Oversight Hearing

Senate Subcommittee on Invasive Species
Senator Cathleen Galgiani, Chair

An Evaluation of Strategies to Eradicate and Control Aquatic Invasive Weeds in the Delta

Stockton, California

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SENATOR CATHLEEN GALGIANI: Good afternoon and welcome, ladies and gentlemen, to the Senate Subcommittee on Invasive Species Oversight Hearing titled "An Evaluation of Strategies to Eradicate and Control Aquatic Invasive Weeds in the Delta."

The Sacramento-San Joaquin Delta is an invaluable California natural resource, as all we know, in supplying water to our communities and businesses. However, the health of the delta is being threatened by water hyacinth as it obstructs waterways and marinas, consumes valuable water resources, creates human health and safety hazards, and damages cherished natural ecosystems by crowding out native plants and wildlife. Therefore, we must control water hyacinth and other invasive weeds to protect the health and vitality of the delta.

Given the delta's unique characteristics and vast 1,000 miles of waterways, fully controlling water hyacinth can be met only through local, state, and national collaboration. Today, we will hear from the Division of Boating and Waterways and evaluate the responsibilities, challenges, and efforts to control hyacinth and other delta weeds. We have also

invited USDA's Agricultural Research Service to discuss the activities of the areawide weed management program and the partnerships that this program has supported. Through these actions and any others discussed today, I hope that we can begin to harness water hyacinth and prevent it from destroying the beauty and health of our delta.

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 sergeant at the back of the room. Thank you.

And now, I would like to invite our first witnesses to come forward, Mr. Christopher Conlin, Acting Deputy Director of 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 with us.

MR. CHRISTOPHER C. CONLIN: Thank you for the opportunity to talk about what we're doing for your water hyacinth problem in the delta, as well as some of the other invasive weeds. I think we have a brief that if we can cue up real quick we can provide information to you and the rest of the audience. We're gonna talk about an integrated control strategy, which is a little bit different, I think, than what has been on previously to handle the aquatic weed problem in the delta. And you're gonna see physical evidence of that here today by testimony from the US Department of Agriculture, as well as in the audience we have several representatives from California Food and Agriculture. We also have representatives from NASA here that are helping us. And I know we're also being helped in this by NOAA. Several different agencies are coming into play. So that is the type of integrated strategy we're going to talk about here, as well as many state and local partners, to include the legislature and yourself.

We're getting a tremendous amount of invaluable help, and that is getting us to the point we need to be, we think.

Next slide, please. Okay, a quick overview of what our program is and is not. It is a control program, not an eradication program. This is not because we don't want to eradicate the weed. It's simple recognition of the fact that water hyacinth, Egeria, and several of these invasive species are not capable of being completely eradicated. Not too different than the common cold, flu, cancer, they are like a disease that is out there, and you can control it as best you can, but to get rid of it would take such extreme measures that we probably would not want to see it. It would literally take the draining of all the water and probably getting rid of a lot of the soil. So, it is so invasive that the best we can probably do is control it. And this is consistent throughout the world. We have gone through and looked at UN studies. We've looked at what other countries are doing. The USDA and our partnership is looking across our country and across the world, and it is a worldwide problem, but we have the opportunity to control it. That's, in our state government, we've been given the permissions to be able to do that. It is permissive, not mandatory. And what does that mean? Really, what it means is, we are to control it within our means, within our resources. There is not an unlimited amount of resources that are dedicated to this right now, so we have to make those compromises and decisions based on what we see out there as the primary problems and the primary threats. So if you take a look at the matrix, there you see three circles. One of them is environment. One of them is economy. And one is public health. What we're trying to do is balance all of those against our control measures in the delta so that we are trying to take care of them in the right levels so that we are providing people an opportunity to go into the delta to do the recreation they want to do, to do the required navigation for commercial shipping that needs to be done. We have water that's

being used to both irrigate and also to provide drinking water to many of our citizens, many of the residents of California. And obviously there are public health issues as well. In some cases the weeds have been vectors or opportunities for things like mosquitoes or some other invasive problems out there. So what we're trying to do is balance all of these against trying to control the weeds out there and not damage that environment at the time, the same time we're doing this work.

Next slide. So this is some of the legislation that gives us our authorities out there. Most significant, I would point to AB 763, which is new, and this is some of the authorities given to us by the legislature. A lot of what we'll talk about today, the fact that we are able to do an integrative controlled strategy is due to 763. Heretofore, what happened was we had to get specific legislation to attack each kind of weed that was in the delta. And we had to go and try and seek authorities from a variety of federal and state entities. What 763 did was they put us firmly as the lead in doing control in the delta for invasive species. It allows us to partner with all of these federal and state agencies. And what it allows us to do really is provide a more holistic attack on this problem. So where before we had to get specific legislation for each weed, what we see now is the ability to incorporate a lot more weeds. We went from within the space of the last two years, we went from only being able to address two weeds, which was Egeria and the water hyacinth, but now all the way up to four weeds, and we have an additional four weeds on the list. And we'll talk more about that later. But we are now currently able to treat water hyacinth, Egeria densa, spongeplant, which came out about a year ago, and this year curly-leaf pondweed. Why is that so important to us? Because the way invasive species work, the way especially these weeds work, if you control one, that space, that ecospace, is backfilled by another one. They're very aggressive. So as you might reduce something like Egeria, which is a

subsurface plant, it is quite rapidly backfilled by curly-leaf pondweed. So it's important that we have the ability to hit all of these weeds and to try and take care of them so that we don't eliminate one problem and create a new one.

Reminder that the delta and the tributaries, the area that we're talking about, is huge: 68,000 acres of water that we're trying to address out there. So a very significant area and a unique area. It really has no model throughout the world. There's one area in China that it looks fairly similar that's a tidal fresh water area, but quite honestly, what we deal with here is unique in the world. And for that reason, too, a lot of the measures that we use are unique. It's not as easy as it would be, for instance, in the northeast where some of these weeds infest lakes and areas that can be easily closed off and handled. We're talking about an area with open access to the sea. We're talking about an area that has tidal shifts. We're talking about an area that is fresh water as well as salt water. Very complex environment that we're dealing with here.

Next up. Okay, here's our report card for 2015 and what we've been doing so far. I think, as everybody knows, we started off right on time this year, beginning our treatments in March. That's the earliest we're allowed to currently by biological opinions. On the 4th of March, that started with the water hyacinth and the spongeplant, we treated about 127 acres so far, 20 sites, 28 applications. So the way that it works with water hyacinth is we can only treat what we can see. So we cannot pre-treat water for it. You can only put the chemicals on top of the plant and the plant has to be present. The other thing is that at this stage of the game where a lot of the hyacinth either has been treated before or the hyacinth is stuck in the tules in and around the area, it's a little bit harder to get to it. So it's literally a boat riding around, going through the hyacinth, in many cases spraying it as you're kind of driving into the tules. But 127 acres is good so far and that's got us on the right course, we think. In the case of the Egeria

densa and the curly-leaf pondweed that's a subsurface plant, we treat that by treating the water, actually. We put the herbicide into the water. The herbicide saturates the plant and then starts to kill the plant. In that case, we have 1,500 acres. Again, it's more of a mechanical issue for us. It's easier to go out and treat the area. We'll be treating that same 1,500 acres for about 12 weeks. That is the treatment process we do. And at the end of that 12 weeks, we should show some sign of deterioration and death and then we can go back later in the season and take a re-look. But that is kind of our one big hit, is 12 weeks at 1,500 acres right now.

Next. Okay, this is what the integrated control strategy really means. We talked a little bit about chemicals. So we have chemicals we use, topical herbicide that we use for the surface plant, the subsurface water treatment that we use for the subsurface plants. Why do we do that? Based upon the opinions of those who guide us, the USDA and in some cases some of the international authorities, the best method for control currently is use of chemical treatments. That's the most efficient. It has been proven the most effective. The reason why is it stops or retards the growth of the plant. This is both, or the, in the case of water hyacinth particularly, these are some of the fastest growing plants in the world. So what you want to do is stop them from growing so rapidly. So the chemical allows you to do that. And then it also, obviously, gets to a point where it kills them. Because it produces so quickly, you're trying to fight not only the spread of the plant but the biomass in the water. If it allows to reproduce too rapidly, you're gonna have a big problem. You're gonna choke off the water. That has happened internationally. There are places like Lake Victoria, which, in essence, they've given up on. They just can't get ahead of it.

Mechanical harvesting, we started that about two years ago. That's fairly new for us. It is one of the most expensive and least efficient methods of taking care of, in particular, like, the

water hyacinth. But when you get to a point where you've got a lot of biomass in the water and it's starting to choke off the waterways, it's something that we use. It's a tool in our kit. We did a lot of that this year. We used both mechanical harvesting, where we went in and chopped it up and then carried it out of the water, and you've seen some of those harvesters that have been out on the water, and we also did what's called removal. And removal is basically taking in extractors, pulling it out of the water, pushing the hyacinth towards those extractors, pulling it out of the water, putting it in dump trucks, and then driving it away.

So we've done both methodologies this year. We've had some good effect. Again, it is not rapid. It is slow and laborious. It requires the use of "spoil fields," which are basically places you put the stuff to dry out. This is a plant, in the case of hyacinth, it's 90 percent water. So when you pull it out, it's very heavy, and you have to de-water it and try and reduce it. And then once you reduce it and you get it de-watered, then you can use the plant material for fill and other things.

Biological controls are something we're also going to be looking at hard this year. And I'm sure that the representatives from the USDA will talk a little bit more about that. "Biologicals" is basically using things like insects to try and reduce the plant. These are very controlled experiments we'll be doing this year. We'll be doing approximately 25 sites. This will probably not be the complete answer, but it will reduce the amount of plant. It is another modality to use. And even if it reduces it 10 percent, that's 10 percent less we have to worry about. And it obviously has the advantage of being a more natural thing. We're not putting herbicide in the water in this. We're just using a biological control. Again, USDA will talk more specifically, but to allay any concerns, the biological they use are plant specific. So it's not

as if we're going to introduce these biologicals and they're going to feed on other plants out in the delta. They're very specific to, in the case of water hyacinth, just the water hyacinth.

And then mapping. We have representatives here from NASA, that's been a huge help. Part of the problematic area – 68,000 water acres of delta and trying to figure out where it is. And in the case of water hyacinth, it's a mobile plant. Once it grows, based on tides, wind, several factors, it will literally move around the delta. And we have to get into a chase mode, trying to figure out where it is. That's problematic for us to find it and treat it. It's also an issue because we have limitations on how many times we can treat it. So it's useful for us to be able to find where it is, to see where it's moving, where it's flowing, to get ahead of the problem and to try and take care of it. NASA has provided some tools for us.

If we can hit the next one. So what you're looking at right here is one example of that. This is a multi-spectral digital product. So they take in things like Landsat, they will take in other telemetry, other assets. They put it all together and then what it gives you is a perspective on where the plant is and how it's growing. In this particular case, if you look up and you see the blue dots, the blue dots describe water hyacinth, and this is from 1989. The significance of this particular shot is this was a drought year. And you'll see there's a large proliferation of that water hyacinth based on the drought. Drought means lower water flows. Mother Nature, no matter how hard we try, is the best controlling factor for these invasive species. When you get a lot of water in the delta, when you have high flows, when the water temperatures drop and you get freezes out there, the water hyacinth becomes a much less of a problem because Mother Nature is flushing it out. It's getting into sea water which naturally kills it. It's freezing it which naturally kills it. And you just have less of an issue.

Let's hit the next slide. Nineteen-ninety-six was a pre-flood year. So this is, everybody remembers we got hit by the El Nino pretty hard in '97, '98. So this was when the rains were starting to kind of kick in. You will note there are not a lot of water hyacinth blue dots out there during that year, because there was a healthy flow going on in the delta. It was eliminating on its own the problem. So, again, this is just kind of Nature take – jumping on in, but it's useful for us to recognize.

Let's hit the next one. Okay, 2013, we're into drought again, and you will notice, again, a huge proliferation of the blue dots.

Next one. And 2014, although it looked pretty bad this year, the telemetry says it was not as prolific. I think our issue this year was just simply the fact that we had very little wind and what came into the delta stayed in the delta. It really didn't move around or it moved around problematically into some areas. But what we're trying to show here is this is a tracking mechanism. We're still working with our friends at NASA. We're verifying their data. We need to go out and check and make sure that the blue dots really are hyacinth and basically validate what they're providing us. But it is very useful to us, and it is a great advantage. That's part of our partnership.

Next. Okay, here's our timeline. So what have we been doing? Basically our treatment season ended around the end of last November. We had December, January, February, and we were doing a lot of mapping. We were doing a lot of plotting. We were working with our partners in USDA, NOAA, and NASA to try and figure out what our attack plan was gonna be for this year. We did a bunch of public releases announcing that plan. That was back in February. And then we started actually the treatment in March for both the Egeria, the subsurface, and the hyacinth on the surface. What we're trying to do during the course of our

treatment period is a lot more public engagement. We have done three public, or town hall, meetings. The Senator hosted one here that we did back in December that was a really good one, where we got everybody in and talked about what we're planning to do. We did one in Discovery Bay a few weeks ago. This is another great example, this hearing, where we're able to get the word out to the public. We're also utilizing as many media as we can to get that word out. Social media, Internet, and I think we have some products that our people took them off the table. They'll take a look that we're pushing out right now to keep people in the game and understanding where we're gonna be.

The solution set long term is this integrated control strategy. It was mentioned that we're doing a 5-year wide area study, areawide study. The purpose of that really is to look holistically at the delta, at everything, not only the plant growth, not only issues like the drought and water flow, but nutrient loading in the delta. Looking at things like the approach of biologicals we use out there, better telemetry, better data, what can we do to address this problem, emerging plant types that may be causing us problems. All of those get thrown into this to come up with sort of a long-term plan on how we can address this. And that's been invaluable to us.

Can you go back one? And these are some of the things that that includes. We're currently doing another round of harvesting bids. The intent there is to have harvesters on call so that when we have problems out in the delta we can bring people in and do this mechanical harvesting earlier than we did last year. We're working with folks, like some of the delta commissions, Delta Protection Commission, and others, for scientific studies, as well as USDA. The reason why I want to do that is we have biological opinions that guard us, that tell us what we can do. We think that if we can provide enough science we might be able to open up some of

those restrictions that are on us in the biological opinions, but we need to have the right science to do that.

