Tracey ([00:01](https://www.rev.com/transcript-editor/Edit?token=Pn1jDRA-OlfjqWiXTuCEAuyZFelzMI_1dws64ukNrHX7EiMYU3PBGJes6kysIi79mgx3coFX_hy5GF4c7YmgPlBq6o8&loadFrom=DocumentDeeplink&ts=1.47)):

Hello and welcome to NC State's Audio Abstract. I'm your host, Tracey Peake. Lately, we've been hearing a lot about the invasion of North Carolina by beetles, moths, even parachuting spiders. It turns out invasive species may not be as rare as we'd like. We're speaking today with Kelly Oten, Assistant Professor and Extension Specialist in Forestry and Environmental Resources about some invasive species and what they may be doing to our state. Welcome, Kelly.

Kelly ([00:32](https://www.rev.com/transcript-editor/Edit?token=j9yghEuxJ4BihM50NwSSJCl7K3QoRkLE8tNIVup4SYqae9GTxg0Ey_ES9WdPQXRTuw41TeuUUPDcSESLjtwJNx23IU0&loadFrom=DocumentDeeplink&ts=32)):

Thank you so much for having me.

Tracey ([00:33](https://www.rev.com/transcript-editor/Edit?token=yqr8RRTpND1g41fhrCE6Xi6Vziv4deUxdC2ZXmjvJgBHvPZ23umMpjS3usMUvsJiCCTw0Rjbc4uxt5TrjTTJkB7PaQg&loadFrom=DocumentDeeplink&ts=33.74)):

I am stoked to talk about creepy crawlers that may or may not be destroying our state.

Kelly ([00:38](https://www.rev.com/transcript-editor/Edit?token=e390zrWUccsg6mNVUrv4cdz3go9gAppdOii3d4mmCNRBVoho6Y5uU98XvTJfSq8vEOw-89b6YBs1o4314SrlTOW1v7M&loadFrom=DocumentDeeplink&ts=38.09)):

Well, you're in good company.

Tracey ([00:40](https://www.rev.com/transcript-editor/Edit?token=djusrZ4ZoVJN8ALJwtJAJDTQRJ0ceGRmcwmD-lqN67eWlHLR_CJHmvvxtAcegAYofS_kUNvHq6zpikHPAJB857Szd8c&loadFrom=DocumentDeeplink&ts=40.47)):

So, first of all, let's just get a handle on how many invasive species may be present in the state and are all invasive species necessarily bad?

Kelly ([00:50](https://www.rev.com/transcript-editor/Edit?token=85p0NemM_uMPTJlE90JDpZwIB0W_JuR-cSrt36aJDBjaLr6Vu3xnYcYk3I1t2XOv1ScEkFraPvLHE-Vm6C8XliwZzTA&loadFrom=DocumentDeeplink&ts=50.53)):

Well, that is actually a really hard question to answer. We have a lot of old invasive species and we have some new ones, some emerging ones, some that are on our doorstep about to come in, so putting together a number is actually something that's near impossible to do. But what I will tell you is across the US, we have approximately 4,000 invasive species and, yeah, that might sound like a lot, but when you think about how many non-native species we have, that's really only about 10% of them that are actually considered invasive.

Kelly ([01:22](https://www.rev.com/transcript-editor/Edit?token=4bTu1m0wS8D-RjLSGDPVHFHwkH31OowjsKPab-JcM2bYZwy7RcAswd02h1-bjBupfimahC95Bb97qiyPzZCKViVq8MA&loadFrom=DocumentDeeplink&ts=82.24)):

In North Carolina, I work on invasive forest pests and we're actively monitoring or managing five, the Hemlock Woolly Adelgid, the Emerald Ash Borer, Laurel Wilt, Thousand Cankers Disease, and Spongy Moth. And we have two more that are on our doorstep that we hope don't invade North Carolina, but it's not looking good.

Tracey ([01:43](https://www.rev.com/transcript-editor/Edit?token=rvhfVmbyB4oOm9y--NLOGWV-HbOA7qiCRbHLmZ1zrj4aRY3a-xJAt0yNxI0taAx5h28GN4hE4Y4hErn6kXK_8xpxNT0&loadFrom=DocumentDeeplink&ts=103.03)):

Okay. Which are the two that you're hoping don't invade?

Kelly ([01:45](https://www.rev.com/transcript-editor/Edit?token=3PGkdem7Cwps49JL6aBtzWqxMVyY8vXzGj36UU385AbAf5qeahM-BV26_BAg33wJF0RDnKSE99pPtsp1bIw8hKR2VCg&loadFrom=DocumentDeeplink&ts=105.71)):

The Asian Longhorned Beetle has been detected in South Carolina, and the Spotted Lantern Fly is in Virginia. And to answer your question, are all of them necessarily bad? Invasive species, yes. By definition, an invasive species causes harm either to the environment, to something we value like food or trees, or to our human health. But if you were to ask, are all non-native species bad, then the answer would be no, because only 10% of them are considered invasive.

Kelly ([02:16](https://www.rev.com/transcript-editor/Edit?token=ZHLJzpqnwB7mhHGkus_NLYn9Uy-5RTMSVhyuj4aeNI5kitaWsr71m_rJ1rVRN9Rkc9SkCPHf5GO_Sg9ORlZ4B1GK4Ow&loadFrom=DocumentDeeplink&ts=136.82)):

And then we really get a lot of benefits from non-native species. Over 95% of our agricultural system are non-native. So corn is not native to the US, wheat is not native, tomatoes aren't native to North America. So these are all things that we value a great deal and we need for our economy, for our food sources, and things like that.

Tracey ([02:41](https://www.rev.com/transcript-editor/Edit?token=ZqgMkb0d89BFvu7Z8iTPSzTz9noSMBPEb4461tWQW0kmXERMqOkN5KO5knY73m8PSMWuKf7EbOL2ArSt4QvCrOtOB2Q&loadFrom=DocumentDeeplink&ts=161)):

Okay. So that's an interesting distinction and good to know. So if you are just from somewhere else, you're okay, but once you get that invasive designation, it's all over, you're just a bad actor.

