

# **CALIFORNIA LEGISLATURE**

*Informational Hearing*

## **Senate Subcommittee on Invasive Species Senator Cathleen Galgiani, Chair**

### **The Invasive Rodent Nutria and Its Effect on Our Levees and Agricultural Land**

State Capitol, Sacramento

**May 15, 2018**

**SENATOR CATHLEEN GALGIANI:** Thank you for joining us, and welcome to the Senate Subcommittee on Invasive Species, our informational hearing on “The Invasive Rodent Nutria and Its Effect on Our Levees and Agricultural Land.”

As of April 26, 2018, over 50 nutria have been found in California, some being found in Merced, Stanislaus, San Joaquin, Fresno, Tuolumne, and Mariposa counties. Originally from South America, this aquatic rodent is an imminent threat to our agriculture and water infrastructure. Nutria will eat entire plants, including roots, making it less likely the plant will grow back. Their burrowing causes infrastructure damage to the levees and canals that provide our ag land with water. We must find ways to be proactive to protect our ag products and water. Today's panelists will discuss what is currently being done and what needs to be done. We will also hear from someone who

has firsthand experience with the successful eradication of nutria in the Chesapeake Bay.

Thank you for being here today and thank you to all of our panelists for your participation in this hearing. As a reminder, if anyone is interested in making any public comment, we have our sergeants in the back; and they will take cards from anybody who's interested.

I would like to invite our first panel to come forward: Stafford Lehr, Deputy Director, Wildlife and Fisheries Division of the California Department of Fish and Wildlife; Kevin Masuhara, Deputy Secretary with the California Department of Food and Agriculture. Thank you.

**MR. STAFFORD LEHR:** Thank you, Madam Chair. Stafford Lehr with the Department of Fish and Wildlife. So today, I'm going to go over the Department of Fish and Wildlife's response and how we have been positioning to deal with this invasive species here in California. And I'll take any questions after the PowerPoint.

So as you began in your opening statement, these are large semi-aquatic rodents that are native to South America. They were introduced for the fur trade in the early part of the 1900s here in California, and they were officially declared "eradicated" by the late 1970s. They're rather -- Being a rodent, they are reproductive very early in their life stage, and the uniqueness is they can produce up to three litters per year, so anywhere from 4 to 13 individuals per litter. Later in the presentation, I'll show you a projected growth curve of a population.

They live in family groups, and their dispersal as individuals is less than or greater than 50 miles. Their habitat are freshwater and brackish habitats. And currently in California, they're regulated by the California Department of Food and Agriculture and the Department of Fish and Wildlife. So in the pictures, you can see a comparison of beaver on the left and a muskrat on the far right of the lower picture and the nutria in between.

So as you mentioned, they can consume large amounts of vegetative matter, up to 25% of their body weight each day, they consume 10 times the amount of plant matter. And they're known for severe erosion and conversion of a mosaic of habitats and wetlands to open water. They can burrow very deep into levees and banks of habitat; and as you can see in the picture, the open water that's created as they move through it and then the burrowing damage that can be sustained as they burrow into levees or habitat banks. They're known to carry transmissible diseases and parasites.

So the United States has been dealing with the nutria for quite a while, and some of the biggest infestations -- in Louisiana here. I think the easiest way is just to look at the pictures on the right-hand side. That is converted open water habitat. You can see an enclosure there in the lower right, showing what it should look like had the nutria not been there. So in Louisiana, they have a bounty of \$5 per tail. They have hundreds of trappers going out there. Over five million have been harvested, to the tune of about \$24 million; and about a 100,000 acres of coastal wetlands have been damaged.

Mr. Kendrot will go into better detail about the Chesapeake, but we had this from another presentation. So it just sums up that they had a very extensive operation that began with the Nutria Eradication Control Act of 2003. Their budgets -- Mr. Kendrot is going to have more accurate information on that. But, needless to say, in for the long haul, and it's quite costly to deal with this problem.

And focusing on the pictures, on the bottom, that's a heterogeneous habitat of wetlands -- and then the conversion to open water after nutria have infested an area. So this is the uniqueness of the Chesapeake Bay -- it is a peninsula with three sides contained by water; and they're very close to complete eradication there. You can see from the pictures the damage, again, to the habitat when nutria are in there and what it looks like when they're eventually removed as it recovers.