We talked a little bit about the mapping and a lot of process improvement, we think, at, on our own selves, the DBW, in the areas of communication, in the areas of getting our planning out. We've brought in new equipment for the folks on the boats, new tablet computers to guide them in their treatments so that we're making more effective use of their time. And we're tracking it much better.

Next up. These are a lot of our partnerships. On the federal side, you can see an impressive list of folks we are teaming with, and they are all very active partners. We, in fact, had a meeting last night where several of us were getting together talking about the areawide study in progress. And there's gonna be another time when we're gonna be getting together all as a group here in two weeks at UC Davis. You can see on the state level we are reaching out. We had a good interagency agreement with Water Resources this year to do a lot of that removal that we talked about earlier. We had been out to all of the delta councils talking to them, trying to work with them. And locally, a lot of good relationships we've been establishing, a lot of people in the room here today. One of our more recent was with the San Joaquin sheriffs, who are now giving us the opportunity to use some of their boats for herding of the hyacinth, pushing it basically towards mechanical harvesters, and a reporting methodology with us. So that has all been tremendously helpful and is giving us more tools in our kit to try and handle this.

Next. Okay, this may be tough to visualize for folks in the back, but this is just sort of a layout of where we have been going with our treatment. And the key note here is it's been increasing. Every year it's been increasing, the amounts that we have been spraying, the amounts that we have been harvesting. Obviously, harvesting didn't start until a couple of years

ago, but you can see the trend is upwards on all of these things. We are pushing right now at 1,500 acres, as we said, on the Egeria and 127 on the hyacinth. We feel very confident that we will hit probably past the numbers that we got last year on treatment. And on the mechanical harvesting and the removal, I'm certain that we'll probably be hitting past the numbers, as well. The only reason why you see a low number there for the 2014 is that was the beginning of our harvesting in December. So we will glom onto that, all that we do here throughout the next year, and that should be a pretty significant number.

Okay, next. What do we ask everybody to do, the citizens and others that are sitting out there? We published – and I think you were good enough to put them in the information brochures that were outside on the table – several information packets about these plants, about what people can do, how to recognize them, what to do to get them out of their water areas. Something that we'd like to reinforce is there is nothing that prohibits citizens from being able to take things like water hyacinth, pull it out, dry it out – you know, on your own shore – if it's clogging around their docks and around their boats. In cases like that where it's between their docks and their land, that's problematic for us to get in and spray. So it's a good thing for them to do. In the case of marinas, keeping their marinas clean, trying to keep them unclogged, trying to check the movement of that stuff in there, that's great. We're aware of at least one marina that has gone in and gotten a permit to put boom out, that seems to be being effective and deflecting a lot of the hyacinth from coming in. That's great. We talked to folks like the San Joaquin sheriff about that, and they've supported that where people have gone out and gotten a permit, in this case from the Corps of Engineers, and made something work like that, as long as they don't stop navigation.

So there are several things we could do. We would encourage people to do that. In addition, we are there for you to report issues with the hyacinth. A lot of – you know – we're playing zone defense on our treatment of these plants right now. We've got a set plan. We know where the plant proliferates. We know where we need to go in and take care of things. But as the season goes on, we need those calls from citizens telling us where the plant is so that we can do the police ups on this, particularly late in the season where we're talking about picking up on the mechanical harvesting and we have real problem areas. So we take those, we ask that you use the phone numbers and the email addresses that we list up here. Some people have old numbers from old staffers that they have been using. That's not a good methodology. It's better to call it in to our main number because we will get the information out to the teams out in the water that way. And we can track it better.

Subject to your questions, that's the end of my brief.

SENATOR GALGIANI: Yes, I met with a group of marina owners earlier in the week, and they were talking about the problem at the marinas and what could be done and so forth. You just mentioned that they can do some of their own work, but they need a permit from the Army Corps of Engineers? Did I hear you correctly?

MR. CONLIN: To explain, Senator, they don't need a permit to pull the weeds out, to do their own – you know – mechanical harvesting, if you will, just simply to remove the weed within their own marina. If they want to do something like one of the marinas did, which actually set boom out, so the boom or the floating kind of obstacles that you can put out there, it's like a long stretch of floating materials, sort of like a block. If they want to do something like that, then they would need to seek a permit. In this case, the marina got the permit from the US Army Corps of Engineers. The important thing there is if they do something like that they

want to be very cautious not to block navigation. Now, you want to give people the ability to still get in and out of the waterway, but if they want to set up sort of an obstacle plan for the water hyacinth that will block it or deflect it as it comes into the marina, that seems to be effective in some cases.

SENATOR GALGIANI: You talked about whether there might be emerging plant types that exacerbate the problem. Are there any that you know of at this point in time? Or suspect?

MR. CONLIN: What we have currently gotten permission to treat are the four: water hyacinth, the Egeria densa, spongeplant, and curly leaf. We have already submitted under AB 763 requests to treat fanwort, coontail, primrose, and watermilfoil. These are invasive plants. We know about them. They have been problems in other places. We can see them in the delta, and basically, what we're trying to do is be proactive because we know that if we remove things like the, or if we decrease the amount of things like Egeria in the water, that'll get backfilled. A good example of that is we treated for three years Discovery Bay. We seemed to have some decent effect on the Egeria, and right back behind it filled in curly-leaf pondweed. But now, we're gonna be hitting the curly-leaf pondweed this year as well. It's the same herbicide, but we can now hit it where it sits in those concentrations.

SENATOR GALGIANI: And then you talked about using, removing it, and then drying it because it's 90 percent water, and then using it as biofuel. Can you expound on that and tell us what some of the other uses might be?

MR. CONLIN: Absolutely. So currently, when the water hyacinth gets pulled out, we put it into what are called "spoil areas," which are large areas, either public or private land, that are reserved for this. The water hyacinth de-waters. The water, in effect, comes out of it. It

dries out and then you basically have a plant – you know – a dried out plant. It is a plant that has very high nutrient value. We've looked at it. We have had several people talk to us about possible commercial aspects of that. Nobody has found kind of the right price point to be able to go in there and do it on their own. I know – you know – in the other week when we were at the Delta Protection Council, we talked a little bit about potentiality of somebody at some point providing grants to folks to explore that more. You know – I don't know if that's a possibility or not, but nobody has found the right price point. I would – Leandro, are you back there? – bring up. I'll tell you what they do. Leandro Ramos, who's our, is our senior environmental scientist, just got back recently from the Philippines. And they have a huge problem with water hyacinth. And this is what they do with it, okay. And they're turning that into a commercial market. Now, understand, labor rates and everything else are probably a little bit better out there. And actually, the folks that they have doing this are a lot of the underprivileged children, and this is something they're giving them to do to kind of bring them out of some of the poverty that they're facing right now. But, I mean, that's what you can do with water hyacinth with the right people working on it and getting it done. As a biofuel, people have told us they also think there's promise in it being a biofuel. Some people think there's promise in it being fertilizer, as well. Right now, though, what tends to happen is you put it on the spoil field and it just becomes landfill for whatever – you know – people want to use it for.

SENATOR GALGIANI: Okay. Would it be more effective if possibly the spraying occurred from the levees as opposed to out in the water itself?

MR. CONLIN: Good question. So the question, better from the levees than from out on the water? The problem that we really have is the chemicals we use. Because of the fact that they don't necessarily discriminate on what they are killing, if we spray from the levees, you

have the potential of being able to take out other plants. You know, the water hyacinth tends to be on the water, does not always come straight on over to the side. It tends to kind of be out, pushed out past the tules in some cases, and in some cases in and about some protected species like elderberry.

The other issue is its heavy equipment that we use, the spraying equipment that we carry around with us. So putting it into a platform like a boat actually works out a little bit better. The boat can maneuver around and do the spraying. We use both prop-driven boats and air boats, you know, like you'd see in a swamp, to allow us to get in where we need to get in. So far it has not been a problem.

We often get asked – you know – why don't you use helicopter spraying? Again, we have to be very discriminatory because we're operating on the water.

So what we need to make sure is when we spray we're spraying on the plant, we're not spraying directly into the water. And that allows us to operate safely out there. We do constant water sampling. It's, we cannot exceed saturation levels in the water or we have to shut everything down. So we're very cautious about that as we do this treatment.

SENATOR GALGIANI: The legislature this week passed the "water package." And as you know, I was able to get $4 million for water hyacinth in the package. How will you be able to use that money this year? And maybe you can break that down for us.

MR. CONLIN: Yes, ma'am. Thank you very much. That is, that is great news. So, the $4 million would go towards what was originally in the governor's budget that we had requested. It'll come out of the Harbors and Watercraft Revolving Fund, but it'll come to us much quicker. That $4 million will be used to get about 11 more positions. Those positions, eight of them are going to be the technicians that actually do the spraying on the water. Since we have 12 right

now that do the spraying, that's almost doubling the amount of people that we can have on the water, which is great. That'll bring us three more environmental scientists. The significance of that is the environmental scientists really are like my intel analysis. They're the people that are figuring out where the stuff is and what the best ways are to fight it. That also gives us a little bit more flexibility and capacity to work with these partners that we have – the federal, state, and local partners – on things like increasing the number of weeds that we're doing, the scientific study, the look at the biological opinions and potentially increase some of the limitations on those, and to stay abreast of any new methodologies, modalities for taking care of these weeds. In addition to that, we'll also be purchasing additional equipment, like boats, engines, and spraying equipment. As well, some of the money goes towards public information, providing better opportunity to get the word out to everybody, better outreach so that we can tell people where we're gonna be and what we're doing, and all those sorts of things.

SENATOR GALGIANI: That's good news.

MR. CONLIN: Yes, ma'am. And thank you very much for that. That's like a godsend, getting it that much earlier. Our primary concern, it being in the governor's budget, was simply that we couldn't see it until July. This is great that we'll be able to see it that much earlier.

SENATOR GALGIANI: Good. Very good. Thank you for your presentation. And next, we'll go ahead and move forward with Mr. Hard.

MR. CONLIN: Thank you.

MR. EDWARD HARD: Sure. Good morning, Senator. I'm here to, at your leisure, to answer any questions you may have. We didn't prepare a brief. We just did that for you. But I'm here to answer any follow-up questions you may have about the challenges, opportunities for this particular program.

SENATOR GALGIANI: You spoke about the NASA data earlier. Can you walk us through how you've been able to use some of that data?

MR. HARD: Sure, I will do that, Senator. So first of all, we receive – as Chris explained, deputy director explained – the spectral imagery that comes from Landsat, from NASA Ames, is flown over the delta. And those images are put together in a package of a map of which you saw today in our presentation. And those images contain varying degrees of colors. Blue, we were talking about in terms of the water hyacinth, and there's various other colors in there in terms of the green and the orange. And some of those are pertaining to agricultural conditions that are adjacent to the waterways, to identify crops, also native vegetation that's actually in the waterway alongside the species that we're concerned about. For example, water hyacinth, there's spongeplant. So but the tool that's been provided to us, as we described today, is kind of the first cut of this integrated strategy for us to be able to move forward with understanding what's actually out there from up above and being able to go out with our personnel, along with NASA Ames personnel, and ground truth what those images are showing so is, in fact, what we showed you today truly present. As technology isn't perfect, as we know, a part of the aim here is to utilize those techniques and methods to better enhance our ability to detect and control through Boating and Waterways.

SENATOR GALGIANI: Are there, is there a limitation on the number of acres that you can treat within one year? I know the spraying time is between March and November. Am I correct about that?

MR. HARD: That's correct.

SENATOR GALGIANI: So is there any maximum number of acres? Or is it an issue of resources, manpower?

MR. HARD: For the water hyacinth, we're 3,500 acres per year.

SENATOR GALGIANI: Mm-hm.

MR. HARD: And the Egeria densa is 5,000 acres per year.

MR. CONLIN: And, Senator, that's the biological opinion that we discussed earlier. You know – that's where we're really looking hard to find the science to see if perhaps we can open that up a little bit more. Quite honestly, previous to this, when resources were low, the possibility of going past those limits probably wasn't there to begin with. But with the drought year being here, with some of these additional resources you're providing via the drought bill, we do have the potential we could push past some of those treatment numbers, and we would like to have the science to allow us to do that.

SENATOR GALGIANI: So last year you treated about 2,617 acres, according to the card.

MR. CONLIN: Mm-hm.

SENATOR GALGIANI: And that's, I know that's up quite a bit from…

MR. CONLIN: Right.

SENATOR GALGIANI: … 2009, which, I believe, 704 acres in 2009. So you still had the ability to do more. Was it a resource issue that kept you from being able to do more last year?

MR. CONLIN: Not really, ma'am. That was purely, you know, the mathematics of numbers of boats, numbers of people, days when we could spray. You know, important to understand that not every day is a spray day. If it's raining, if winds are high, you know, those will – we have strict mandates on when we can and cannot do the treatments so those involve times when we will not be able to treat. As well, because we are treating in and about things like

water pumps, when those water pumps are running, we can't be treating right next to them. So those are all concerns that we have. And there are periods blocked throughout the year in the biological opinion when we simply cannot treat. We cannot do any chemical treatment whatsoever right now, between the end of November and the beginning of March. There are only certain periods when we can use certain chemicals, like, 2,4-D can only be used basically in the summer months. So those are some of the restrictions we have.

Again, they are, they are there for a reason. They are conservative to make sure that we don't hurt the species, the listed species, that we don't do any contamination of the water. However, based on our best practice, based on what we've seen in the water, again, we think we might have some opportunity to perhaps modify them, allow us a little bit more leeway.

SENATOR GALGIANI: And are those federal biological opinions?

MR. CONLIN: They are federal, but they're also reviewed by state. And the permitting also comes via the state for use of pollutants in the water.

SENATOR GALGIANI: Okay. Can't think of any more questions. Thank you.

MR. HARD: All right, you're welcome.

MR. CONLIN: Thank you, ma'am.

MR. HARD: Thank you.

SENATOR GALGIANI: And our next panel. I'd like to welcome from CDFA: David Kratville will be giving the presentation, and Pat Akers will also be part of the presentation. Thank you.

MR. DAVID KRATVILLE: Good morning. My name is David Kratville. Seventeen years ago I was hired as a "seasonal" to work in the CDFA noxious weed program. Currently, I am the senior supervising environmental scientist in charge of the Hydrilla Eradication Program.

Formerly, Patrick Akers held that role. He's now the branch chief of the Integrated Pest Control Branch. I am here today to give you a historical overview of CDFA's weed and biological control efforts within the delta.