Kelly ([02:52](https://www.rev.com/transcript-editor/Edit?token=BmifbPQsoCPAmcHVrJZP3Le5pHRC_tjqMhlwG9-zB0WfDRFozXBVOrSm6Tr7-UMfvHhbWxZHTG2RdbSx0_JXD7Xoqhc&loadFrom=DocumentDeeplink&ts=172.21)):

Yes. Then you're on the bad list.

Tracey ([02:54](https://www.rev.com/transcript-editor/Edit?token=j4wN5fH4kNznWywk9G_ABMAFyywX0DQMj_h_BUgjEn8fUmTXUxB_F6i_9I4JVHA7JwXicy0lgO7hej1JkSeDSIH1bPY&loadFrom=DocumentDeeplink&ts=174)):

So how do we know when we're being invaded? What kinds of monitoring programs do we have out there?

Kelly ([03:00](https://www.rev.com/transcript-editor/Edit?token=I4xyCGqzoIGiwQpl_4socIKCfyGklYEPuMhLpFfp-j56z8Obz_pn22Eiik9cXwHbyTlaJF101K-WiKhhe7-86la2VG4&loadFrom=DocumentDeeplink&ts=180.89)):

Well, there's lots of ways that first we try to stop an invasion from happening and, really, it starts overseas. Before things are brought in, there is actually an international agreement, it is called ISPM 15. Wood packaging materials have to be treated before they come over in the first place. So that's the first step.

Kelly ([03:22](https://www.rev.com/transcript-editor/Edit?token=TUdvQUGBJl2ZGxFWH_IuIn3MwxpA_LLi6dxKZgHhinDbe-CIlY0jVEYl77pvz7kr76LJWluvEYGgQuMX9ia019jeQps&loadFrom=DocumentDeeplink&ts=202.52)):

Once it gets here, we have customs and border protection agents, agricultural agents trained to inspect goods, look for some of these invasives, and we also set traps to try to detect new invasives as well. So lots of traps are set near ports, airports, ship ports, things like that, and we just look at them and see is there anything strange, is there anything that doesn't belong. But we don't always detect them that way. More often than not, it's someone who notices something strange or someone who notices, "Wow, all of these trees are dying, what's going on," and that's how we figure it out.

Tracey ([04:01](https://www.rev.com/transcript-editor/Edit?token=JWKXdnX5clv_nZYNAovuDQ2fH1iHku93QrH4opDspvhFxeSlEtqBE-cVYlvKk4Za-UB9zGi6W9f18jvTkgYOrt9BzZ4&loadFrom=DocumentDeeplink&ts=241.5)):

Well, and that's... That leads me to my next question, the routes by which they get here. Okay, they're traveling overseas probably on container ships.

Kelly ([04:10](https://www.rev.com/transcript-editor/Edit?token=qXEbFRPWCHt3uYmMsjbsO6pfkEMK5mXnuT4zj2WZMS0SdZiAIW5PPOGFHpreuakyAx0JVZcM_UNzd-e773hTzCiKAYg&loadFrom=DocumentDeeplink&ts=250.24)):

Yes.

Tracey ([04:10](https://www.rev.com/transcript-editor/Edit?token=rUfbghg1axCEZ-3CGFoZUz_LRFRLRWWMNwg_jrmNXOuBPVObXuqbj43lfMjGmd_W1PlmodM6Hal5IrSiCOb9-SwGjkY&loadFrom=DocumentDeeplink&ts=250.67)):

Imported materials.

Kelly ([04:12](https://www.rev.com/transcript-editor/Edit?token=Yc4lbcgcMJN8ymR4O9yo9Eo4MTD_uuUHyQVwpee_fsrG5pMkpWaqvN5JLiZedn3M2bMWdfz8bBl5hzeW3ab5jMGxOwY&loadFrom=DocumentDeeplink&ts=252.26)):

Yes, yes. They're hitchhikers.

Tracey ([04:13](https://www.rev.com/transcript-editor/Edit?token=-ku_BscKbnQwM47_ZKv1ukLNArMUyLU10pmP9ONOooDPk6Wq4ulaNZFPDTVDWsO-in1v0Vcfo3MS30pER-ZwaaAMG0s&loadFrom=DocumentDeeplink&ts=253.64)):

Okay. And once we notice them, is it already too late? Like your tree example, if an entire forest is already dying, is it maybe too late to do anything at that point?

Kelly ([04:23](https://www.rev.com/transcript-editor/Edit?token=MRJG_hGGAe8FJWP6fd3N8wb1C_PFbQv3rlI8NfLvwPSRWUQmYnI3DJ7Yhx4ZssAM20NUAWoDGzxANseNwaBjh0WQp3g&loadFrom=DocumentDeeplink&ts=263.71)):

Not always. We have a lot of success stories. If we catch the infestation early on and we know what to do about it, then we can control it, and we do have some eradication success stories. However, the longer something is here, the longer it's given the ability to become established, the harder it is to manage it.

Tracey ([04:51](https://www.rev.com/transcript-editor/Edit?token=o7kKkXPiaw6Zr0rHzJun9_-dmQgpo-35E8mHQHBvTjQvB2njbS_befXDR-8KpSJf7yNxPm2-QMrl1DOh0Ap80hWXKjo&loadFrom=DocumentDeeplink&ts=291.61)):

As a follow up to that question, once it's here, once there's been an invasive species that's gotten a toehold here, have we ever completely eradicated one?

Kelly ([05:01](https://www.rev.com/transcript-editor/Edit?token=XDUrvHtf7JslsTMCfQ1bTL6FLyQIg76xVaZr8Y9ApNg5R-hxT6gnCwSPpn-mIsDdMMNR1uEeCkMU01dmQtSSab4_ywU&loadFrom=DocumentDeeplink&ts=301.39)):

Yes. One of my favorite success stories is actually an insect that I'm working on, the Asian Longhorn Beetle. It was first found in New York in the mid nineties and, at the time, someone saw it on a street tree and reported it and they were like, "This doesn't look right," maples were dying, and they determined this was a new beetle and it was attacking Maples.

