03:10

And when people think of pollinators as I, as I mentioned, they tend to think of bees and butterflies. What does pollinators really include in Vermont? And what kinds of pollinators has your work focused on so far?

J

Jason Mazurowski 03:20

Yeah, so there are pollinators other than bees. Bees are the professional pollinators. That's the analogy I like to give to my undergrad students, is that while there are other animals out there that engage in pollination, bees are by far the most efficient pollinators, they're the best at it, and they account for somewhere between 70 to 80%, of pollination services depending on who you ask. So bees are mainly the focus when we talk about pollination, especially from an economic perspective. There are plenty of other organisms out there that do pollination. Pretty much anything can be a pollinator, like, you and I can be a pollinator, you can grab a paintbrush, or one of those little buzzy things that you use to hand pollinate blueberries, you can use those, pretty much-- you can imagine a scenario where like a bear could fall down a hill and like roll in a bunch of pollen and like pollinate a flower. But really the difference between a flower visitor and a pollinator is if it happens frequently enough that it's an actual strategy that the plant can use. And so in New England, at least, there are seven that are called the "super seven" pollinators. So that's seven groups of animals that have been identified as significant pollinators. So in order from the most efficient pollinators, bees are number one, like we mentioned, and depending on who you ask, and you know what kind of setting you're in, they're responsible for about 70 to 80% of pollination. After that you

have the Lepidoptera. So those are butterflies and moths, and it's also hotly debated which ones are better pollinators, but some suspect moths are better because they kind of come around at night and mop up where the bees had missed during the day. So they're considered the night shift. So when I say bees are 80%, the rest of the organisms I'm about to list off all added together make up about 20% of pollination. So butterflies and moths are up there. They're the next highest after bees. After that. It's also debated whether or not wasps or flies come next. But both are frequent flower visitors. You won't see them covered in pollen like bees, but you will see them transferring pollen from time to time, and they're mostly visiting the flowers for nectar and not pollen as a reward. So after the wasps and the flies, you start getting down into beetles. So beetles, again, you can go out in the early spring and see beetles on a lot of flowers. That's when I suspect a lot of beetle pollination is happening. So you think of flowers like red trillium, and skunk cabbage that are red and they have like sort of a skunky or like rotting smell. They're meant to attract carrion beetles, there's diurnal fireflies, they are also significant pollinators. But again, they're, they're not really hairy, they don't-- the pollen doesn't stick to them very well. But it happens often enough that they're on this list. And the same goes for flies. They're just so abundant, that it happens often enough that they're considered pollinators. At the bottom of the list is birds. In New England, we only have one bird that we know of that engages in pollination. And that's the ruby throated hummingbird. And they're actually a pretty efficient pollinator. The reason they're at the bottom of the list is just sheer abundance-- there's not very many of them. So yeah, that's, that's all seven of them. And roughly in that order. And again, if you were to travel outside of New England, that order could be totally different.

L

Liz Woodhull 06:49

And generally, what's happening with these pollinators in Vermont right now?

J

Jason Mazurowski 06:53

So from a bee standpoint, you know, we hear a lot about bee declines and insect declines in general. And there's a lot of evidence to support that. But in Vermont, the picture is not really that clear. Right now, for bumblebees, it's pretty clear, they're pretty extensively surveyed and studied. And they have been the Vermont Center for Eco Studies led a bumblebee survey several years back, and they found significant declines than at least four species. There are a few species that just have totally disappeared from Vermont. And then some species of bumble bee are actually doing better, like a lot better. So it's not 100% clear why this is happening. There is some some evidence to support that there are pests that come with domesticated bumble bees, just like people domesticate honeybees, they also domesticate bumble bees for greenhouses. And so there's evidence to support that bumblebees in these-- that are being domesticated and bred in these large scale operations are transferring these parasites to the native wild bumblebees. So that could be part of it. But for the rest of the native bees in Vermont, it's not as clear. So bumble bees have been studied for a long time, because they're big, they're fluffy, they're charismatic. They're what most farmers think of as like a native bee. But when you look at native bees in Vermont, there are over 300 species of native bee, and bumblebees are about a dozen of those. So you're looking at still almost 300 species of other bees that we really don't know that much about. And the reason for that is they're small, they're really hard to study, they're really hard to sample, they're really hard to ID, and they're just hard to survey. But Vermont Center for Eco Studies started in 2019, they started using a template from the Breeding Bird Atlas, looking at wild bees in Vermont. And so a lot of the data that I collect in my projects we share with Vermont Center for Eco Studies, and they're compiling all of these data about wild bees. So I guess the long answer to that question is we actually don't know a whole lot about what's going on with native bees in Vermont. But yeah, there's a lot of evidence to support that bees aren't doing so well. But we're gathering data to try to understand how fast bees are declining, which species in particular are declining, and what's causing it.

