BIOINVASION
Closed Caption Script
1/29/04

Tease
(Narrator) From the majestic green mountains of Vermont, to the rocky coast of Maine, Northern New England is alive and bustling with natural beauty. From hemlocks to honeybees, our diverse plant and animal life form part of our traditional and unique environment. However, honeybees aren't native to New England, they were brought over from Europe, and honeybees aren't the only exotic species dotting our landscape. Whether by design or accident, an increasing number of foreign species are being discovered in Northern New England. And while some, like the honeybee, may eventually become an integral part of our environment, others are akin to foreign invaders and herald the coming of a potential ecological disaster. With no natural enemies to check their growth, invasive species are poised to change our environment. Our native species haven't had the opportunity to evolve defenses against these new invaders. These invasives may eliminate many of our traditional plants and animals, damaging our environment and causing severe economic loss. Prevention is the best defense but when prevention fails and an invasive species takes hold there is no simple way to get rid of it. The tools used to try and control invasive species, range from pesticides to releasing new foreign species into our environment. Often the uncertainty surrounding the effectiveness of the control competes with the unpredictability of its long-term impact.

(Scott Williams) There really are no easy solutions to this problem. There certainly is no silver bullet.

Quest Intro Music

(Linda Greenlaw) Hi, I'm Linda Greenlaw. The school children of Isle au Haut are teaching me about one of New England's invasive plant species, called Japanese Barberry.
(Child) When the birds come and get them, they see this red, and that's the one that attracts the bird. Well once the bird eats it and digests it, then they poop it and it falls and it lands in a different spot.
(Linda Greenlaw)
Many Exotics are invading Northern New England, are we to blame?

Phone ringing

(Don Ouellette) Maine Forest Service, Don Ouellette speaking how can I help you?
Okay, what does the insect look like?
Okay, so it's a white cottony mass on the hemlock tree.
I'd like to look at that this afternoon, would two o'clock be a good time if I met you there? Okay, Willard Beach. Okay good, I'll see you there at two o'clock.

(Narrator) On a rainy Friday in July, Don Ouellette an entomologist at Maine's Forest Service follows up on a troubling call. If his suspicions are right, he doesn't have the luxury of waiting for good weather.
A troubled homeowner has urged him to inspect her hemlock trees.
According to her, the trees have recently become spotted with a foreign substance, tiny, white, cottony, masses. They have stubbornly adhered themselves to the twigs of her trees.
Don takes a few samples back to the lab to verify his suspicions. But taking the samples is just a matter of protocol. Already this veteran forest entomologist is confident of his gloomy diagnosis.
About 250 million years ago, scientists believed the earth consisted of one mass ocean and one large super continent called Pangaea. 70 million years later that single landmass divided into 2 separate landmasses.
Around the same time the dinosaurs became extinct, these land masses began to slowly separate further;

eventually forming the familiar continental outlines we know today.
This separation allowed each for continent's plant and animal life to evolve into its own unique and diverse ecosystem. During that evolutionary process, which took millions and millions of years, organisms developed the tools they needed to compete and survive in balance with their environment.
But in today's world, technology, from an ecological vantage point is fusing back the continents at a feverish rate. Where once the earth's physical barriers contained its living communities, Global trade has opened Pandora's box.

(Linda Gregory) An invasive species is a non-native, organism that has come to an area, that's from away, as we like to say in Northern New England, meaning that it didn't, it's not naturally here. It came, the way the park service views this, is that it came by way of human intervention.

(Dennis Souto) It seems like we are seeing more of them now. In just the last decade we've gotten some new ones and I think the reason why is because we are doing more trading, with more countries around the world that we've never traded with before.

(Amy Smagula) It's important to note that invasive species don't need to be something that is from overseas or from tropical or foreign land. They can be very much neighboring states contributing invasive or exotic species, non-native species. And even in some individual states say New Hampshire for example, if something was brought down from northern New Hampshire and introduced into a system terrestrial or aquatic, where it wasn't native originally that can be deemed an exotic species.

(Narrator) They come in all shapes and sizes from Microorganisms like the West Nile virus, to animals like the Sea Lamprey. They are infesting Northern New England's fields, waterways and forests.
In southern Maine, Don Ouellette's suspicions are confirmed. He has found another outbreak of hemlock woolly adelgid, a forest intruder that has all of Northern New England concerned.