Kelly ([05:26](https://www.rev.com/transcript-editor/Edit?token=Nq0r5T-yjW9ngQeMMxvrXEVzF7I9VEN5ZVnrorq1VVVQ3PUHZPCyH2aP5jghx8SN6dR6E1waIa4cVAWyczsfFfPXb9U&loadFrom=DocumentDeeplink&ts=326.72)):

It didn't spread a ton immediately, but then suddenly it popped up in Chicago, hundreds of miles from New York, but there was an immediate response. The response didn't look good, they came in and removed all of the host trees. Completely removed them, chipped them, but it worked and they have been able to get rid of this beetle from these isolated infestations multiple times.

Kelly ([05:50](https://www.rev.com/transcript-editor/Edit?token=BQYSO2yxvnv6lhm2lVvaJbICPHx0WsDZOwJrnq5ZHjoiPPSb4i3ImytsYFyIxCDV9OSUcxcdBIJMXmFalUpjI8VSqEY&loadFrom=DocumentDeeplink&ts=350.99)):

We have more success stories eradicating these little satellite populations of Asian Longhorn Beetle as they've popped up than we have of where we're still actively trying to combat them. So there are success stories and we have been able to get rid of them from time to time.

Tracey ([07:08](https://www.rev.com/transcript-editor/Edit?token=droVp9pn-C4aEzGMN-kTSgVhRYDnyTUdaHJc2qA_MLn9RJlpZy3WaAjOtyM2rCFBc9I_rhqFI1CR-naLqVP1HdlX3Bg&loadFrom=DocumentDeeplink&ts=428.83)):

That brings me to our other question which is, I'd like to talk some more about some of the species that you have worked on or are familiar with. You mentioned a few of them earlier. And I'd also like to know a little bit more about, we talked about the Longhorn beetle, but also about the Spotted Lantern Fly, which I was told about the last time we had a bug fest at the museum here. They had all of this be on the lookout for this creature material around. And also, a tree, a Bradford Pear tree. We think about insects a lot, but also the Bradford Pear. So if you could tell me a little bit more about the invasive species that you're familiar with and what they're doing.

Kelly ([07:52](https://www.rev.com/transcript-editor/Edit?token=_g7_uX5rmk4uvckG5jGZjvqOguZiFVSSV7U31d7p4QHyUCVUGfntsvn1_UyHLch7cn4MGKMGqeHYAKF0JHQPv4kjF54&loadFrom=DocumentDeeplink&ts=472.45)):

Yeah. I'll start with a Bradford Pear first, since it's the last thing you asked and frankly, it's become very viral in the past few weeks. Two weeks ago, we announced a Bradford Pear bounty. I'm working with the North Carolina Urban Forest Council, the North Carolina Forest Service, and the North Carolina Wildlife Federation. And the four of us, as a team, got together and we put a quote unquote bounty on these trees. And, basically, what this does is if a homeowner has a Bradford Pear in their yard, they can cut it down, take pictures before and after they cut it down, bring it to our event, and basically get a free native tree to replace it.

Kelly ([08:32](https://www.rev.com/transcript-editor/Edit?token=9zhXqAxxTX7vuudzai2TPXvNM5noQDlvnXf-d4WvinN8sFi-JMsrrcFN9oLGVmYnb1gBwP5t4rdaQa9aXC6mzVUjteA&loadFrom=DocumentDeeplink&ts=512.13)):

This is our first event, this spring, and we're hoping to come to different areas this fall, the next spring. This is a program that we're hoping to last for several years, as long as funding supports it. But it has gained a lot of traction. It's interesting when you take a stance on an invasive species that some people love. You get a lot of support but a lot of naysayers coming out of the woodwork.

Tracey ([08:58](https://www.rev.com/transcript-editor/Edit?token=6CNzTDYBeJp21Me66JbbWJ9C7H8vbTnSIJewWhx_gl3j-s1kVkyUivINVuEQR3QUmVb20cZ9xktV36_KLedWWwkS5-4&loadFrom=DocumentDeeplink&ts=538.94)):

Well, what I personally don't understand why everyone planted Bradford Pear trees. They smell terrible, they fall apart, they're the worst trees in the world. But what is it about them that makes them an invasive species, harmful to where they're planted?

Kelly ([09:13](https://www.rev.com/transcript-editor/Edit?token=ufZ_oxYprSdVZZ23MY3CjItyoYpmqPE1mRBom9CHSRot9euFQZAmwOx3t9d82PEoIhgffdsyMkbPfQXBvO5uZdoAwxI&loadFrom=DocumentDeeplink&ts=553.44)):

Yeah, you're right, a lot of people do enjoy them, which is why they were planted. They were originally brought over to hybridize with our fruit pear trees to make them more disease resistant, but then they realized, "Wow, this tree looks beautiful in the spring." And it's one of the first to bloom, so people love it, the first signs of spring, right? And it has a good canopy structure. But all of those things are now negative. Those flowers that everyone likes because they're showy and early, they smell awful, like you mentioned, people hate it, and that branching structure that makes for those symmetrical oval canopy, actually also creates weak branches.

Kelly ([09:55](https://www.rev.com/transcript-editor/Edit?token=24qLXrBKh_hkCLfvN78veiQEvEf5s_YmIAgl0Tw861JTrGYfpu4UTsWZC5gnQwnJWnPzSw7rS-wVkyM2gfxngkqTdl4&loadFrom=DocumentDeeplink&ts=595.01)):

So it took a while for them to realize that those qualities were actually negative. But then it was years later that the offspring of Bradford Pear, because on its own, it cannot self pollinate, but when it crosses with other varieties of Callery pear, of which Bradford is a variety, then the seed is viable. So birds will eat the fruit, they'll defecate somewhere in the woods, and then you have a baby Callery Pear growing and that's when it becomes invasive. And the reason it's invasive is because it's growing up in these areas where our native plants should be growing.

Kelly ([10:31](https://www.rev.com/transcript-editor/Edit?token=sPLa9l9BN26oLHjHs9pQ7r4Sk6yR6gl1VYoFOHvAcTEJ5B0TTOwSLIMcr7lQCcZqyxrvXYurODvN9oFveEa1YgvvW4k&loadFrom=DocumentDeeplink&ts=631.6)):

Because it's an early bloomer, it puts on leaves earlier, and so it shades out our native trees, our native plants. And if our native trees and plants aren't there, then the native insects that feed on them aren't there, and that's the basis of our food web. So you have these areas where Bradford Pear or the wild Callery Pear is taking over and birds hardly have anything to eat. There's no caterpillars for them to bring their young, the forest floor diversity is completely collapsing. It's really become an ecological disaster and it's becoming more and more apparent. I think anyone who's driven around North Carolina roads in the past month, they're hard to miss they're everywhere.