A

Alison Adams 09:20

I feel like most of the things I've seen about bee decline have been about honeybees specifically, is that the evidence that you're talking about, or is there evidence about native bee populations as well?

J

Jason Mazurowski 09:29

In states where this has been studied extensively, there's more evidence. The problem right now is that we don't really have a good baseline to compare to. So you can look at the data with wild bees in Vermont. And you can say, well, it looks like they're declining, but we really don't have like a starting point. And so that's what we're trying to do now is get this big broad set of baseline data that we can compare to in the future. Elsewhere outside of Vermont, I know there has been evidence of native bee decline, and particularly the specialist bees are the ones that are declining most rapidly. So they're bees that might need one flower or a genus of plants or a family of plants that they specialize on. The generalist bees tend to be doing okay, and in a lot of instances seem to be doing better. So it's just kind of like we think of crows as like a generalist bird, like no one's worried about crow decline, or robin decline. But there are a lot of species of birds that are declining really, really rapidly. And the same goes for bees, some bees are just gone. Like we just haven't seen them in decades, and other bees are just exploding in numbers, you see them everywhere.

L

Liz Woodhull 10:41

Can you speak to a little more about why specialist bees are declining a lot faster than generalist bees?

J

Jason Mazurowski 10:48

Yeah, it has to do with their habitat being just a lot more specific. So if you think about something like a typical hay field in Vermont, how many species are there and how many of them are native, when you start thinking of the specialist bees, and they need a certain plant, if the plant's not there, they're not going to be there. And so you start seeing areas where there's not a lot of native plant diversity, the odds of having the specialist bees decrease. The plant, I guess, is half the battle. And you also need the correct habitat type for them too. So yeah, if they're a species that nests in snags, you can plant, you know, the plant they feed on, put it everywhere, but they won't show up if there are no like snags to nest in. So it's this combination of habitat, both from like a food standpoint, and then also, like where they're nesting. And you need both.

A

Alison Adams 11:41

Can you elaborate a little bit on what the impact would be, or is, of these declining bee populations? I recognize that you're saying we don't totally know what's happening with them. But if they are declining, what sort of impacts are we seeing, or would we expect to see as a result?

J

Jason Mazurowski 11:58

Yeah, with bees being the most important pollinators, economically, that's a big impact we'd see right away. And already, you know, this spring we had a rough year for bumblebees, and a lot of blueberry growers were a little freaked out by it. And it's thinking of the future where if we continue to see bee declines like this, and we have years where there's low abundance of bumblebees, you'll start seeing a significant impact in the economic side of things. So that's one huge impact. And then if you start thinking about the pollination that goes on in the wild, that's also significant as well, because for the most part, animal pollinated plants will need bees, and if they're not around, you won't see complete pollination.

A

Alison Adams 12:46

So some ecosystem sort of food chain impacts, potentially as well, not just the human side of the food chain.

J

Jason Mazurowski 12:52

Yep.

A

Alison Adams 12:53

Can you tell us a little bit more about the 10-year bee monitoring effort that you've been involved in at the Intervale--what that's involved in and what you've been finding?