So California's story: In March of 2017, some reports started circulating, and we had an actual capture, and the animal was transferred to our Wildlife Investigations Laboratory in Rancho Cordova where the identification was confirmed as nutria. We began to put together a stakeholder-interested partners working group. It ran the gamut from local government officials to other state departments, primarily the Department of Food and Ag and DWR. We had also at the table the United States Department of Agriculture Wildlife Services because of their expertise in trapping.

As a result of that, the department made some decisions that we needed to get on top of this; we could not sit around. It's classic invasive species

integrated pest management. You want to get after an invasive when they're in a small area, and hit them hard. So we had to make a decision to go after these things. We have taken 63 animals as of Sunday. They range from juveniles to adults, males, females, and, as you mentioned, six counties. The most troubling one is the San Joaquin that occurred late last month. And they occur on federal, state, and private property -- so the whole gamut of what we have for different property ownership in California.

This map is showing where we have had nutria taken, from north to south in the San Joaquin system. The upper red dot right there is the most recent, most troubling discovery on Upper Roberts Island near the town of Lathrop. But anyways, this is the distribution as we know to date; and this is probably the most troubling.

So this is a population growth curve that our staff have put together. The confidence intervals range from about 55,000 to over 300,000. So this is sort of like just the . . . I'll just say this is the curve we've established that could occur if all conditions are ripe in California. And we are right about . . . We are right about here in the time frame. But we don't know what our numbers currently are, as I'll talk to you in a few minutes.

So in our response and to date, with limited resources, we are conducting trapping surveys; we're performing local outreach. We have interstate consultation with Oregon, Washington, Louisiana, and Maryland; and we have been allocating and redirecting internal resources to respond to

this. We're seeking partner commitments. We cannot do this alone. And we are preparing the eradication plan based upon the Chesapeake Bay plan.

So right now, we have implemented an incident command structure where we have an incident commander who is reporting to an executive oversight team. We have redirected approximately 40 staff to the incident command system. We have positioned the internal funding, and we have secured one grant for \$1.2 million that will be used over a three-year period. We are trying to enter into a contract with USDA APHIS Wildlife Services for focused eradication efforts, and this will be strictly overseen by the incident command structure. Our primary goals are protection of native species -- and only legal trapping methods shall be used in California. We hope to draw from their expertise from the Chesapeake Bay program. We are beginning to train and deploy nutria detection canines. And then we need to, as we said, enlist partner agencies' assistance as we move forward.

So the response in California would be modeled after the Chesapeake Bay operation, which has five phases: survey, knockdown, mop-up, verification, and surveillance. Just to re-emphasize, this is in for the long haul. This is not going to be an easy lift.

So challenges and needs in California: The availability of long-term funding and resources. There is access issues with private property. Currently, the department must seek voluntary permission or written permission from a property owner to enter that property. If someone chooses to refuse entry and they have a population of nutria, that's a weak point in an eradication

program. We need to establish and maintain an effective surveillance network and then, assuming we are successful, we need to prevent reintroduction.

Some people have asked, “How the heck did they get back here? We declared them eradicated in the late 1970s.” I’ll be honest with you. Given the landscape where these were found in the area of Stanislaus County, the number of boots on the ground for over 50 years conducting various habitat restoration efforts, wildlife surveys -- we would have seen something. So most likely, vector was intentional reintroduction.

There's no certainty, either way; but there's a lot of habitat work that's been going on, numerous duck clubs where people are on the ground all the time. And to miss this animal for over 50 years, from an ecologist's standpoint, it's a little unlikely. Anyways, I'll take questions; and thank you very much for the opportunity to present today.

**SENATOR GALGIANI:** Thank you very much. And our next panelist?  
Thank you.

**MR. KEVIN MASUHARA:** Thank you, Madame Chair. Kevin Masuhara, Deputy Secretary, Department of Food and Agriculture. As Deputy Director Lehr indicated, there was a nutria discovery last year; and so his agency contacted our agency. And we have a little bit of capacity here and there, but it's intermittent, and so we have some staff that have expertise in similar type of survey work, and so they immediately got engaged. Unfortunately, all we could really offer up at that time was an environmental scientist and a pest prevention assistant. Both of them are very well-versed, though, on getting out

on the water and doing survey work because we have similar programs that go on. And so, once they got engaged, they went out; and they had a lot of various activities they participated in.