Tracey ([11:17](https://www.rev.com/transcript-editor/Edit?token=l4Iql1k7e66F5PH9TlS-txvGbhLqZJqQPVY3WGdJXJtz_BKcjGGQY0ZU8ETyBiETugHwQyi9XWVXP3XvPo_nF-km_Hc&loadFrom=DocumentDeeplink&ts=677)):

Yeah. I'm just glad to have some actual evidence that I can share with people about why these trees are awful.

Kelly ([11:22](https://www.rev.com/transcript-editor/Edit?token=DDOKT2AlDI0hvOtEA-G8IPgTI2FcYxHeXVCECbuJDxISPmJxV-dU7-7eUHHoty_10sHWTLVj8I-5J1Q1uI2Ee-Rea6w&loadFrom=DocumentDeeplink&ts=682.06)):

Yes, and I haven't even talked about the thorns when they...

Tracey ([11:24](https://www.rev.com/transcript-editor/Edit?token=D8-IRGc45kfIfIVxjBckWefHXLJVotmnSOsRSxy-l4FAQ2jTvw8HkwYoA5WInN4OxVaKur1HsEmg49Oz9uc2E-OSHME&loadFrom=DocumentDeeplink&ts=684.94)):

They have thorns?

Kelly ([11:25](https://www.rev.com/transcript-editor/Edit?token=TSNuju8zjzCmNzC8-WeWU006zFENo7wJzVbKK-Du2ETvy9P0bQKGhjscII87aG7xNlTwCdMFyrnjbgdXmys3EQD8Cr8&loadFrom=DocumentDeeplink&ts=685.2)):

They have thorns. When they're wild, thorns get up to four inches long.

Tracey ([11:29](https://www.rev.com/transcript-editor/Edit?token=bk0OPJseI47sB6GMd5uB3BMBp94I5AgNYFocvmJeJzzup4rQOokc6wOx0jjwPqyJzuGdZeqK1e4jAEuBoBjVB8YEdZs&loadFrom=DocumentDeeplink&ts=689.84)):

What?

Kelly ([11:30](https://www.rev.com/transcript-editor/Edit?token=PEC8TIGvm0aG9Qd41KQhgha-lAV890-PkC6UYcZ8b3QMDC1TIPL8C8Joi1DYnlDpkWciJM_530OaIjyfieCCXxleiFY&loadFrom=DocumentDeeplink&ts=690.36)):

Huge, huge. This is bad for wildlife. I teach my kids all about this. We'll be driving down the road and my four year old points out, "Bad tree." She says it's because they poke animals. Which is true, they can create thickets and make it hard for animals to wander around. But also, from the human perspective, people can't manage their land. It's really hard to go in there, cut down trees that have four inch thorns. It's known to puncture tractor tires, so land management, both in agricultural settings and forest settings, has become really complicated.

Tracey ([12:06](https://www.rev.com/transcript-editor/Edit?token=So927SPyUxSfCyAw8QBXmQJOwq1ChwNwFHzNrhf06lC0Gs2gyE5zzm-lyleqSEhqXiZnD-M_noJrrNH5A4IP_x9QkMI&loadFrom=DocumentDeeplink&ts=726.26)):

Those are just bad, bad trees.

Kelly ([12:08](https://www.rev.com/transcript-editor/Edit?token=B_4tUsFBPWBgIBPaXzH4utixoFdGU0sEOYQlkqhYHUa4QjQBEb0pENB8rhKCMN9OkPDkSpuyGSx6Q7EsSevP0KJcjB4&loadFrom=DocumentDeeplink&ts=728.03)):

Bad trees. Yeah, everyone should say it, not just my four year old.

Tracey ([12:10](https://www.rev.com/transcript-editor/Edit?token=oa2LtgQhvs3FTMjwBvTXuoWWRhQJz8PUTH4y3sgQRwXEExdYIFm70c-cF41men9h9mEUmLOgTCiwZwSoEx5tVtD5ICU&loadFrom=DocumentDeeplink&ts=730.85)):

Not your four year old. Bad trees, bad trees. Well, let's talk a little bit about some of the other species that you're familiar with.

Kelly ([12:16](https://www.rev.com/transcript-editor/Edit?token=Lo_wKnqGJ5wtHCTyzVr1v4AFb1j0LN3IvyQAS2-83dmyeJIDnahwxjfwHY_wSfAZkeFFsirF9_T3D_hzt5pHKYJlpvs&loadFrom=DocumentDeeplink&ts=736.02)):

Yeah, yeah. So Spotted Lantern Fly has also gained traction recently and that's because of its recent detection very near to the North Carolina, Virginia state line. So it's been creeping south. It was originally found in Pennsylvania and it is expanding its range quite quickly. But last year, it was detected less than 20 miles from our state line.

Kelly ([12:37](https://www.rev.com/transcript-editor/Edit?token=3C4ytQN65UZaa9NG-XuxvPyBIkfbQR1SpvQhE5ZqM2W9VYCKYvfB5j5KeU9tpPpAKH960pqnCj0E6xm5vnRVGFpRnac&loadFrom=DocumentDeeplink&ts=757.87)):

Now this one's scary because it attacks a lot of different plants, so we're going to have a lot of things that we'll find this insect on. It's a showy, beautiful insect. They congregate in large groups. They're going to be very, very annoying. People are going to hate sitting out on their backyard if there's Spotted Lantern Fly on the tree right next to them. If you park under a tree that has Spotted Lantern Fly in it, your car can get covered in honey Dew, which is this sweet, sticky substance they excrete. But even worse, they attack some of our agricultural commodities. Grapes are one of their favorite things to attack and we see a huge reduction in grape crops. The grapes that do remain have less sugar, so this is a really big concern for the wine industry. All those wine drinkers out there, this is an insect you don't want around.

