# Using New Mexico's AIS Management Plan and Legislation to Protect Our Aquatic Resources

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**Editor's note: The following paper represents an unedited version of the speaker's remarks at the conference.**

Thank you everybody. My primary position within the Department of Game and Fish is conservation strategy coordinator. To give you some background, every state has a Conservation Plan, sometimes referred to as the State Wildlife Action Plan. Congress mandated that every state have a plan with a coordinator, and I am New Mexico's coordinator. I help implement the plan and do good things for wildlife. The cool thing about it is that the mandate also comes with state wildlife grants, and New Mexico gets about $1 million a year, which requires a 50 percent non-federal match, so I get to double $1 million into $2 million to do good things for species and conservation. As was mentioned yesterday concerning the state's budget, I now also get to be the state's Aquatic Invasive Species Coordinator, which is a gift. It is a massive undertaking and I just started in this position in late May, so I am barely at the six-month mark with this mission.

To start, I would be interested to see how many people here are from the Office of the State Engineer? One person. Alright how about from the Bureau of Reclamation? A couple of people. How many from the Army Corps of Engineers? A couple of people. I'm guessing Fish and Wildlife or State Parks staff are also involved. How many of you like to fish or boat or recreate in New Mexico's waters? I've hit just about everybody. Municipalities, too, are important and I know they are represented here as well. This means you all are on the frontline with me in slowing the spread of AIS, or aquatic invasive species, in New Mexico.

What is AIS? Essentially, it is any non-native plant, animal, or pathogen that can harm our economy, environment, or the health of plants, animals or humans. Rainbow trout is not exactly a native species, but it is not considered an aquatic invasive species because it provides recreational opportunity. I want to make that distinction right off the top, otherwise I will get in trouble with our Fisheries Division. In New Mexico, we have at least 100 non-native species. Our Agriculture Department takes care of all plant species that are non-native whereas Game and Fish has just been granted the responsibility for any and all aquatic invasive species and those are numerous.

To give you examples of a few AIS that are of concern: Asian Clams; Whirling Disease as it skews fish that are infested with it, skews their swimming pattern, and makes them, among other issues, much more vulnerable to retardation; non-native crayfish; Eurasian watermilfoil; and Didymo (rocksnot) found in the upper Pecos drain and in the Rio Hondo. I have to thank the New Mexico Environment Department and their folks who have been going out to test surface water quality and

collecting samples to give to Fish and Wildlife for confirmation of identification.

Other AIS of concern include the New Zealand mudsnail and what are referred to as Dreissenid Mussels, or Zebra mussels, which I will be focusing a majority of my time on because of their devastating effects (Fig. 1). We have native clams and mussels in New Mexico, but the way you can identify a Dreissenid mussel is that they have hairs that allow them to attach to boats, water treatment plants and grates, and almost any kind of material. That's what gives them away. We are also concerned with Quagga mussels, which are also devastating (Fig. 2).


Figure 1. Dreissenid Mussels

Figure 2. Quagga Mussel

How did these non-native species get here? Zebra and Quagga mussels arrived in the late 1980s and are believed to have come in through ballast water on ships from the Caspian Sea into the Great Lakes. Initially, we thought they would be confined to the Great Lakes, but they started spreading south and then east. We thought they wouldn't make it past the 100th meridian and we would be okay since we don't have the same kind of weather as in the east, but unfortunately we were proven wrong and they have spread faster than anyone thought they would.

In 1988, their distribution was fairly well defined, however they are very prolific. During optimal growing conditions, one adult female can release one million eggs, the fertilized eggs quickly mature, and the cycle continues. So how did they make it past the 100th meridian? The best and easiest way is via boats coming from different places and climates. The photo in Figure 3, I believe was taken at Abiquiu Lake. Figure 4 shows a veliger on 20 lb monofilament fishing line found on the boat in Figure 3. Unfortunately, recreationists and biologists are most guilty of spreading AIS because we go from water body to water body and we aren't decontaminating between trips because we aren't aware that we are harboring AIS. We are really good at spreading it ourselves. The juveniles or veligers drift for about 20 days as plankton before settling.