I don't want to belabor the point. I'm just giving you this as background so that when we have a discussion of what our budget proposal and the May revise is, then it'll give you a sense of proportionality of what we'll be able to do going forward if that proposal is approved.

So they did survey work looking for visual signs on waterways of the presence of nutria. They videotaped nutria in the wild. They were actually able to get some footage of them in the San Joaquin River. They hung cameras. They baited stations next to the cameras -- they found that sweet potatoes were the most preferred bait to bring these things out -- and then they moved and serviced the cameras every two weeks. They collected photos of nutria and confirmed the presence in McConnell State Park in Merced County and shared this information with the Department of Fish and Wildlife for follow up. They tried out a nutria scent-gland lure that they got from the USDA Chesapeake Bay Eradication Program. However, they did find that the lure was more appealing to foxes and raccoons than it was to the nutria. They built two wooden resting platforms based off of the design used in Chesapeake Bay. And so, we do know that we will need a lot more platforms; and that is part of our budget request going forward was that was incorporated in, as to be able to buy more cameras and to build more platforms.

In August of last year, our department finalized a pest rating for nutria; and it was given a pest rating of “A,” which is a severe pest and has to be addressed immediately. So we've conducted modeling of nutria distribution and habitat and climate suitability, and it indicates that California is highly suitable for establishment and spread of nutria. They have proven to be a significant agricultural pest in other parts of the world, so we have high confidence that that would be the experience here if these were to become established. They've caused extreme environmental degradation to wetlands around the United States. And based on that, we have a very valid fear that that could happen in the Delta. As well, a lot of other groups that are very concerned about the Delta have the same fear with nutria becoming established here. They've caused extensive damage to waterways, water storage and conveyance, as well as adjacent right-of-ways. Of particular concern would be the thousands of miles of earthen canal, dikes, and levees, compromising much of California's irrigation infrastructure. So you can imagine, something like this becoming established in the Delta and then even moving farther north into rice country, the devastating impact to agriculture.

So our department's very well aware of this, and that's why we're very engaged early on in this. In November, we did send a letter to Fish and Wildlife to support their efforts, and our staff has been on some of the incident command calls, and there's been cross briefings with Fish and Wildlife staff to keep up to speed as to what's going on.

As I mentioned earlier, though, we've only had the two staff available and on a part-time basis because they do have other duties that they're required to perform. So what we have done recently, though, is that we have had a couple phone calls with Department of Fish and Wildlife staff. Our staffs collected a lot of information, and we put together a proposal that went into the May revise. What we asked for was \$400,000 for two years. Basically, what we want to do with the \$400,000 -- and so, hopefully, this will tie into what I was talking about earlier with some of the limited activities that two people could do part time -- is this is going to ask for one full-time environmental scientist, and then we're going to ask for two Agricultural Techs and three Agricultural Tech 1s. We have kind of a structure where the Ag Tech 2s would serve as boat captains, and the Ag Tech 1s would be surveyors. And so, we would get two boats out on the water. We'd purchase two boats, actually, with this money, the \$400,000. We'd also purchase 15 motion-triggered trail cameras and three mobile GPS units, and then supplies to construct hair snares.

If we do get that budget proposal approved, once we get that funding, what we'll do is we will be able to get out and focus on land survey for nutria; and we'll get the teams out on the water. All three of the crews will have GPS units and cameras to gather data on the nutria sightings. The motion-trigger trail cameras will be deployed and baited with nutria attractant scents, as well as food items like the sweet potato I mentioned earlier. We'll check the cameras at two-week intervals with memory cards being pulled and reviewed for any sign of nutria. The survey crews will perform visual surveys for any

signs of nutria or their damage when they're moving from site to site. Resting platforms will be constructed and deployed with and without hair snares to collect hair that can be analyzed for genetic proof that the area is being frequented by nutria and not a non-target animal.

As I mentioned before, we've had a lot of coordination with Fish and Wildlife. So the proposal here with these teams, we would set up a structure where they would have constant interaction and briefings with the Department of Fish and Wildlife so that they could share the findings of the survey work, and also just receive updates on other new areas possibly to redeploy and to do survey work. That's what we're going to do if we get this \$400,000.