Tracey ([13:33](https://www.rev.com/transcript-editor/Edit?token=DBG-6R8NwKEe4ol-SnWFZ4pQZQFXAi6fF13FFuF4erje4stoQnVBF3AKs6AdZqwpS7uFs77THCPFL0hb_PytS_jRMXk&loadFrom=DocumentDeeplink&ts=813.83)):

No. Has there ever been an instance of native plants or anything adapting to these species and fighting them off, or does it take so long that by the time they get an adaptive response, they've already been decimated?

Kelly ([13:48](https://www.rev.com/transcript-editor/Edit?token=vDL9dzxer9eK-z_mduHKlGt72vhKQ-ew9o-cInZBbz20Teqsj6jzDKZzVcsayC4DlFygpEZvwUlSlMzn7sviOfIr2uU&loadFrom=DocumentDeeplink&ts=828.97)):

That's a good question. Sometimes, yes. A really good example of that would be Emerald Ash Borer, which I'm also working on. We found it in North Carolina in 2013 and it has spread so fast throughout our state. We have it in over 60 counties now and it is just destroying our native Ash populations. Not just here in North Carolina, but everywhere where it's been introduced in the Midwest and Northeast.

Kelly ([14:14](https://www.rev.com/transcript-editor/Edit?token=5WyAyQT3Y9qvBcYznenY1lZ0KfhlgBOcBB55Gv3gGxgL7-2CfZ_1KCVh2OG2_rO6FiL0IKFF4mZzGgJSTHVbBMVQ06w&loadFrom=DocumentDeeplink&ts=854.61)):

But we do know some of our native organisms attacking it. Woodpeckers love to feed on Emerald Ash Borer. The larvae are inside the tree, so you can't see them, but woodpeckers go to the tree, they start pecking at the bark and they actually pull some of the bark off. We call this blonding because it changes the actual shade of the side of the tree. So they're flecking out the bark, but they're actually successful and get a lot of those larvae out.

Kelly ([14:39](https://www.rev.com/transcript-editor/Edit?token=S9Q9nD4o6mOefZU72hPH5Gzhgp4cUGXd8Fj_5XMDf2dn1s5jE--85vlXNOvci0AHGW-bwFBB6gVjUdxZ05MJ1IkmfZY&loadFrom=DocumentDeeplink&ts=879.08)):

There's also beetles that attack them. The Pelos Checkered Beetle will eat Emerald Ash Borer. There's also some parasitoid wasps. We have nearly 20 native parasitoid wasps that will attack the Emerald Ash Borer. And if you don't know what a parasitoid is, think of the movie Alien where the alien bursts out of the body and kills its hosts on the way out. That's what parasitoids do. They utilize their hosts for some time and then eventually kill it. So a very cool method of practicing pest control.

Kelly ([15:16](https://www.rev.com/transcript-editor/Edit?token=FZ4IBDGr7Z7tIPZGZZjrws4cGdfid2ub6fgtTIswtTeRMYiwXACYNTVKVfivkSOLepBXGGIGctMllPnnvLUJSGLwNLU&loadFrom=DocumentDeeplink&ts=916.37)):

But another cool organism that feeds on Emerald Ash Borer is something called the Cerceris Wasp, and it is this ground dwelling wasp. One female, they're solitary, she provisions her nest with this family of beetles that Emerald Ash Borer is in. So, typically, it's native metallic wood boring beetles, but if Emerald Ash Borer is around, they will also attack Emerald Ash Borer. The female stings it, paralyzes it, and then brings it to her nest, lays an egg on it, and then packs it with a little bit of dirt. And then when that egg hatches, her offspring basically eat that beetle.

Kelly ([15:58](https://www.rev.com/transcript-editor/Edit?token=eb44DeCGkeZ9j6CfW8UBig5bPj5MQtlq9trG9qPDvYgvA-Y-ZGxFKgX2eDGFyuLUEF8jn479XVsG2p22X1XAUpaKL5A&loadFrom=DocumentDeeplink&ts=958.4)):

Now we've actually used this in our favor to help us detect new areas where Emerald Ash Borer is. So the North Carolina Department of Agriculture has a program where they monitor some of their nests and if this wasp brings back Emerald Ash Borer, they know Emerald Ash Borer has been introduced to that area. And this has proven to be an effective method and we've found it in four or five counties in North Carolina using the Cerceris Wasp bio-surveillance method. So very cool, using insects against insects.

Tracey ([16:32](https://www.rev.com/transcript-editor/Edit?token=j8rrSAVCYJrqrcQcvnsBsMK5lmbTdkwbg9QLkpHi02yaq1UX4SxijWV0kQebtSOKU8IhV6PV1DkR3B5NWEZp-Dv_RGU&loadFrom=DocumentDeeplink&ts=992.57)):

I think that is cool. I never thought I'd be... rooting for a parasitic wasp but hey, you know. It's got that nice sort of vengeful air to it. You don't get to be here. I will eat you in a terrible, terrible way. I like the fact that we do have some natural response to some of these. Is the rest of it just monitoring, spraying, decimating, what do we do with some of these other ones? You mentioned tearing up entire populations of maple trees to get rid of the Longhorn beetle. Do we have to do that for all of these different species?

Kelly ([17:11](https://www.rev.com/transcript-editor/Edit?token=PfICFJ3sUIWPS6MeGqczjXfx5agb2HQnS4fQNmQaI2055k8vKlXyCvkNexA8ZBvqlgosm6eR5AaqRpfqrqQSu586Dc4&loadFrom=DocumentDeeplink&ts=1031.61)):

No. Asian Longhorned Beetle is a unique one because the goal of that program is complete eradication, complete removal, get that beetle out of here. And because it's been successful, they continue to do it and replant with new species after that's done. But that's pretty unique, that's not what's typically done for a lot of invasive forest pests.

Kelly ([17:33](https://www.rev.com/transcript-editor/Edit?token=3w7R5E2mZ9Wvv4CHeIyJtjy0959rT_jfX-Cn12QsXzGFVApSCBkJVd_coBU1GQIjW4RGcbXM9TCvmdwS5YGCneaxUd8&loadFrom=DocumentDeeplink&ts=1053.31)):

Typically, what's done is, when it's first introduced, we have to figure out new management tools. Thinking about the Emerald Ash Borer again, we do have some short term solutions. You can protect Ash trees with chemicals. It can be expensive, you have to do it over and over again, probably forever, so it's not ideal and it's really not effective in a forest setting, so we are investigating new long term methods.