J

Jason Mazurowski 13:01

Yeah, so I hopped into that project late. So that's been going on since about 2012. Taylor Ricketts, the director of the Gund Institute, saw the Intervale back in 2012, and said "This would be a great place to do a long term bee monitoring study." There's just a lot going on down there in terms of a lot of different types of farming going on, a lot of turnover with the farms that are down there and the types of farming that's happening. And also a lot of different types of habitat all crammed into one spot, you've got like riparian habitat, and you've got grasslands, and wetlands and all sorts of different types of agricultural settings down there. So it's this really cool area where you can learn a lot in a very small space, and it's within Burlington city limits. So it's kind of cool to learn a little bit about bees in an urban setting and urban agriculture. So he identified it as a great place to do a study and started collecting data down there and has been resampling every few years. And after I helped out with the pollinator friendly solar project, he asked if I wanted to help out sampling bees, we were due to go down there and do another round of sampling. And I said sure, so I sort of got sucked into it. And it was a lot of work, but it's been really rewarding. And especially just getting to spend a lot of time down in the Intervale. I hadn't spent that much time down there, and it is just a wild place. And just that foresight of knowing that it was going to be an interesting place to collect data, and now having such a robust data set when statewide data on native bees is generally lacking... We have this incredible giant data set to work with now. And with sharing this data with the Vermont Center for Eco Studies, they've been remarking how diverse it is down there. We don't have a lot of data like this from other parts of the state but from what we've gathered, it's one of the most diverse spots in the state for bees, if not the most diverse. It's more studied, which tends to lend towards more or higher diversity. But it is just really diverse. Part of that has to do with the climate--it's very warm down there, you've got nice sandy soils, which bees tend to like, and just a lot of different habitat all crammed into one. So it's been interesting. And we haven't really started like a formal sort of analysis yet, there is one undergrad who's doing a thesis, looking at how temperature and weather has

changed over the past decade and how the assemblage of bee species has changed, and that's pretty interesting. So I'm excited to see what we find. But so far, we found that it's a very rich, diverse area for native bees.

L

Liz Woodhull 15:46

Following up with that, I know you kind of alluded to this talking about the Intervale, but your recent work suggests that it's important to have a complex structure with mixed heights of trees, and shrubs in order to best support pollinators. Can you explain more as to why that is?



16:01

Yeah, so part of that has to do with food, and then part of that has to do with nesting habitat. So bees will forage-- so some of the-- especially the specialist bees will maybe only forage at a certain height, like they know what they're looking for. And so they feed on, say, Joe-Pye-weed or something, it's like four or five feet tall. They may never go up into the canopy, they don't have a reason to, or they may never forage on the ground, because they have no reason to. So they may only go at that height. And conversely, you know, you have other bees that might forage, if they're claytonia specialists, like spring beauty, they may only forage like a foot off the ground, they have no reason to go anywhere else. And there are some bees that specialize on red maples, or willows and things like that. So having that varying structure kind of ensures that you're going to attract bees, almost like niche partitioning, where they're going to different heights to forage. The other part of that, too, is having a nice shrub layer. So you have some bees that nest in snags, some bees that nest in the actual stems of shrubs. So like sumac and raspberry and blackberry and things like that are excellent shrubs with pithy interiors that these bees will burrow into and nest. So yeah, you have this complex structure, where you have varying degree of flowers blooming at different heights, and then habitat at all different levels. So yeah, it's sort of like a three dimensional habitat that you're looking at.

A

Alison Adams 17:33

So there was some recent research that came out of UVM by Charlie Nicholson, who I'm sure you're familiar with his work since he was also advised by Taylor Ricketts, and he was looking at bees and blueberry farms and found that native bee species visitation rates, and abundance, which is the number of bees, and species richness, which is how many different kinds of species, that all three of those variables went up with the area of deciduous and mixed forest on the farms he studied. And this maybe kind of mirrors what you were just describing about mixed habitats. And I'm wondering what this means for you when you're thinking about pollinator species and riparian areas or restoring riparian areas specifically, what do you make of that?