**SENATOR GALGIANI:** Thank you very much. I look forward to seeing that. Senator Dodd, thank you very much for joining us, I appreciate it. Do we have any questions? Okay. Thank you very much for your presentation.

Next, we have from the USDA, Stephen Kendrot, Deputy Director for Wildlife Operations.

**MR. STEPHEN R. KENDROT:** I get to fly solo up here. Give me one second to -- alright. Here we go. Well, you will see ample evidence of our prior collaborations with your folks here in the state. Many of the slides that you're about to see, you've seen parts of already in the other presentations.

My name is Steve Kendrot. I'm a wildlife biologist with the United States Department of Agriculture's Wildlife Services Program. I've been with the agency for about 19 years now, since '99. From 2002 to 2014, I was privileged to lead the field operations as a project leader for the Chesapeake Bay Nutria

Eradication Project. And I'm here today not just representing Wildlife Services, but the entire partnership that brought the Chesapeake Bay program to fruition. I've got a slide on that in a few minutes that I'll go in more detail on.

This is a picture that should look familiar to you. This is Blackwater Refuge prior to the introduction of nutria in 1938. In the early 1940s, nutria were introduced as part of an endeavor to establish a fur trade. The species existed at relatively low levels for approximately 20, 30 years. In the 1960s, it began to transition from novelty to nuisance. As that population continued to grow, it turned into a nemesis. In 2010, by that time, we had lost virtually 50% of the emergent marshes that comprised Blackwater National Wildlife Refuge. So over 5,000 acres have been converted to the shallow open water ecosystem; and that's a loss of habitat for a tremendous diversity of birds, mammals, invertebrates, shellfish, and fish that support both commercial and recreational fisheries. So a huge economic impact as well as ecological impact to our region in the Chesapeake.

Other types of damage for us in Maryland: The most obvious was the loss of wetlands; but we also saw a lot of burrowing into levees, water control structures. Blackwater Refuge has water impoundments that they use to fluctuate water levels for waterfowl management -- a lot of damage to those through the burrowing and tunneling. Agricultural crops where we had interface of ag lands with marshlands would see damage to soybeans and corn crops, nursery horticulture-type damages in other parts. And then the indirect effects of loss of wetlands: Increased impact from storm surges, saltwater

intrusion, that sort of thing that further compromises the integrity of the ecosystem there.

Interestingly, this picture is not from the Chesapeake Bay but, rather, the Netherlands, where I was last summer, looking at similar issues they have to what I think you'll be dealing with here in California where you've got this extensive network of levees and water control. They're trying mightily to prevent the invasion of nutria from neighboring Germany, where the populations are well established.

This picture illustrates the results of work that was done in the mid-1990s, trying to prove the critical role that nutria played in causing this sort of catalytic response of wetland loss. They put up a series of several dozen of these 30x30 meter pens that had fence that was buried into the marsh and would exclude nutria. They monitored the vegetation growth inside and outside. And as you can see, within a year's time, the marsh had begun to respond. So we took two messages home from that. One is that if we can control nutria, we can not only prevent the continued degradation of wetlands but actually encourage the recovery and the restoration. This was really the pivotal study that led to the inception of our Chesapeake Bay project as it stands.

So the Chesapeake Bay Nutria Eradication Project is comprised of a large number of federal, state, private, and NGOs that support this endeavor. The program is administered by the US Fish and Wildlife Service and funded by the US Fish and Wildlife Service through their Partners in Fish and Wildlife

Program as well as the National Wildlife Refuge System. The program is implemented by the organization I work for, USDA Wildlife Services. And we do all of the field implementations, so all of the field staff work for USDA. And we transition the funds to support that through an interagency agreement.

We get support, tremendous support, and oversight from our state partners as well as other federal partners for research. We have the Maryland Department of Natural Resources, Virginia Department of Game and Inland Fisheries, and the Delaware Division of Fish and Wildlife. We also work with the Patuxent Wildlife Research Center at USGS, University of Maryland Eastern Shore, which at one time had a cooperative fish and wildlife research unit there, but also -- we don't even have them all pictured here -- several dozen NGOs that supported the initiative. So broad support -- and really, I think that this partnership is really what led to the success of the program because we were able to maintain the political support and the funding throughout the program. And it would have been very difficult to do with just a single agency working alone.

