*Oversight Hearing*

# Senate Committee on Agriculture

Senator Cathleen Galgiani, Chair

# *Controlling Water Hyacinth in the Delta: An Update on Current and Future Strategies*

Stockton, California

**September 27, 2016**

**SENATOR CATHLEEN GALGIANI:** Good afternoon, ladies and gentlemen. Welcome to the Senate Committee on Agriculture's oversight hearing, "Controlling Water Hyacinth in the Delta: An Update on Current and Future Strategies."

The Sacramento-San Joaquin Delta is an invaluable California natural resource that provides not only water to our communities and our farmers but is enjoyed by recreational boaters and supports beautiful natural ecosystems and wildlife.

However, water hyacinth has been plaguing the Delta for several years now and has been proven to be a highly prolific weed that obstructs Delta waterways and marinas. It creates human health and safety hazards and consumes valuable water resources.

The California Division of Boating and Waterways, USDA, NASA, and other government entities, private businesses, and individuals are working to keep water hyacinth from choking the Delta; and we will hear today from them

on what is being done. This is an "all hands on deck" problem, and so, personally, I pushed for and helped secure an additional $4 million in funding for Boating and Waterways to purchase more boats and to staff more crews to go out and find and destroy the hyacinth.

My goal for today's hearing is to receive a full update on the status of the water hyacinth, the control efforts in the Delta, and to determine what more can be done or should be done to make sure that we can effectively and consistently keep a strong grasp--as well as any other problematic invasive weed--and that it's prevented from damaging the health and the welfare of the Delta and its residents.

I thank everyone for being here today and for your interest in this important oversight hearing. I would like to invite anyone interested in providing testimony during the public comment period to please sign in with the sergeants at the back of the room. Thank you.

Now, I would like to invite our first witnesses to come forward, Mrs. Lynn Sadler, Deputy Director, California State Parks, Division of Boating and Waterways, and Mr. Edward Hard, Environmental Program Manager, also from the Division of Boating and Waterways. Thank you for being here today.

**MS. LYNN SADLER:** Thank you very much Chairperson Galgiani. And thank you to all the folks here who care about the Delta and are here to work with us to help control this invasive species.

As the chairperson pointed out, my name is Lynn Sadler, Deputy Director, State Parks, Division of Boating and Waterways, and with me is Eddie

Hard, who heads up our Aquatic Invasive Species Unit. I've also brought with me today a visual prop that I would like to share with you. You might be wondering why I would show you my handbag, but I want you to know this is made of water hyacinth. [Laughter]. So back to more serious business.

[PowerPoint presentation begins]

Our AIS Unit has jurisdiction in the Delta, specifically over these six weeds. Our role is in 68,000 acres of the Delta and its tributaries, and we are to be the lead agency to cooperate to control, at the moment, these six species. The bottom two, milfoil and water primrose, we were just recently authorized to treat.

Our mission is to control aquatic invasive species for three reasons. One is the environment. The other is public health, and the other is the economy. And we emphasize that it is a "control" program. Water hyacinth has never been eradicated in moving water. Although China, we understand, has spent over $1 billion in an attempt to do so.

Boating and Waterways uses an integrated control strategy for both floating and submersed vegetation. And so that means that we use a number of different protocols and treatments so that we can stay adaptable and flexible, and that helps us to address the species that are already a problem and also those that are emerging challenges. These are three that have begun to show up in the Delta in greater numbers and are gathering our attention and our research to see what needs to be done in terms of those as well. I would point out that pennywort is a native and that creates issues of its own in

addition to the fact that it is proliferating and clogging various sloughs and areas.

So again, our jurisdiction is in the Delta. And I used this map for you because this shows the integrated management control program in a number of ways. As you see, the very bright red and yellow spots, those designate nurseries; and those are places that we believe the water hyacinth can grow much faster because the water is more shallow and it's not moving. And then as the season progresses, we believe that that water hyacinth begins to move and those areas serve as a nursery. So we'll be talking a little bit more about that. There is an area kind of aligned. It isn't on this one, but you can kind of see it right there. That delineates when we can treat.

There are certain areas of the Delta that we cannot treat before certain dates. There are areas of the Delta where we can only use certain herbicides, and we are limited in the number of acres overall that we can treat. And so this map, while it's difficult to see the detail from here, it's one of the tools that we use to remind ourselves where we need to focus during the year. While we're focusing mostly on the northern Delta, I just put this here as a reminder that we are responsible for southern sites as well for control.

So when we control for the environment, these are the main drivers that we need to watch out for and to care for: VELB, Valley Elderberry Longhorn Beetle -- that's that little critter right down there -- and so just for example, when we see elderberry bushes and we happen to be spraying, we have to keep a wide buffer to make sure we don't get near that bush. If we are doing

harvesting and a snake is discovered, we need to make certain that it's not a giant gardener snake and that we're not disturbing habitat. When it comes to Delta smelt there are any number of things that we need to look at, such as water quality monitoring. So when we do water quality monitoring, it's not only for endangered species, but it's also for humans and public health. We need to make certain that herbicide residues stay at appropriate levels, for example.

I note there that the second item is temperature. I think many of you know that the drought has exacerbated the water hyacinth issue because the warmer the water the more it grows, and it can double in size in about ten days on a normal summer weather. So temperature and low water have played an enormous role in how fast water hyacinth grows.

So this year, we feel that we have made enormous progress. We've been working with many of the people in this room to improve that. And I wanted to talk a little bit about what does that mean on the ground, and so here to talk about that is Eddie Hard, who heads up our team that is on the ground here in the Delta.

**MR. EDWARD HARD:** Good morning. Thank you, Lynn. And thank you, Senator Galgiani, for holding this hearing. I first want to introduce myself, Eddie Hard, the Chief of the AIS Program, but I also want to introduce two audience members here, Ed Somera who is our field chief for floating aquatic vegetation, and Albert Gold, who is our chief for submersed aquatic vegetation. Both these gentleman were hired about a year ago to help Boating

and Waterways get our ducks in a row in the field and get smarter about how we control this problem.

So moving forward -- I will advance the slide here. Our current status, this was submitted as of the 19th of September. However, as the plants grow and we control more of them, the number you noticed on the preceding slide was 2,849 acres, as of today. The [outdated] slide that we're now looking at shows 2,800 so we've increased just since September 19th. As of the 27th we're now at almost 3,000 acres, and that puts us approximately on track of where we were last year, 2015. We're averaging about 500 acres per month. So between now and November 30th, we should reach our target, our maximum acreage allotment for sure.

Pardon me? Yes, that includes--thank you, Lynn. One of the interesting things this year that we experienced, unlike last year, was the climate this time around. Early in the season, we lost about a month due to winds, lightening on the water, which pushed us off of the water because we can't operate during those situations. So even despite that, we are still on trajectory to meet where we were last year at this time.

So on the screen there, you'll notice that we began our treatments in March, early, March 10th as a matter of fact. And to date, it's been high to moderate efficacy of where we have treated. And similarly, on the submersed aquatic vegetation, that program has been highly efficacious where we've treated to the extent that the vegetation was topping out in the water. We

began those treatments in March, early again, and this year we're about 2,500 acres for Egeria and other species such as curly-leaf pondweed.