18:10

Yeah, that's really interesting. And Charlie specifically was studying blueberry pollination. So it doesn't surprise me at all that blueberry, something that flowers in the--you know, relatively early on in the season would benefit from being close to forest settings or forest edges, because I tend to find in my research too that diversity and abundance in the spring especially is higher closer to forests. And part of that has to do with the earliest bees emerging. So there's mining bees called *Andrena*, and cellophane bees, *Colletes*. So those are some of the first bees to show up in the early spring. And they're oftentimes feeding on red

maple flowers and willow flowers, things that bloom very early on are usually in a forest, like a deciduous forest or on a forest edge or riparian area. And if you look at blueberry pollination, you're seeing that it's mostly *Andrena* that are pollinating blueberries, *Andrena* and bumblebees--*Bombus*. So it doesn't surprise me at all, you have that early boost of food resources from the flowering trees. And if you think about trees in general, too, not just red maples or willows, but trees tend to flower pretty early in the season. So May, June, right when blueberries are out. So yeah, you would expect to have an abundance of bees, there's just a lot of food, a lot of habitat for them that time of year. And then I tend to find that the further you get away from forests later on in the year, you start to notice things like goldenrod and Joe-Pye-weed and all those things kind of bloom like mid summer, the abundance sort of shifts away from the forest, everything's done blooming there, and everything's kind of out in the fields at that point.

A

Alison Adams 19:47

So then, is that the same bees? Or are we talking like those other bees? What happens to them if it's not the same bees in that point in the season? Are you seeing different species?



19:56

So it's a really good question. So something like a bumblebee is active year-round, so they'll just move. The ranges they'll go to feed on things is pretty broad. So from them, they're just moving around to different spots. But for most of the other bees, they might only be active for like a couple weeks in the year. So you might have these early spring bees that are out for two, three weeks, they go through their whole lifecycle collect their pollen, lay their eggs, and then go dormant for the season. So all of those early forest bees, those *Andrena*, and *Colletes* will only be active when whatever they feed on is blooming and then they're done. And then the later bees, the bees that start showing up mid summer will come out. And it tends to be different species. There are very few species in Vermont that stay active throughout the whole growing season. And they're mostly bumblebees.

A

Alison Adams 20:42

You mentioned that you're not surprised that for blueberries in particular that having forest nearby can really benefit blueberry crops. Do you think that that kind of impact of having nearby forests extends to other crops as well? Maybe ones that are later in the season? Or is it really specific, do you think, to early season crops?



20:58

From a habitat perspective it's beneficial, I would say, throughout the entire year, I think it's probably most noticeable with blueberries, just because it's an early season crop, and there's not much else out at that time. But yeah, from a habitat perspective, having a forest edge nearby, I can't see a downside to that at all. Like having a diversity of habitats nearby, and specifically thinking of the nesting, so a lot of bees will nest in the ground, but also a lot of them will nest in like rotten logs or snags in particular. So having that nearby-- even if it is a late summer bee they'll probably be nesting in something like that.

L

Liz Woodhull 21:32

What are a few things riparian forest restoration practitioners should be sure they do or avoid if they want to support pollinator populations? And can you speak to some of the key elements or features of riparian areas or pollinators?



21:47

Yeah, so the things that a practitioner should do: diversity is like the underlying thing. It's the more species of plants, preferably native, that you can fit in one area, the better. It's just yeah, that that's probably like the one thing is increased diversity. Another thing would be favoring natives over non natives. There was a study that I read recently by Doug Tallamy and his grad students that looked at hedgerows, and they looked at hedgerows that were made of majority native plants and majority non native plants, and found like a really significant difference in both abundance and diversity. So that's the biggest thing is just diversity: if you think your hedgerow or your riparian buffer has, you know, enough species, like just add one or two more. Like, that's, you can never really go wrong. So that's the one thing I think that can be focused on more is a push towards natives and diversity. And then things they should avoid? I would say that the biggest ones are staying on top of invasive species in particular. So like avoiding, you know, just letting things like buckthorn and honeysuckle come in, because it can be really detrimental. And then pollinator traps is another thing you want to avoid. So this is a term that I've seen the Xerces Society use, and this refers to, like you can put all this pollinator habitat in and bring all these pollinators, but then if you're using pesticides, somewhere nearby, it's just you're setting a trap for them, like, you know, you're just killing more pollinators. You would have been better off not attracting them in the first place. So those are some things to avoid. So being smart about pesticide use and limiting it.