I'd like to take a quick second to talk about "eradication" because it's a pretty significant term. It's not something that's easily accomplished in most cases. But it's really the complete removal of all individuals of a species from a defined area over a specified amount of time. And that's much different than "control" or long-term sustained management where you're continually trying to suppress numbers to keep them from causing damages -- like they are doing in Louisiana. This effort is to eliminate them entirely.

So in order to be successful at meeting eradication, several criteria must be in place. You have to be able to put every single individual in the population at risk, particularly considering the fecundity and the reproductive abilities of nutria. They can rebound very quickly. Mortality must exceed reproduction. You've got to kill them faster than they can breed. And then finally, the risk of re-invasion must be near zero. Because we were on a peninsula and the nutria population that we had was actually introduced on site, we felt that the risk of re-invasion was pretty low for us unless we had somebody that was actually physically bringing them across the Chesapeake Bay, or whatnot.

But there are three other components that are equally as important to those biological criteria: And that is that the techniques that are used must be both acceptable -- but also, importantly -- effective. The benefits have to outweigh the costs. And I think it's pretty clear when you start looking at the economic impacts of the damage these animals cause to multiple industries and the ecological impacts, it's a pretty easy bar to hop. Then finally, the institutional support must be declared at the beginning and maintained throughout the entire program. It's a really difficult thing to do when you've reached the later stages of an eradication where the capture rates drop to very low numbers; and accountants and bean counters like to look at the amount of money spent to capture each nutria -- it increases astronomically as you approach your goal. And very often support is withdrawn at that point, figuring, "well, we're almost done; we can divert these funds to other avenues and other priorities." Sadly, in a few cases worldwide, that's resulted in failed

eradication attempts, where the remaining animals that were not removed rebounded. So those three things are critical, as well.

You've seen the slide in a previous version already. Delimiting survey is the first stage of eradication, trying to figure out what the extent of the population is. The size isn't necessarily as important as the geographic extent. The knockdown phase is the first initiative to reduce that population to as close to a near-zero population as you can, followed by mop-up efforts. Usually, this is done on a management zone approach. So you do a knockdown in one area, then move to another area, come back and mop up the first area after you've knocked down the second area, and kind of rotate around those management units. Following the mop-up phase, there's a verification period where you go in and you surveil these, applying all of your detection methodologies to try to determine the presence of nutria. If you do find them, you kick back to the mop-up phase; and you repeat that cycle until you no longer find nutria. After some period of time -- which is up to the managers running the program -- of verification without a detection, you move into the surveillance phase, which is long-term monitoring. Another component of that is biosecurity. So if you think that one of the issues might be the deliberate reintroduction of nutria, then putting in place laws that may prevent that or strategies that may provide early detection of those kinds of releases, that would be part of a biosecurity program.

I'd like to talk a little bit about the integrated methods. There is no silver bullet when it comes to eradicating nutria. We relied on a whole suite of

different traps and hunting techniques to remove nutria but also, importantly, a whole suite of techniques to detect nutria. This was a valuable learning experience for us. When we first started, we were charged with reducing the populations as quickly as possible; and we didn't get a whole lot of support, nor did we really recognize the importance of developing tools to detect nutria at very low densities. As it turns out, that is the most challenging part of an eradication campaign.

To list the tools that we used: Counter bear traps were probably our most important body-gripping type trap. We captured probably 80% of the nutria removed in that type of trap; but also, we did use foothold traps. We did use hunting, both with dogs and just tracking them in the snow during the winter months. When it comes to detection, you heard a little bit about the platform that we developed with hair snares. We used remote-triggered cameras. Good old-fashioned boots on the ground and eyes on the marsh with folks walking the marshlands, patrolling the streams and waterways to search for tracks in the mud.

In the early stages, for the removal we used dogs to actually hunt nutria and that aided in our removal process. In the later stages of the project, in the verification phase we've actually trained specialized detection dogs, which are not designed to capture nutria but rather to detect their presence or confirm their absence. Not that you can ever prove something is not there, but they greatly increase our confidence that when we sweep through an area and don't

find anything, the dogs not finding anything is a much stronger indication that they're not there.