Kelly ([18:01](https://www.rev.com/transcript-editor/Edit?token=uDhAdOCHY06iFHErWDoh3eGVJpwHdQZx6WtpZHJAkTPSo1DvzAJnFMjPfEFsCL02u3KHCsGg7s2_3LBeGHDwu7Fpllo&loadFrom=DocumentDeeplink&ts=1081.66)):

Going back to these natural enemies. Yes, we do have native natural enemies attacking them, but it hasn't been enough. Clearly, the beetle continues to spread, continues to kill trees. So we have gone back to the native range of the Emerald Ash Borer and brought over some of those natural enemies in its native range. That's a classical biological control program where you basically introduce the agent that keeps its populations down in the native range into its introduced range. So that's one thing that we're working on. The species that have been introduced have become established in some areas and they are contributing to population decline, so that's something we're really hopeful about.

Tracey ([26:25](https://www.rev.com/transcript-editor/Edit?token=kjcJ9Lf-icL0S-CYQ5RfOq6SzZ_FYlBdct0HYv13MIeNvvsztO0cB_t7hosDiZ89UY2yXK8gPl1jkAWsjJ7wzDR59W8&loadFrom=DocumentDeeplink&ts=1585.46)):

I guess we vet, right, those other species that we bring in, because we don't want to start some kind of crazy arms race.

Kelly ([26:33](https://www.rev.com/transcript-editor/Edit?token=uV-nXSMBL-0fT5kNenTWMbPCgYdCcR5IER_GCU54dwfL_110zzBNMw_F-aXuI5NV5NXLd6DVou4O1zviHy4-zENBuZs&loadFrom=DocumentDeeplink&ts=1593.35)):

I did not mention that. For example, when Emerald Ash Borer was first found in North America, a team of scientists went over to the native range and they looked for the things that were attacking it there. And when that happened, they brought over 12 species of natural enemies, but they kept them in a quarantine area for years. And they were basically looking at what will it do if we introduce it into our ecosystems, will it attack our native species? And out of those 12 original species only four have been approved for release.

Kelly ([18:50](https://www.rev.com/transcript-editor/Edit?token=3QA40kbP2ARNxiZu4dnfX_NblTBHw5w5q2smB2WvhcKAmvz-79xx_TSjCypdrfaAuJjnjf5IQR40cZAdRl_Qr-x0HPo&loadFrom=DocumentDeeplink&ts=1130.18)):

Another long term thing that we're looking at is host plant resistance. A lot of trees in the native range of these invasives can withstand attack or at least defend itself. The insect gets introduced to a new area, our trees are naive, they have no idea how to respond, and in some cases, they overreact, ultimately succumbing to the insect.

Kelly ([19:14](https://www.rev.com/transcript-editor/Edit?token=VFizj-uo4R4U2Is4e0ush0yhkbaOu_AysrbJPLo91GSRvpEYxmTJBi2vA6MoShn4bSmB7kTWWye-jcHiOtbeRObfBoE&loadFrom=DocumentDeeplink&ts=1154.9)):

With Emerald Ash Borer, one of the things that we're looking at is are there trees that naturally have more resistance. In areas where this beetle has come through in wiped out the vast majority of Ash, some are surviving. These have been dubbed lingering Ash. We're just getting to the point in North Carolina where the invasion has been here long enough that we can see what trees are surviving. A colleague, years ago, phrased it this way, "How do you find a needle in a haystack? Well, you burn the haystack down." Emerald Ash Borer is doing a really good job burning down the haystack, and we are looking for those Ash trees that are surviving in the wake. Are they resistant? Does this hold up? Is this something that we can actually utilize to reforest our decimated forests or replant in urban areas?

Kelly ([28:00](https://www.rev.com/transcript-editor/Edit?token=IhOFPloLF0l45IZnN81w16qdwF5Y-Nk1UyEUT3rVbo0n123M1zhAGcNKUYggigry3IuGVNiy8Zg00zhxTONFuNQJViE&loadFrom=DocumentDeeplink&ts=1680.64)):

It's hard because there's so much to talk about with all of these invasives and you can't generalize anything either like how do we manage for them, which insect. Right. So there's a different story with each one. We have some success stories with Asian Longhorned Beetle, with Spongy Moth, but then we also have some unsuccessful stories as well. Hemlock Wooly Adelgid, which has just gone through our forest ecosystems and we're trying to battle it and manage it as best we can but we haven't been able to stop it yet, so time will catch up.

Kelly ([28:38](https://www.rev.com/transcript-editor/Edit?token=ryIe-y_HOEK9ov8XTOXcbQD1zc4uyDNn8-FJE32hIu1lmlbpeYCuABZjo2KP0dmXgb4B-0Mlq35HgYhb9PYKxDGARrM&loadFrom=DocumentDeeplink&ts=1718.52)):

And that's another thing, the longer an insect is here, the more we learn about it, the better we are at managing it. The Spongy Moth, it has been here since the 1860s. And by the 1980s, when it was approaching North Carolina, suddenly research was catching up and we had management options available. And for the past 30 years, we've been able to keep Spongy Moth out of North Carolina because now we have tools. We know enough about the biology of the insect that we can use pheromones to basically make it so males and females can't find each other. We can introduce a virus to kill large numbers of their population. We just have so many more options available to us.

Kelly ([29:31](https://www.rev.com/transcript-editor/Edit?token=am5Jg5gqQlixq9T2o1pSxvB7DvvYu7utPii24pFvWvhgQ40ZuSoOlCc0wBnQEdzWW4l4N2ampoAxhhnEgnuZIakV1cQ&loadFrom=DocumentDeeplink&ts=1771)):

And we can also spray a bacteria on trees that when the caterpillars feed on it, it kills them as well. So we have three really good tools and we basically have been treating the North Carolina, Virginia state line as a fire line. And when these populations of Spongy Moth pop up over the state line, we try our best to smother it out using these tools that are now available.