Liz Woodhull 23:22

A lot of restoration practitioners use herbicides, including things like glyphosate, and does that actually affect pollinator populations?



23:30

Yeah, so glyphosate, it's kind of a tricky thing. So Roundup would be the term most people would be familiar with for glyphosate. And yeah, supposedly, it's supposed to be harmless to animals. And I had a job as a landscaper when I was living in Montana, and it was kind of billed as like a native plant restoration job. But then I would be walking around all day long with like a Tyvek suit and a backpack full of Roundup. And I'd be like spraying all over the place, you know, just covering thistle in glyphosate, and I used to read through all the manuals to try and reassure myself and it always says, like, "No, this is harmless to animals, like we've sprayed mice in the face with it, and it's fine." You would think that compounds in it supposedly only harm plants, they can't harm animals. But there is some evidence to show that bees are affected by it. And so people have tried to figure out why. And there's a couple of reasons that I was able to find for this. The one specifically with honeybees, and I don't know if there's any evidence for wild bees on this, is that affects their microbiome to the point where it can kill them. So glyphosate, it targets plants and also bacteria. So if there are bacteria in their gut that's being affected, they can be fatal to them, and often is. Like a lot of these studies found that you spray bees with glyphosate and they die and they're like, huh, that's weird. Their animals are not supposed to be affected. And then the other thing I heard of is that the ingredients in Roundup that aren't glyphosate, so the inert ingredients, are harmful to bees. So usually you have to mix glyphosate with other chemicals like surfactants that get it to stick to the plants you're spraying, and that was found to mat the hairs down on bees and prevent them from collecting

pollen. So they essentially just starve to death because they can't feed pollen to their larva. So yeah, it's been found as harmful to honeybees and bumblebees, and I'm not sure about the rest of the wild bees, but I would assume it's probably not great.

A

Alison Adams 25:18

Yeah, and I know, because I know a lot of riparian forest restoration practitioners will be listening to this, I do want to say I am aware that the practitioners I've sort of spoken to him out in the field with I know try to apply herbicides very, very carefully, and really try and hit just the spot on the plant, you know, where it's going to affect the plant, or just the immediate area around it. I know many of them are in sort of a bind, because there are other things like reed canary grass that'll come in really hard and really strong and make it hard for those new trees to establish. So I think it's a really challenging and difficult issue if you're trying to-- and I know a lot of people are really, you know, sort of eco-minded really concerned about impacts on pollinators as well. And so I know that that's sort of a difficult line to walk a lot of the time. Do you know if there are any alternatives farmers can use that would be safer that are effective? Or have you seen anything really working, maybe specifically, if you're trying to get plants to establish and you're worried about the competition from other herbaceous species?

i

26:12

Yeah there are alternatives to glyphosate, but unfortunately, all of them require a lot of work, and a lot of attention. And a lot of these non-natives that we're battling, specifically, the invasive species that we're battling, are invasive for a reason; they have these just crazy survival strategies, like, you know, they can just send off innumerable shoots underground and just pop up everywhere. They're really, really hard to kill, and that's why they're invasive. So chemical means are by far the most effective way to get rid of them. All of the other methods like solarization, or trying to shade things out, like reed canary grass, they'll work long term, but you have to be persistent, and you have to stay on them, and it's like a multi-year effort, and it's a lot of labor. It's really labor-intensive. When looking at how much time and money farmers have to spare, it's usually not a lot, it's usually the best alternative is just being really careful and really mindful and really targeted using herbicides.

A

Alison Adams 27:11

I was wondering if there are any incentives that you're aware of for farmers to modify their farms to support pollinators?

i

27:17

Yeah, the one I'm most familiar with is through NRCS. They have a bunch of different programs that farmers can enroll in. And usually they will find funding for you. Each farm, there's a region--I don't know exactly how it's assigned--but they have like an NRCS go-to person that will be able to tell them like exactly what's available, what they can do, you know, what plants they can order and where to put them. From my experience, at least, it's usually pretty easy to find funding for that kind of thing.