On the screen, you will see an image. This is an example from the Imperial Irrigation District, hydrilla infestation found in the late 1970s. This is the infestation that led to the establishment of the Hydrilla Eradication Program. From 1978 to 1982, CDFA, they dedicated three permanent biologists and six to nine seasonal employees in an attempt to eradicate hyacinth from the Sacramento-San Joaquin Delta. In the early '80s, that staff was pulled off to work on the Southern California Mediterranean Fruit Fly Eradication Program. When that program ended and the staff returned, rather than going back to attempt hyacinth eradication, they were moved on to the Hydrilla Eradication Program. At that point, the hyacinth program transitioned into a control project. From 1982 to 1985, CDFA worked with the US Army Corps of Engineers and released three biological control agents targeting water hyacinth. From 2000 to 2005, CDFA received funding from the Department of Water Resources to go out and reassess those biocontrol agents within the delta. At the time, only a single hyacinth weevil species was found to remain. And in addition, the difficulty was determined that the problem with the hyacinth weevil was that only the adult stages are capable of overwintering. All of the egg and larval stages freeze over the wintertime and then those populations need to rebuild in the spring. So they do not get a significant chance to impact, heavily impact, the water hyacinth population.

Currently, CDFA is cooperating with the biocontrol program, what's left of it, is cooperating with the USDA areawide Delta project. We are producing the South American planthopper, which was recently approved for use on water hyacinth. In addition, up to 2010 and 2011, we had established field nursery sites for two agents which would attack the giant reed,

also known as Arundo. But with the budget cuts in 2011, that work ceased. However, CDFA is preparing for production of both of those control agents at their facility in Sacramento if we get funding.

And then thirdly, Tamarix, or salt cedar, is another plant in the delta. It's a riparian tree. A biological control agent was established and built up very well in the Cache Creek area of Yolo County. At that time, the biocontrol staff were attempting to redistribute those insects within the state. But, again, with the budget cuts in 2011, all that work has ceased. But we plan to restart distribution efforts as soon as we can, again, if we get funding. As I have said, the funding of the CDFA biocontrol efforts using state general funds were completely discontinued July 1 of 2011. At that time all, weed biocontrol staff were transferred to positions either in other branches or those individuals retired. Now, currently, a small amount of activity has restarted with receipt of federal funds from the USDA APHIS. However, those funds are restricted to only covering travel expenses to move to and from release sites. All salaries and other expenses associated with biocontrol need to be funded through external sources. The biocontrol individuals that remain have proposed two new weeds, Egeria densa as well as South American spongeplants, as good potential candidates for future work on biocontrol agents, South American spongeplant in particular, if it's determined that eradication is not feasible. But, again, we do not have any funding to commence that work.

Now, personally, from 2002 through 2007, I was the statewide coordinator or crew lead of the Purple Loosestrife Control Program. CALFED at that time funded the control program. Myself and one or two seasonals were tasked with treating and controlling all loosestrife within the tributaries of the delta. As you can see on the screen, I worked everywhere from the Fall River in the northeastern corner of California, the Eel River in Humboldt County, all the way

down to Lake Isabella in Kern County. I was responsible for surveying, detection, mapping, mechanical chemical control of purple loosestrife, as well as assisting the biocontrol staff. At that time, I would spend seven-plus months out of the year on a boat on the rivers in the state controlling purple loosestrife.

Because of my experience in the delta, and in particular in identifying aquatic weeds, in 2003 I was chosen to participate in a pilot project. We assisted the UC Davis Center for Spatial Technologies in a remote sensing in testing the efficacy of hyperspectral analysis, which is similar to the mapping effort that Boating and Waterways mentioned earlier. This was actually work funded initially by Boating and Waterways, and it was done in conjunction with NASA and UC Davis CSTRS. What I did was provided the boat access as well as the field ID of the aquatic weeds so that those grad students could take those ground truthing. You're taking a picture of the plants in the field and using that spot where you have a known plant and comparing it back to the imagery so that you get a signature or a fingerprint for what that color of that particular plant looks like. And then by going through and looking at any other pixels that match that, you can assume with high confidence that it's the same plant as in that section of the imagery. Following that initial pilot project from 2003 through 2007, CDFA provided boat access as well as field ID. The same stuff I had done initially but on a much larger scale for all the ground truthing efforts in the delta.

In 2008, at this time, the biocontrol, the Purple Loosestrife Program, was now funded by the California Bay Delta Authority. It is my understanding that CALFED essentially became CBDA. But in 2008, we lost that funding. At that time, all of my survey, detection, mapping, chemical and mechanical control efforts stopped. However, I continued to assist the biological control program. What we were attempting to do is relocate biocontrol agents from our

populations in northeastern California on the Fall River and distribute them within central California. That was a difficult task because you're taking organisms that live in a much cooler and humid climate and moving them into the Central Valley in July and August when it's 105 degrees out, and it was very difficult. In 2010, if I remember correctly, we had our first successful recruitment from one of those releases. But, unfortunately, again, in 2011 with the budget cuts, all that work ceased. And to my knowledge, no assessment or further distribution of those insects has happened within the state following the end of the Purple Loosestrife Program in 2008.

I have the wonderful distinction of being the last person the state of California has ever promoted to the position of a district weed biologist. You will see on the left-hand side there, at that time there were six of us. I was responsible for 13 counties. I should say, of those six, one gentleman, Ron Eng, still works in the department in another program, another branch. Otherwise, the rest of my counterparts retired, and Kerrie Perosco moved to the state of Oregon and continues to do weed work there. What we were responsible for doing is all the detection, mapping, control, assisting biocontrol eradication efforts, training, outreach within our districts. I can personally say that I have been individually responsible for the eradication of dozens, if not hundreds, of single individual plant infestations, quite often requiring nothing more than a shovel. The rapid response, the early detection, rapid response, your tools are much easier. You can eradicate an infestation of a single plant. And if you get it before it sets seed, no one will ever know how successful you were. Which is part of the problem with this type of work. And, again, another service we provided was connectivity across the state. There were a number of times where I found quite common weeds in a county that the locals had never seen before. And we, I was able to notify them and let them know that that was something they should be

concerned about, and we could begin controlling it. Also, just letting, just having that awareness that something that may seem innocuous in many areas that in their particular, the right habitat, could be quite a problem. But, again, all that work ceased to, it discontinued with the budget cuts in 2011. And, again, I am the only one left at the Integrative Pest Control Branch. But in addition, at that time, we, the department, oversaw the weed management area; and within my district, I was responsible for oversight of those weed management areas. This program provided funding and coordinated, usually they were between two and three counties, and this brought together state, local, federal, county governments as well as non-governments and concerned citizens. It provided funding and allowed for local work on local weeds of concern that may be a particular problem in that particular part of the state or perhaps in an ag use or an ag setting that is particular to that part of the state. That the funding was not available to work on a similar weed in other parts of the state where it may have been more widespread or may not have been as much of a problem. But, again, that funding as well was discontinued in 2011.

And here is a graph. Again in 2011, our department took a very significant cut to its general fund. In particular, our branch, the Integrated Pest Control Branch, has received a 100 percent cut of all general funds. And to this date, we have not received any general funds for any of our programs, whether it be the weed management area, the noxious or terrestrial weed program, or, and hydrilla. On there, you will see the biocontrol program lost all of its weed funding in 2011. In the following year, in 2012, they lost all funding for biocontrol agents of insect pests. So that's why that one leg goes out an additional year.

Now, currently, as I said, my program receives no general funds. We are fully funded by the Division of Boating and Waterways. Harbors and Watercrafts, they give us roughly $1.5 million. Since the loss of the general funds, the Department of Water Resources had initially

upped its input too. The last few years it's been $785,000. However, this year we were told that that has been reduced to $464,000. Over the next two years, I've been told that it will further decrease annually. And at the end of those two years, Water Resources informed me to not expect any further funding from them for the hydrilla program. Lastly, I get $132,000 from the US Bureau of Reclamation for pesticide purchases.

Now, hydrilla is unique in that it is one of the only weeds, there's only two, named by name in the Food and Ag Code. And the Food and Ag Code pertaining to hydrilla mandates that the department must attempt, where feasible, to eradicate any hydrilla that occurs in the state. That, because of that, I have to, what little money I have left, I have to dedicate to eradication efforts. So any of these additional activities that we like to help out on as far as mapping and detection, those are the first to be on the chopping block as the funds get reduced. The issue with hydrilla is that it forms a tuber which it sends down into the soil. They can easily survive seven years before sprouting. And what that means as a management implication is you cannot just go through and remove all the active vegetation within a water body and plan to have any impact on the hydrilla. Those tubers will remain in the soil waiting to sprout.

Here is a photo that I like to show. It has the variability of hydrilla. On the right, you will see a photo. Hydrilla has never been found in the delta. When you are in the delta, in particular bass anglers tend to refer to the Egeria beds as hydrilla. If they happen to fish in the southeast, they would be fishing hydrilla beds in those settings and that terminology carries over. But hydrilla has never been found in the delta. If you see that photo on the right, the larger, darker green, more robust plant in the center is Egeria with hydrilla off to the left of it. In addition, the last few years, we have been helping Department of Water Resources in mapping their water storage facilities. They've asked us to go out and identify the weeds present as well

as map the distributions of them. On the right-hand side, you can see last year's hydrilla survey within the delta. Traditionally, my counterpart within the, the district weed biologist, we would come down; we would have anywhere from six to eight boats. We would spend one to two weeks at a time. Sometimes we would only do the early summer. Other seasons, we were able to get both an early summer and a late summer survey of the entire delta. Our attempt was to look at every single mile of waterway in the delta to look for hydrilla. And while we were out there, we were taking note of any other unique weeds. But at this time, that has been reduced. I have a single crew out of Fresno of four individuals. They come up with two boats and a number of kayaks and survey as much of the waterway as they can. And here, again, is an example of the maps that we create while we're out there. We are taking, we are recording all aquatic weeds that we come across, and we get these distribution maps, which we can share with our counterparts.

Lastly, I want to talk about the impact of hydrilla itself. Again, it's never been found in the delta. The photo on the right there shows the Imperial Irrigation District back in the 1970s. You can see it is absolutely 100 percent chock full of hydrilla. The photo on the left has, is more recent. I believe that was in the early 2000s. But one of the things to note in that photo on the left is that the hydrilla is in that irrigation ditch. To the right, you can see a lateral gate going into an ag field and off to the left, presumably, is some sort of riparian area. And the CDFA has unique authority in that we can work in all of those situations, wherever hydrilla occurs. I do not know that other agencies have that authority. But we would be able to work in the ag ditch, the irrigation ditch, the wildland area, waterways, etcetera.

Next, this is a photo of one of their water storage reservoirs in Imperial County. Again, this is 100 percent infestation. Hydrilla infestations at this level lead to an 85 percent reduction

in both conveyance and storage capacity. So in other words, if this was a 100-acre-foot reservoir, in a situation like this, you would have 85 acre-feet of hydrilla and 15 acre-feet of usable water. And here are a few examples from Florida. You can see that hydrilla, unlike Egeria densa, when it reaches the surface, it branches laterally. It completely fills the water column. Egeria tends to stay a little bit lower. Now, in the delta, we have tidal influence; so you have times when you can zip across the top in a boat, across the top of the Egeria. I would assume with hydrilla's ability to branch laterally at the surface that it would just fluctuate with the tide.

Here is a photo, again from Florida. They are well beyond the point of a control program, of an eradication program. They are controlling hydrilla. You can see that is an absolute monotypic stand, 100 percent full of hydrilla. Currently, the state of Florida pays $4.00 for hydrilla control to every $1.00 they spend on hyacinth control. And my understanding, if you are a marina owner in the state of Florida, you essentially have on staff a harvester or some other weed control technique. You essentially have to "mow the lawn" on a regular basis in order to get boats in and out of those marinas. We looked at the salinity to try to, I put this up, to try to see where in the delta hydrilla could likely exist. It is slightly more salinity tolerant than Egeria densa. And this is some data I found from a delta levee risk assessment, just trying to find a distribution for where are salinity levels. And I think you could safely say that hydrilla could live all the way downstream to Rio Vista, if not potentially, maybe not thriving, but probably establishing all the way down to the city of Pittsburg. So, essentially, there is nowhere in the heart of the delta that hydrilla could not grow.

On this last slide, this was a study from 2014. What I wanted, what I wanted to show you is that regardless of the model they ran this is the suitability of habitat for hydrilla in North

America. Regardless of the model they ran, California always lands in the highest level of habitat suitability. In other words, had we not been so persistent in the last 35 years, we would likely be sitting here discussing hydrilla rather than hyacinth.

And in closing, I want to say that over the last four years I have had opportunities to leave the state and continue my past weed job in other states. The reason I stayed with CDFA was in hopes that someday I would have the opportunity to share my story and not lose that institutional knowledge. So I just want to personally thank both Senator Galgiani and her staff for inviting me here today. Thank you.

SENATOR GALGIANI: Well, you're welcome. And this is the first time that I've heard any broad information about hydrilla, to be honest. I have been trying to take notes up here, so I've been looking down at my paper a lot and missed a few of the pictures. But, is hydrilla sometimes mistaken to be water hyacinth or one of the other plants?

MR. KRATVILLE: No, no. It's mistaken to be…

SENATOR GALGIANI: So it's clearly…

MR. KRATVILLE: … Egeria densa.

SENATOR GALGIANI: Okay.

MR. KRATVILLE: It grows submerged in the same situation that Egeria densa and many of the other weeds that were just mentioned grow.

SENATOR GALGIANI: Okay. So looking at it in a broad-brush point of view, how prevalent is it in comparison to these other four plants?

MR. KRATVILLE: We have an ongoing eradication effort in – Clear Lake? Pest prevention? – We have an ongoing eradication effort in Clear Lake. Last year we found 17 individual plants in the entire lake, and that's pretty typical. It's extremely rare. We attempt

eradication in all the known locations. We do successfully, we have successfully eradicated it quite a few times. And we do, our department does continue to do pest prevention work. Just – was it last week? Or two weeks ago? – hydrilla was found on a boat at a border station coming in from, I believe, the state of Colorado. So we are still doing that prevention work. And the reason we do this work is so that hydrilla does not become widespread within the state.

SENATOR GALGIANI: So we don't have a problem with it in the delta at this point…

MR. KRATVILLE: It has never been found…

SENATOR GALGIANI: … because of the…

MR. KRATVILLE: … in the delta.

SENATOR GALGIANI: … because of the good work that you've done heretofore.