Figure 3. Mussels Rapidly Spread from one Lake to another Via Boats

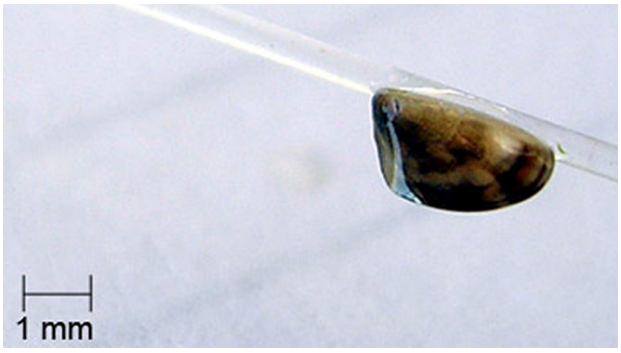


Figure 4. Veligor on a 20 lb Monofilament Fishing Line

What are the impacts and why are we concerned about these mussels? For one, we are worried about their impacts to native wildlife. The top left photo in Figure 5 shows habitat loss, shown as substrate covered in Zebra mussels; they will pile on top of each other or on top of anything. The bottom left and right photos show Zebra mussels attaching themselves to freshwater mussels not allowing them to open, which basically starves those native species. Their effects on native wildlife can be devastating.


Figure 5. Impacts to Native Wildlife

I'm sure many of you have seen the photo in Figure 6a of the propeller covered in mussels. Boats in particular that have been left in infested waters for multiple months carry the mussels and the longer the boats are in the infested waters, the higher the chance of them becoming infested and spreading more mussels (Fig. 6b-6d).

Figure 6a. Damage: Propeller Covered in Mussels

Figures 6b.

Figure 6c.

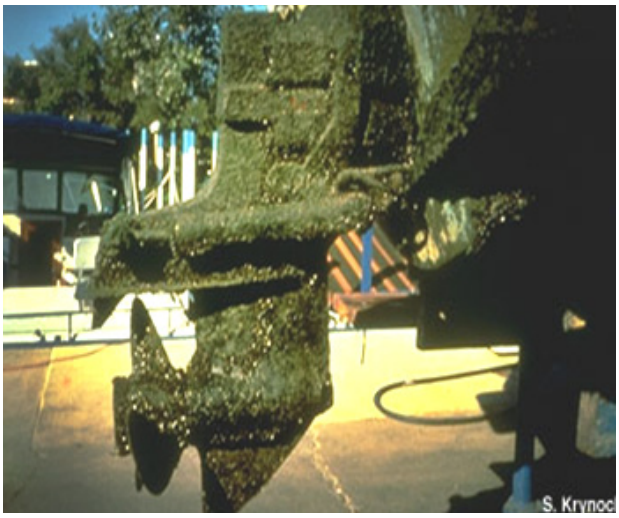


Figure 6d.

Water delivery systems can become contaminated with AIS. Mussels can attach to metal pipes and grow on top of themselves in the pipe or they can attach to glass and obstruct vision. The mussels can obstruct water control and delivery systems such as the trash rack and Penstock gate has shown in Figure 7. There is a trash rack in the Los Angeles municipal water district where they are very familiar with this issue as they spend millions of dollars on maintaining their equipment before it gets infested with Zebra mussels. The Bureau of Reclamation is having problems partially with clogged screens on water delivery structures. It is hard to imagine that this could occur, but it is happening. Waters that we thought were safe, given the biological range these species should be able to live within these species, are quickly proving in the West that they are expanding their range of water quality and water temperature in which they can survive. These mussels require some of the highest levels of calcium to build their shells so we thought calcium would be a limiting factor. We thought they wouldn't like salt water, or high temperatures, or certain pHs, and people were trying to use the chemistry of the water to understand their vulnerabilities. But they are proving us wrong and evolving very rapidly unfortunately.