So as the Senator--you acknowledged when you first opened up about new resources bringing to bear. Out of the eight authorized positions, we've hired seven. And with that, we've also hired... So those are the field technicians that augment the operations in the field. Secondly, we've... to add capacity to the scientific field to understand how we spray and then monitor for federal and state compliance requirements, those scientists augment what we did not have. So the more acres we treat, the more samples we have to take.

We brought on a toxicologist to look at the implications for how we reduce risk strategies for our operations. And with that, we've also acquired four new vehicles with trailers and boats. And one interesting note that was different from the last time, I believe, we came and talked to you was that we now have a four-year harvesting contract; and that contract allows flexibility for the program to not only look at herbicide control but also mechanical. So this is an example of a harvester. Some of you who are in the audience have seen this in the port area. And we have other locations where we've done: the Whiskey Slough, for example, and up and around Sycamore Slough. And we have a current operation in the Central Delta on the west side of the central Delta in the Seven Mile Slough location on Twitchell Island currently.

So what could be better for next year? One, looking at how the new resources are working better together and expanding our partnerships and smarter approaches. And to tee this up, part of is that, yes, we are directed to

work across local, state, and federal lines. And some of the speakers today, USDA and NASA in particular with our federal side, have been very helpful in terms of federal nexus and also for our environment compliance, USDA's role in that, but also NASA in terms of providing spatial data to understand where the floating vegetation, specifically where they are in the Delta, to help us calibrate our operations at the state.

Secondly, at the state level, we work cooperatively with the California Department of Fish and Wildlife, specifically, on the fact that we now have a Delta-wide routine maintenance agreement. And that's very significant for State Parks because at this point no one else has a routine maintenance agreement for the entire Delta. That provides us additional coverage to operate but also sets forth environmental stewardship and the way in which we go about our operations. So that includes monitoring when we're out doing the mechanical harvesting.

And at the local level, this is where we've had some really good inroads in terms of working with the cities and counties. We work in an 11-county jurisdiction. Each county has set with their agricultural commissioner certain standards for how we operate our herbicide operations, in terms of wind requirements, as such, and also restricted use permit. So we also are expanding our interactions with local water districts, irrigation districts, and reclamation districts.

So the partnerships also include an expanded role of looking at how we evaluate performance for our herbicide operations and that includes evaluating

reduced-risk approaches. So greening the program is another alternative. A speaking point on this is: How can we move forward with controlling these challenging aquatic species but also do so in a very sound manner? So we're evaluating that through a partnership with UC Davis.

And one of the additional things that we bring to you that we didn't have last year, in addition to the harvesting contract, is the partnership with California Conservation Corps. So the $4 million pushed us to get additional staff, but we're working smarter by leveraging a partnership. CCC, what they bring to the table is up to six additional staff from the Bay-Delta office in Stockton or the Delta field unit that allow us to utilize those staff, train those staff, as we need to, to augment our own operations. And that's been very useful, to pair a specialist with one of the corps members to train them because that is a building block for what the corps is all about. And plus, if we all work together, they may end up getting a job with us. That's a good partnership.

So one of the key things here I want to transition to is let Lynn speak on behalf of some specific examples on how we're engaging our partners.

**MS. SADLER:** Thank you. I also wanted to take this part because I want to brag on staff. And they won't do that for themselves, so I get to do that. They've done a remarkable job, I think, of helping us work with the city.

One of the things that we control for is the economy and trying to help local economies. And of course, the waterfront here is a huge issue. And this, I've asked to have this example highlighted because we were made aware of a

very big event that was going to be held in the waterfront just as the hyacinth began to float in; and we worked with the city and local businesses, Business Alliance, Chamber of Commerce, and others to make certain that the section of the waterfront that was going to be part of that fundraiser was as cleared as it could possibly be by the deadline; and we were stopped by lightning. Obviously, we don't want our staff out there in metal boats and lightning, so we had to stop. We were stopped by 30-mile-an-hour winds one day, but we still managed to work with the city and save that event.

And so what has changed this year that I think has been an enormous asset to us is that we're asking local folks to talk to us when they see the hyacinth--you'll see it before we do--and to work as sort of citizen scientists by sending us photographs, locations. If you've got your GPS out, send us the coordinates. Whatever it takes so that we can all work together and within the parameters that we're allowed to work and also recalling that we have to protect and control weeds in the entire Delta. It helps us be smarter and be able to work with local folks to protect the local economy as best we can contribute to that.

So another way that we're expanding our partnerships that I want to highlight, because this is frankly one of the biggest problems we face--highlighted here in this slide--and what you see here are the spoils from mechanical harvesting. When those spoils are first deposited, they're about 4 feet high in the big; and they compost down to maybe 6, 7, 8 inches. But it takes up a lot of room, and it's difficult to find places where we can place that

for that process. And so we are looking throughout the Delta for folks that need compost. Or in this particular case, this was a road through a park actually that... I don't know if it was originally meant to be a road, but they wanted it closed. And so we were able to do the spoils there, which served as shutting down that road. So we are looking for all kinds of opportunities where we can be helpful to local farmers or land owners or businesses at the same time as helping us find a place to put those spoils so that everybody is served by that.

I'm going to turn the microphone back over to Eddie Hard, who's going to talk about how we're working smarter through the science. And you'll hear more about that with other speakers, but we are going to talk about it from our point of view for just a moment.

**MR. HARD:** Thank you, Lynn. And, as Lynn mentioned, one of our next speakers, Dave Bubenheim, will address the real details behind this image, but this is a signal for us to work smarter. They provide this composite image from Landsat and identify floating vegetation. And what this enables the partnership to do is be able to see where early in the season these large areas of blue are occurring; and our staff at State Parks, Boating and Waterways will go out and essentially ground truth what is being recorded from up above to verify in fact whether or not the signals of the blue are species of vegetation we can actually control.

And to date, it's been a big signal of, yes, we can treat that and, yes, those vegetation--pardon me--the vegetation is growing where it's indicating it's

growing. But not until recently have we been able to treat the primrose, which in this year, 2016, the early signals in Big Break and the western Delta were indicating we were going to have a significant problem of water primrose. And not until just recently, as Lynn mentioned, we now have the authority to control that, and we are. We have been so for about the last three weeks, plus. So that's a key ingredient for us being what I would call not only strategically but operationally and tactically ready.

Here's another example for our friends in the Contra Costa County area, eastern Contra Costa County. For those of you who aren't familiar with this, this is the western part of Discovery Bay. And in 2014-15, on the left side of that screen, you'll notice a lot of oranges, reds, and so on. That indicates heavy presence of submersed aquatic vegetation that was choking those waterways in there. And the "smarter" part comes in as: one, we're using a tool that's readily available to put on vessels--and a lot of fishermen who may be in the room use these already--and that is to detect fish, but we're using them to detect underwater vegetation. And that vegetation is coupled with the fact that we take, kind of, duct tape and bailing wire, go get some rakes from the hardware store without handles, roll them together, and toss them into the water, and pull up the vegetation--and speciate what that vegetation is so that when we have the map we can then correlate, oh, at each one of those bays, of which there are several dozen in Discovery Bay, we will know what the percentage breakdown of what species there are. That then tells us, you know, how we're doing.

