

WITW-Podcast-S1E4-The Green Menace Part 2_mixdown

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SPEAKERS

Christine Krebs, Jay Ferrell

J Jay Ferrell 00:00

Welcome back to part two of the green menace. This is the Working in the Weeds podcast, and this is Jay Ferrell. I'm the director of the UF/IFAS Center for Aquatic and Invasive Plants. And I have Christine Krebs with me here today to continue talking about this fascinating story of water hyacinth in Florida. So quick recall on what we discussed in the last episode, we started in the 1880s, with the introduction of this plant into Florida with all of the best intentions, but very quickly, we have broken bridges, we have streams that are full, we have the inability to use the St. Johns River, and now we have the US Army Corps of Engineers involved, and Congress being fully behind them with funding and helping them deal with this huge problem that we have in Florida. So now let's dive back into this great article written by George V. Buker in 1982, called the Green Menace.

C Christine Krebs 00:58

In 1939, the Army Corps realized that drifting, sawboats, and physical removal were no longer enough. The Jacksonville engineers set up a complex series of plant traps to control the water hyacinth. By 1941, hyacinth traps were in place on the St. Johns River, in the Caloosahatchee River, Lake Okeechobee region, and on the Withlacoochee River. With this arrangement, the waters of the St. Johns River from Jacksonville to Palatka were kept relatively free of plant jams during World War II, allowing the Navy to operate on the river. Meanwhile, the engineers were looking for new ways to control the green menace.

J Jay Ferrell 01:38

Alright, so now for a little bit of context, we've been 40 years since the 1899, ports and harbors act that really put forward this money to have a concerted effort year after year to manage these plants. But we're now, we've been doing mechanical harvesting for 40 years. And it is finally beginning to dawn on everyone that this is not a long term solution. It is a short term

solution for that era, but we are now in a totally different world. Our nation has been through two world wars, we have now split atoms. So we are now technologically way more advanced than we were in 1899. So it is time for innovation and scientific discovery to really reenter this picture, and energize how we manage these plants and what options we have. And what really changed things was the development of this amazing, at the time, new technology called 2,4-D, 2,4-D is a synthetic herbicide that was created by the War Department of all places. The whole concept of this was how can we selectively kill plants we don't need? And the War Department was hoping to use it as a weapon. Well, they used it in rice fields in Louisiana. And what they found is not only does it not reduce food supply, it killed the weeds and we were we made more rice yield than we ever knew possible. So we said okay, this is really not a war weapon, but maybe it can be a green menace weapon. So that is when this product starts being brought in and trialed in Florida and the US Army Corps of Engineers was at the very tip of that, that work and that innovation. But what was so amazing about this is remember back in the arsenic days, that product was toxic, it was toxic to cattle, it was toxic to the applicator. But now we have a means of managing this water hyacinth plant that is essentially non toxic to cattle and non toxic to the applicator. So now everything changes, but not only that, it was able to selectively control water hyacinth, meaning it doesn't kill all plants, it only kills certain types of plants. So you could go into an area that had cat tail and all of these other native plants, Vallisneria, pondweed, that's under the water. You spray right across the top, the water hyacinth disappears, and a lot of that native vegetation thrives. So it was fantastic. The technology though, we almost became a victim of our own success, because we have this new tool. And as humans do when we have something that works, we love to overuse it. So the technology was so good. We stopped innovating. We stopped trying to find novel ways to harvest we still weren't really looking for biological control. Who needs it? We've got this wonderful 2,4-D technology, we're ready to go. But the problem was, that was only one piece of the puzzle. We had a great tool to manage plants. But we didn't have a management plan. We hadn't really thought about "how do you best use this material?" Secondly, we didn't have consistent funding. Yes, the Army Corps of Engineers had the rag funds, the reduction of aquatic growth funds from the federal government, but that was really just targeted to navigation, navigation waters. By this point, this plant has spread all across Florida in both public and private waters that are not part of the rag program. So the state of Florida was having to try to manage there, and they didn't have a funding mechanism. So what was going on was the worst possible management strategy that has ever been devised, and that's wait until you have a really, really big problem, come in, spray a whole lot of herbicide, and then walk away until the problem becomes bad again. So it was this whack a mole, boom, bust situation, where don't do anything until people complain, come in, turn everything brown, and then leave again. Well, that is not the way to manage plants. That's an effective way to kill plants. But it's not a way to manage a problem. So we started realizing we've got to do more, we've got to think more about how do you handle the water hyacinth problem? Not just, "how do we find a solution for this water body on this day?"