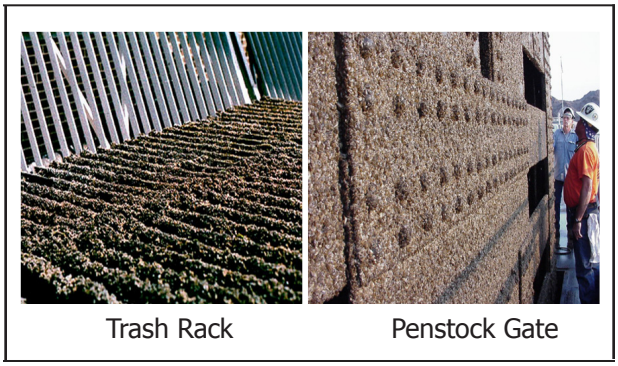


Figure 7. Damage: Obstruction of Water Control & Delivery Systems

Zebra mussels are very difficult to manage. Management, not eradication, is the name of the game and that is too bad. A lot of money is going into investigating how to better control and/or eradicate a source population of mussels. Unfortunately, nothing has proven very effective and the effort is very costly and intensive. We could drain all of our lakes, because no more water means no more mussels, but that would be a problem for other species as well, and every solution has a consequence or multiple consequences. As far as we know, we don't have any zebra mussels in New Mexico, and we are one of a few states remaining that is not infested with mussels. We are surrounded though by states with infestations. Texas has not confirmed that they have infested waters, but Oklahoma has infested waters, Colorado has infested waters, and Arizona does, so we are in a sense an island surrounded by infestations and we are trying to keep these mussels at bay as long as possible. If and when they do get here, it will be about management, not eradication, unless new technology is developed, but this in itself would cause huge infrastructure costs in just management. Figure 8 shows how quickly the problem spreads. In Parker Dam on the Colorado River you see that in three months, the substrate sample went from a few mussels to many. To check on the mussels, we float different items in the water, and later check what is growing on the item. So far we have no mussels on our substrate samplings. In Colorado, in just three months, it is just unbelievable what happened, but it is what is occurring.


Figure 8. Fast Increase in Population Density - Parker Dam, Colorado River

AIS economic costs in the U.S. are at least $109 million annually. Nevada's Park Service has spent $1.9 million in 2007 alone. Utah spends about $15 million annually; Idaho currently spends $56 million on trying to get rid of whirling disease. People in this field talk about homeland security and this effort should be under the Department of Homeland Security given how costly it can be. Essentially everyone in New Mexico will be impacted because our waters are connected. We don't have many isolated lakes, and if something upstream or from Colorado, since we are downstream, gets infested, there will be no way to keep the veligers from moving toward us. Their job is to move so they will be coming south into the

lower water systems. If they get into the San Juan-Chama system, they will get into Abiquiu, Cochiti, and so on until they arrive in Elephant Butte. This would be a nightmare worst case scenario, and it is something that I am hoping I won't be around for since Albuquerque gets a lot of their water from surface water and the costs will be transferred to the water users, and of course, irrigation is another concern.

House Bill 467 was unanimously passed in March 2009; before that, nobody had jurisdiction or authority over AIS in the state. By the end of May, I shifted my duties to start spearheading this effort. The Act relating to Game and Fish provided the authority for control and prevention of the spread of AIS in New Mexico and it was declared an emergency. Let me talk about a few things the act does. It is unlawful to knowingly transport AIS into the state and within New Mexico's borders. Most people do not know that they are spreading it, but if you have a boat that has been in Lake Mead, you know the storage tanks inside the boat are probably infested with veligers. When your boat gets into New Mexico's waters, it releases those veligers into our waters. Even if the outside of the boat seems clean, it does not mean that the boat is uninfested. To knowingly transport AIS is illegal and a misdemeanor.