The map is very clear. It tells us on the right what happens when we really go in there and treat. And that's what you see on the right. It's often very clear with a picture - the problem on the left, [and] what happens when we go on the right, when we treat. So you'll notice the dramatic difference between '14-15 and '15-16 on the right that shows mainly blue and a little bit of green. That's very cool. We're working smarter with the technology that's out there from the various vendors. So that's another example.

So one of the things I'd like to talk about briefly here, which is going to be an important step for State Parks, Boating and Waterways, is we're nearing the end of five-year federal permits--or biological opinion, I guess I should say--with the NOAA Fishery Service and US Fish and Wildlife Service; and that necessitates us to start anew come 2018 with a new program. And as one of the speakers next will discuss in part, our USDA is our federal nexus that allows the state of California, through that Section 7 of the Endangered Species Act, to move faster versus Section 10, which we would be doing on our own from state to state. It's a much longer process.

So what I'd like to talk about here briefly is what are the factors that have shaped this program historically and moving into the future. Just to acknowledge for the audience members that may be unfamiliar with this is that we do have a situation where there's deciders and there's implementers. And we're the implementers of the decisions, and the deciders are on the left--US Fish and Wildlife Service, NOAA, Marine Fishery Service, California Fish and Wildlife, State Water Board, Department of the Army, Army Corps of Engineers,

Coast Guard. The “CACs” refer to the county agricultural commissioners, of which there are 11 in our jurisdiction, and “DPR” referring to the California Department of Pesticide Regulation. Also, reclamation districts because they have their own permits in the event we would want to get on their levies, and the irrigation districts.

So key drivers. You'll see there in the list that we have, as we discussed earlier, in terms of our environmental requirements, endangered species, both federal and state, and the habitats of which those species live in. We also have major drivers in terms of water quality. And, of course, the Delta is a huge geographic area for our food and fiber for California. So we have irrigation and crops for agriculture in the levies, navigation, weather. And one of the big drivers, as we've been talking about, is weather. And weather does play a big part with the wind restrictions. So most counties are, you know, eight to ten mile-an-hour limits. If there are any... If the wind is blowing at that point, at that level, we have to stop. So that's a real challenge for us because the Delta is the gateway to the Delta Breeze, of which we enjoy here in the valley. So that's a challenge for us.

So the big influencers are methods, acreages that are limited--that are set by the deciders at the federal fishery agencies--and the locations. As Lynn mentioned earlier, there's time durations of when we start the program. For example, the audience, I think we talked last year, is the timing and location. The entire north Delta is off limits for treatment until June 1st. That's a third of our control area. So if a third of our control area is not treated three

months, given the factor of six to ten days doubling in size, that timing is a big factor in how we operate our program. And if we have three-quarters of, or pardon me, two-thirds of the Delta that's been controlled between March and June and a third of it is not, and the winds start blowing from the north, we could all of a sudden have all that stuff blow south.

So the shaping of the program and implementation, what we want to look at is how we comply, are there more flexibility in terms of the permits and boat crews. And one of the key things is the monitoring and the plant species. One of the key drivers, as we talked about, is the additional risk assessment process that was put in back in 2014 that took effect January 1st; and those new processes do require us to look holistically. Instead of going specie by specie, we look at it as an ecosystem. And we've been doing that. This will be a process now where we're able to now look at that in a much more holistic sense, going through a biological opinion planning process.

So some of the key guiding principles, of which a couple of them we've talked about. Collaborative approach: reemphasizing this, how do we work better in partnerships. The example of the CCC is one example, but also from government to government and private to government. Science-based controls: We're looking at this solely at science is the driver here, fact-based information, and fully adopting an adaptive management approach both at the state regulatory and the federal regulatory process so that we at State Parks and Boating and Waterways can be flexible on how we control this. That's really imperative, and we're looking for the widest range and tools possible.

Flexibility is our friend, and we need to embrace it. The laws currently, as written, do allow a lot of flexibility. We just need to look at where those options are. And part of the thing that is big these days--and we're stepping up to meet that and leaning forward—is, in addition to mapping and monitoring, what's the metrics of this program, how are we moving this program from what I'd call, you know, crisis to maintenance. We need to be in a maintenance mode--control it and then maintain it.

So one of the key things here for all of us in the room and those listening is, your input matters. You own this program. This is your state. This is your program. We're going to be rolling out how we move forward with this in the fall through public presentations and meetings in the Delta, starting with the big three: Delta Protection Commission, Delta Stewardship Council, and the Sacrament-San Joaquin Stewardship Council as well. But we're looking for other venues in Modesto and Stockton, too. Looking at also the scoping process for CEQA. That's a public process that allows the public to comment. Also, we're doing something new here, memorializing it more so that feeds into a statewide effort, which is a management plan for the Delta for Delta invasive species. That has not been done before.

So one of the key things, what I'd like to just verbally discuss with you is the timeline. The timeline is, essentially, we're under a tight timeframe for getting our new process in place; and that requires us to have a discussion like we're having today and on these public meetings we're going to be doing in November and December. But moving forward, we need to have a draft of our

biological assessment--that talks about the program description, about who we are, what we've been doing, what we desire to do--based on public input by June, at the latest, of 2017.

Why so soon? Well, obviously our permit or our process expires in 2018, and there are other large actions going on in the Delta that are being reviewed by the federal fishery agencies. And in order to do both of them, we need to have this put in place by June so that it gives the federal agencies time to actually go through and render a biological opinion within six months after we deliver it. So we will be going through a series of both CEQA and NEPA. And some of the NEPA actions, John Madsen at USDA may get into, but we can always answer questions. So I'll turn it back over to Lynn.

**MS. SADLER:** One of the things that I would like to point out is that Section 7 does not require public input, that Parks has decided to do that on our own because we want to. As part of increasing our partnerships, we want all of you to have an opportunity to provide input to this. We think that the more brains we put together on this the better the program is likely to turn out. So we're asking you to help us make sure that wasn't a bad decision on our part--that you actually do participate, that you do provide comments, that you do provide input that help us make this a better plan in the end.

And the other thing that I would say is that we will have a section on our webpage. Many of you are already signed up to receive notices when we are treating. You go to that very same place, and you can receive notice when these meetings are set. And that will tell you where you can go to talk to us in

public, but it will also tell you where you can send things in writing. And we encourage you to do that. We invite you to do that. We hope that you will. And with that, we would like to take any questions that you might have. Or if you prefer that we wait until the end, we can do that as well.

**SENATOR GALGIANI:** Okay. I did have a couple of questions. So if you're out spraying and you come across other floating invasive weeds other than water hyacinth, are you able to treat all at the same time if you see them together or do you have to come out separately?

**MS. SADLER:** I love that the answer is, it depends. Some species have to be treated with a different herbicide and so that might or might not be available in the same way. Like, if you were treating a submersed weed, you might not have on your boat something to treat a floating weed.