C Christine Krebs 06:12

Not "how do we kill this one plant?" But, "how do we manage this whole problem?"

J Jay Ferrell 06:17

Right? What what are we what are we trying to accomplish? What is our ultimate goal? We weren't asking that question. It was just problem. Fix. problem.

C Christine Krebs 06:26

And historically, in the very beginning, it was like that, right? It was this one bridge, this one river, this one plant. But because of how things were handled, for better or for worse, it proliferated. And this plant is now everywhere in Florida, and so this becomes a larger problem than it ever started out to be. Through the district's continual efforts employing both spraying and mechanical means, the green menace was held in check, but there could never be a let up on the task. In the spring of 1971, Putnam County officials asked the engineers to restrict their spraying around Palatka and to leave a fringe of plants. By December, navigation was blocked again. Crab traps were damaged, peers were weakened, and in some cases destroyed by the press of the wind driven plant jams. And in addition, the plants dissolved oxygen in the water killing off fish. Thus, relaxing of the vigilance and management of hyacinth around Palatka brought tremendous plant jams, with its resulting damage to the economy of the lower St. Johns River.

J Jay Ferrell 07:37

So the managerial philosophy that had really started to become known and acknowledge was developed by a guy named Dr. Al Burkhalter, Al Burkhalter worked for the Florida DNR. So not only did we have the US Army Corps of Engineers controlling plants, by this point, the state of Florida was doing it as well. And Dr. Al Burkhalter realized that there was a huge issue with how we were managing these plants, being fully reactive, wait till you have a problem, then swoop in and do a whole lot. He realized we needed a proactive strategy. So go after these plants and keep them at a low level. So they don't become a problem. Well, he started doing this very effectively. And now he had the managerial philosophy, he had the tool, and now he had consistent funding both from the federal government and from the state. So all the pieces were coming together. And the green menace was really starting to be put on the run, things were looking very, very good. It was being managed, the rivers were open, and things were looking up. However, we're still early on. And again, this is around 1970. This is post Rachel Carson, and Silent Spring, the EPA has now been formed. DDT has been dealt with, we have the Clean Water Act in place, people are becoming much more environmentally conscious. And they're seeing the spraying that is going on. They're saying, "well, wait a minute, do we need to put a timeout on this? Remember, in the past, there were issues with cattle? What are we doing now? And do we need to take our foot off the gas a little bit? And really consider how bad are these plants?" So people started to ask, "hey, can you just start leaving a few?" I think because they mentioned that the Palatka group they said, "can you just leave a fringe of plants in the river?" Very reasonable.

C Christine Krebs 09:36

Yeah they're probably figuring you did so you cleaned it up. Looks great. But let's keep a couple of the purple flowers.

J Jay Ferrell 09:40

Absolutely. And because you're also thinking after this plant has been here for this long, it's

absolutely. And because you're also thinking after this plant has been here for this long, it's kind of a naturalized citizen. Right? How bad can it be? It's been here for almost 100 years. And they're saying "okay, well let's just leave a few more because I don't think it's that big of a deal." So the management group said, "that's a very reasonable request. Let's do that, let's leave this fringe of plants." The problem is leaving a fringe of floating plants is not possible, because they move. So they are starting to move out and as the water moves, they are going to collect some where. So if you are leaving a fringe of plants along an 100 mile stretch of river, that 100 mile fringe is going to go somewhere and create a blockage. And that is what started happening. And you see here they started blowing these big rafts of plants into people's docks, and it was breaking their docks, it was pushing over crab traps, it was causing all sorts of problems with dissolved oxygen. Remember, we talked about that earlier, the more plants you have, the more decaying leaves you have, the less oxygen you have in the water. So we went from this very aggressive, very effective proactive management, don't let these plants multiply, don't let them bunch up to let's leave some and see what happens. That was putting us back in to a reactive management stance.

C Christine Krebs 11:10

So Jay, you talk a lot about proactive versus reactive management. And then historically, it's been sort of this boom and bust response, which is an example of reactive management. Can you talk briefly about the difference between proactive and reactive just so our listeners follow along with us.