The main part of the Act gave the director of New Mexico's Department of Game and fish, in consultation with our Energy, Minerals and Natural Resources Department and the New Mexico Department of Agriculture, the authority to designate AIS, designate what water bodies are infested, and to specify decontamination requirements. In addition, both Game and Fish and New Mexico State Parks are authorized to create regulations as necessary to implement and enforce HB 467 and that is partly because both agencies have law enforcement capacity.

We have four main targets in terms of how we are going to approach this issue. By the way, Game and Fish has very little authority over water or any water bodies in the state. Eagle's Nest Lake is the only lake that we have any major impact on, so the name of this game requires coordinated collaboration and funding. Right now I have been working diligently with the Army Corps of Engineers, Bureau of Reclamation, Fish and Wildlife Service, New Mexico State Parks, and most recently with the New Mexico Environment Department. Recently, I received a request from the Department of Transportation to instruct them on how to decontaminate their equipment when they go into different water bodies with their big machines. Their help will be wonderful.

First, education is the name of this game. We must get people to understand what AIS is and its impacts. They must understand what they can do to prevent and/or mitigate its spread in the state. Interdiction right now is voluntary. The Corps, State Parks, and Bureau of Reclamation provide voluntary boat inspections. If you decide you don't want to get your boat inspected because the line is too long or what have you, we really cannot stop you unless we are concerned about your boat because you are from an infected state. Otherwise inspections are voluntary. Interdiction and stopping infested boats from entering our water bodies is huge because most of our boat ramps are open 24/7 and are not manned. So if you have a dirty boat, you can bring it in at midnight and no one can stop you, and this is a huge problem. We must realize the effects this will have on our recreating public and tourism. We don't want to make going to our lakes a miserable experience, but we need to balance that with the significant threat, particularly with boats from other states that are considered high risk.

If a boat is infested, we need to provide a service to decontaminate it, which is a huge undertaking right now. We also must monitor our lakes and waters for veligers in order to get a heads up on whether an infestation exists. This requires collaboration across the board with state, federal, municipalities, private enterprises, boat marinas, and all the other players involved. Another issue is funding. This authority came with no funding so it is an unfunded mandate right now, which makes it really tough. What we need to do requires a lot of money and a lot of people.

We approach education through a variety of means. Our department and others have developed different print media including informational brochures and 50,000 rack cards placed in every state park. We have an AIS coloring book and we included information on the back of hunting and fishing regulations. We have billboards around the state instructing boaters to clean, drain, and dry boats and equipment. We use newspaper ad space to get the word out and we are trying to figure out how to best use that space. We are also working with a Minnesota group that has some funding for billboards and they want to help New Mexico. We are trying to get funding for billboards around Navajo Lake and Elephant Butte Reservoir. That

is not to say that the other lakes aren't important, but right now, Elephant Butte and Navajo Lake are two of the most high risk lakes given their boater numbers and their location.

We are also working with social media. You may have heard a radio spot last summer that I did in Santa Fe. We got great feedback and we are looking into doing more of those as well as public service announcements, particularly over holiday weekends when we get most of our boater traffic. We are focusing our efforts on boater traffic. There is a five-minute TV segment on New Mexico Wildlife, a TV program produced by the Department of Game and Fish. I will be working with the Chief of State Parks at Elephant Butte to film a one-minute infomercial on AIS. We'll be showing life jackets, boater safety, and AIS maintenance equipment to get the word out. We are going to have a presence at outdoor expos and other types of wildlife or recreation events. I will be presenting information as I'm doing here to lots of different entities to keep different agencies and individuals aware of what's going on. If they want to work with us, that would be great in getting the word out. The Army Corps of Engineers have a pretty cool video on YouTube on how to deal with AIS.

Interdiction is our second target and is the front line of defense and that means marina owners and managers. They must keep an eye out, talk with boat owners, and performing inspections. State Park staff and their officers will help train marina owners and while they are checking boater licenses, they can talk about AIS and make sure the public is informed. Volunteers, public support, and watercraft user support also are definitely important.