(Dr. Scott Costa) Northern New Englanders need to be concerned about the hemlock woolly adelgid because they have some vast, expansive forests of hemlock in the area. And as the adelgid comes into, the area will expand rapidly and cause major tree death. And that will cause a dramatic change in the forest ecosystems, the way the forests look, and just in some ways in our ability to enjoy the forest.

(Jennifer Bofinger) Losing hemlock trees to hemlock wooly adelgid would have a significant impact on bio-diversity and the environment. Hemlock trees may not be the most important trees in terms of timber production but they serve a vital role as a tree in terms of holding back soil, shading streams and rivers, providing habitat for a multitude of birds and mammals. In some places, hemlock is the most significant softwood that's growing in the forest. We probably wouldn't understand all of the implications and losses until after it happened but we know intuitively the things that rely on hemlock, and if we didn't have hemlock how dramatic that would be.

(Narrator) And it has happened.
Its trail of destruction begins as far south as Georgia. During the past decade it has spread north at an estimated rate of 20 miles per year. And with each passing year, the insect's population increases dramatically.

(Dennis Souto) It looks like an Aphid. It looks like when it first starts out, a black aphid, a flat black Aphid, with a white cottony fringe around the edge of it.
And it has this stylet, kind of like a straw that it sticks into the tree and that's how it does its feeding. And as it develops it just produces more and more this cottony mass around it. And the most characteristic thing that you would see, this ova sack that is produced by each individual insect, and within that cottony mass the insect

develops, gets larger, becomes a female, produces eggs and then those eggs hatch.

(Jennifer Bofinger) Hemlock wooly adelgid sucks the sap from the twigs at the base of the needle on the hemlock tree. It also injects a toxic saliva. Which eventually ends up destroying the needle and as more needles die the trees are unable to photosynthesize and the trees decline and eventually many trees do die from the feeding.

(Narrator) And while this vampire of the forest drains the life from its host, other invasives have different approaches.
Purple loosestrife a well-known terrestrial invasive grows so densely it chokes out its competitors. Zebra mussels multiply at amazing rates. Their hungry offspring greedily devour a water body's plankton, starving its neighbors. The notorious aquatic plant water milfoil creates a thickly woven carpet, blocking out sunlight needed by other plants.
For years mechanical harvesters have been used in Vermont as part of the effort to control the invasives. For each of the states it has become an endless costly endeavor.

(Linda Gregory) It's very expensive to control non-native plants and it's not completely effective often to eradicate them. So the more there are, the more we wait to do something, the higher the cost.

(Amy Smagula) For control costs basically you can assume that it will be limitless. People will want to treat or manage until the problem is gone and right now we really don't have a mechanism for eradication. Once there's an infestation we can't get rid of it. So, yes it is sort of a bottomless pit at this time where we tend to keep putting money into management. You see benefits from the management certainly, the plants are thinned out and managed. But eradication hasn't been achieved and we don't know that it will.

(Paul Gregory) Invasive plants pose a very real economic hardship. For one, Maine enjoys natural resources as a form of its economy. People come to Maine for pristine lakes. They come for the fishery. They come for a good outdoor experience. And so if a lake is dominated by an invasive plant none of those are really pleasurable experiences when an invasive plant has taken over.
That outside revenue that comes and visits may go elsewhere, which still has pristine environment. Also a lot of folks own property in the areas that are by lakes. And when the lake quality or lake or water quality diminishes you're likely to see also the real estate values will diminish as well. And so therefore they take an economic hit for the folks who are living here or keeping summer homes.

(Linda Gregory) The economic fall out from invasives is huge. And the story that I know best is from Vermont where the aquatics, where they are literally spending millions of dollars each year to just manage these plants. There's no way to get rid of them that's what's really scary. All they can do is they have these huge mowing machines that go on lakes and get these plants out, but they'll never be gone and that's what's so sad. Is those lakes where people use to fish and swim and go in the summer and enjoy will never, ever be the same again.

(Narrator) It was once thought that Northern New England had time. The cold harsh winters would create an inhospitable environment for these alien organisms. But time was not on our side. That initial hesitation gave the invaders the critical foothold they needed.

(Ann Bove) It took about 20 years before, at least in Vermont, before there was a designated funding source and program to tackle the problem. Certainly we understood that milfoil at least, that Eurasian water milfoil and water chestnut which were the two species that we had at that time were causing impacts and the magnitude that they could have, but without a program dedicated to dealing with the problem it's difficult to tackle one.