So the other thing is we have to be authorized to treat it. So if we came across coontail, for example, we would not be able to treat that. And that has been a problem, specifically with primrose. Because the primrose--I don't know if you're familiar with what it looks like, but it has a yellow flower and kind of a leaf shaped like that--and it was growing on top of primrose. So we actually couldn't get the spray into the primrose, I mean into the water. I said that backwards, didn't I. The primrose was growing on top of the water hyacinth. And so we weren't authorized to treat primrose, and we couldn't get underneath to treat the hyacinth. So now that we're authorized to treat the primrose, that makes it a little bit easier. But as I said, that's why the answer is, it depends.

**SENATOR GALGIANI:** So do you feel as though now... For example, you mentioned--wasn't it the pennywort that's the new invasive weed that has been discovered in great quantity out there? The pennywort.

**MS. SADLER:** I think it would be fair to say that primrose is the one that, at least to me, is the most concerning. I've been out on, I think it's Old River?

**SENATOR GALGIANI:** Yes.

**MS. SADLER:** Through there. And the primrose was blocking entire crosscuts. It not only grows on the water but then it's a vine. It grows up on the land. It grows on buildings, docks, trees, other plants. And I think at the moment that would be one of the most concerning. In fact, it seems to be in greater numbers than the hyacinth.

**SENATOR GALGIANI:** So do you feel that you're adequately prepared with resources and funding to make sure that that doesn't get out of control, too, at this point or are there other needs that you have?

**MS. SADLER:** Let me ask Eddie to talk about that because he's specifically working with the folks on the ground, and I think he could give a more complete answer. Just a moment.

**SENATOR GALGIANI:** Thank you.

**MR. HARD:** Sure, thank you. Senator, so the response I would give is that they often tend to grow in the same place as the hyacinth, the primrose for example; and the resources that we use and bring to bear are the same suite of authorized herbicides we have now. One of the things we're looking for, as we

mentioned earlier, is looking at reduced-risk herbicides. So same type of herbicide and the like-specie, if you will, of herbicides, but you use less of it but still highly effective. So typically at this point, as we're winding down the season, we're trying to get as much primrose as we can because we do have restrictions on the type of herbicides at this time of year.

September 15th was the last point in the season to use something called 2,4-D, which drastically takes down the plant at a faster rate than would be the case with using Roundup, for example. So Roundup is what we're using now, along with imazamox, or Clearcast is the common label name. So both of those we have in our arsenal and supply. We're probably order another batch of that for next year in prepping for next year, but at this point those resources we have ready for the challenges for the rest of the season.

**SENATOR GALGIANI:** Thank you.

**MR. HARD:** Sure.

**SENATOR GALGIANI:** Well, thank you very much for your presentation and for your work. I will say, I've had people tell me that it's visibly been much better in our area, so they can tell that we are making progress. And that's wonderful news. And I greatly appreciate your efforts, the efforts of your team, and your willingness to continue to be here each year, a couple of times a year, for a hearing so that we are able to really stay on top of this and keep it a partnership between our local community and the state. So thank you very much.

**MR. HARD:** Thank you.

**SENATOR GALGIANI:** Next, I would like to welcome John Madsen, Ph.D., Research Biologist from the USDA-Ag Research Service, Exotic and Invasive Weeds Research Unit; and David Bubenheim, Ph.D., Senior Research Scientist, Earth Science Division of NASA Ames Research Center. Thank you.

**DR. JOHN MADSEN:** Thank you. I'm John Madsen, a research biologist with the Agricultural Research Service, and I want to thank the Senator for the invitation to come and speak. I'm speaking on behalf of the, what we would call the executive committee of the program. We're going to talk about the Delta Region Areawide Aquatic Weed Program.

[PowerPoint presentation begins]

Okay, interesting. So obviously this is a different version of PowerPoint than what I made the presentation on, but that's life.

So anyway, I'll just explain the areawide program a bit. Areawide programs are an area within USDA in which USDA targets specific projects, pest management projects, where they feel there's an adequate amount of research done on a technology or approach that's going to be effective; and they try and implement that technology in a large geographic region or in a specific commodity.

So usually these are related to pests of row crop agriculture or some commodity. There are a number that have been done on rangeland weeds. The DRAAWP, or the Delta Region Areawide--that's a really long acronym, isn't it. DRAAWP, this is the first one on an aquatic weed. So the general goals of these are to... Again, areawide projects are to implement a new strategy on a

pest, to perform any research that might be needed to improve the implementation. But, generally, this is not meant to be only research. It's meant to be: let's take this research that's been done and implement it somewhere and get our stakeholders, our cooperators to adopt this as a new approach. We're also interested in educating all the federal, state, and local agencies and stakeholders about the science related to this process and get adoption of the approach. There's a lot of other verbiage there that I can't see because the text is dark, but what can we say.

And as I mentioned earlier, the areawide program, this aquatic program, is the first one on an aquatic weed. But given the importance of the Delta as a resource, I think it's very appropriate that this be the first areawide project that's done for management of essentially a suite of aquatic weeds in the Delta. As you know, the Delta is a large freshwater estuary. It's really the central hub of the water delivery system for drinking water and irrigation water in California. It's an important natural resource. It's important for both commercial and recreational navigation. It's an important site for tourism, and it's also important as a home to a number of rare, threatened, and endangered species.

So we're looking at essentially these six weeds. Though, certainly over time, there will be new weeds that appear. The top row are the focus weeds of the DRAAWP project: water hyacinth, Brazilian waterweed, and Arundo. Brazilian waterweed is also called Egeria. And then the bottom row are sort of the newer weeds or other weeds that we're also including: water primrose,

South American spongeplant, and curly-leaf pondweed. So they're both emergent, floating, and submersed weeds.

So our objectives are to model the growth of these individual species in the Delta both in terms of their seasonal growth and how they move around in the Delta or where they're located in the Delta, develop usable remote sensing tools to track these species and evaluate the success of management, to find and implement new and improvement methods for control of water hyacinth, Brazilian Egeria, and Arundo in the Delta using an adaptive integrated management approach. And I can't read the others, but I'll kind of make it up as I go. We're also interested in how the management activity is affecting other aspects of the environment.

So as far as funding, we've just started the third year of funding on this project. They typically run five years, but they can be extended a little bit beyond that, as needed. But the decision is made year by year based on how productive the program has been and if it's meeting its goals. And thus far, we've made a great deal of progress in this areawide project.

There are a number of factors that are kind of motivating the development of this areawide project. The first is, while in the past aquatic weed control efforts have been very diligent and substantial, they have not been effective in achieving long-term, sustainable control--or as I like to say, long-term control in which the population the weed is declining rather than increasing. And we've done a number of things in this project thus far. We've seen a reduction within a given year in the amount of water hyacinth. We've

seen a reduction in the amount of water hyacinth from one year to the next. We've seen improved control of Brazilian waterweed, and we've also seen implementation of management on Arundo. This is an emergent grass or riparian grass that is found on a number of the levies. And then we've implemented a bioeconomic model that's going to help us track the cost of both, you know, the impact of the weeds itself as well as the cost of management.