Staffing is critical. This is a small component of the team -- at one point, we had close to 20 people working on this project full time, as many as 15 wildlife specialists plying the marshes at once. Funding has varied over the years; and ranks of the team has swelled and shrunk over time; but we always strive to have 10 to 11 field specialists out there checking traps and monitoring and detecting throughout the entire program. It requires a dedicated staff in the sense that these folks should be dedicated to the mission of eradicating nutria and not a collateral duty or alternate priorities, but it also takes on the individual level quite a bit of dedication. This is some tough work, extremely inhospitable habitats. It's challenging to find the evidence of nutria in this type of stuff. In Maryland, we had large expansive wetlands that we had to cover every inch of -- a tremendous amount of work but with significant rewards. You know, this was an area we found that was heavily damaged by nutria; and after removing just a few dozen animals and coming back a year or two later, seeing that restoration, it was really rewarding for us. It's not too often you get to work on a project that has this kind of legacy potential, to restore habitat and leave something better than we found it. So it was a very rewarding project for us.

The lessons that we've learned: Funding is a big one. The original nutria control act of 2003 authorized an expenditure of \$4 million a year in Maryland for five years. We never received funding at that level; the most we ever received

was about one and a half million. After the sequestration in 2013, it dropped to just under a million; and we've slowly been kind of getting back some of those funds to build our team back up again. Had we been funded at that original level, I suspect we would've been where we are today quite a few years ago. But because of the amount of funding that we did have to work with, it was fewer people to cover a larger area. That was one issue.

Another recommendation: We got so caught up in the removal process that we didn't spend a whole lot of time documenting the actual damage and showing the recovery. We got a few before-and-after pictures, as you've seen; but a more rigorous means of documenting that damage, I think, is critical in really showing the cost of dealing with nutria and what the cost of doing nothing would be.

Identify the challenges early: Again, we did not foresee the challenges that we would have in detecting nutria at very low densities until we were dealing with nutria at low densities. It's hard to develop new tools for detection and conduct research when you don't have study animals to work with. These types of things -- developing detection techniques -- should really be developed throughout the entire process of eradication, rather than something you come up with at the end when you hit the verification phase.

Integrating research and innovation: We did everything we could think of, including Judas nutria, where we radio-collared Judas nutria that were sterilized, released them into the marshes -- where we thought we had trapped them all -- and tracked them. Lo and behold, in some cases, we found

evidence of other nutria. The hair snares that we developed, the use of camera traps, that sort of thing -- a lot of innovation was key there.

So if I were to hit the five or six key factors that I think has made us successful so far . . . And to be clear, we have not yet declared an eradication; we're still in that verification phase. We've probably got another two years of verifying to make sure that we don't have any nutria left. However, this month marks the third year without a detection since the last nutria was caught and removed in the Chesapeake Bay zone.

The key factors to our success to this point have been: that effective and committed partnership I told you about earlier; a dedicated staff who have a singular mission; the integration of multiple methods for both removal and detection; the ability to innovate; and an adaptive management. You'll find as you go through that you'll encounter challenges you never anticipated; and being able to sort of adapt to those needs is pretty critical; and it's key for the folks that are in the field, the ones that are carrying out the mission, have the freedom to make those on-the-fly adjustments.

Another key one, for us was huge, was buy-in from private landowners. More than half the nutria removed were taken from private land surrounding the complex of federal and state lands that formed the core of our eradication zone. So without the support of private landowners, we never would have been successful.

Another key thing -- that I think you guys have some materials on -- is the result of an external review. We contracted with an outside company to

come in and take a close look at what we were doing and provided some invaluable advice. I think you've been provided with a report that resulted from that.

And finally, persistence. You just have to stick with it. I think that's my last slide. Just in time for the celebration outside. Happy to take any questions.

**SENATOR GALGIANI:** So can the nutria contract rabies?

**MR. KENDROT:** Any mammal can contract rabies, yes. It's not terribly prevalent in nutria that I've encountered, but any mammal is capable.

**SENATOR GALGIANI:** Okay. Through this whole process, did you have any opposition from any wildlife animal groups or other organizations that you needed to work with to address any efforts to stop?

**MR. KENDROT:** We did not have tremendous opposition. There was concern, of course; and frankly we were concerned as well about our impacts on non-target species and that sort of thing too, because we're in this for the conservation aspect. But the ecological imperative for what we were doing was so overwhelming. You could see . . . Anybody driving through Blackwater Refuge can see the damage that's been done, so there were not a lot of folks who were willing to come out in support of maintaining a nutria population. Now, contrast that with mute swans, which were a similar problem in the Chesapeake Bay.