Kelly ([29:55](https://www.rev.com/transcript-editor/Edit?token=bkFwj9hLyZaNRGmBXuoVR1m7zPsNZ3yi3pOPyKVNDUjgJ1EGpY3BsrnM29PflTEEMNkYiTFNa4ecDzer4IjThs71Fjs&loadFrom=DocumentDeeplink&ts=1795.72)):

So our hope is with these new invasive insects, eventually tools are available that we can manage them better. And until then, we're just encouraging people not to spread them as best they can. Don't move firewood. That's a way that a lot of these forest pests are going around. So that when we have management tools available, there's still trees left to save.

Tracey ([20:19](https://www.rev.com/transcript-editor/Edit?token=y71k_X02YDsMJhpvE0F5arlRSbp1EONA-jvqcSCIWRGmm0xhbtn8FNzAoVFUuGtxEykI9qVgxUV4-FGHHLFWWTsmqKs&loadFrom=DocumentDeeplink&ts=1219.15)):

To turn our attention a little bit now. I know the Joro spider has been in the news a lot.

Kelly ([20:26](https://www.rev.com/transcript-editor/Edit?token=Vsae0_imge3ppv6Rsq1mKf5d4Au8XVavZYhixH8zZixVYAQcqg2epmR-HnUx2cGpySn_OC7PXY7IlGDbZGfcTkGIvaI&loadFrom=DocumentDeeplink&ts=1226.29)):

It has.

Tracey ([20:26](https://www.rev.com/transcript-editor/Edit?token=fq_80V1YcwPLelKWD2QPXfwPKJoIu4nPULx4JQEDvIarHuxA2PtaOMICQbrbW-YYrpqvxcUIt_J9AxbdVJIOnW9UJig&loadFrom=DocumentDeeplink&ts=1226.91)):

It's parachuting down the east coast and we're all going to die, and it's just a garden spider. Is this anything to worry about? Is this spider going to do anything to anything that isn't an insect? Might it eat an Emerald Ash Borer or two?

Kelly ([20:42](https://www.rev.com/transcript-editor/Edit?token=DqbVrBhgd6ed0fbuIapaUwsM4tJjaeMeiQE2N8pPt3J7oTUWadLEb6gUxUXg9r0-pP54yvGhE_2U3LjHBtH_O_BXfkU&loadFrom=DocumentDeeplink&ts=1242.65)):

It could. The short answer is yes and no. And to explain that, from my perspective, no. It's probably been in the news because recent research out of UGA suggested that it was more cold tolerant than maybe some of its relatives, so it's likely going to spread into North Carolina and up into Northeastern parts of the country. However, is it going to have a negative impact? Right now, we have not seen that. It doesn't seem to impact ecosystems. It's not venomous to people or pets. Really, the biggest negative about it, which is why yes, it could be a problem, is because some people just don't like spiders, even the good ones. Yes, this will be a huge spider, so it's probably going to be high on the list and yes, it's going to be a new spider, so people probably won't enjoy them, but they could maybe serve some benefit, maybe relocate the Joro spider to your garden if it happens to set up shop on your deck, things like that.

Tracey ([22:00](https://www.rev.com/transcript-editor/Edit?token=WTohLlNJZwquxrhnnFNEPzR8xUTYnai_rRB9yV8JzbkDO4YV9btXiaUUjRuuhxHuFlQbENs3x0MsTFAmigAI6E6X1AY&loadFrom=DocumentDeeplink&ts=1320.94)):

So yeah, I can understand that because they are rather large, but...

Kelly ([22:04](https://www.rev.com/transcript-editor/Edit?token=HqaDrILGhICi8ZLqKxBhjs-UR4ATCJxiAuWXrfKvA1Sr1N8XbWwPmBfp3CLAslS57ezI20eQU1OWoX8HU12IOawMgfo&loadFrom=DocumentDeeplink&ts=1324.49)):

They are. They're also beautiful. Someone asked me, "What would you do if you saw a Joro spider?" I'd be like, "I'd be taking pictures and posting on social media."

Tracey ([22:17](https://www.rev.com/transcript-editor/Edit?token=56zb67wMpzZWsago9fBm65K6m-WiSos4wPOxc6oRKj3ljhXwl8lAwWsnkkhhVW_jdSJoBfGRB0LZDSXRhYYFrS8qPbM&loadFrom=DocumentDeeplink&ts=1337.79)):

Okay. And I always ask this of folks who come on the podcast. What is the coolest thing that you have learned in doing this work with invasive species? What's your coolest factoid or maybe the coolest invasive species if there is such a thing?

Kelly ([22:35](https://www.rev.com/transcript-editor/Edit?token=DUqp1vbuyfvevM-_DtufrD_6KHiEQZMueN5im_-t11kjQFPHSUS6ol7M790sjukly4gZRcAq7suv1GCbzL_5FY5Q_Do&loadFrom=DocumentDeeplink&ts=1355.6)):

Well, so... That's a good question. I am one of those people who love insects. Ever since I was a kid, I would get in trouble for bringing an insect clenched in my fists into church. I was the kid when other people were having lemonade stands, I caught a spider in a jar and charged people 25 cents to look at it, so I'm very fascinated with insects.

Kelly ([22:59](https://www.rev.com/transcript-editor/Edit?token=6pO6xz6nJ-csLt7pw2mcoYZVNeO-hakIHfqAcRrepoLq7lCwum-ZVjp7FS6o4I8axIR77nkoXvKa8YhHzOGvUB_u55c&loadFrom=DocumentDeeplink&ts=1379.28)):

And I would say the most fascinating thing about invasive species, to me, is that every time there's a new one, it feels like it's a new insect. And that's because it's not a problem in its native range, so people don't learn about it, people don't do a ton of research. Maybe they know its lifecycle, but it pretty much stops there. We have no idea what pheromones it uses, we have no idea what its lifecycle is in different areas, basically all of this information that pours into how do we manage for it.

Kelly ([23:31](https://www.rev.com/transcript-editor/Edit?token=N4xGRfxH6G3D-gErcDTiQ08Ckl10wPD2JTr3yP53ELPEOu-0Wy-GD_g78wRl5Wjq06rtYPRlY5Mu9Bm0Y1MGaxYB3_c&loadFrom=DocumentDeeplink&ts=1411.35)):

Yes, it's devastating, so sometimes it's really hard to be excited about that, but it brings out that joyous kid part of me that just loves learning about insects. One of the things that I joke about a lot is the hardest part about a new invasive species is pretending I'm not excited.