(Paul Gregory) It's only since 1990 that a federal perspective came up with the realization that this, this is

a serious problem. States depending on the immensity of the invasion responded differently. So the lessons learned from other states, for one is we're really on the same page in terms of playing catch up with a lot of these problems.

(Narrator) And there is a lot of catch up that needs to be done.
In Vermont 1 in 5 lakes larger than 20 acres is infested with milfoil, and it is not known how many smaller lakes, ponds and tributaries are also polluted. In New Hampshire 59 waterways are infested. Maine struggles to hold its ground with 16 known infestations. Every year new infestations are found in each of the states. And as the time passes, they run the risk of complicating the problem for each other. Because the milfoil invading Vermont is a different species than the milfoil found in Maine.

(Amy Smagula) Maine does typically have just all variable milfoil to date. Vermont has all Eurasian milfoil. New Hampshire because of our location we tend to have both species.

(Ann Bove) Why doesn't Eurasian water milfoil exist in Maine and why doesn't Vermont have variable leaf water milfoil? It's anybody's guess and it may be that it's just a matter of time before those species get a foothold in the states where they don't exist.

(Narrator) But believe it or not, milfoil is not the most feared aquatic plant by the scientist. That infamous notoriety belongs to hydrilla.

(Paul Gregory) If I were to come back as an invasive species and I wanted to be the best survivor of all, I'd come back as hydrilla.

(Scott Williams) Well, if I could come back as any invasive plant I guess I would come back as the most, the best adapted, most aggressive from a strictly selfish point of view and that would almost certainly be hydrilla because hydrilla has been dubbed by some to be the perfect weed. It is extremely well adapted, it is extremely aggressive. I don't think I would be very popular if I came back as hydrilla.

(Paul Gregory) Hydrilla is a, it's been called an exquisite pest. The reason is that it has so many systems for it to reproduce by. It can fragment, where only a quarter inch of the plant, can if severed from the whole plant, and moves to another part of a body of water or moves into an entirely new body of water, it can take off from there. It also has seeds, it has some rissones, which are stems, able to spread into normal growth that plants would in a fixed position. But it also has tubers, which are a potato like root system. It stores a lot of energy and as a result it is able to establish itself and is very difficult to control. You can pick it. You can cut it in a way. And they do this in other states, harvesting it with machinery, but until you pull up that tuber, that root system it's just going to come back.

(Narrator) Hydrilla has spread like wildfire through many parts of the United States.
Lakes in California have been kept drained for up to 10 years in an attempt to eradicate it. Only to see it bounce back. Florida spends 75 million dollars a year just trying to control it enough so that it doesn't affect tourism. It is a superior organism with an undefeated record. Once discovered **no** state has ever successfully been able to rid itself of this pest.

(Amy Smagula) We have found pet stores selling hydrilla in New Hampshire. In the summer months we have interns that go around and do pet store inspections and we found a few hits this summer where people were illegally selling plants that are prohibited in New Hampshire. And we can fine them or issue notices where they need to remove the plant from the selling floor.

(Scott Williams) Many of the aquatic plants that are most problematic in this country did first come here as a

result of the aquarium trade. And in fact, many of these plants by themselves in an aquarium are quite beautiful and as a result they were like many invasive species. They were brought in with the idea of beautifying an aquarium, a water garden, and nobody at that time of course could conceive or did conceive of the fact that if they were to escape they could cause the wide spread havoc that they have.

(Paul Gregory) The hydrilla story has all the elements of a late night, grade B monster movie. Imagine if you will biologist discovers exotic species, but someone very enterprising thinks, you know, I could bring this to North America. I could tame it and then make a profit from it. Well, like a monster movie, the monster has other ideas. It breaks out and wreaks havoc on everything we know.

(Larry Grant) I was bringing the boat in and, in-between here, of course this is where I park the boat, and you could see tentacles. So when it came out I could see these things and I'm going "this is very strange, I've never had seaweed where the boat was." I expected it to be the same type that's over there, those type of green weeds. But it was totally different and I reach in the water and go "I've never seen this before."

(Narrator) In the fall of 2002, Northern New England's suffered a set back in the war against invasives. Hydrilla was now in Maine.

(Paul Gregory) We've been looking at existing invasive plants here in Maine, which was variable milfoil. Because the surrounding states are, are dealing with another pest called Eurasian milfoil. We were surveying and we're vigilant about that particular plant. Low and behold a resident finds a plant that looked awfully suspicious.