A

Alison Adams 27:47

For supporting restoration for pollinators, specifically, or restoration in general?



27:51

Uh, restoration in general. And a lot of it has to do with riparian restoration. So a lot of what we're working on with some of the projects that I'm teaming up with Audubon on is we usually work with the farmer, we recommend a bunch of plants that would be good for both birds and pollinators, and usually, it's pretty in line with what NRCS had in mind anyways, and like what they have available, and then we just make sure that it checks all the boxes.



Alison Adams 28:13

And we'll put links the local NRCS offices and things on the blog post for this podcast.



Liz Woodhull 28:18

In your report on your work at the Intervale you discuss the importance of pollinator insectaries. Can you describe for our listeners what insectaries are and how they support pollinators?



28:28

Yeah, so insectaries are generally strips of vegetation that can be strategically located across a farm. A lot of times, I found that they're just like spots that are unused and just don't get mowed, and then can end up being this haven for pollinators and beneficial insects, predatory insects, like wasps that can actually help suppress pest populations. And so some people actively like strategically plant insectaries all over their farms, and then some just don't, they're just places that are kind of wild. And I see this down in the Intervale all the time. A lot of it's pretty wild, like there's a field over there that hasn't been in cultivation for a while. And there's a little strip over there that no one really had time to mow, and you go out there in the morning, it'll just be loaded with wasps. And you'll just see all sorts of ecology happening right in front of your eyes. That's kind of outside of my area of expertise, talking about beneficial insects, but I do know that like insectaries really help promote that and help suppress pest populations.



Alison Adams 29:27

Is there anything else that listeners, particularly those who may not be restoration practitioners or maybe aren't farmers, can do to support pollinator populations?



29:36

Yeah, planting native plants. It doesn't really matter the scale you're working with. Obviously, when you're working on an agricultural landscape, you're aiming for large scale changes, but if you're just trying to attract pollinators, and support pollinators, the main things to keep in mind are that they have basic needs just like any other animal, so they need food, they need shelter, they need water, and then they need to not be killed by pesticides. So those are their main needs. And for food, the best thing you can do is just

plant a diversity of native plants, and you're more likely to attract those specialists. And if you've managed for the specialists, the generalists will also benefit. So if you can find a native seed mix, they're usually expensive, but if you can find a mix that works, you know, that's the best thing you can do. And then for habitat, urban areas are actually pretty great spots for bees, there's a lot of nooks and crannies, they can get into a nest in, like they nest in between sidewalk cracks, and bricks and cement walls, and things like that. But it's usually a lack of food. So just providing that food for them is fine. And then in terms of habitat, most bees nest in the ground. And so just being cognizant of that, and if you have like a bare patch of soil that you know, a spot where your dog likes to run around in circles, that might be great bee habitat, because like even though they've eroded the grass away, you know, it's a perfect spot for bees to go in and out. And yeah, there are commercially available bee hotels, I would use caution with those because if you're not careful and you don't clean them often enough, they can spread disease, but you can make them pretty easily too just by drilling holes in wood. So yeah, check out the Xerces Society website. They have a lot of just tips and tricks on how to attract and support pollinator populations.

A

Alison Adams 31:13

Well, that's really good to know! I am literally later today talking to somebody about what to do with my currently just dirt yard so I'll keep these tips in mind.

L

Liz Woodhull 31:21

Thanks for doing this interview with us.

J

Jason Mazurowski 31:23

Yeah, thanks for having me.

A

Alison Adams 31:24

Thanks so much Jason.

A

Alison Adams 31:40

Today's episode featured the call of the belted kingfisher. It was recorded by Martin St. Michel on May 25th 2014 in the Riviera Missisquoi in Quebec. We downloaded the song from xeno-canto.org. This project has been funded wholly or in part by the United States Environmental Protection Agency under an assistance agreement to NEIWPC in partnership with the Lake Champlain Basin Program.