The second thing is that the agencies responsible for aquatic weed management had insufficient information to optimize the seasonal spatial targeting of aquatic weeds. And so with the NASA remote sensing tool, we've been able to find early season locations where significant amount of water hyacinth is growing and focus on those as nursey areas. We've been able to, through Boating and Waterways, implement Delta-wide surveillance of Brazilian waterweed. A number of us have worked together on developing information on the seasonal growth of the aquatic species and starting to develop an understanding of where in the growth cycle of these weeds might be the best time to manage the weed. And then we've increased the dialogue with a number of stakeholders and fellow scientists.

Moving on. The resources have not been available to help the wide range of agencies to talk among each other, to collaborate, as well as getting input from a variety of stakeholders. And we've done a number of things just in the past year. We had a stakeholder meeting in August 18th in Stockton. We've been meeting with the Delta Interagency Ecological Program, which is the

federal and state scientists that work on the Delta. There's been a lot of interest in including aquatic vegetation in the overall scientific scheme of the Delta, and so we've been collaborating on that aspect. We've also launched the DRAAWP website, and there's a website address that you can find, and there are a number of resources there, including information sheets, a semi-monthly blog, and some other information.

More for our scientific colleagues, we're participating or actually developed a special symposium on aquatic weeds for the Bay-Delta Science Conference that will be held in November, and we are working on developing a public outreach and information meeting that will be run by the University of California Extension Program for Stockton at a date to be determined. And once we determine that date, we can let people know through a number of avenues when that will be. And that will be merely information on water hyacinth and what's being done to manage it.

Looking at specific partners' activities, the ARS partners, themselves, we've been working specifically on collecting season growth data on water hyacinth, currently, pondweed and Brazilian waterweed. We've completed a study looking at what's the most effective adjuvant for herbicides. And what does that mean? Well, the aquatic herbicides have no additive to help the herbicide penetrate the leaf of the plant. You have to actually add an additional substance, an adjuvant or surfactant, to the herbicide to make it penetrate the leaf. And we've evaluated a number of the surfactants that are

available for use with glyphosate to help it penetrate the leaf of water hyacinth better.

We're also in the midst of doing efficacy trials to find the most effective herbicides for water hyacinth and Brazilian waterweed, including trying to expand some of the options that are available for treating both of those. And we are working with NASA on environmental weed responses, as well as establishing a new biocontrol agent in the waterways outside of the Delta proper.

NASA is going to talk quite a bit, extensively, but I do want to highlight the importance of this Landsat satellite-based tool for detecting water hyacinth. This is a satellite that's in orbit. It's actually a series of satellites that are the real workhorses of monitoring the surface of the earth, and this has been a very effective and inexpensive tool for this sort of monitoring.

We're working with UC Davis, actually four different departments. Here are three of them: Entomology, they're working on the relationship between the weeds and the management of the weeds and mosquito populations. The Land, Air and Water Resources Department is working on modeling land crop use, as well as providing input for the Delta SWAT model that NASA is leading the implementation of. And then Plant Sciences are assisting with the plant growth studies, assisting with the efficacy studies on herbicides.

Cooperative Extension has a special role in pesticide trials in the state of California, so we're working with them on that collaboration. And then lastly, developing outreach tools like the website and meetings. The Ag Issues Center

is working on this bioeconomic model, and that will be providing us a very useful tool for predicting the impacts of the weeds as well as the cost of management. And then the mosquito vector control districts are working on the interface of mosquitos with the weeds and management, as well as helping to assist rearing the new water hyacinth biocontrol agent. And then lastly in our long list of partners, the Sacramento-San Joaquin Delta Conservancy is focusing on the mapping and management of Arundo within the Delta.

So we're expecting a number of outcomes from this project. Again, it's an implementation project. We expect to implement an areawide adaptive integrated management program for the weeds in the Delta. We expect to see a decrease in aquatic control cost per acre and an increase in efficacy of the management activity. We expect to see a decrease in economic damage to navigation and an increase in the efficiency of water conveyance. We expect to see some other benefits from this program, as well, that are listed there. And I think that's the end of my presentation.

**SENATOR GALGIANI:** Thank you, Mr. Madsen. And now, David Bubenheim.

**DR. DAVID BUBENHEIM:** Thank you, Senator. Appreciate being invited to come and talk a little bit. I'll talk specifically about NASA participation in the DRAAWP program that John just described. I will point out that more than just hyacinth is included in that program. I'll highlight that, but…

**SENATOR GALGIANI:** Thank you.

**DR. BUBENHEIM:** …occasionally there'll be a few other plants that pop up.

[PowerPoint presentation begins]

I'll start with a little administrative piece, but I think it's important to point out that there's a lot of similarity and objective between the NASA office that I'm working with at headquarters and the Ag Research Service Areawide Program. They're both very much focused on the highlighted text there on innovation and practical use of unique--or of observation in the case of NASA--models and knowledge, but also for ARS to be able to bring together a more comprehensive organization of disciplines and to have new methods and technologies adopted and put into practice. And so very much what we're about at the bottom, I think, is being able to link enabling new science understanding, that's existing -- connect that up with appropriate technology, and that that would provide us, as John just gave a nice list, improved management of the problem.

I'll start off a little summary of really what we do and then I have a few slides for each of these. I've got about eight slides in total, so not too long.

We start off with remote sensing. And remote sensing is a very useful tool, first, to be able to do mapping to tell us where the weeds are. And that's something that has been rapidly adopted and is very useful. But it's also a nice tool to be able to do assessments to try to understand impacts and feed into a long-term management program. We'll talk a little bit about that later.

Also, we do have a modeling program that we're developing for the Delta called SWAT, which stands for Soil Water Assessment Tool. And what that really does is try to look at what's going on in the Delta and around the Delta and how those uses, land uses in particular, contribute to the water quality that then impacts the plants growing in the aquatic systems. And then we have a program focused on determining what are those biological impacts from what's in the water, and to do that in a quantitative way so that we can apply a biological portion of the model overtop of the Delta water quality, so that we're able to then have a comprehensive view of what's going on in the Delta, and be able to support things like risk assessments as to what's happening, and look at scenarios, both management and environmental impact scenarios.

And all of these end up in, hopefully, what's the most important thing, which are support tools, decision support tools. They're very much focused on operations. You know our goal is not, for NASA, is not to become... We're not an operational agency, so our goal is not to have a long-term job in being able to supply information but to get that transferred, whether it's to state agencies or to action agencies. We're just there to help get the new science and methods put in place.

So John mentioned the hyacinth mapper that uses the Landsat satellite. It goes over every two weeks over the Delta. We get that image in about two days. And from that, we're able to process and look for the spectral signature for hyacinth. And then each of those blue dots is a 30 x 30 meter pixel where there's more than half of the area is covered by hyacinth.

**SENATOR GALGIANI:** Wow.

**DR. BUBENHEIM:** And we're able to break that up. So on the right is an example of all the different sloughs with their acreages. We typically break that up into 145 different designations. Those can be rearranged sometimes. For Boating and Waterways, we do it according to their treatment areas. It's a computational process to be able to use that. So we get this image every two weeks, as several people have talked about.