(Scott Williams) We received a call at the Volunteer Lake Monitoring Program from an individual, Larry Grant, who lived, had shore front property on Pickerel Pond in the town of Limerick.

(Larry Grant) I thought it was the hydrilla but then when I went into the hydrilla actual part of the web sites of the Environmental Protection Agency they said, "Oh yeah, hydrilla is a big problem in Louisiana and Texas and Florida and there are no cases of it like in New England." And I said, "Okay, maybe that's not it."

(Scott Williams) We thought it was probably unlikely that in fact it was hydrilla because there was no known hydrilla in the state of Maine at that point, none even in our nearby states.

(Larry Grant) They said it looks like it but a lot of things can look like hydrilla and I tend to think that in the back of their minds they are saying, "There has never been a case in Maine, you know, and if there was we would know about it." (laughs) You know, which is perfectly understandable to me, but I was sitting there looking at my monitor going, "I'm sorry this looks like this, there's leaves and all that, you know…"

(Paul Gregory) We did not expect to find hydrilla here in Maine. And it was, we were gob smacked by the finding. It exists only in 4 other ponds in New England, 3 in Connecticut, one in Massachusetts. And so meanwhile we're surrounded by states with other invasive plant problems, which we expected this plant to hitchhike from those neighboring states.

(Scott Williams) We decided because we were unable to rule out the possibility the plant in Pickerel Pond was hydrilla we should go down and have a look for ourselves. At that point in time Larry had moved back to his winter residence away form the pond. We went down in early September and drove up to Mr. Grant's property, parked some distance from the pond and proceeded to walk down toward the water body. And as we got closer, it was a bright sunny day, we could see at the water's edge that there was something growing there in great abundance. In fact the closer we got the more we were able to determine that this plant spread in both directions as far as we were able to see and also out into the pond as far as we were able to see.

I was certainly asking myself the question what could this be, it certainly appears to be quite unusual, and especially relatively late in the season to see something growing as robustly as whatever it was happened to be was a little bit unusual.
As we walked right up to the water's edge the plant that was growing there was the only plant period in that area. Anything else that might have been there had been pushed to the wayside. When we pulled the plants out of the water and washed away the sediments there were indeed tubers there and it was at that point that we first strongly suspected that we had in fact come across a population of hydrilla. And it was frankly a very sinking feeling, we certainly had not expected to find hydrilla and it was not a pleasant discovery.

(Larry Grant) So they came down and called me back and said, "You're right. It is."

(Scott Williams) The day in September that we actually went down to survey the extent of the hydrilla infestation there was another individual on the lake fishing. There was a boat, and there was a truck and trailer in the parking lot at the boat landing. We looked at the trailer wondering how many people typically go in and out of that pond because there was a great deal of hydrilla growing right at the point where boats are put in and taken out. And there were fragments of hydrilla dangling from several points on the trailer. So we certainly were asking ourselves you know what is the likelihood that this plant has spread, or has not spread to other water bodies. And I think that we felt that the likelihood was fairly high. It would in fact be, we would be very fortunate if in fact the hydrilla had not spread to other water bodies.

(Narrator) Now up to the DEP to take action.

(Paul Gregory) Well once discovered, realized that we had this problem in Pickerel Pond, we hit the books. We had to look at what hydrilla has done in other states in terms of how effectively it does take over a body of water or move into other bodies of water. And then also we had to look at strategies to control it.

(Narrator) Maine's Department of Environmental Protection surveyed their arsenal of defense. Controlling the spread of the plant became first and foremost in the DEP's mind. The plant was growing thickly upon the lake. And the on going war with milfoil had taught the scientists some valuable lessons. They knew all that was needed was one small sprig off a boat's propeller to start a whole new invasion somewhere else. Something had to be done.
But there are as many concerns with the methods to control invasives, as there are with the problems these exotics present.

(Paul Gregory) And you know in monster movies they're usually resorting to all kinds of high tech solutions. Too often military weapons, atomic bombs and things like that. And it's often a sobering moment when they realize "My God, we're going to unleash a technology as awesome as the monster we wish to control."

(Scott Williams) When you present all this information to the public for people to start asking the question "Okay, which is worse here, the disease or the cure?" And it's very reasonable question to ask because virtually all the control measures that are used to try and address these invaders have impacts on the ecosystem themselves. And some of them are pretty serious and in fact some of them are unknown. We really don't know what the long term impacts are, just as we don't know what the long term impacts of the infestations are. So I think we need to move very cautiously.