Tracey ([24:12](https://www.rev.com/transcript-editor/Edit?token=23CusFbSaMClrKm1kcwtof2Ut2AUZAwH2DLuLd1AKdERbmu0FUaH30dic48Ll2Tujd0pQvlw9k4QrjJ5MaiE7owshFE&loadFrom=DocumentDeeplink&ts=1452.65)):

What is, in your opinion, the yuckiest invasive species.

Kelly ([24:20](https://www.rev.com/transcript-editor/Edit?token=6no_27XzYJLmWg2HRkrRCP_yhQqQuUlPAIvxBzi9baaRBeR3l7FXVR0Rogj7_GQrZnJoY9GW-bhIMN4v76EpCehbJ74&loadFrom=DocumentDeeplink&ts=1460.61)):

Right now, I do think it is Spotted Lantern Fly. Because I am a wine drinker, I'm not a fan of it going after my weekend delight, but also, it will be pretty nasty. I've heard stories of it flying up people's shirts. They get in these large groups and cluster on people's homes, people's trees. It's not one of these things where... With Emerald Ash Borer, most of the people who know about it are more aware or maybe they have Ash on their property. No, with Spotted Lantern Fly, everyone is going to know about it and everyone is going to hate it. They make huge messes because of the amounts of honeydew that they emit, that sugary sweet sub. And then on that honeydew, Sooty mold can grow, so it's just the negative impacts keep on coming.

Tracey ([25:12](https://www.rev.com/transcript-editor/Edit?token=-7E-JNlDJR745dFD_VuPXxbXU23k1S1h92i-dVvAyZA1p8EfBf5hO8zCi8MOO79ifxP_W670RogfLnC5S_P9taOMQqg&loadFrom=DocumentDeeplink&ts=1512.61)):

Nasty, sticky, moldy flies, basically, is what's coming. Excellent.

Kelly ([25:17](https://www.rev.com/transcript-editor/Edit?token=1WhSw91Bl-n1hOn6c7eWu6ZkTQqmvJ2NILIKiyrmr743DTyvSpb5kmEF58xE0LYNsjDW6_BvRUKd3kNDmpGsDlDfVUM&loadFrom=DocumentDeeplink&ts=1517.56)):

They are beautiful, though. I will give that to them.

Tracey ([25:20](https://www.rev.com/transcript-editor/Edit?token=IGb93zwgKNAAgoSUTSjchCymZivlwwXmVAn_EBOxFx0SEJ35I7Mk_V-MZoMqK9fSvwu3RizEzOgx-5tu4FP11JkitnU&loadFrom=DocumentDeeplink&ts=1520.75)):

Okay, beautiful, nasty, sticky, moldy flies.

Kelly ([25:23](https://www.rev.com/transcript-editor/Edit?token=8qGm5THinB403r86cV9kpg9ZIrWlHWh8qOHO5tFiTPlFxDRflNgs18rawcGAbdhrbykkkq86WASvFglFs_8kZfE2ML0&loadFrom=DocumentDeeplink&ts=1523.85)):

So many adjectives.

Tracey ([25:24](https://www.rev.com/transcript-editor/Edit?token=V8iqMyk5A5Pscl0tR7-Tyg9wJlhyOgf6EUEz2hjAabcZYDBF-f4BS8Z7G6YFrPaHZjliCRXkwaftq5Rvs0SMne0IZAI&loadFrom=DocumentDeeplink&ts=1524.98)):

I'm so excited.

Kelly ([25:27](https://www.rev.com/transcript-editor/Edit?token=8ht4QYvhZf73qdj3g2f69Au14du1Tahv8SDvSVzt4UBZPtOzXGTdfHeqeW9nRDA68Kl9609v-W7uU5QdqZxASJt6GWI&loadFrom=DocumentDeeplink&ts=1527.63)):

Me too.

Tracey ([25:29](https://www.rev.com/transcript-editor/Edit?token=UqHzCuUkVkX_QEo37dKf4zgVFwSTHe32VFWIIYHMhYmWyZH5qjxacb2l0xDo1ngXe_9pR6_o62dRuU2S8Q1sYNhL_uo&loadFrom=DocumentDeeplink&ts=1529.74)):

Well, thank you so much for being here today, Kelly. It's been-

Kelly ([25:33](https://www.rev.com/transcript-editor/Edit?token=G5ROsSRuknLhSnVQCkX6JQAxgtR4SlYkakow0WnZoiPk7wCfL2Yk2VUPLopOZttQwBfEHrNnxNopTn80Qim0nEIJFH0&loadFrom=DocumentDeeplink&ts=1533.33)):

Yeah, happy to.

Tracey ([25:34](https://www.rev.com/transcript-editor/Edit?token=Fau_uwOmt_qfyJrgHMzfJuNhSZu4MD5oppuEkVgfg8UpjVdqAWx2W8wQlb24atC6OBfqJTVYJH7XuX9fuXj-79ZODsw&loadFrom=DocumentDeeplink&ts=1534.02)):

Super informative and I'm going to hunt down and kill the last two Bradford Pears in my yard.

Kelly ([25:39](https://www.rev.com/transcript-editor/Edit?token=oS8S2stWTFAjkDnMNujASiqWRSjWNpSfsUKV3FempNN079hIuJt51E9GTjJdCC7xE3W5Fx5OTj8meSA1-yFciKHeglI&loadFrom=DocumentDeeplink&ts=1539.73)):

Please do. Take before and after pictures.

Tracey ([25:42](https://www.rev.com/transcript-editor/Edit?token=GqlohYFMH1DA3g7L6Qnuaa5B6c3u09xafxEiSYZqUcRkkj9N3mfJtjw2PFq1crD2suEF_1MYiuBDiXgbqGv3KFClaSc&loadFrom=DocumentDeeplink&ts=1542.27)):

I will, and get some replacements for those. We've been speaking today with Kelly Oten, Assistant Professor and Extension Specialist in Forestry and Environmental Resources here at NC State. This has been Audio Abstract. I'm your host, Tracey Peake. Thank you so much for listening.