What is nice, since it's a satellite-based system, we have an archive of this information over the past about 25 years except for 2012, which we missed. It wasn't available right then. But if you look at this, I guess that's... So here's 2011. I'm sorry, we can't really read that, the numbers, but there's a peak acreage there. And then compare that over to 2015 and then even 2016. Now, you can see there's been fairly significant differences. Since we have this archive, there's a lot of ability to go back and analyze and look at why was that, what was different in those years.

You know, a lot of things change; but as we, especially as we develop our models and our understanding of the environmental controls, this gives us information to go back and test those against and provide some validation for the information that we're developing; so that as we think about looking to the future and developing management approaches, they can be informed by giving us some confidence that it actually works, by going backwards.

So the next slide is going to look at these peak numbers for 2011 and 2015 but look at it in a particular map where the red dots, like here, are where

the weeds were, hyacinth was in '11, and the blue is for 2015. Clearly, there's a lot more blue. But this is the kind of information that is very useful to us for being able to--and to Boating and Waterways, it's really driven by their needs -- to be able to help them try to evaluate what is happening.

I should mention, too, that one thing we're in the process of validating right now is that, besides just doing area estimates that this map reflects, we're also able to use this information to quantify the amount of biomass that's there at the same time. And that's something that can be very useful in assessing the effectiveness of treatment and also in scheduling and planning some of the mechanical harvesting because it gives you a much better idea of how much is actually there and not just area covered. It gives you an actual kilogram per square meter kind of information.

Now, we do other… I mentioned we are interested in other weeds as well, and primrose is one. Here's a picture of primrose here. And I bring this in as an example, but we go through the same kind of process for submerged weeds as well. But what frequently happens is you have a population of hyacinth and then the primrose will start by coming from the shore and growing out across the top of the hyacinth. The issue that we've had is that the spectral signature of hyacinth and primrose are very, very similar, and the satellite that we're currently using, the Landsat, has a sensor on it that doesn't have adequate specificity, spectral specificity, for us to easily pick it out. It's difficult.

So for separating those two populations in the same area, we're going through the same process that we do for submerged, which we use things like

a NASA high-altitude plane with a hyperspectral sensor. And the real work horse are some of the aircraft based with instruments that have the particular sensitivity that we need so that we now believe--not totally validated yet--but that we can go into an area and we can identify, for example, here is hyacinth in the blue and the red are the locations where primrose is growing over top.

The issue at the moment is that something like this, the ER-2, is very expensive to fly, and we can't schedule it when we want it, and it's definitely not an operational tool. And so what we're all about is using this kind of approach, kind of a research approach to determine what are the minimum requirements to be able to identify that primrose and then be able to go back and look for an appropriate technology, if there are other satellites that are in space that we can access. They may not all be free and as easy to get to as Landsat, but if we can get some good information, it would be worth spending a little money to buy some commercial data if we're able to save a lot of effort. Because you can save a lot of boat time by being able to get a comprehensive view in one shot of what's happening in the Delta and then be able to drill down into specific areas based on that.

Just a few slides to get off of hyacinth slightly and just... This is a little of the modeling. You've seen this map. Lynn and Eddie showed that map as really their area of interest or of responsibility for management for Boating and Waterways. I put this in here because, while that's their area--and we really use Boating and Waterways as the action agency--that, you know, if we can help them do their job. We think we can help lots of people do their job with

these kinds of tools. But they're interested in areas with that frame. But what comes into the Delta is determined by many of the areas outside of that.

So we are looking at the Sacramento and the San Joaquin watersheds and what goes on in those areas, particularly agriculture and what kind of agriculture, what management practices in that. We use the Soil Water Assessment Tool; that's very useful in being able to look at those management practices, look at soil type and elevations and be able to hydrologically route water. And, in this case, we're really focused on the nutrients and pesticides. And it's able to route those into the rivers and then has an entry point into the Delta. So these are very important.

We've been lucky that we've been able to team up with a group, Minghua Zhang, a professor at Davis, because her and her group, they've had experience working with this modeling tool, excuse me, and they've done work in those watersheds. So it's been extremely helpful to be able to get them in to update what they're doing and be able to feed us that information. Because the next thing we do then is try to put it all together, which takes most of the colors there, represents some very general land uses: industrial, residential, commercial, agricultural. There are several levels deeper that makes that a very complicated and hard-to-look-at map.

If you look at all the different kinds of crops and all the golf courses and all the different kinds of things that are going on--that this model is very good at, of being able to identify what is happening with rain and management and how that contributes to water quality--and so then we can route all that

information into the Delta. And the Delta is a fairly instrumented area so that there are many points that we can use to calibrate and validate the information that we're putting out.

And then on top of this, really in trying to define the biological impact, there's a lot of research that's been done on hyacinth and a lot of aquatic weeds. But we have been able to identify some science gaps that make it very difficult to translate that information into application in the Delta. So we do have some effort going on. We've got some controlled environments. And this is a square meter of hyacinth growing. We're developing very specific information relevant to the altered environments of the Delta to be able to support those models and integrate those.

So as a summary, you know, so we really see that there are remote sensing tools that can be used at a lot of different levels and some that are being used right now. And then we're trying to put together the entire Delta dynamic model so that we can then be able to predict what the biological impact is of those altered environments. But very much the objective is to end up with tools that people like Boating and, groups like Boating and Waterways can use in an operational and management program and also be able to help develop long-term strategic plans. So instead of sitting around and trying to think about and make best guess, that we have some quantitative methods in place that have been validated, at least historically, so that, hopefully, they're smarter decisions because the economic and the environmental risk of making

wrong decisions is pretty high in the Delta. So we hope this is useful, and we're very happy to contribute.

**SENATOR GALGIANI:** Thank you very much. I had a question for Dr. Madsen. What is the likelihood of USDA extending funding for another year or five years?

**DR. MADSEN:** So long as there's money appropriated for the areawide projects as a whole, I think the probability of our project continuing for at least two more years is pretty high because the program manager is very pleased with the progress we've made over the last three years.

**SENATOR GALGIANI:** Good.

**DR. MADSEN:** But you know, who knows what's going to happen with federal funding in the next couple of years. That's an open question.

**SENATOR GALGIANI:** That's instructive for us. We'll know what we need to do on our end. For Mr. Bubenheim: You mentioned that NASA will not be involved long-term and that you have to transfer skills down. How would this work and would other agencies, whoever took over at that point, still be able to use the satellite data that you've collected?

**DR. BUBENHEIM:** Yes, all that information is available. And it's very much part of this process, is to go through that transition. It's definitely not that we develop a method, put it in a paper, and hand the paper to Eddie and we walk. We're not going to walk away. We try to work very interactively both with Boating and Waterways to understand what their long-term management needs are and then be able to select the tools and then work with them to

adapt it. I think right now--or adopt it. I think right now is a perfect example. Boating and Waterways is very much trying to figure out how to utilize the information we're providing in the best way. Because it's one thing to get a snapshot of, you know, the map of what's there today; but there's a lot more information available to utilize there. We all see that. And there's way more information than there is people or funding to really go through. The list of questions that we can ask is ever increasing. It's a matter of prioritizing what are the most important things to look at right now. But, definitely, all this technology transfer program and this process is geared to not walk away but to work together and help you validate that Boating and Waterways or action agencies can take that information and use it independently.