MR. KRATVILLE: Correct.

SENATOR GALGIANI: Correct?

MR. KRATVILLE: In the state.

SENATOR GALGIANI: And you are able to eradicate it when you find it, correct?

MR. KRATVILLE: Correct.

DR. PATRICK AKERS: It's a very long, hard job; but, yes, you can eradicate it.

SENATOR GALGIANI: So we have to be watchful and mindful of it that it doesn't hit our area.

DR. AKERS: Correct.

SENATOR GALGIANI: If it does, we have to be vigilant very early on.

DR. AKERS: Have to respond very, very rapidly and very aggressively.

SENATOR GALGIANI: I'm a little bit confused about the fact that you work for CDFA but you get your funding from Boating and Waterways and some other resources. Maybe

you can walk me through that because I'm not familiar with how you get your funding other than to hear from you here today.

DR. AKERS: It's more of a historical development, and it's actually a pattern that's fairly common in Food and Agriculture. There's always more resource, there's always more needs than there are resources. And so in general, with many different pests, including insect pests that are new, like, perhaps you've heard of the Asian citrus psyllid, which is, it's a threat to citrus. It helps a lot getting a program going if there's a concerned community that brings not just political support but also supports us financially. And what happened was, back in the early '90s when we had a couple of very large infestations of hydrilla start, there was some, basically, outreach meetings with a number of the different agencies in the state. And Boating and Waterways and Department of Water Resources, in particular, stepped forward to help us fund much of, much of the work that's done on hydrilla. And they've just, basically, kept with us ever since. We used to get some funding, perhaps 25 percent of our funding, from general funds but then in 2011 we lost those. And, again, we went to Boating and Waterways, DWR; and they stepped up and helped us fill that gap.

SENATOR GALGIANI: So if it were to be present, how quickly could it get out of control? So, for example, water hyacinth can double within 10 days, a mass of water hyacinth. What about hydrilla?

DR. AKERS: It's faster.

SENATOR GALGIANI: It's faster?

DR. AKERS: There is one study that showed that – I think it was in five weeks of, of five or ten weeks, but anyway – it, one single stem of hydrilla that was 9 inches long produced 3,200 inches of stem within that five or six weeks. So it increased, like, 150 times. And, of

course, it'll fill a water column completely full. That's – it out competes Egeria everywhere else except, hydrilla here, because no hydrilla here.

SENATOR GALGIANI: So it doesn't seem as though CDFA is very active in controlling water hyacinth. Am I…

MR. KRATVILLE: Not anymore.

DR. AKERS: Not any longer.

SENATOR GALGIANI: Not anymore. And that's because they've given that full responsibility to Boating and Waterways?

MR. KRATVILLE: Correct. Although I will add, when our people are working outside of the delta or outside of our control projects, when we are doing survey work – again, our familiarity with weeds – last year, I believe it was, they found three water hyacinth plants in Clear Lake, and we removed them. We have that – we work in so many waterways, and we have that familiarity of where weeds are issues around the state – that, in those situations, we will just go grab those. If I see three water hyacinth at a boat ramp, I'm gonna get them out of there if I know that lake is not infested with water hyacinth. So in that sense, that's just sort of, you know…

DR. AKERS: Civic duty.

MR. KRATVILLE: Yeah.

SENATOR GALGIANI: Right. Do you have ideas for how you could be more active? Or could work more collaboratively with Boating and Waterways? Or are there some suggestions that you have that I should take back?

MR. KRATVILLE: Boating and Waterways really appreciates the mapping that we've done in letting them, it's, again, we can provide some of that ground truthing. We've been

recording the location of weeds in the delta as long as I've worked at CDFA. And they have discussed with me the potential of maybe in the future increasing some of that. But, again, as the funding gets reduced, as hydrilla's funding gets reduced, the crew that does the work in the delta is the one that is most likely, because they do not do any eradication efforts anymore. They eradicated all their populations in the Fresno area. So they, specifically, currently, are doing detection work. So if I only have enough money to fund my eradication programs around the state, that's what I have to fund.

SENATOR GALGIANI: From a legislative point of view, it gets difficult during the budget times when you know that things like what you do fall under CDFA; but yet, you get some of your money from Boating and Waterways. Now, we're looking at a budget; and we're looking at line items from different departments; and we see what's in front of us; and we don't know all these back stories of the collaborative work that you've done to keep programs alive. I realize in the 2009 budget crash there were a lot of things that happened very quickly. And staff at different departments did everything that they could to try to save programs because it's so much more difficult to get them started back up again if they completely go to the wayside. So I know people took measures at that time. But then later on, for us to understand what's happened, if we don't see it in the budget, we aren't necessarily aware of where the gaps are and where the problems are. So I learned a lot from you today, and I really need to have a follow-up with you so that I better understand what you've presented and what's at risk now that your funding levels have dried up in these areas. How do we make the most of what you do have? What's working, what's not working? Is there an ability to get more money back when the economy continues to improve? Where would we approach that first? Those are things that I need to better understand.

DR. AKERS: Be happy to meet with you any time.

SENATOR GALGIANI: Thank you.

DR. AKERS: Yes.

SENATOR GALGIANI: Thank you. So those are the questions that I have. Okay, thank you very much. And now, I would like to call up Dr. Patrick Moran, a research entomologist from USDA Ag Research Service, Exotic and Invasive Weeds Research Unit.

DR. PATRICK MORAN: Thank you, Senator Galgiani. I've got just a short presentation. Some of the stuff in this presentation has been covered by Chris Conlin and Ed Hard from Boating and Waterways. But, just happy to be here to talk about the USDA areawide pilot project, which was funded last year to synergize agencies and improve control of the aquatic weeds in the delta. So I wanted to first briefly mention just the mission of the USDA Agricultural Research Service. We are fundamentally a research agency; and we do research to solve problems in agriculture, including problems for natural resources that are relevant to agriculture: water, soil, air – but not just agriculture, but also natural ecosystem, health, and human health. So in our five-year strategic plan, the first two bullets there would be the closest ones that match up to what we're doing with the weed controls: ensuring high-quality, safe food and other agricultural products and enhancing a natural resource base.

So prior to the start of this areawide project, we already had a number of interactions with Boating and Waterways and with aquatic weed control on the delta. For a number of years, we've been what's called the federal nexus for Division of Boating and Waterways for their permitting process. So they obtain permits from the US Fish and Wildlife Service and the NOAA National Marine Fishery Service for the threatened, listed threatened, and endangered fish species. And so USDA-ARS submits the biological assessment to those agencies, receives

feedback in the form of the biological opinion, which Chris Conlin referred to, which is essentially the permit which allows Boating and Waterways to go and treat the weed species, and the submission of the annual reports.

For a number of years, USDA-ARS has been working on research, different aspects of controlling aquatic weed, improving aquatic weed control, new technologies, different ways of detecting the weeds, and also a role in biocontrol, looking at potentially new biocontrol agents that could be used for the aquatic and also weeds that grow near the water – so what they call riparian weeds that grow along the shores of the sloughs and the canals and the reservoirs in the delta and also other parts of California.

So the areawide project – I'm not gonna read the whole title there – this was a project that was started through a collaboration with USDA-ARS and NASA and Division of Boating and Waterways getting together and submitting a proposal for a 18-month pilot project designed to enhance the success of the aquatic weed control programs, protect natural habitats and also human health, and tie in with agricultural activity in the delta as well, focusing on three aquatic weeds: the water hyacinth, floating water hyacinth; the submerged Egeria; and also the riparian, or near water, giant grass known as a Arundo or giant reed. So here's the three main objectives, or our goals, of this areawide pilot project: First of all is to redesign and implement improved control for these three aquatic weed species; also to improve our understanding and control of mosquitoes in relation to aquatic weeds, try to understand this interaction better and try to improve mosquito control; and then also to gain a better understanding of what agriculture in the delta might be doing to influence the aquatic weed populations, things like nutrient inputs, agricultural practices that could be influencing the problems that we're having with the weeds.

So there's a number of collaborators on this project, and I'll go through them individually in minutes. I won't go through this slide in detail, but you can see there's a number of agencies that are collaborating on this areawide project. It's been a very good collaborative exercise bringing agencies together, and also agencies that aren't on this list have also been getting involved, coming to the meetings, learning more about the project.

So you've already heard about the problems being caused by the actual target pests. So floating water hyacinth: big problem, thousands of acres in the delta, been around for quite a while. And a number of major economic impacts, commercial and recreational navigation, water quality, the ecological impacts, as well.

Also the submerged Egeria: potentially more acreage than water hyacinth. Some of the same impacts: water quality impacts, navigation, and water flow, so with water flowing through the delta for the local agricultural production and also to the south delta pumping locations, water that gets pumped to the state and federal water projects to the south.

And then you may not have thought about Arundo previously as being a big problem, but it is actually a big problem in California and throughout the southwestern U.S. It occupies the levees, the banks of the sloughs. It was actually introduced originally for erosion control, but it actually can increase erosion. And it also out-competes native vegetation. Can spread fires, it burns very easily and regrows very quickly after fire. A number of major ecological impacts. And also the tie-in with mosquitoes. This was something which was envisioned by my predecessor, Ray Carruthers, who used to be the research leader of the USDA Agricultural Research Service Exotic and Invasive Weeds Research Unit. The tie-in with mosquito control, bringing in the county mosquito vector control districts in the southern and western delta. Contra Costa and San Joaquin County have seen a big increase in the number of West-Nile-virus-

positive mosquitoes and birds in the last several years. And you see on these maps here, those red dots show where they've seen the positive mosquitoes and birds. They've also had a few human cases in 2014. And there is potentially an association with the delta with aquatic weed infestations that these mosquito outbreaks are occurring. And extra control costs as a result of having to go in and control the mosquitoes where these weeds are present.

So in terms of this areawide project and just going over the project partners, the USDA-ARS Exotic and Invasive Weeds Research Unit in Albany and Davis, California, a number of different aspects of this project that we're working on. We're looking at the growth of the aquatic weeds in relation to controls, so optimizing the timing of control. We're working with Boating and Waterways to improve the prioritization of the control timing and location for water hyacinth and Egeria. We're also working with NASA to develop models of weed population, movement, and growth between – during the field season. And we're also testing and releasing biocontrol agents. So CDFA mentioned the – some of the biocontrol agents that are present for water hyacinth. There's nothing present right now for Egeria, but there's also the potential for new biocontrol agents for both water hyacinth and Egeria. And also for Arundo, we have two biocontrol agents. And also looking at the effects on mosquitoes. So there's three scientists at the USDA-ARS Exotic and Invasive Weeds who are working on this project. Myself, I work on a lot of the biocontrol aspects of it for water hyacinth and Arundo, also integrating biocontrol with the other control methods, the chemical, and mechanical, physical, and cultural. Dr. John Madsen. He works on weed growth studies, optimization of control based on finding the vulnerable life cycle points in the weed life cycle, and also integrating that work with models that NASA is putting together on water nutrients in the delta. Dr. Paul Pratt is a new – he's not

here today – he's a scientist who has been here for about six months. He also works on biocontrol and also looking at some of the ecological effects of water hyacinth.

So in terms of the interaction with Boating and Waterways, so they already spoke about their projects. I'm focusing here mainly on how they interact with other aspects of the areawide project. So first of all, they receive critical information from NASA and from USDA-ARS on the control locations, the prioritized mapping of the control locations for water hyacinth. And this technology is being developed for Egeria as well. They also provide critical information on the efficacy or success of the treatments and on the locations where they are treating to inform the research studies. And they provide information for the mosquito vector control districts as well as integration of mosquito control and aquatic weed control, as decaying weeds, for example, increase mosquito populations. This map here shows how Boating and Waterways is already incorporating the prioritization scheme. The sort of reddish-orange areas there are the prioritized areas where they're planning – either already doing or planning to do treatment. So it shows how this interaction is working between agencies.

NASA is a critical partner on this areawide project. There's two scientists who are working on the project there, including Dr. David Bubenheim – he was here today. And there's various aspects of that. They're looking at remote sensing using both satellite- and airplane-based systems, including Landsat, which has been around for quite a while. It's been capturing images since the mid-1980s. They're taking those images, processing them for what's called the spectral signature of water hyacinth, the actual color signature. They can use that to determine how much water hyacinth is present in the delta at given times. It flies every two weeks given clear conditions. They can get data over long periods of time. We're also testing and working with different platforms based on cameras mounted on airplanes that have fine resolution, down

to 2-meter resolution. And they use this information, again, to prioritize location, to inform Division of Boating and Waterways. We're also looking at water nutrient data that's available for the delta to model where the water nutrients are the highest and potentially influencing the aquatic weed growth. So the objective is to provide what's called decision support models to help decide when, where, and what method to use for treatment. An example of their mapping information – and Chris Conlin showed an example of this earlier – they can quantify the amount of water hyacinth present at given times during the year. They can turn this into regional maps for different parts of the delta, the north delta, central delta, south delta. They can also integrate that with the water nutrient information. So on the left, there is a map of the known agricultural drainage points in the delta. Superimpose that on a map of where the water hyacinth is, you can determine where potentially the weeds are growing biggest, fastest, and earliest. Target those areas for control. And they're looking to develop similar models for Egeria using this remote sensing technology along with the water flow and nutrient information.

So UC Davis is also a critical partner on this areawide project. The Department of Entomology is helping out with research studies on the interaction between mosquitoes and aquatic weeds and also looking at potential agricultural inputs and how that might influence the aquatic weed populations. Department of Plant Science is also getting involved just this year, helping out with the plant growth studies and also an outreach component. There's also the UC Davis Agricultural Issues Center. We have an economist on this project that's modeling the cost of the weeds, the cost of the control programs, and the benefits of the areawide approach, looking at benefits in terms of reduced control costs and reduced damage.

And also the Contra Costa, San Joaquin mosquito vector control districts are on this pilot project. Their mission is to protect human health by controlling the mosquitoes. They've seen

this association between the mosquitoes and the aquatic weeds. So we provide them with information on where the weeds are going to be controlled at certain times. They provide information on the mosquito populations over time at these weed-infested locations, and are the treatments successful in terms of decreasing or abating the mosquito population, and how does that interact with the aquatic weed control schedule.

So the benefits just going a little bit in terms more about biocontrol. The benefits of the biocontrol approach, it's a long-term approach. It's a slow approach. Many of these agents don't kill the weeds; they reduce the size of the weeds, therefore, their acreage, their coverage and, therefore, reduce the cost of other forms of control. And these agents, as Chris and Ed mentioned, are meant to be – are safe. They've been tested that they only feed on the target weeds.