(Narrator) Linda Gregory is a botanist at Acadia National Park.
By using a herbicide called rodeo, Acadia has successfully kept purple loosestrife, a formidable invader in check.

(Linda Gregory) I think if here in Acadia we hadn't started our purple loosestrife management program 12

years ago that over here we would see purple loosestrife growing in all, along all the wetland edges. This is a shallow wetland and it will grow just fine. And we would have lost a lot of beautiful native plants that border this, this turn here.

(Narrator) A different herbicide, is being used on other invaders, like this shrub honeysuckle that is taking over one of the islands in Frenchman Bay.

(Linda Gregory) We have these fleshy, bird-dispersed fruits, which is part of the reason that they spread so effectively, is that birds come along and eat them, and then fly off and the seeds are deposited far and wide. And that's true of many of our shrub invasives have nice, bird-dispersed fruits. And it looks like that perhaps this is like junk food for birds, and there is some research going on to assess whether perhaps birds eating these some of these invasives are linked to songbird decline. That they are not getting the nutrients that they need from their native, the native food that they usually eat, and are drawn to this kind of food, but it's not really what they need, sort of like kids and potato chips.
How we manage the shrub honeysuckle is we cut the stems and then we apply a very small amount of herbicide to that cut stump, just to the live cambian layer and that goes down and kills the root. So effectively kill the whole plant, but only use a very small amount of herbicide.
It may seem drastic but we don't take it lightly using herbicide and we're very careful with what we use. We think of herbicide as a tool. The loppers are a tool, the saws are a tool and the herbicide's a tool and we treat them all very equally. They all can be dangerous. But they're all, used the right way, can be very effective and very safe.

(Narrator) But there are still many questions left unanswered about the long term risks of herbicides.
Concerned scientists raise caution about the use of any herbicide and fear the impact these toxic agents could have on our health and that of wildlife. Others feel that chemical controls may be leading us bigger problems down the road, like plants developing cross-resistance. Instead of conquering a monster, are we arming it with a genetic superiority that will make it unstoppable?
For example in the 1970's Australian farmers applied a herbicide known as diclofop-methyl to a troublesome weed called ryegrass. Within a decade not only was the ryegrass back with what seemed to be an immunity to the diclofop, it actually seemed to be at least in part resistant to 14 other herbicides.
And what are these chemicals doing to the native vegetation.

(Paul Gregory) There's, no herbicide that is perfectly selective for, for controlling the one undesired plant, the one pest that you want to take care of. It's going to affect other plants as well, native plants. Herbicides can also affect non-target species, fish, birds, people. Pesticides, herbicides are pesticides. There's no such thing as a safe pesticide. They are meant to be toxic to something. And so there's always that degree of risk that makes folks very uncomfortable, the fact that we have had to resort to using herbicides.

(Narrator) The infestation of hemlock wooly adelgid that Don confirmed at this homeowner's house could have been given a chemical treatment.
But the neighborhood felt uncomfortable with this choice of control, so another drastic option was chosen. But in the war of invasives fear of extreme consequences seem to spur extreme actions.
New Hampshire Forest Health Program Coordinator, Jennifer Bofinger is coping with her own infestations of hemlock wooly adelgids.

(Jennifer Bofinger) Possible controls for hemlock wooly adelgid are fairly limited at this point. We have, our first line of defense has been to try to eradicate the insect from areas that we have found it in. And in order to completely eradicate the insect we have cut and destroyed the hemlock tree that the insect is on, because we can, we can see that. We can watch the tree be cut, we burn the branches, and we know that we've completely destroyed the insect. And that has been our first line of defense. When we find an infested tree our first option,

we like to just get rid of the trees if it's a small area, because if we can stop it from spreading out it's easier to control.

(Dennis Souto) We do it because when we don't know how much impact a species will have our first thought is that there is always going to be more impact than less. Our first thought, our first concern or our first worry I should say, is that a species is going to be like, is going to be the next chestnut blight and it's going to totally remove a species from our forest ecosystem.
And a lot of times I think we're lacking better information, but that's the assumption we are forced to go on, and given that assumption, or given that belief of what's true, then that allows us to do some of the drastic things that we do out there.

(Narrator) Charlene Donahue and others in the forest health protection are determined to try to prevent that from happening.