**SENATOR GALGIANI:** Good, thank you. We would hate to have to start this process all over or have a lag in timing, so thank you very much for clarifying that for us.

**DR. BUBENHEIM:** Sure.

**SENATOR GALGIANI:** And with that, I'd like to thank you for your presentation. And at this point, we can call up Mr. Jeff Wingfield. Jeff Wingfield is the Director of Environmental, Government and Public Affairs Division of the Port of Stockton. Thank you very much.

**MR. JEFF WINGFIELD:** Good morning. Thank you for having me, I appreciate it, and thank you for hosting this important hearing. Before I get into my slides, I just want to give a little bit of a background on the port.

We actually are the fourth busiest port in the state, which is pretty impressive being how far inland we are. We compete with a lot of ports that are right on the coast. We import and export over 4,000,000 metric tons annually; and we're actually a growing port, which is somewhat rare in California. We're number four now and probably in 2000 we were number nine or ten. Every year, we have about 240 vessel calls at the port, so that's about 500 ship movements going up and down the channel annually. So this is not a low-use channel and actually is a medium-use channel and a channel of national significance based on the amount of fertilizer that we import for the Central Valley.

We are a job generator and, actually, that's why we were created. We provide more than 5,500 jobs for this area, and we're an economic engine for the area with more than $1.5 billion worth of cargo crossing our docks each year. Over the past five years, we've actually had $2 billion worth of private capital investment just on the west complex, or Rough and Ready Island, alone.

So what we do, we coordinate extensively with the pilots who are bringing the vessels up. And as you can see, this is from the bridge of one of the ships. This is their view during the day. Typically, between October-November our ship channel is shutdown at night based on not being able to see what's going on through radar. And actually, it's gotten worse in the past few years with some of the fog. Foggier days, the ship channel will be shut down during the day as well because they utilize the radar imagery to navigate.

So as you can see, this is the radar imagery that the ship captains use, or the pilots. In the middle is where the vessel is. You can kind of see the outline of a levee to the right, above where the ship is. But if a ship captain is trying to get up to the port, based on all the hyacinth that's in the water, he can't tell whether or not a small vessel is in front of him, whether or not another land mass is in front of him; and so they don't have any other option but to shut down the ship channel.

So the pilots are... You know, obviously, you can't blame them. They are risk averse based on what's happened in Oakland and the collision with the Bay Bridge over the past few years. They make sure that they shut the shipping channel down rather than risk impacting a vessel. This is not...

Are we locked up?

**UNIDENTIFIED SPEAKER:** [Inaudible]

**MR. WINGFIELD:** Really? Okay. Well, I'll have to work with this one then.

So over the past few years, we have been coordinating extensively with Boating and Waterways, with other water users, with boating industry in the Delta and providing as much information as possible. We've actually taken NASA out to ground truth some of their data, on boats, as we go out and do reconnaissance surveys both in boats and in helicopters to kind of get a visual of where you can see a lot of the hyacinth is growing in tulles, kind of back, outside of areas that you could identify with a boat.

We also own property up and down the ship channel. You know, I think that one of the issues is where do you put this stuff if you go out and mechanically harvest the material. And working with the Corps of Engineers, we have to provide them with dredge placement sites up and down the ship channel, and so we can utilize some of that property to place hyacinth in as well.

We've actually been providing hyacinth to a community garden. I don't know if you've been over to the Boggs Track community garden near the port, but we provide them with hyacinth that they have composted and utilize to grow crops over in the community garden. So there is a small benefit to hyacinth. And we've actually also worked with some of the water users and others to put in a grant application to look at whether or not we could turn water hyacinth into green energy as well with one of our ethanol facilities at the port. So we're still looking at whether or not that's a viable option.

Let's see. So we have also worked with... We've also put about $500,000 of port funds into water hyacinth mechanical removal over the past few years. We've worked with some of the folk here. We've hired a couple different harvesting companies to go out and at least harvest hyacinth near some of the port berths and areas where, like, our police boat was blocked in based on, you know, so much hyacinth being in one of our slips. So we hire a harvester to go out and remove, mechanically remove that material as well.

Without my slides--one of them was kind of a joke. It was, you know, there's a big movement for ports to be green, and one of the jokes around the

port recently was: Certain times of the year, I think we're the greenest port in the United States. [Laughter]. We actually are trying to be less green in some aspects with all the hyacinth that we see in the ship channel. I think that's about all I have.

One other issue that has come up recently is: So this year our plan was to try to utilize the tides and the wind more to bring the material to us, where we were going out before and chasing it with little harvesters. It wasn't the most efficient way to, for at least us, to spend our money. So we were going to utilize the winds and the tide--as they're coming past port properties on Roberts Island and then they eventually end up downtown here--to try to utilize harvesting equipment to push it over to our property and then remove it with a mechanical backhoe or something like that.

We have been discussing that option with Boating and Waterways; and it appears, from the permits that they have with Fish and Wildlife Service and with NMFS, that anything that we harvest will be counted against their allotment in their permits. And so that's something we're going to have to try to work through. That's very discouraging for us too--you know, anything that we remove counts against what they can do.

So that's really all I have.

**SENATOR GALGIANI:** Okay, thank you very much. And now, we would like to call up Claude Pellarin, owner of Village West Marina, and Cindi Fargo, CEO of the Downtown Stockton Alliance. Thank you.

**MR. CLAUDE PELLARIN:** Thank you very much. Morning. My name is Claude Pellarin. I am the Village West Marina owner. I'm here today with Tim Fontaine, our harbormaster, and Vickie Baumann, our general manager, who combined have decades of experience in marina management in the Delta. Though we are new to the Delta, having acquired the marina about a year and a half ago, their experience gives me great background for our thoughts going forward. So we had some pretty meaningful testimony today. I think we're more the color commentary. I'll try to make it a little lighter and give you just our perspective of one marina's operator in the Delta.

So real quickly, we'd just like to thank you for the opportunity to testify today. I think it's important that the state has reached out to the business community as well as others to see how this affects local businesses…

**SENATOR GALGIANI:** Thank you.

**MR. PELLARIN:** …how it affects the recreational opportunities in the community for us. Real quickly, we'd just like to tell you a little bit about Village West Marina, the background of what the facility is and what our experience last year has been with water hyacinth and what we are doing currently, internally to combat the invasive plants in our marina. And then finally, just some current observations of what we see on the river today.

So with that said, a little more fun here. [Music playing]. Village West Marina is a 678 slip marina located about a mile and a half off of Highway 5, off Benjamin Holt. We have two signature restaurants on site: Garlic Brothers, which has waterfront dining and boat-in availability, and Bob's Burgers on the

Bay. We also have a yacht brokerage on site. We have a yacht service company on site. We have a yacht club on site. We have a fuel dock, a launch ramp, a convenience store, and about 150 dry store spaces on site--as well as being the largest covered marina west of the Mississippi. We also employ about a hundred people on site through our business and related businesses and create a large recreational access for the community and a gateway to the Delta.