J Jay Ferrell 11:26

Sure, so reactive management strategy is waiting until the problem gets so bad that an action is required. So now you have a lot of plants and you have a lot of brown or you have a lot of activity with harvesting or something else to try to disrupt and fix this problem. A proactive strategy is one that says we're never going to let these plants build up to a problem level, we're going to go be preventative or proactive. Now, some of you may have actually heard this called "Maintenance Control." That was the term that Dr. Burkhalter developed because he said his goal was to maintain the population at a low level. So proactive management, Maintenance Control, don't ever let the problem start in the first place. So based on that, and responding to the interest of the Palatka community leave a fringe of plants, that has now put us back into this situation.

C Christine Krebs 12:30

Fast forward to the winter of 1972 and 73 when several freezes burned hyacinth mats. That spring, the US Army Corps Jacksonville district launched Operation Clean Sweep. To spray the plants before growing season, allowed the hyacinth's to resume its blockade of the river. The only way to control the water hyacinth was through vigilance. Operation Clean Sweep was the turning point in water hyacinth control in Florida. After the cleanup of the St. Johns River in 1973. The aquatic plant control section of the Jacksonville district was determined to stay on top of the situation. In the past, the water hyacinth had been dealt with when the problem of serious infestation arose. Now it was decided to prevent the plant jams before they occurred. As a result of this philosophical change in operations, the aquatic plant control section laid out

long range plans to evaluate where the hyacinth were, and to schedule year round maintenance spraying to keep control over the plants. From all of this develop the selective Maintenance Control Plan.

J Jay Ferrell 13:33

So Operation Clean Sweep was the US Army Corps of Engineers addressing a problem with great vigilance. They knew because of a decision that they had made, things had gotten out of hand and they had to bring it back into control. Now, before this, this proactive management strategy was a good philosophy. And they thought that it was working but now they had the data to really show that maintaining this plant population at a low level truly does prevent these blockages from occurring. But not only that, they had records they had years worth of records at this point of what their spray operations looked like. How many gallons were being used on the river, exactly how much from year to year, and now they were able to document because they let the problem get out of hand. There was way more herbicide needed. So by maintaining that population low for the first time, they were able to clearly document a massive reduction of pesticide in the environment because they were simply fewer plants.

C Christine Krebs 14:48

In the article Buker writes, "public displeasure with water hyacinth management activities has dropped because of a chain reaction. There are fewer plants. There are less applications of herbicides, therefore this section is less visible to the public. The person who had been blockaded by plant jams is now free from that agitation. The person who objected the use of herbicide is also freed from much of their concern because there are fewer spraying operations." Joe Joyce, chief of the aquatic plant control section voiced a new concern. "One of the drawbacks of that success is that there is no visible problem, you can't really show somebody the water hyacinth problem other than by stopping what we're doing and letting it redevelop." So to our listeners, I ended the storytelling part with those two quotes, because I found them to be very powerful and very present. So Dr. Ferrell, what do you have to say about those two quotes and where we are now?

J Jay Ferrell 15:45

Well, the quote, in particular by Joe Joyce is just so intriguing to me that this quote was made over 40 years ago, and I still think it holds true today, I still hear people say, "why are these things going on? Why is this management still occurring? Because these plants have never been a problem." Well, actually, you haven't seen them be a problem, because there has been a very effective diversified proactive management plan in place for well over 50 years. So just because you haven't seen it be a problem, doesn't mean that these plants have learned to be nice, it doesn't mean they've learned to behave, they have not become tame, because they've been in our environment for over 100 years. These plants are still highly destructive, we have just finally figured out how to manage them into a way that they are not destructive. So a second thing is people will say, "I really dislike the management program that's in place in this state, because I think back to these rivers, these lakes that I enjoyed as a child, and they don't look like the way I remember them. And it's because they've been destroyed by the management program." Well, we need to keep our mind focused that the management

program goes back to the 1890s 1899, with Rivers and Harbors act, but it was really set forward in a very progressive way, the 1970s. So the chances are, the management program predates your childhood. So what is causing the differences in what you remember versus what you see now? Well, we also need to remember that there's a lot of people in this state, it has been dramatically developed since the 1950s. There's a lot more things going on here. So is it just simple enough to say the management program is what has caused the difference that I'm seeing or can it be a huge collection of a lot of other forces all coming together?

C Christine Krebs 17:44

As we mentioned before, in 1897, the Army Corps stated that this plant was probably not going to be eradicated from the state. And it seems like they knew what they were talking about back then with that observation, right. So this plant is still present, takes up a lot of our research efforts. So where are we at right now, with water hyacinth?