(Charlene Donahue) These are called geekers, cause you look like a geek when you where 'em. So the first thing I am doing is looking for beetles, because I can't wait to see if there are any here.

(Narrator) Charlene has been monitoring a beetle called pseudoscymnus tsugae or a ladybird beetle. An exotic beetle that was brought here intentionally from Japan, hemlock wooly adelgid's native home.

(Charlene Donahue) The main focus of what we are doing is to see if the beetles reproduce on the balsam wooly adelgid, and I am just going to cut off a piece of the bark. And I'll take it back to the lab and look at it under the microscope.

(Narrator) The thought is, by introducing this new exotic, which preys on the hemlock wooly and other adelgids, the spread of the hemlock wooly adelgid would be held in check. A predator would be in place before the pest had a chance to establish itself.

(Dennis Souto) One of the questions that we have about hemlock wooly adelgid is that in Japan and China where it's native, it's not a problem on their trees. We're not sure whether it's not a problem because of their natural enemies that occur there, or because the trees have just developed that resistance we were talking about earlier, over time. But it could be a combination of both of those. So certainly, natural enemies are really important.

(Narrator) Taking the time to see if nature can balance itself is a risky proposition. Having no natural enemies is one of the key ways non-native plants and animals gain their advantage. With nothing to stop them they march forward, colonizing the territory before them.
Doug Cygan is New Hampshire's Invasive Species Coordinator.
In a suburban community near Nashua a scenic wetland pond had become overrun by purple loosestrife.
After becoming frustrated in his attempt to hand pull the weed, he introduced a leaf eating to try and stop the advancing weed.

(Doug Cygan) It's a little tiny leaf-eating beetle that has a tendency to eat the foliage of the purple loosestrife plant. As you can see here he's approximately 3 millimeters in length, pretty small, but as you can see from the site they do pretty good job in terms of de-foliation.
In 1996 this area became overwhelmed with purple loosestrife. Purple loosestrife first started coming in this area over in here and surrounded this wetland system over in here, going to where you can see the cattails around this open emergent marsh area. It eventually had a population of about 6 acres in size. And as you can see now purple loosestrife is severely stunted, reduced and has lost its vigor. It is now about 3 feet in height, it has lost most of its foliage and these are just from the reaction of the beetles feeding on their leaves.

(Narrator) Intense studies are done before any organism is deliberately introduced into an ecosystem. But like the pest it was designed to defeat only time will tell its true nature. And unlike other control methods, once a biological agent is released there is no easy way to stop or discontinue the application.
The mongoose was purposefully introduced to Hawaii in an effort to control its rat population. It has become an exotic pest itself, taking an irrevocable toll on the native bird population. Purple loosestrife was even deliberately planted by the Department of Transportation to try to control soil erosion.
And while there has not been any known infestations of hemlock wooly adelgid in Vermont for some time, the noose around their boarders is tightening.

(Jennifer Bofinger) Vermont is worried about hemlock wooly adelgid too. They haven't discovered it in the natural forest yet, but New York has hemlock wooly adelgid up as far as the bottom of Vermont and New Hampshire and now as it's moving into New Hampshire. And now that it is coming around in Maine I think that soon we'll be hearing that they're finding it is a threat for Vermont.

(Narrator) One Vermont scientist who is trying to prepare for this coming invasion with another type of biological weapon is Scott Costa from the University of Vermont.

(Scott Costa) I'm working with insect killing fungi and trying to develop them for management of the hemlock wooly adelgid. We went out and isolated these fungi from adelgids in nature and also other insects, maple Leaf cutter and what not and soil too, and we tested those fungi against the adelgids in the laboratory. And now we're bringing out into the field and the objective is to get the fungus established out there so that it can maintain some control over the adelgid population.
It's not a silver bullet, it's not going to totally eradicate the adelgid, or wipe it out but what we want to do is to reduce the adelgid populations and we are hoping that the fungus can work in concert with other biological agents that are out there.
The way that the fungi work is that there is a canidia or spore that is the, basically the reproductive stage –it's like a seed and that seed lands on the insect. It doesn't move itself there it is either sprayed on or released in nature and it lands on the outside of the insect and it germinates and it sends out a tube and that tube then penetrates in through the insects skin and it does it uses enzymes and pushes its way in through there leaving a nice little hole and when it gets inside of the insect it starts to proliferate throughout the interior and it releases toxins at that time and grows mycelia. Which are basically like a hair like stage that grows within the insect. And the toxins and the growth of the fungi kill the insect and when the insect dies the fungus pushes its way back out of the insect, grows these reproductive stages that have millions and millions and millions of these canidia or spores and they get released back into nature to infect other insects.