Our third target is risk management, which is essentially what this is all about – educating the public and educating boat owners to inspect and "filter" vessels at key launch ramps. If a boater is high risk, hopefully we will be more thorough with them, and if a boater is low risk, we'll let him or her on their way to enjoy our waters. We must engage stakeholders and here the really important thing is coordination across borders and jurisdictions. I am involved in some western and national efforts on this. It is really interesting because there are boats that slip through – basically in every state it is illegal to transport AIS – but it is still spreading because somebody is illegally transporting AIS, and we all are aware that it occurs. There is now an effort for when a "dirty boat" leaves a water body without being decontaminated, everybody keeps track of where that boat is. I will get emails on when and where a boat called "Sunshine" is moving from Lake Mead north to Idaho and where we think it is going next. I always chime in that I hope Sunshine goes north and not east. It's interesting to see people out there who are concerned citizens and who say they are worried and take part in tracking the boat's plate number. The law enforcement aspect is cool given their surveillance and monitoring techniques.

Currently, trained personnel, per the statute, is anyone who has completed the Fish and Wildlife's AIS watercraft inspection and decontamination training, level 1 or level 2. If you are level 1 trained, all you can do is inspect the boat. I am level 1 trained. If you are level 2 trained, you can actually dig in and decontaminate, and currently, about 140 people in the state are level 1 trained, mostly staff from State Parks and Game and Fish. We have seven people in the state who are level 2 trained and who can decontaminate a boat. Level 2 training requires that you go to Lake Mead, and I will be going there in two weeks so I can learn how to decontaminate a boat and I probably will decontaminate a boat at some point. We are looking at revising state statutes so that perhaps we can start training level 2 people here rather than sending them to Nevada, which is really not within our capacity. Currently, state statute also says that only trained personnel of Game and Fish or State Parks may affix a warning tag to equipment or conveyance where there is a presence of AIS, or if equipment or conveyance is leaving infested waters. Unfortunately, this really limits the Bureau of Reclamation and the Army Corps because they don't work with Game and Fish and so they can't tag a boat. We are looking to change that statute language as well to say that as long as you are trained you can tag a boat. Tagging a boat means it has to be decontaminated before it enters New Mexico's waters. Once we have a boat that is infested, after it has been inspected and tagged, it requires decontamination.

I'm sure some of you here heard about Navajo Lake and the infested houseboat that Lake Mead sent us in May. Figure 9 is a map of Navajo Lake State Park, and for those of you not familiar with it, the top part of the lake is in Colorado and under the jurisdiction of the Bureau of Reclamation, which is where multi-state coordination comes in. The photo on the right shows the bottom of that houseboat, and it came from Nevada through Arizona and

was literally about to get in our waters. It was on the ramp before the manager of that marina, at 7:30 that night, just happened to be on the ramp and stopped them to look at the bottom of the boat. He had gone through level 1 training so he knew what to look for and was certified to inspect. He was able to stop that boat, otherwise it would have been in the water and would have infested it.

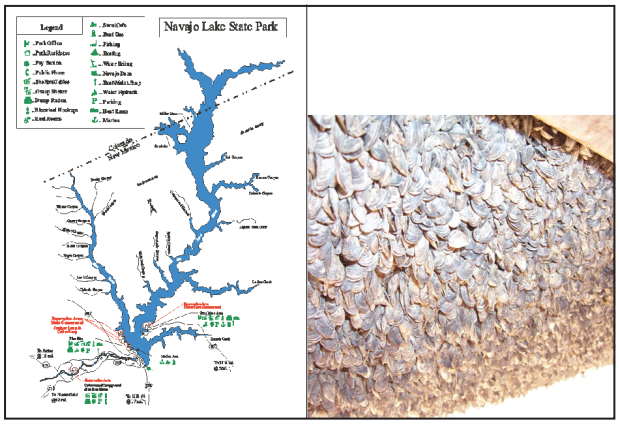


Figure 9. House Boat Found Contaminated Upon Inspection at Navajo Lake State Park