In the case of water hyacinth, we have the Neochetina bruchi, a water hyacinth weevil that CDFA and Corps of Engineers introduced in the 1980s, present but not exerting impact. One aspect of this project is to do a survey and learn more about why it's not having maximal impact. There's also the planthopper, which, again, like the weevil, was discovered by USDA in South America, brought into the U.S., found to be safe, permitted for release. CDFA released it first in 2011 and then I've been doing small-scale releases since 2012. The areawide project is going to scale this up within the delta but also the tributaries of the delta. It's potentially possible that these biocontrol agents might actually do – have more impact in some of the tributaries which are not getting sprayed as much potentially as the delta that could contribute to the long-term control in that way. Also, for Arundo, I helped discover and characterize two biocontrol agents for Arundo, the Arundo wasp and the Arundo scale. And these are having impact in the Rio Grande Basin of Texas and Mexico where I used to work. We're seeing the

impact. I'm releasing them here in Northern California. The areawide project, again, is an implementation project. So it's a small – right until now – a small-scale project in California. The areawide project is scaling this up: more sites, more monitoring, and more evaluations. Just the benefits – the overall idea of the long-term benefits of the areawide project are to improve the efficacy of the control of the aquatic weeds, also improve the control of the mosquitoes in areas that have been invaded by the aquatic weeds, and looking at this interaction potentially between agricultural practices and the aquatic weed infestations.

So we just applied for more funding under this program. We are only allowed to apply for one year at a time, but this is a multi-year project. So we'll see what happens with that. But the current project runs through the end of 2015. And again, you know, the state and county agencies have their own funding that they use to actually go out and control the weeds and the mosquitoes, but this areawide project brings new technologies, brings the agencies together, and synergizes the effects to achieve better long-term control. That's what I have. Be happy to take any questions.

SENATOR GALGIANI: Thank you very much. Has USDA been involved with controlling water hyacinth before this time on this project?

DR. MORAN: Yes, we had our laboratory in Davis, exotic and invasive weeds. They were involved in some of the follow-up evaluations of the water hyacinth weevil in the early 2000s. I actually came out here in 2004 and went out in a kayak and saw the weevils out there in Seven Mile Slough, for example. So they were involved in some of the – doing more releases and following up and trying to see why the weevil wasn't having as much impact as it was – as what's expected. So, yes. And so here in the delta, USDA has been involved in biocontrol.

SENATOR GALGIANI: So what's the likelihood of funding being extended for another year? Or more importantly, it would be better if it could be extended for another five years.

DR. MORAN: Right. We – the RFP, the request proposals, this year was only for one more year of funding. That's the way the ARS administrators seem to want to do it. And we did submit it. We think we submitted a strong proposal. It's a technical competition, kind of a merit-based process. It's only ARS scientists can apply for these areawide proposals, so it's limited to within ARS. But if we receive the funds, we, of course, we redistribute them to the state and county cooperators. But we think we have a good shot. But I can't, you know, guarantee that we're going to get additional funding.

SENATOR GALGIANI: Are there other resources that USDA has that we could be taking better advantage of? Like additional crew members, boats, scientists, etcetera, that we could utilize?

DR. MORAN: We have, you know, we have our appropriated funds that we use to – you know, for salaries for the scientists and then some long – permanent technicians that are, you know, separate from the areawide funding. And we have certain resources. We have some boats and – and we – you know, we use them for research purposes. Things, for example, we're doing a study on the macroinvertebrate community that's affected by the water hyacinth. This is very important for regulatory purposes because the permits that are granted by the regulatory agencies are based on protecting the listed fish species, which, and these fish feed on the macroinvertebrates that live in the water hyacinth roots underwater. So we're studying the effects of the water hyacinth and its control on the aquatic invertebrates. So that's an example of – we're using our own resources, our own boats, technicians, scientists; and so actually, the

areawide project is helping the state take better advantage of the federal resources that we already have to do this kind of work.

SENATOR GALGIANI: So you heard the discussion earlier about the science that we're doing, the science that's being done by Boating and Waterways, and how it might be that that could impact the biological opinions that control what is done now. Do you think that in the future, should we have the science available, that there would be flexibility in a future permit application?

DR. MORAN: Yes. Yes, I think the US Fish and Wildlife and National Marine Fishery Service has expressed, you know, eager willingness to discuss these issues to get more science, get more data, and on what the limitations on the permits might be. Their mission is to protect those species. And so if there's various ways we can show that the aquatic weed control programs don't pose a risk, or of any kind of lethal risk or what they call harassment, any kind of negative effect on the listed species, that they would make the permits more flexible, make them and the time frame more flexible. And so that is – part of the areawide project is to increase that amount of scientific data. In monitoring the water quality, the aquatic invertebrates, and some other studies to provide more data to the regulatory services.

SENATOR GALGIANI: And then finally, how successful in your view has the planthopper been as a biological control? And do you think this is promising for the future?

DR. MORAN: Well, you know, the initial studies were done in quarantine laboratories and in greenhouses, showing 70 percent decrease in biomass weight of the plant. USDA-ARS released it in Florida in 2010. They have been following the establishment and impact there. They're still looking at the impact; so again, these agents take typically at least five years to show their full impact. And they spread, they spread out. They just propagate themselves and

spread and start having impact. So I'd say we, you know, we haven't seen the full impact in the original area of release. Here in California, they've only been released for a shorter period of time. And one of the things we're looking at and as part of the areawide is the interaction with chemical and mechanical control. Can the planthopper survive a chemical treatment? Maybe certain plants that don't get treated, they survive on those plants. And also on their own, how much impact do they have? So I'd say we're still evaluating the impact of the planthopper as a long term contribution to the overall control strategy.

SENATOR GALGIANI: Okay. Thank you very much. That's all that I have for now. I would like to recognize Supervisor Chuck Winn, who is with us today from San Joaquin County Board of Supervisors. Thank you for being here. And next, I would like to call up for our panel on local efforts, Mary Nejedly Piepho, who is the Contra Costa County Board of Supervisors, represented by Lea Castleberry, Deputy Chief of Staff. And also Jeff Wingfield, Director of Environmental Government and Public Affairs Division of the Port of Stockton. And Richard Dunn, owner of RiverPoint Landing Marina-Resort. Thank you.

MS. LEA CASTLEBERRY: Thank you.

SENATOR GALGIANI: Go ahead.

MS. CASTLEBERRY: Good morning, Senator. Thank you for allowing me to testify on behalf of Supervisor Mary Nejedly Piepho on the important issue of invasive aquatic weeds, something we are becoming all too familiar with. I speak not only on behalf of Supervisor Piepho but also as a resident of Discovery Bay who lives on the delta and sees the impacts of these weeds daily. Supervisor Piepho's district includes two delta communities, Discovery Bay and Bethel Island, who have first handedly felt the impact of these invasive weeds. In 2009, Supervisor Piepho began working with the Department [sic] of Boating and Waterways and

created a stakeholder group that consisted of local, state, and federal agencies to discuss the invasive weeds' impact, primarily water hyacinth and Egeria densa, and how to streamline the process to combat this ever growing problem. We were successful. With the help of state legislators, we were able to obtain a five-year permit to treat the weeds, as opposed to the one-year permit that was in place at the time and made treating these weeds in a timely manner extremely challenging for the Department [sic] of Boating and Waterways. With the five-year permit, we had successful treatment for water hyacinth and Egeria densa in 2010 through 2013. In 2014, the treatment came to a halt and the weeds were back. The prior years of successful treatment and financial investment were gone. We need regular and reoccurring funding to develop a consistent plan of treatment delta-wide. The shotgun approach is not effective and wastes our collective efforts and revenue when treatment goes away. Water hyacinth helped grab the media's attention this last year, but the less visible Egeria densa, South American spongeplant, etcetera, are just as devastating to our delta infrastructure and environment. These latter weeds are not that visible from the shore but have a significant impact to the environment, water quality, water exports, and the economy of the state. That's why Supervisor Piepho was working hard to keep federal and state agencies at the table for a long-term, funded, comprehensive invasive aquatic weed program. The state needs to provide broad jurisdiction over the complexities of invasive species, including aquatic, terrestrial so agencies don't have to piecemeal treatment efforts one weed or species at a time.

With that being said, the Department [sic] of Boating and Waterways is treating our base this year, and the communities couldn't be more grateful. But, again, this is a bandage, not a solution. In 2014, Supervisor Piepho and former San Joaquin County Supervisor Larry Ruhstaller partnered with state and federal agencies, which include the Department [sic] of

Boating and Waterways, the USDA Agricultural Research Service, NASA, and the University of California at Davis, to develop and implement a new areawide IPM project. And Patrick just touched on this a bit. This effort is working to establish new and sustainable means of controlling both invasive aquatic weeds and the mosquitoes that these weeds harbor that are causing increases in West Nile virus in the area of the delta. Each agency plays a vital role in this current areawide IPM program. The program is bringing together new partners and tools to achieve what has been a long and growing problem that is further aggravated by the drought and climate change. Additional funding over the next 18 months is being proposed through a competitive request for proposal from the USDA-ARS program. The project team has submitted a proposal, which Patrick has mentioned, to fund the next 18 months to further their research and continue to develop the tools necessary to combat invasive weeds in the delta. Additional support is necessary to implement and assess these comprehensive strategies and then work with additional jurisdictions, agencies, and stakeholders to implement a sustainable management approach. Supervisor Piepho requests your continued support for funding for the areawide IPM project. This team has made great strides over the last 18 months and still has more great work to do in order to achieve a successful management plan for invasive aquatic weeds delta-wide. Again, thank you for allowing me to testify on behalf of Supervisor Mary Piepho.

SENATOR GALGIANI: Thank you very much.

MS. CASTLEBERRY: Thank you.

SENATOR GALGIANI: Jeff Wingfield, Director of Environmental Government and Public Affairs Division for the Port of Stockton. Thank you.

MR. JEFF WINGFIELD: Thank you for having me. I appreciate the opportunity to testify here today. Just as a reminder, that the Port of Stockton is the fourth busiest port in

California. We provide more than 4,500 jobs to this area, and actually, 2014 we set a record for our ship traffic. So anything that gets in the way of that obviously has a negative impact to this region. So just to share a little bit, this is a shot from one of the vessels traveling up the ship channel. You can see what the pilots are seeing as they are trying to navigate their way and avoid impacting or hitting any of the levees as they come up. You can see the mats, is significant – and this is what they – when they look at their radar screen, this is what they see. You can see the crescent shape which would be a levee, but with the hyacinth reflecting back, the pilots can't tell where the levees are during the nighttime. Or, the pilots have also talked to us about their getting fishing vessels that are anchored in some of the hyacinth, and so they cannot see those vessels with the hyacinth being so thick. So they had to shut down nighttime ship traffic between November and February.

So the port's been active in hyacinth removal and communication over the last couple of years. It started to negatively impact our shipping. We've been obviously in communication with the river pilots. We actually brought the Corps of Engineers to investigate the ship channel last year. They are trying to obtain funding to assist with maintaining the navigation channel. And the port has also hired – we have hired a harvester last year and the year before. We've actually taken on – we've gone out and did some boat reconnaissance this year. Also, we took NASA out with us so that they could ground truth a lot of the satellite imagery that they're getting. And that was very helpful to them.

We did some helicopter reconnaissance just last week, and I'll share a little bit about that. And we've been providing sites for Boating and Waterways to place some of the water hyacinth because we do coordinate with the Corps. We have properties up and down the ship channel. It's much like with the dredging; the Boating and Waterways, if they mechanically harvest the

material, they need a place to put it. And we can coordinate and help with that effort. And then just last week we were back in Washington, D.C. I had a meeting with Senator Feinstein's office regarding – it was mostly regarding dredging efforts, and water hyacinth actually took up a great deal of that conversation. So they are looking to bring additional federal funding to help us with that effort. So you can see, this is one of the areas. We've been trying to identify and work with Boating and Waterways to identify some of the nurseries. We identified Tule Island via boat survey – as I mentioned, we took NASA out there – as one of the larger nursery areas. You can see, up next a lot of the tules is significant water hyacinth present even today, where typically this time of year we don't see it. So, and I believe with the warmer water temperatures and the lack of fresh flows this year is going to be the worst year for water hyacinth. And then on March 18th, we took a helicopter survey. I've got video that I'm going to share with Boating and Waterways, showing them some of the areas that we identified as potential nurseries. And those areas are what you see on the screen: Big Break, 14 Mile Slough, Tule Island, Burns Cutoff, and Mormon Slough.

And this is a map. We mapped them last week. I sent this information over to Boating and Waterways this week so that they could, hopefully – well, at least, to give them an idea of the areas that we're concerned about, and hopefully, concentrate their efforts on spraying these areas now. So as far as what the port continues to do, we are going to continue to work with various agencies to try to control this water hyacinth. It's obviously beyond eradication at this point. But we will continue to do everything we can to support the effort. We will work with Boating and Waterways in any way that we can to help us to minimize the economic impact to this area and the Port of Stockton. Thank you.

SENATOR GALGIANI: Thank you. You mentioned that you're seeking funding through Senator Feinstein. What specifically are you asking for, and I would be willing to write a letter of support for that request.

MR. WINGFIELD: Yeah, that wasn't our intention of the meeting. Her staff continued to ask us what – if they were able to obtain funding, if that would be useful for the problem. And obviously we said absolutely. So we weren't – we didn't go to ask for any support at that time. They brought it up.

SENATOR GALGIANI: So is it that they're looking to explore what that funding might look like, and what the amounts might be, and from where, and that they're working with you?

MR. WINGFIELD: They put it on the table, and we are gonna provide them with what the costs that the port has paid over the past two years and offer them any support and anything that they might need to offer federal funding.

SENATOR GALGIANI: Okay, if you could share that with me, that would be very helpful as well.

MR. WINGFIELD: I would be happy.

SENATOR GALGIANI: I would be willing to back you up on that request. Thank you.

MR. WINGFIELD: Great. Thank you.

SENATOR GALGIANI: Okay. Next, we have Richard Dunn, owner of RiverPoint Landing Marina and Resort. Thank you for joining us.