(Narrator) So with all these less than perfect types of control methods in mind, Paul Gregory and his colleagues at the DEP had to quickly choose which actions to take against hydrilla.

(Paul Gregory) We looked at a wide range of options. Everything from hand removal of the plant, applying what's called benthic barriers, a tarp you put on the bottom of the lake or pond that prevents it from emerging or growing in the spring time. Also we looked at grass carp, which is a fish that loves hydrilla. But that option could also invite a bigger problem then we have with the hydrilla since after it's done with the hydrilla it will also start working on native plants. So we looked at control options and then of course we looked at herbicide use. Herbicide use is traditionally very difficult to do in Maine. It's like many technologies, pesticides are about risks and benefits and the perspective from the state's Department of Environmental Protection was there was no benefit worth the risk of using a herbicide. Then we met hydrilla, and we realized there was a benefit in fact. Hydrilla will devastate this lake. We're using herbicides and frankly we're knocking back the native plants, not all of them, but we are stressing them to some degree. And this is the kind of powerful medicine we had to resort to, based on the experiences of other states. Where applying herbicedes was, the option of last resort was

really first resort, it was the only option we could take.

(Narrator) On a warm clear day in the spring of 2003, a herbicide known as floridone was mixed into Pickerel Pond.

(Pesticide Man) You ask the question is Maine being too aggressive or aggressive enough, as well as other states? And our feeling as biologists in the scientific community is that you can't be aggressive enough with this plant. This plant really represents a potential ecological disaster, as far as were concerned.

(Narrator) The floridone is injected 2 to 3 feet below the surface of the water. It is a systemic herbicide that works by cutting the plants ability to photosynthesize. It targets some plants more than others. The DEP knows that this treatment will not completely eliminate the hydrilla. Other measures will still have to taken, more hard decisions will have to be made.

(Pesticide Man) We don't really know as scientists how much hydrilla is out there elsewhere. We don't think there is a lot, but there is an awful lot of water to check and you just cant get to it all and of course, you may not actually see it until it becomes a major component of Conner Lake and people start calling about it. It's just really difficult for biologists who know how to recognize this, to always find it, and that really speaks to the education programs that the DEP does and other states. Getting people on the lake to be able to recognize it, so we get an early identification and early action.

(Amy Smagula) New Hampshire's very concerned with the location of the hydrilla in Maine because it's only 15 miles over the border from Wakefield and there are 7 very well used lakes in Wakefield that could potentially see traffic that has been in Pickerel Pond in Limmerick, Maine. So we're concerned that it's going to get a foothold there and start to spread through out the rest of the state. So border lakes have definitely been warned and educated about hydrilla and they know what to look for.

(Ann Bove) Having found hydrilla in Maine and knowing that it is now established in two other New England states has increased concern over it's ability to make its way to Vermont. We've stepped up our educational campaign to try to educate as many lake shore property owners and lake users as we can. And we're only in the beginning of that. With the hopes of, if indeed hydrilla makes it's way here that it can be found early and preventing hydrilla from getting a foothold in the state is a critical piece of our program right now.

(Narration) All across Northern New England volunteers and lake associations have impressed upon the public the need to inspect their boats for aquatic invasives like milfoil and hydrilla.

(Jack Schultz) Has a courtesy inspector ever inspected your boat before.
(Boater) Um, no.
(Jack) Have you inspected it.
(Boater) Oh yeah, I clean it.
(Jack Schultz) One of the most common areas to pick up weeds are in the propeller. This is where you would pick up weeds from a lake. Other things to inspect are the anchor and the rope.
(Boater) Okay.
(Jack) And you have the ropes here and the anchors and because here is a great opportunity…
(Boater) Oh yeah.
(Jack) And see, we have some weeds. Now these are not invasive weeds, but they could be. The other thing to check is when you come in and come out of an area where there are weeds you can catch them on your trailer, and they can get into the tubing or get into this light.
(Boater) Uh huh.
(Jack) And you want to insure that you don't have any weeds dragging on this light and you want to insure that

you don't have any weeds dragging along out, because if you put your boat back in somewhere else, you will transport the weeds and that's the last thing we want to do.