J Jay Ferrell 18:01

Well, I would love to say that technology has continued to advance and we have this plant on the run and it's days are numbered, and we're going to return Florida to like it was before it was introduced. Unfortunately, I don't believe that will ever occur. This is a plant that will be here forever. So the way it reproduces, the way it grows, it is a plant that we are going to always have and we're going to always have to deal with. So because of that, there are multiple agencies that pull their talent pull their resources to continue to battle this green menace. The US Army Corps of Engineers still have active management programs. The state of Florida through FWC has active management programs, water management, as well as a lot of counties and municipalities. So they're all sharing resources, sharing knowledge and really trying to learn from each other because the learning continues. Here at the UF/IFAS Center for Aquatic and Invasive Plants, we're continuing to study this plant. To even right now about 40% of our total research effort goes into water hyacinth. Yes, believe it or not, it's been here for 120 years, we are still devoting tremendous resources to this plant and we will even joke with our graduate students that you can't get your degree until you've done at least one project with water hyacinth. So it is still consuming tremendous amount of our effort and time and if you come here in June or January, I guarantee you we have water hyacinth growing in culture because we are working with it year round.

C Christine Krebs 19:36

With all that said, as we wrap up is there really a future for this plant? I'm thinking about the water hyacinth basket I have in my closet and is there a future for this plant?

J Jay Ferrell 19:47

So if we can't beat them join them.

C Christine Krebs 19:49

CHRISTINE KREBS 20:15

It could be some sort of living room decor I'm about it.

J

Jay Ferrell 19:53

Boy so you've got this plant growing everywhere and really brilliant engineers for the past 50 or 60 years have been super creative and try to find alternative solutions to this thing. So we talked earlier about cattle really don't like to eat it, it does kind of mess up the chemistry of their digestive system. Well, is there other things we can do? Can we incise it? Can we help break some of that down so that the cows can actually eat it? Well, lots of work has been done. And what they found is you can only feed them green tissue about 13% of their total ration. If you incise it, that number goes up. But there's not enough sugar or nutrition in it to actually make the bacteria work in the fermentation process so you have to add sugar. Well, now it's not cost effective. It's actually cheaper to grow corn than it is to harvest this free growing plant. So cattle feed has really never materialized. So other folks came in and said, Well, can we make paper out of it? Lignin is lignin right. It doesn't matter if it comes from a pine tree or from a water hyacinth. It's all got those fibers, what can we turn it into paper? Well, they did. But what they found is not all lignin is lignin, and pine lignin, those fibers are really long, it makes this super nice, slick, strong paper. Water hyacinth has short fibers and yes, you can turn it into paper, but it is lower quality. And as they pull it across the rollers to kind of dry it out, what they found is if you try to produce the paper in a mill that is set up for pine tree paper, as it stretches across the rollers, it actually pulls the paper apart and breaks it because it's not as strong. So can you turn it into paper? You can but now you have to have a dedicated mill, because you can't process it in the same mill that you use for wood pulp. So that one is not really a great solution. They've looked at can you turn it into charcoal briquettes and use it for fire? Well, they can. But what they found is that they smoke so bad, you can't stay in the home while they're being burned. So on and on and on, they have looked for ways to add value to this plant to do something with it. And it's not for lack of trying, but they have never successfully found anything that really worked. And honestly, I think the best thing is in this niche little you know furniture market where you're making baskets and things people seem to like those, that is probably been the only successful avenue for using this plant for anything. It's just not a plant that lends itself for anything of value.

C

Christine Krebs 22:43

So Dr. Ferrell, do you have any final thoughts for our listeners today?

J

Jay Ferrell 22:47

So one of the things we do need to remember as we leave this discussion is that we are never going to spray our way out of this problem. We've seen that in history. We've seen from the 1890s, we can't harvest our way out of this problem. We can't have bugs eat our way out of this problem. We can't legislate our way out of this problem. This is a man made problem. And it's going to require manmade solutions. And we have to bring all of the available technologies together, and none of them are perfect. That's why we have to integrate them and leverage the strength of each individual management strategy to its absolute highest potential. So in the

meantime, we need to be very cautious not to allow our personal bias that the fact that we prefer one management strategy over another that we don't take other options off the table. We have to have all of these coming together if we're going to address this problem.



Christine Krebs 23:50

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