So last year about this time, we went out and got some imagery to try to track what our experiences are in the marina, in the Delta. This is 14 Mile Slough; 14 Mile Slough is about three miles off of the San Joaquin shipping channel. And you can see here where the hyacinth has broken free and free floating down 14 Mile Slough. It creates a hazard to our boaters going up and down, obviously. It also impedes our commercial operations.

This is our fuel dock. You can see how heavily impacted our fuel dock is. It also clogs our launch ramp and our pump-out facility. You can see the flow of hyacinth coming down the way, and just makes a left-hand turn and comes right in the marina. We have 1,200 feet of guest berthing for the community coming to visit the marina here, which you can see as well is heavily impacted and becomes non-usable as we go forward. By November of last year, this is what we looked like. We were virtually a hundred percent impact in a 65-acre basin. We went out and hired local boat harvesters and mechanically harvested the marina three times throughout the season, in four months, and emptied the basin three times, storing it on site in large piles until we reduced

the mass of it, then loading large dump trucks with tractors and hauling it out to the landfill. All said and done, by the end of the season, in four months, we had hauled out 500 tons to the landfill out of our marina alone.

That said, it sounds a little dreary. But going forward, we think that this year the season appears to be better, and we've taken some proactive measures on our own. But we've gone out and we've actually acquired some mechanical harvesting equipment to build into the basin of the marina so that we have access to remove the aquatic plants as they come in on our own without the need of other services or any public activities. That said, this is how the system works. We have push boats bringing hyacinth to the back of the marina, and we have a staff of people that are out mechanically moving the material up and into dump trucks and then bringing out on the land and drying it out and then, unfortunately, disposing it in the landfill, having no other option for disposal. This is an ongoing cost to the marina and an ongoing burden that we just have to live with going forward.

This is current operations. This is 14 Mile Slough, as you heard tonight people talk about the nursery that exists on 14 Mile Slough. You can see where the spraying has been effective on the hyacinth in the foreground. Unfortunately, what you also heard a lot about today is this in the background is water primrose, and we're currently seeing a tremendous amount of water primrose on the site in the river behind us. We're seeing also large quantities of pennywort that are now accumulating in 14 Mile Slough behind us. This footage was flown a week ago, and you can see the deposits of pennywort and

water hyacinth. Very little of this is, excuse me. Very little of this is water hyacinth. It's almost exclusively pennywort and primrose.

I do want to thank the state for being very proactive. Deputy Director Sadler came out to the port and met with us early in the season. Mr. Somera and his team has been on site with us, working in their activities in trying to control it; and we think we've done, they've done a very good job with the hyacinth in the river. But unfortunately, this is the current state that we're addressing now going forward.

So that said, that's just one business owner's perspective and a very short window of one year of what we've experienced at the marina. So thank you for that.

**SENATOR GALGIANI:** Thank you. Cindi Fargo. Thank you for being here.

**MS. CINDI FARGO:** Thank you so much for having the Downtown Stockton Alliance today. I wanted to just comment on behalf of the local community. Stockton has managed to emerge from bankruptcy. Our real estate prices are recovering and our community is working on our crime issues; but the community thinks the weed is winning, and this is a big problem for us in Stockton. Stocktonians, generally, for generations have had a love affair with the Delta; but there's a third party interfering with that love affair right now and that is the community of weeds that are established within the Delta. And so I thought for just a few minutes we'd talk about the social and economic disruption that's occurring there.

There's been very adequate testimony about the port industries and marine industries that are negatively affected by the clogged waterways in the Delta. But some things that I think haven't been mentioned are the fact that there's a discouraging influence on investment in both the north and the south channel commercial properties within the Stockton river channel area. We're also seeing an impact on potential agricultural tourism development within the Delta. And our deputy director has talked with us about potential tourism projects that can be connected within the Delta which we're unable to pursue right now because of virtually a ten-month period during the year where we are all impacted by, particularly, the water hyacinth.

We're also seeing a discouraging impact on investment in tourism and boating activities within our marinas and recreational facilities. And surprisingly, we're also seeing some discouraged investment within the residential real estate areas that are along the sloughs. There's almost an abandoned, backwater feeling in many of the slough areas. We're seeing that primrose, as well as the water hyacinth--along these residential areas that were really the pride of generations of families that often owned houses along the sloughs now not being able to use their facilities, seeing their decks abandoned, their docks abandoned, boats abandoned, boats submerging. So there's really a wide variety of impacts, economic impacts going on within the Stockton area.

And then I thought we could just discuss for a minute the social impacts on the Delta and on the community of Stockton. There's, as I said, a historic

love affair between Stocktonians and the Delta and generations of use for boating, kayaking, fishing, and other forms of recreation. This is a big impact on our community. And with the amount of challenges the community has faced, the Delta is one place that they've always turned to for recovery and relaxation. The development of water resources that create linkages between the city and the Delta and continue to emphasize this relationship that we have as a community, the major urban community on the Delta, things are the waterfront weed situation is very definitely discouraging to us being able to move forward. There are also years of community celebrations that have occurred along the waterfront which the water weeds have disrupted over the last couple of years. The community has long celebrated the holiday season with a wonderful lighted boat parade, and the last two years that has been prevented to the comment of many, many people. I can't overstate the number of times that I have received comment about the loss of that tradition in the community.

In addition, there are new activities that we are trying to promote that will celebrate our heritage, will reconnect our community of downtown Stockton to the waterfront and promote this unique urban identity that we have--really, the only urban downtown on the Delta within our state. And in general, there's malaise created about our waterfront and about the river channel and about our future. So I'm sad. I'm happy to report that, with the deputy director's activities, her outreach, and with your addressing resources and funding, Senator, that we have seen a, you know, dramatic wave of

interest in solving these problems. But within the community, there still remains a general malaise and disappointment about this problem. So I look forward to the times that we can all work together and go from this situation which we see on a regular basis.

And I've provided you with a couple more pictures from the downtown area to this, the place where we are celebrating our waterfront on a regular basis. We've already started this event. We look forward to the progress that you make in clearing the river channel of the negative impacts of the water weed and look forward, rather, to celebration of the Delta and the waterfront in Stockton.

**SENATOR GALGIANI:** Thank you. I would like to remind everyone that we've seen this problem exacerbated over the last several years, and a great part of that is because of the drought that we've had and the fact that the temperatures of the water have been warmer, which creates the perfect conditions for the weeds to grow. And so the problem has been much, much greater than it had ever been in previous years.

And so I'm grateful to everyone who's been here today. For many, it's not the first time that they've been here to testify and be part of this. But it's been an ongoing process in the entire time that I've been in the Senate to make sure that we manage this problem as best we can, knowing that we can never eradicate it but we can certainly do our best to have a community partnership so that we have the eyes and ears on the ground, working with our partners at

the state level so that we can manage and maintain it the best that we can. So I want to thank everybody.

I did not have anybody sign up for public comment at this point; but if there's anyone that would like to make a comment, you're certainly welcome. Otherwise, that will conclude the hearing for today. Thank you.

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