(Amy Smagula) You don't need a boat inspector to inspect your boat or trailer and it's something that anybody with a boat or trailer can do. Just before you launch you should check your boat looking at wheel wells, the trailer the rollers or bunks, around your propeller, in your boat at your anchor, at your fishing gear and anything else that comes in contact with the water. If you see a plant fragment remove it and dispose of it away from the water. And you're not looking for spores or seeds or anything like that. You're looking for visible pieces of plant. So you don't need to worry about missing something.

(Paul Gregory) If we as a society, not just as a government, as a society we did nothing about invasive aquatic species we would lose our natural resources, our lakes and our ponds. They would be compromised, they would provide less recreation for people. They would develop this momentum where plants would be able to spread more easily because they're found more frequently. So for the state or as again as a society for us we need to first of all prevent it. But also think about rapid response ways that we can control it once it is established. If we don't, it will only spread more easily. And today we have 16 bodies of water in Maine infested with an invasive species. If we did nothing it would be twenty, forty, eighty, one-sixty, and in time our lakes will have no future.

(Narrator) Man has caused this problem and man is the only viable solution.
Jo Wright is a property owner on Lake Iroquois in Vermont. She has been working with Ann Bove to try and claim back the Lake.

(Jo Wright) "But there are still a lot of boats coming in at axis."
(Ann Bove) "There are still, on weekends and…"
(Jo Wright) "Yup, even late afternoons."

(Jo Wright) What would I tell people? Be proactive. Don't let it get there to start because once it's in, it's, it's almost impossible to eradicate it. Even the chemical methods are not long term successful.

(Ann Bove) Having folks like Jo Wright on a lake either with or without milfoil is critical. As far as educating others about the problem, helping others to understand the magnitude of an infestation and implementing a management program. Jo not only embellishes the problem of Eurasian water milfoil but she cares deeply about the health of this water body, has been active in milfoil issues as well as other issues. And if every lake in the state of Vermont had a Jo Wright everybody would be better off.

(Narrator) Each of the three states has set up programs where the public can learn more about invasive species.

(Scott Williams) Although it doesn't look like any of the plants we have on our radar screen, so I think it's probably just an obscure native.
When you go out on the water today you don't have to know all the friendly natives that you are going to find out there. You just have to know the invader, know the enemy so to speak, and that makes the whole process a lot easier.

(Narrator) Workshops like the one run by Scott Williams' group teach people what they need to know.

(Scott Williams) Volunteers play an absolutely vital role in addressing the threat of invasive species, for a number of reasons. One being that there is never going to be the government support available to address this problem to the degree that it needs to be addressed, in order for us to substantially reduce the risk of the spread of these plants and animals.

(Les Mehrhoff) If people find an invasive species often they wonder what to do or who to notify about it. Most states in fact all of our states in Northern New England have programs where there are people working on invasive species, so contact them let them know that you found something. Or call them and ask is this particular species because if you find something while you are out fishing or while you are out jogging that's often the first indication that there might be a problem developing. People can go to the IPANE website that's the Invasive Plant Atlas of New England were we have distributional information. We have a very simple way of having people send in a report that we can check on. We can forward on to the state agencies and that we can as part of our rapid response set some things in motion that will check on whether or not it is identified correctly and if it is, be able to assess the situation rapidly and respond to it.

(Linda Gregory) I really think that here in Northern New England that we really do have a chance to win the battle against invasives. Probably they will exist at low levels, but everybody can do their own little part in this war against invasives. Homeowners can take out loosestrife out of their gardens.

(Dennis Souto) I can't think of anything more important for us to do than educate the public. The idea of raising awareness so that people know what insects we are really concerned about, and what they look like and how they look different from their native counterparts is absolutely critical.

(Jennifer Bofinger) I think in all of the instances of discovery of hemlock wooly adelgid in New Hampshire, we have had it reported to us by someone other than our forest agency who's out there looking for it, someone who had heard about it and was keeping an eye open to it.

(Paul Gregory) Prevention is really the only effective way of dealing with invasives on a larger scale. If it wasn't for the vigilance of this one gentleman it may have, another year or 2 may have passed, which then the hydrilla may have established itself even more thoroughly in that lake and it would be a more difficult problem to control.

(Scott Williams) One individual can certainly make a difference and I think Larry Grant is a perfect example of that. I don't think that we would know that the hydrilla was there were it not for Larry.