MR. RICHARD DUNN: Thank you, Senator. My name, again, is Richard Dunn. I've been a businessman here in the delta for almost 39 years. Our company has a long history in Stockton and the delta. We started out as boat builders. We've been involved in almost every

other facet of recreational boating that you can think of. I'd just like to make a few comments about the economic impacts on delta business and boaters, particularly in 2014. Last year was the first to bring many portions of the boating industry to a complete halt. And, for example, Buckley Cove, where we're located, Village West Marina in downtown Stockton probably experienced direct revenue losses somewhere in the neighborhood of $250,000. With the big numbers that are being tossed around in this room today, that's not much. But it's a huge impact on a small business.

And along with those three marinas, another area that hasn't been spoken about much today is recreational fishing. And fishing for all intents and purposes between September and December last year was nonexistent. And the fishermen do create some revenue impacts. I wouldn't make any attempt to estimate what those are.

The second impact that hits the marina business is additional expense for either mechanical or manual harvesting of the weeds. I think we've touched a little bit on the mechanical harvesting. These relatively small harvesters, they're very effective in confined areas between floating docks. One of the difficult – well, the difficulty that's already been mentioned, you harvest the material, you've got to offload it someplace to dry out. And then it's got to be reloaded into some other conveyance and shipped off to a landfill. The cost per acre is probably several thousand dollars. There's a lot of problems. Total blockages are problematic. The harvesters really can't even make a dent in it. We tried it at one point last September. It was kind of a joke except for the harvester, who still got paid for it. But the fact is the tides and the winds can refill the waterways faster with new weed mats than you can take it out. A second effort is the manual harvesting which the DBW folks talked about. We're fully allowed to do it. It's very cumbersome. It's very difficult. Think of a wheelbarrow full of weeds and water going

up a gangway one trip at a time. It's pretty hard on the backs of the people doing it. There aren't any real tools that ease the pain. And you go through the same steps. You've got to dry the weeds out, load them into a dumpster, and haul it off to a landfill. Again, the cost is several thousand dollars per acre. Probably not much different from the cost of the mechanical harvester other than it's typically the marina staff, which has other responsibilities. And you can only harvest what you can get at, which is not much. And there's a few variations on those processes, which I think have been spoken about, booming for one example. And then, finally, there's the larger mechanical harvesting projects, which have been talked about, particularly down by the Tracy Pumping Plant. And, you know, the logistical issues and the real areas where those can be conducted are fairly few and far between as far as I know. At this point, I don't know of any individual business that has undertaken such a project like that on, on their own. You know – it's one case where you need – you've got to have "Big Brother" government step in and come up with some money.

The third major impact, which I think is probably the most important, is that boaters, fishermen, and tourists will finally just throw up their hands and go elsewhere. Many cases, we can expect boaters to sell their vessels and leave the sport for good. A real severe blow to a sport which has been in general decline for almost ten years. I can't overemphasize that point. That's the real threat of not getting this water hyacinth under control.

Secondly, on my agenda is we've created a small task force to help Delta boaters and businesses get more involved in the water hyacinth battle. Our effort will focus on creating better communications between the Division of Boating and Waterways and the delta constituents of all descriptions. And, you know, I must say that, not necessarily with our input, DBW has already taken some pretty good steps. The principal concept driving this activity – and

I'm kind of talking around your SB 223 – is to get the citizenry, particularly the boaters and boating businesses, more involved in the process. And the boaters and boating businesses have thousands of pairs of eyes, GPS devices, cell phones, computers; and all of these can be marshaled to assist in giving early warnings and providing essential feedback. So I wouldn't say that we're ahead of you, but I would say that what we're trying to do is get that citizen input and, probably more importantly, create some kind of actual database on what's going on so that when we're sitting in this room next year talking about this problem it's not all anecdotal references. So on this, your SB 223, I think any kind of citizen advisory and oversight is very good. On the other hand, if Mr. Conlin and Mr. Hard do the job that they say they're going to do with outreach and communication, I'm a little concerned that your committee, or your suggested committee, might be a little redundant. And like the Boating and Waterways Commission, any committee that would be constructed along those lines would have to have almost total reliance on input from the agency and that requires time, staff, and money. The date for the committee, I think, if you say you want it by 2017, I think that's two years too late – so the sooner the better. If it's gonna go forward, then let's get it done now. And I would say, as an all-hands-and-boots-on-the-ground guy, that that money that might be spent trying to marshal that committee might be better spent with spray rigs and boats in the water, and so forth.

As we go forward, it seems to me that the biggest – the constant comment is we don't have enough money. And I think what we're dealing with is a problem that was probably addressed with the knowledge available at the time in the early '80s – make the Division of Boating and Waterways the key agency. I have some ideas why that happened. One of them has to do with they thought there was a source of money they could get their hands on. But the main thing is this is not a boater problem. This is by no means a boater problem. Probably

somewhere around 80 percent of the delta users are ag uses, water projects, water districts. There's many cities, counties, and other governmental entities that have a stake. There's a lot of public health and safety concerns. We've got our deep-water shipping folks here. My wild guess would be that boaters are a 10-percent part of the delta user. And somewhere, somewhere along the line the funding and the responsibility has to be spread out over the public in general. And particularly, there has to be some access to some general funds. Some of these stories that the scientists tell me would really give my psychiatrist some food for thought because why would I be in a business that's gonna be eaten by the giant weed in the next three, four, five years? Water hyacinth isn't gonna go away quietly or easily, but I think the legislature has to take the time now to lead for real change. I really appreciate the chance to get up here and say a few words. And it's one minute to 12. Thank you very much.

SENATOR GALGIANI: You're welcome. Thank you. And thank you for staying with us. I know it's been discouraging, all of the businesses in the delta; but I want you to know that we have listened, and we have taken it very, very seriously. And that is why we now have $4 million, not that we have to wait for but that was part of the package that was passed this week for the emergency $1.1 billion in funding from the Water Package. The $4 million for the water hyacinth, it's in that package. So secondly, I wanted to comment: You made some comments about the bill that we've introduced for the advisory task force. And I recognize and thank you for putting together the advisory group on your own to meet the problem that we have right away, as opposed to us having to wait for legislation to pass, because, as you know, that takes time to do. I think it's much better to have a task force than to just rely simply on a public outreach program because, while they would do as best as they could, generically speaking, to do outreach, it is certainly much more direct to have people that are affected by the problem, who

want to be there and who want to have input and who want to guide the department and, as you say, be the eyes and the ears for them because they're doing all of these different things; but you're on the ground. You see the problem day in and day out. You hear about it. You know about it. And you will know much sooner than they would know just by any public outreach program. So I think what you've done is excellent. The focus of the bill is to make that permanent and to give you more authority in that respect. You mentioned that you thought that 2017 might be too late. We started with that date until we had a sense of where the bill was going to be going. And because we have not had any opposition and because we had support, we will be taking amendments to the bill to give it an urgency clause so that it can take effect right away, as opposed to having to wait until next year. Therefore, we can – as long as it passes, we can have that committee go into effect right away.

That being said, that concludes our panel. So at this point, we have a number of individuals who have signed up who would like to ask questions or make comments. So I would ask that Mr. Conlin and Mr. Hard please come back up so that you can assist me with responding to questions and so forth. First, Dominick Gulli.

MR. DOMINICK GULLI: Thank you, Senator. My name is Dominick Gulli with Green Mountain Engineering. I've been working in the delta for 24 years. Started in Rio Vista, worked mostly in the first 10 years for marine construction companies. And now I have – since 2002, I've had my own engineering business, Green Mountain Engineering. I work primarily for reclamation districts, currently have seven reclamation districts, five here in San Joaquin County and two in Contra Costa County. So I work nearly every day in the delta. I got smart about three years ago, and I bought a jet ski. So I've been out on the water quite a bit, and so I see the

problem first hand. And I believe – it gets – it doubles each year. I think 2014 was double what it was in ’13. And I believe this year it will easily be double what it was last year.

And, Senator, I think you were hitting on something very important that they sprayed 2,600 acres of hyacinth last year of which they can only spray 3,500. And I didn't see much results in October of all the spraying, the 2,600 acres that got sprayed. There was still over 8,000 acres of hyacinth out there. And today much of it remains. You really can’t measure it in acres anymore because three-year-old hyacinth is much more dense than two-year-old hyacinth, which is more dense than one-year-old hyacinth. And that’s the way I identify it now is by the age, and pretty much however high it is, and how old it is. So it’s a big problem. As an engineer, I always try and solve problems, and I think it can be solved fairly easily and somewhat inexpensively.

Mr. Dunn was talking about booms. And the delta is unique in that it has tides, and the tides can help you to move the hyacinth. And putting a boom in front of Buckley Cove is in my plan here. I published my plan on my website, and I put $500 worth of plans out there for the public and the panel to look at. But it shows a boom picture in there which you can simply keep. For example, in downtown Stockton here, right about the I-5 bridge, two booms right there with an opening for the boats will keep all the hyacinth from coming in. And then, if you want, when the tide starts going out, you can transport it downstream a little bit, get it to select locations.

And as I said, I work for many reclamation districts. The hyacinth, when it’s pulled out of the water, it turns into native peat, exactly like the peat soil that we have out there. I’ve investigated piles of it, and I carry around samples of it in my truck. And it’s very good organic peat material, just by simply letting it dry out, just skimmed over a couple of times. So it’s not a nuisance at all. It does have some benefits. And you’ll see in my plan that I’ve got one

environmental enhancement component, which is restoring the tule islands. If you pile it up in large piles on the tule islands and let it compress there, it will restore what would have naturally developed in the delta on its own. So my proposal there – and I spoke to the Delta Protection Commission last week – I don't think that the spraying is going to help the problem this year. It's a localized prob – it's not a localized problem. It's gonna continue to get worse. So we are a state – local – reclamation districts are local state agencies. So it is possible, I believe, for Boating and Waterways to transfer funds. Most of my districts are low-budget reclamation districts. They spend their money on electricity first to pump the water off their island, cleaning their ditches to keep the water flowing within the islands, then rock and dirt, whatever is left over. So they are very frugal with their money. And one of my districts, Terminous Tract, has expressed some interest in helping me to try and find some funding to assist with the problem in the delta. Sycamore Slough, if you look at one of my – the last picture, I believe it's picture #10 – it's Sycamore Slough. That's the end of Sycamore Slough, and it's a mile solid of one- and two-year-old hyacinth, very heavy. It's not gonna float away. Mike Scriven says the only way to kill it is to spray it with a helicopter, but I don't think Boating and Waterways can spray it. It's gonna sit there. It's gonna sink to the bottom. And it's gonna give off quite a few shoots and start a lot of one-month-old hyacinth which doubles every year. The more hyacinth you can take out right now at this time of year prevents it from doubling. And an acre of hyacinth at this time of year will be 16 acres of hyacinth, at least, in October because, as Senator says, it doubles every 10 days. And that's assuming it doubles every month. So I believe there's a solution. I believe the money should be spent on large-scale removal projects. The booms, I think, would be a perfect thing for Boating and Waterways to maintain in select locations. You do have to get a permit from them for them. I think that they should just be established where they should be

put in, put them out there. And we'll have a couple more no-wake zones out there, but that's not a problem compared to having to navigate through this stuff.

One other concern I have is that with all this spraying, and pulling it out – Boating and Waterways says go ahead and pull it out – I had to pull it out of Buckley Cove on my jet ski because I, you know, launched it right in the jet ski; but if I touch that stuff, is that bad for me? I mean, if we take it out of the water and put it on our levee, does that have a chance of contaminating our drainage water or is it safe?

MR. CONLIN: It's safe. The chemical used – the chemical dosage we use, it's safe. The chemicals primarily used to treat the water hyacinth is simple Roundup, the same stuff that you use to kill crabgrass on your lawn.

MR. GULLI: Okay. So the reclamation districts, all these partners we've seen on this – on the screen here, no mention of the reclamation districts, and these are people that live and work and make their living in the delta. And we're here to – we can help as long as it doesn't cut into our budgets which are very, very tight. One other question I had for the Boating and Waterways was the bugs. I assume that the bugs that eat the hyacinth that's been looked into that they don't eat agricultural crops such as corn or tomatoes. I would guess that we've looked into that to make sure we're not introducing a species that could have a far larger impact than the hyacinth.

MR. CONLIN: As we said during the brief and Dr. Moran covered it during the USDA brief, they are plant specific. They do not eat anything other than the hyacinth in the case of the one that's set on the hyacinth. Or if they're introduced for some of the other plants, they are determined to be plant specific.

MR. GULLI: Okay, thanks. So, again, my plan is posted on two of my websites. One is savedadspoint.org. And the other one is greenmountaineng.com. They're there. Public document now, in the download section. And thank you, Senator, for all you're doing and your interest because the delta is a wonderful place.

SENATOR GALGIANI: Thank you. And thank you for your interest. And thank you for bringing handouts that you could share with everyone who is here today.

MR. GULLI: Yeah. Do you have any questions?

SENATOR GALGIANI: I don't. I heard your presentation at the Delta Protection Commission, too. Appreciate you being here. We have another 20 people on the list. I don't know if everyone still is here and wants to speak, but I'll go ahead and call your names off. Bill Wells with the Delta Chamber. Okay. Bill Pease?

MR. BILL PEASE: Thank you, Senator, for hosting this. It's been a long time coming. I, along with my partner, Ron Mize, own Rivers End Marina. And just a little background: we're at the south end of the delta. We're down in Byron by the Tracy Fish Collection Facility. We've been dealing with this problem for six years. Our marina has been completely closed down for three to four months during these last six years. We've tried to put a claim in to the Victim Compensation and Government Claims Board. We applied there. This is back for 2011 and 2012. We were denied because they said, well, your claim is a year old. We didn't know where the – where this board was. We, at this time put in another claim for the year '12-'13. We were denied that one, and I'll read the answer. Based on its review of your claim, board staff believe that the court system is the appropriate means for resolution of these claims because the issues presented are complex and outside the scope of analysis and interpretation typically undertaken by the board. They're gonna act on our claim September 19th. You don't even need to come to

the hearing. I find that appalling that we have a government agency that has ability to pay claims, or at least review and see if it's warranted, and then we're told to go through the state. We're – we've lost on approximately $60-$70,000 per year because of the water hyacinth blocking our entrance. The problem that we have specific to our location is we're at "mile marker zero" for the Delta-Mendota Canal, Tracy Fish Collection Facility. We're about a half mile away from the Clifton Forebay. When those pumps are running at about 9,000 cubic feet of water per second, you could walk along the levee, and the hyacinth is moving faster than you are. It's a – was a major issue for us. And that's part of the, you know – a boom situation isn't gonna do anything.