**SENATOR GALGIANI:** With what? I'm sorry.

**MR. KENDROT:** “Mute swans.” It’s a beautiful, big, white bird. They do a lot of damage to submerged aquatic vegetation. The state of Maryland implemented a similar eradication control program around the same time we started this, and that attracted a tremendous amount of opposition. And perhaps that was a bit of a distraction from the nutria for us, but we did not have tremendous opposition.

**SENATOR GALGIANI:** How many years was the whole process from start to finish, or until now anyway?

**MR. KENDROT:** So the eradication campaign in proper began in 2002, and it continues today. We anticipate there’s probably at least two more years of validation or verification that need to be conducted without any detections before we feel comfortable declaring that eradication has been achieved. That'll put us at right around 20, 18-20 years -- much longer than your typical eradication program. Most eradication programs are very short and limited in time. But they're often conducted on much smaller, island-type habitats and are often conducted with toxicants that quickly remove an entire population -- of Norway rats or house mice or other rodents. With a program like this, which is essentially conducted on the mainland environment with traditional tools that are used by fur harvesters, it’s a much more hands-on approach; and it takes a lot more resources. The project actually began with a short, about two-year pilot study in advance of when we started this; so it's been going on since about 2000.

**SENATOR GALGIANI:** So in California, we've discovered or detected 63. How is that in comparison to the numbers that you had originally seen when you first started your program?

**MR. KENDROT:** So I did not provide the little summary that I should've probably.

**SENATOR GALGIANI:** It's okay.

**MR. KENDROT:** At the end of the program, we had removed nutria, about 14,000 nutria, from over about a quarter million acres of wetland habitat along the Chesapeake Bay. I'm not sure exactly how that compares to the sites here in California. I'm very eager to get out in the field tomorrow and take a look at your environment and see what it's like.

But at one time, Blackwater estimated that it supported somewhere in the vicinity of 35-50,000 nutria. By the time we started our program, they literally had eaten themselves out of house and home. So the habitat that once supported those numbers was no longer there, and we believe that there is also some natural decline in the population occurring. We were able to capitalize on that. So 14,000 sounds like a lot; but it actually, I think, pales in comparison to the numbers that had been there previously in the peak of the population of the, probably, '80s and '90s.

**SENATOR GALGIANI:** So do you have a sense of what the number was that you had originally when you started the program?

**MR. KENDROT:** You know, it can change; that's the trouble with estimating nutria populations, they can change. They can double in a year,

90% die off over a single hard winter; so it's a very difficult population.

Assessment is not an easy thing to do with nutria.

What we found was the most effective way of assessing the population size . . . And this was the effort of the original research project. They were doing a mark-recapture study where they go out and capture animals and put an ear tag on them, they release them, and then they go out and trap again; and they see what proportion of the animals captured have an ear tag. And from that they can extrapolate the population size. That was very difficult to do. By the time we started this, what we found was in about a month's time we could trap about 95 to 99% of the nutria out of a specific area; and that was probably the most accurate way to count the number that were there.

But because it was taking place over such a long period of time -- 14 years for the removal part -- it was very difficult to estimate what populations and other watersheds were doing during the time until we got to those. So I'm afraid I can't give you a reliable estimate of the population size when we started.

**SENATOR GALGIANI:** Okay. Well thank you very much for your presentation. If you could please remain seated. I'm wondering if we have any questions or comments from any members in the audience who would like to come forward. Yes.

**MS. NOELLE CREMERS:** Good morning. Noelle Cremers of the California Farm Bureau Federation. I just wanted to say thank you to the committee for having this. It's [inaudible] an important issue. Those of us in

agriculture in the Central Valley are very worried about finding nutria -- the potential expansion and the damage that they will cause to our water infrastructure, as well as crop damage. And so we would urge all state agencies to work together with a role in this to help eradicate nutria and use all available tools necessary to do that. Thank you.

**SENATOR GALGIANI:** Thank you. Any other members from the audience? Okay, with that, that concludes our hearing for today. Thank you to all of our presenters. And I'm certain that this won't be the last hearing that we have on this issue. Thank you.

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