I want to commend the current staff at DBW. They've done an excellent job in trying to catch up in not only in our location but delta-wide. They have a plan now. They're working hard. It doesn't help us from a private sector standpoint because of the dollars lost. And we're not the only marina that's been impacted. I'm not sure how or where you could propose something, but I certainly appreciate the dollars that you were able to put into the budget to help their department. I would like to see some sort of a compensation budget of some sort, maybe provided to the claims and compensation board, specifically for marina losses, that can be documented, naturally. And allow that board to have the ability to do some hearings to help us. It's not only the loss that we have in a given year. In our particular case, we have a storage facility. We do a lot of recreational boaters come in, also fishermen. Well, they're going to other locations because they can't launch. We're losing storage customers because they say: well, we can't get in the water here, we're leaving. So they – and then they go somewhere else. They don't come back. And it's a very frustrating situation. I would – I don't know the big solution. I think that DBW did a great job down in our area to try and keep the waterway open.

They had five large excavators working. The federal facility at the Tracy collection facility has a conveyor. They had dump trucks working. Still can't keep up with it. Part of the mitigation, our marina was opened in the '50s, and part of the mitigation for the fish collection facility to be put there was that they would insure that we had access to the waterways at all times. How are we gonna sue the federal government? You know, how – who do we go to sue the state for the lack of the business that we're losing?

Again, I commend you for hosting this. And it appears we're on the right track. I'd like to see the, you know, that NASA is involved and all the other agencies working on it. But I certainly would like to see if you could introduce some sort of legislation and put some funding into the claims board and allow the private marina owners to at least have an opportunity to try and get some relief for the impacts that have been created due to no fault of our own. Thank you very much.

SENATOR GALGIANI: Thank you. Next: Wes Bowers, Kathleen Gapusan, Doug Sherman, Gary Rogers, and David Bubenheim. Any of, okay, okay. Why don't we go ahead and have anybody who would like to speak go ahead and come forward and start to line up. That might make it a little bit easier. If you can please be sure to tell us your name and whether you're representing yourself as an individual or as an organization.

MR. JACK MICHAEL: Thank you, Senator. I'm Jack Michael, Past President of Recreational Boaters of California, an organization of volunteer directors that represent the boaters throughout California; work very closely with our lobbying firm Desmond and Desmond in Sacramento and have done so for about 46 years to represent the boaters for the legislature. And thank you, Senator, for your time last week on this very issue. And I think you can get maybe a better idea with what you heard today in terms of our primary concern right now, that

being that we're happy with what you were able to help with in terms of getting the $4 million in the drought relief package so that the department has money to spend right now; but we think that the legislature needs to look a little further, evidenced by the testimony of the ag department and so on that the boaters are paying the largest share of solving this problem. And yet, the problem is a burden to the farmers, to the ag industry in its entirety, to the water agencies that provide the water for us. And we think there needs to be some work done to help some of these other agencies share the cost of this instead of just the boaters. As Richard Dunn indicated, boaters are probably 10 percent of the problem, but we're probably paying close to 90 or 95 percent of getting the solution done. So I urge you to, you know, follow that problem as the legislature moves forward and in the future years be able to balance that out a little more. Thank you.

SENATOR GALGIANI: Thank you. And your name and who you're representing?

MS. ANNA SWENSON: My name is Anna Swenson, and I'm from North Delta Cares out of Clarksburg, California. And what we do is we run a Thursday night meeting, every Thursday night except on Delta Protection Commission meeting night. And we've been talking about the water hyacinth now for over six months. And we've had lots of very informative engineers and scientists and people who are really knowledgeable in the delta come and speak to our group. And so I've learned a lot about the water hyacinth. And one of the things that hasn't been addressed today is the over conveyance or over allotment by five times in the delta. With less flow and less water, the system – the problem – less water in the system is making the hyacinth problem worse and worse. And that is something that hasn't been spoke – talked about today, and it hasn't been addressed. And that is one of the major, key aspects of this problem, is that we need more water flowing through the delta in order to push the water hyacinth out. The

more stagnant the water is, the more the water hyacinth is able to take hold. The other thing that I would ask of you is to please consider plans that come out of the delta from local delta residents and businesses. Local participation is something that is missing in many of the agencies and oversight in the delta, and it is vital. The people of the delta have an inherent value and they have an inherent need to be successful in the delta. So I think that more reliance needs to be put on local businesses and people in the delta to help have a more successful outcome.

There have been reports in our meetings, we've had lots of local residents that have come, and one of – actually two of the delta residents that came to speak with me told me that there were areas right in front of their property that were treated 19 times in one season. And they did not witness any change at all in the hyacinth that was in their area, except for their own manual pulling it out of the water. Nineteen times of a spray application in one area sounds excessive. And if they're spraying that much of a chemical in one area, I want to know what the cumulative effect of that spray is. Local projects such as Green Mountain Engineering and other locals have come and talked to our group about really innovative, inexpensive – innovative projects that can really be helpful that don't include chemical spray. And I think we need to move away from chemical spray, and we need to start focusing on things. There's even simple things like putting the hyacinth in dump trucks and compressing it that way and then being able to store it off site. But when you spray the hyacinth with all of these chemicals, I agree with Dominick, that what are the effects of that? You're now putting a plant that has been treated with these chemicals onto property, and I don't think there really has been done studies or really good information about what is – what we're doing to our environment, especially if agriculture is being grown in that product.

It is not expensive – it is not effective to spray chemicals such as 2,4-D, which is one of the ingredients in Agent Orange, which is the worse chemical ever created on earth. And also glysophate [sic] which is internationally known as a cancer causing agent. These chemicals are bad for public health, and as I am a mom, I really fear for the children of the state of California to being consistently, yearly, exposed to these chemicals. I don't believe that the research has been done effectively to discover what's happening and especially if it's internationally known as a cancer-causing agent. Why isn't California taking a more decisive stance in trying to figure out if that is true or not? If internationally it's known as a cancer-causing agent, why is California one of the few states that says it's not? The money that is spent on chemical applications is being wasted and when we have effective ways that are nonchemical that can eliminate invasive species. And the other thing I wonder is no one has ever talked about dredging. And it is my understanding from the scientists and engineers that have come and spoken to our group that the Er. densa does not survive in deeper level – in deeper water. So wouldn't dredging be a very effective, nonchemical method to eliminate the problem? And yet, I've never seen it in any of the reports from the Department [sic] of Boating and Waterways. I've never seen it as a suggestion that has been brought up. And to me, we need to start moving away from chemicals and start moving towards methods that are not harmful for our public health and not harmful for our environment. The delta is one of the most beautiful places on the face of the earth, and the idea of chemical applications 19 times in one area scares me. It makes me feel like we're not being good stewards of this environment.

SENATOR GALGIANI: Perhaps, Mr. Conlin…

MS. SWENSON: Okay.

SENATOR GALGIANI: … or Mr. Hard would like to respond to that.

MR. CONLIN: Sure. Not aware of any area that was treated 19 times. The biological opinion prohibits that. In fact, the biological opinion requires us to treat areas – 50 percent for areas where the water is moving and I believe it's 30 percent of the area for where it's stagnant. We have to take extreme precautions to make sure that we're not doing that. We do water sampling consistently and constantly while we're doing the spraying. The chemicals that are used include glysophan [sic], which is Roundup. Roundup has been found, most recently in 2012, by the EPA to be safe for use in the procedures that we're using it. It is under EPA study again this year. I think you're referring to the World Health Organization that said glysophan [sic] is probably carcinogenic. They did not make a statement one way or the other. That's a vague reference, and I will leave it up to the US EPA to make that determination. We have permits for use at the levels that we use it. In the case of 2,4-D, I'm reading right now from the 2,4-D technical fact sheet from the National Pesticide Information Center. Agent Orange, the herbicide widely used during the Vietnam War, contained 2,4-D; however, the controversy regarding the health effects centered around 2,4,5-T component of the herbicide and its contaminant dioxin. Agent Orange was a cocktail of several chemicals, including water. One of those chemicals was 2,4-D. 2,4-D was not found to cause any issues. In fact, 2,4-D, approximately 46 million pounds are used each year in the United States based on it being cleared by the EPA. In the same report underneath "toxicity levels," it states categorically, no human data were found on chronic effects of 2,4-D other than epidemiological studies of cancer occurrence. Although pesticide use has been linked to Parkinson's disease, respiratory disease in farmers, 2,4-D was not implicated in any relationships between pesticide exposure and subsequent disease. So bottom line, they have not found any linkage between 2,4-D and cancer in humans. However, I would, again, tell you that we do not use these chemicals without being

under extreme precautions in the biological opinions, as well as in our pollutant discharge permit that we receive from the water boards. And that's the reason why we sample, and we use it so – with such great precautions out there. That is also the reason why – and we get asked this all the time – why citizens cannot use any of these herbicides in the water or on the plants on the water – because we are held to very high standards. If the citizens use that, there is a potentiality that they would use it at dosage levels that were not authorized.

SENATOR GALGIANI: Rather than getting into a situation where we debate over this issue, it would probably be helpful if we could get your name and number and put you in touch so that you can continue to have the conversation – in the interest of having so many other people that still wish to speak, as well.

MS. SWENSON: So I have three more points. The "cookie cutter" harvesting method, the method that DWR currently uses, shreds the hyacinth. And in our opinion, that is dropping seed to the bottom of the delta which then will grow later. So the harvesting method that the DWR uses or the Department [sic] of Boating and Waterways uses, I'd like some clarity on that. And then the other thing is the proposed salt barriers that are going to be put in by DWR is just gonna also intensify the effects of the hyacinth. And for the North Delta, we're very, very concerned about that, that it's gonna intensify and bring the hyacinth back further up in north delta. And the last thing I want to say is that regardless, studies change, information changes, and I don't think the children of the state of California should be guinea pigs. And for future information that comes out that these pesticides and 2,4-D and glysophate [sic] are harmful for the environment, if we can possibly do something that does not include chemical spray, I think that that is a better answer. We don't want to be the fools in 20 years who say we sprayed glysophate [sic] all over the delta and now we've figured out that it probably wasn't a good idea.

I don't want us to be that state. I want us to be the state that said we were innovative, we figured out other methods. Chemical was our last choice. And we've, we've worked through this problem. We've saved tons of money. We saved the environment. We didn't expose our people to 2,4-D and to glysophate [sic]. That to me seems like a more sane and rational route to go to than just to rely on chemicals that are heavily lobbied, have heavy support, and can easily sway the movement and the way of scientific research. So I really encourage the Department [sic] of Boating and Waterways, and I encourage you to please, please try and find other methods that are non-chemical that can save the – that can eliminate the hyacinth but also can help the people of the state of California not to be exposed to chemicals. Thank you.

SENATOR GALGIANI: Thank you. Next, if you can please state your name and whether you're here as an individual or representing an organization.

MR. GENE COLVER: My name is Gene Colver, as the Deckhand's Marine Services. I really appreciate this forum and your time. I am a Vietnam disabled American veteran, and I see this as an opportunity. One of the things my company does, we are in production design. There is equipment available, design and make harvesting and managing and handling of this invasive species basically manageable. The eradication of it is probably not gonna happen as long as we still see hyacinth seeds for sale at Walmart. As long as you can go to any nursery, buy seeds in a package for your ornamental floating pond plants, we're fighting a never ending battle. This – the zone defense that was mentioned needs to be addressed on more than one front and not be held to chemical direction only, a mechanical direction only; it has to be managed, in fact, from all sides. Thank you.

SENATOR GALGIANI: Thank you. Thank you.

MS. BARBARA DALY: Hello, my name is Barbara Daly, and I live in Clarksburg. I live in the delta. And thank you for this opportunity to speak today and to listen to the panels today. It was very informative. I do have a couple of questions if that's also from some of the other panelists, but perhaps Mr. Conlin and Mr. Hard could answer these, as well. And one, I was wondering – I'm also – may I just include, I am on the advisory board of the Delta Protection Commission, and I did speak last week…

SENATOR GALGIANI: I remember.

MS. DALY: …at that meeting. And so I have a little bit of follow up to that today, as well. And I'm also part of North Delta Cares, which is Community Area Residents for Environmental Stability. So the questions that I have are for Mr. Moran. Are the decaying weeds an increase in the mosquito infestation? I didn't make that – I didn't hear that specific connection, but is that what's going on?

SENATOR GALGIANI: Thank you for coming forward.

DR. MORAN: That's what we've heard from the Contra Costa and San Joaquin vector control districts. And we want to expand this program to other mosquito vector control districts as well if we receive additional funding under the areawide project. But they've told us that they've seen the association between the post control chemical herbicide control and the mosquito population jumps up. They go in there, they abate the mosquitoes with the chemicals they use. And then it goes back down. But they do see that transient jump in the mosquito population. So we're investigating that and also the effect of the live weeds, the healthy weeds, and if – if just a long-term presence of the live weeds enhance the mosquito populations. That is something which has been reported in the scientific literature and other areas of the country and

the world. But we're studying it here in the delta now and hoping to use it as part of the implementation of the project.

MS. DALY: Thank you very much. Also, I have a question for Mr. Kratville. And I was wondering if spraying the tops of the hyacinth is effective in killing the roots of the hyacinth, or does it work differently with the hydrilla than it does with the hyacinth? Because he said the root system still lives on for seven years, I think you said.

MR. KRATVILLE: I do not personally have any experience in treating hyacinth. But the issue with hydrilla is the formance of a tuber, which is similar to, like a peanut.

MS. DALY: Mm-hm.

MR. KRATVILLE: Actually a growing bud which is sent – you can think of it just as a seed. But we can kill the actively growing plants. We can cut the actively growing plants. We can remove them. We have removed all the soil and lined ditches with cement. Those tubers in the soil, when they sprout, you again have hydrilla. And many other aquatic weeds do not have that feature.

MS. DALY: Thank you. One of the reasons I'm asking this question is because when I drive around the delta – which I do quite a bit – I see the brown tops of the hyacinth, but underneath it, it's clearly green. And so I'm just wondering about the effectiveness of spending a lot of money and a lot of pesticides and the results of that. But thank you very much. It would really be nice to know if that's true for hyacinth, as well.

MR. CONLIN: Hyacinth is a floating plant, so it does not dig into the soil…

MS. DALY: Oh, okay.

MR. CONLIN: …per se. So there are no…

MS. DALY: Wonderful.

MR. CONLIN: …tubers left in the soil.

MS. DALY: Mm-hm.

MR. CONLIN: However, if the plant flowers – one of the reasons why we spray it with chemicals – if it flowers, then it produces seeds. Those seeds can go into the riverbed, and they can actually survive for up to 20 years.

MS. DALY: Mm-hm.

MR. CONLIN: So one of the reasons why we spray is to stop the growth, stop it from flowering. And that's all part of what USDA is studying about: when do you attack the plant, at what stage of its life cycle, and what's best? The plant can also asexually reproduce. I mean, basically, if it survives, it can replicate just with the living portions of the plant. What you tend to see in the delta – if we spray the plant – the way the glysophan [sic] and 2,4-D works is it attacks the photosynthetic processes, as I understand it. So what you're doing is just like if you use Roundup in your yard; it starts to kill off the top of the plant and eventually it takes out the entire plant. So sometimes you see it in that process of dying before it settles on the bottom. What you may also see, as in some cases because of the cold weather, it just has a dormant effect where it kind of freezes the top of the plant and then it dies a little bit. In that case, the plant may still survive because all you've really done is you've created a dormant effect on it like your grass turning brown in the middle of the summer, you know, when it can't get water or turning brown in the middle of the winter when it's too cold. In those circumstances, when our technicians go out and they look at it, they can make that assessment. And if they think that that's what's going on, they can spray it. Granted, the spraying isn't quite as effective if you have a good green top because it has to absorb the chemical. But it will still cause the plant to die and retard growth. Okay?

MS. DALY: Okay, thank you very much. So I read on the – what was it called – the ingredients and the terms of use of the glysophate [sic], that farmers should not irrigate within 24 hours of the spraying. Is that taken into consideration when they go out and spray in the areas? Or do the farmers – is it up to them to know where and when you're spraying and that they shouldn't irrigate at the time within 24 hours of that? Or?

MR. CONLIN: We coordinate with local agriculture as well as the pumping agencies for those irrigation canals to make sure that they don't have the pumps on if we're gonna be spraying in close proximity. And also, we make sure that the farmers understand when we're spraying so that they're not drawing on the water with their own pumps in some cases and, therefore, bringing the water out. It's because of the fact that some of the chemicals have sensitivities to some certain plants that are up there. You know, for instance, we know in the case of glysophan [sic] that's really bad for tomatoes. If you spray it, it will kill the tomatoes. So we want to make sure we have good close coordination with them.

MS. DALY: Okay, thank you very much. And then I'd – I really appreciate that, thank you. So I do have one question about the NASA, all of the studies you're doing and the ability to – how you use them. So when you have the NASA pictures, what is the real time? Because you said that the hyacinth moves quickly with the wind, etcetera. So you're getting all these pictures as to where the hyacinth is and then how long does it take for that to get to you so in real time you can use that?

MR. HARD: Really, the great advantage of what they're providing right now is that it creates the ability to do modeling. Okay. And modeling means that it shows us growth patterns, and it shows us predictability patterns on where it may be going in the delta. So as far as being able to pick up a picture and say that's exactly where it is, run on out there and treat it…

MS. DALY: Not for that.

MR. HARD: …not as valuable for that. Although, there is some value because it does obviously give you a portrayal of the entire delta. And I believe every two weeks right now is what we're striving for right now in getting a download from them on this data.

MR. CONLIN: Right. So that every two weeks when the flight comes and provides the information there is gonna be a delay…

MS. DALY: Mm-hm.

MR. CONLIN: …in whether we're gonna be able to get out there because, as we know, there's two tides a day. And what's seen up above at that point in time, when you go out to ground truth it, unless it's connected to local reeds or…

MS. DALY: Right.

MR. CONLIN: …cattails, it would probably have floated away or gone somewhere else.

MS. DALY: Thank you. So you said that you would like more tools in your tool kit to try to handle this. So I have worked with Mr. Colver, and he has a way to – who just spoke – and he has a way to eradicate the seeds and to handle them gently, and to his mechanical means is – sounds like it could be very, very workable since the seeds are the delicate part of this whole plant for it not spreading. And then I'd like to also just make a comment on your discussion with Anna Swenson earlier about the glysophate [sic]. And I have a recent – which I have copies for you, Senator, as well – that says, glysophate [sic] is classified carcinogenic by the international cancer agency. Group calls on the US to end herbicides used and advance alternatives. And this is dated March 20th, 2015. So it just came out this week. And it says a national public health and environmental group, Beyond Pesticides, is calling on the US Environmental Protection Agency and the US Department of Agriculture to stop the use of the country's most popular

herbicide, glysophate [sic], in the wake of an international ruling that it causes cancer in humans. The International Agency for Research on Cancer released its finding today, concluding that there is sufficient evidence of carcinogenicity based on laboratory studies. And when – I won't read the whole thing, but I would like to give you copies. I brought about 10 copies.

SENATOR GALGIANI: Please.

MS. DALY: If I may?

SENATOR GALGIANI: Thank you.

MS. DALY: Thank you. And, but one of the last sentences in the second paragraph says, further epidemiologic studies have found that exposure to glysophate [sic] is significantly associated with an increased risk of non-Hodgkin's lymphoma. So, with that, being an advocate for the public on the Delta Protection Commission and the public health and safety, I would ask for your review of these mechanical means that haven't been looked at yet. They are – they definitely are an alternative and to really give them a chance…

SENATOR GALGIANI: Thank you.

MS. DALY: …to do their work. Thank you.

SENATOR GALGIANI: Points well taken. Thank you. Next.

MR. ROGER KELLY: First off, thank you, Senator, for everything you've done for the delta. I really appreciate it. My name is Roger Kelly.

SENATOR GALGIANI: Yeah.

MR. KELLY: I'm a lifetime resident. I live on the Calaveras, just west of I-5. That's what my place looked like last December.

SENATOR GALGIANI: Oh.

MR. KELLY: Okay? And so it looked like grass instead of water. That's just west of I-5 in between I-5 and Stockton Yacht Club. I – maybe I misread the spraying, but is the Calaveras listed as being sprayed?

MR. HARD: Good afternoon. How are you?

MR. KELLY: I'm good, Eddie. How are you?

MR. HARD: Excellent. Yes.

SENATOR GALGIANI: You know one another on a first-name basis?

MR. KELLY: Oh, yeah. Me and Eddie are tight [laugh].

MR. HARD: Roger, so site 8 is included in our annual email that goes out for communication. It does identify a large area. And as you pointed out last week in your email in the afternoon to me after that went out, site 8 probably should be clarified to show the Calaveras River is part of the treatment. It is part of our site, but given your process improvement suggestion, hopefully, this week when we send this out we'll have all sites identified within each – we have a numerical site rating – ranking. So at site 8 – so there's Mormon Slough, the deepwater channel, Calaveras River, Stockton waterfront, etcetera. So thank you, yeah.

MR. KELLY: Thank you. I'd like to say that last year Eddie did cure the problem, got it opened up. And since then, we've been in constant communication. This year, unfortunately, even after all the harvesting, we have small fragments of hyacinth. And kind of like they were talking earlier about the Arundo, it undercuts the levee, and it's all underneath there. And sometimes it's – if you looked at it from an aerial standpoint, you wouldn't see it. But we're a nursery area. We're gonna be deeply impacted if we don't get in the nooks and crannies. We're gonna look just like this. And so I'm really glad to hear that. I've even found hyacinth – being I'm a lifetime resident – I walked up the Calaveras, over the UOP foot bridge, over to Pacific

Avenue; and Eddie since has told me since Pershing after that it gets so shallow it's not navigable. There's hyacinth beyond there. I wanted to go to El Dorado and beyond, and I want to see where it ends; but, unfortunately, my time has not permitted that. And we need to find solutions to get that out because all that's gonna do is hold up there and build into solid masses. And hopefully, someday, we'll get a heavy rain; but that'll come right down to the next section of the Calaveras which, in turn, gets out to the port. And it's just problematic. So if we can find some way of treating the hyacinth beyond Pershing and look into that, I think there's gonna be great benefits in that. I would be glad if you'd be interested – I have a small boat – we could take a trip up there, and I could show you some of the stuff, if you're interested. It's not quite as big as Randy's boat – who took you out – but I would be glad to take you out. And people have been talking about the flowers. I'm gonna let something out that the commodore of my boat club has put together. We're gonna try to get the boating community to go out in small inflatables, kayaks, things of that nature; and we're gonna have a flower-picking day. We don't know when it's gonna bloom, so it's gonna be hard to set up. But we have several of the yacht clubs we've been talking to, and we think we could turn it into an event where it would be a win-win. The boaters would feel like they're helping out.

SENATOR GALGIANI: Mm-hm. Yes.

MR. KELLY: We could help curb the cycle. We'll let you know more when we know. But the problem is trying to track the flowers. So if you start seeing flowers before I do, please let me know. I send – today you have pictures from me. Senator, Eddie gets my pictures on a regular basis. I probably fill his inbox.

MR. HARD: Keep 'em coming.

MR. KELLY: I just have one quick letter and no comments on this. But Randy from the Stockton Yacht Club, who took you out for the ride, Randy Welch, he just – he would really like to be here, but this is his comment:

"I will not be able to attend the meeting of invasive plants Friday. I had a prior commit with my mother to take her places she needs to go; at 92, she needs help. I was disappointed that not more than just a few days' notice was not given, specifically after attending many sessions and hosting Senator on our boat for tours. I did not get a direct invitation via email but a link from you, which I appreciate, Roger. Our Stockton Yacht Club membership is quite concerned by a large number of healthy fragments that we're seeing in the Calaveras River, throughout the delta. Never has this been seen this early in the year. We have requested spraying at and around our docks that are nursery areas but have not gotten a planned response to our request. I would love to understand an umbrella grant so we could spray locally at our facility and help the large fight that we all have ahead of us. If each of the marinas and clubs assist in the effort, I could only imagine that we would be of help, especially in areas that are hard hit by access on the water staff. I wish you luck at the meeting and hope that we can all work through this in the fight for our delta and livelihood. Randy Welch."

SENATOR GALGIANI: Thank you. And please convey to him my apologies that he didn't get an invitation directly from us. And we'll make sure that he gets an invitation to the next hearing.

MR. KELLY: I will leave the basic premise for the flower-picking day with Marian.

SENATOR GALGIANI: Mm-hm. That's a great idea.

MR. KELLY: Thank you. Thank you very much.

SENATOR GALGIANI: Thank you.

MR. KELLY: I really – I'm – I support the delta. I'm an avid boater. And I really – I appreciate your support.

SENATOR GALGIANI: Thank you. Rogene?

MS. ROGENE REYNOLDS: Another person, unfortunately, on first-name basis. Thank you. I'm wearing two hats today. First of all, I am chairman of the board of Restore the Delta. We are a 10,000-plus membership nonprofit group that is seeking a swimmable, drinkable, fishable, farmable delta. That covers many, many things. But the hyacinth is one of the most important ones right now because you can't fish, you can't swim, you can't drink, you can't do anything with the water as choked as it is now. Thank you for your efforts, Senator, and thank you for Boating and Waterways for paying more attention to the words that you've been getting from people. I want to echo previous speakers' statements about flows. We're in a struggle in the state now with the drought, and no one denies that every drop of water is precious and is being argued over. But the delta needs flows. So anytime that any of you has the opportunity to advocate for that, I hope that you will. Not out of any selfishness, but out of long-term hope for the delta. Because without flows, we will only be choked by hyacinth. Now, I'm gonna put on my other hat. And that is a resident of the South Delta for all of my life. One mile north of Old River and one mile to the east of Middle River. And I brought some pictures today that I took in January. And I wasn't sure who I should give them to, and frankly, I'm still not sure. But I'm gonna give them here to Mr. Conlin, have him look at it. And I'm going to encourage you, as you were before, to work with reclamation districts. They look at those levees all the time. They're on those levees. They would be wonderful sources for information of where the hyacinth is. And my card is on these photos. I will take you to this stretch of Middle River. It looks like the pictures that you have of Sycamore Slough. Thank you so much.

SENATOR GALGIANI: Thank you. And Rogene, can you please say your name and organization?

MS. REYNOLDS: Oh, I'm sorry.

SENATOR GALGIANI: For the record.

MS. REYNOLDS: It's Rogene Reynolds. I live at [address omitted], and I am representing not only myself but Restore the Delta here in Stockton.

SENATOR GALGIANI: Thank you. Thank you.

MR. GARY ROGERS: Hi. My name is Gary Rogers. I'm a boater, and I'm a volunteer for Delta Weed Watch. Delta Weed Watch is a group formed by River Point and Village West Marina to find out where the water hyacinth is and then help Department [sic] of Boating and Waterways find it. So I'm gonna be out running around in my little dingy or my big boat looking for water hyacinth, taking pictures, getting locations, and reporting them. The other thing I'm doing is I'm visiting with other boating groups. I see a boater or a fisherman, I stop and tell them that the state has a place where you can report it and you'll actually get a letter back this year. Emailed back. So that's really nice, I appreciate that. And what I'm here is – I'm a tool. I will help anybody find the water hyacinth. I'm not gonna pick it out of the water, but I'll help you locate it. And I will be sending DBW emails virtually every day. I'm out on the water three or four days a week. I'm mostly retired, got nothing better to do. So I'm out looking for water hyacinth. Now, I was down at Whiskey Slough two weeks ago, and I was talking to the people there. And at one point last year, they were hauling boats at their expense that were in their storage shed over to Windmill Cove and paying to have them launched. And when the people got done boating, bringing them back because they could not get boats in and out of their marina. That was the only way. So, you know, and at our marina, I couldn't take my

boat out for three weeks. I was having – I was going through withdrawal. But the point is, you know, there's lots of people out there that are seeing it, and what Delta Weed Watch is trying to do is get the information of where to report it. I've got cards that I pass out with the reporting email address on that. And then our website also, you can send stuff there. But we're trying to help. So if …

SENATOR GALGIANI: Thank you.

MR. ROGERS: …if you need help on anything, your office knows who I am.

SENATOR GALGIANI: Thank you.

MR. ROGERS: I would be glad to help. But what we're trying to do is help find it so that you guys can get rid of it.

SENATOR GALGIANI: Thank you. That's why the task force is important because all of you have such innovative ideas that you're already moving forward with. Yes, we've been tackling this problem for so many years. Thank you. And with that, I believe that concludes our hearing today. Thank you very much for everyone who attended and for your patience and for listening and for your interest. And we will keep you informed when we are at a point where it's time to have another hearing. Thank you.

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