Figure 10 is a photo taken by Mickey Porter of the Army Corps of Engineers of James Sandoval who is with the Fish and Wildlife Service. James is decontaminating that houseboat using equipment borrowed from Colorado because we don't have decontamination equipment in the state yet. So you see that this is a multi-federal and multi-state coordinated effort. Game and Fish is required by statute to create requirements for decontamination. I believe those requirements were signed the day before we decontaminated this boat, which was very convenient. Our Website contains the requirements for decontamination of boats infested with Zebra and Quagga mussels. We can't say these are requirements across the board, they are very specific to species but we do have them for Zebra and Quagga mussels. Also, being released of liability prior to decontamination is a very important step because we use high pressure water between 300 and 350 psi at a minimum of 140° F when it hits the boat and comes out of the device a lot hotter than that. It is a fairly intensive process and if there are issues with the boat, we might not know about those issues until we are in the process of cleaning, and the boat could spring a leak, which happened on this houseboat. So it is very important that we sign a release form prior to touching a boat.

New Mexico Department of Game and Fish
Aquatic Invasive Species
Requirements for Decontaminating Warning
Tagged Conveyances and Equipment Infested with
Quagga or Zebra Mussels


Figure 10. Decontamination of a Houseboat

Our fourth target involves early detection and monitoring. We are monitoring our waters with both PCR and microscopy. Currently, we are sending samples to Denver to be tested and are trying to find local labs in New Mexico to do PCR testing for us to hopefully reduce some costs and the coordination efforts in mailing everything to Denver. We also use artificial substrate samplers where we just pull them up from the water and see what's going on.

In terms of collaboration, national, federal, state, and local stakeholders, there is the 100th Meridian Initiative, the point of which was not to allow Zebra or Quagga mussels to get past the 100th meridian. There are also western and national AIS taskforces. I have already mentioned our federal partners and many of the state partners, and local stakeholders such as sport fish organizations, New Mexico Bass, all those groups that are interested and involved. It is important that they stay that way as well as concerned citizens and private businesses.

The New Mexico Aquatic Invasive Species Advisory Council was formed two years ago and just recently met in July. The council was divided into five subcommittees: Inspection, Decontamination, and Enforcement is one large subcommittee; Research and Monitoring; Infested Waters Protocol (when that designation is made we need to have solid ground to stand on which will be based on Research and Monitoring); Information and Outreach (getting the word out through our

agencies that can pull resources and funds); and the Stakeholder Advisory, which is concerned citizens and marina owners giving us feedback (it is very easy for us to get stuck in regulations and how to make this work, and it is great to hear from bass fisherman exactly what kind of impact we will really make as we don't want to create horrible restrictions on people who are just trying to do the right thing).

Because we put together an Aquatic Nuisance Species Control Plan, we are eligible for an official wildlife grant and we received $34,677 that will go toward research, monitoring and outreach. It's not much and won't go very far, but it is something. We also have Boater Access funding available from Game and Fish and State Parks and it requires a 25 percent non-federal match so we are using that as well. In addition, we are working on compiling a list of all marinas, marina owners, conservation groups, RV entities, and anybody who could be interested or involved in this effort and who might want to contribute either to outreach efforts and get some free advertisement, or to donate toward the purchase of decontamination equipment. A mobile self-contained unit costs about $26,000. The permanent infrastructure for drive-through decontamination units costs around $200,000. We'd like to purchase some but they are not in our current budget. American Recovery and Reinvestment Act funds were utilized by the Corps to hire seven temporary park rangers and continued funding was requested for FY 10. We are scraping up funds when and where we can to increase our capacity.

Looking ahead, we need to continue with training efforts, get more people level 1 trained, get more people level 2 trained, or modify level 2 training requirements so people don't have to go to Nevada. We are also working on refining our monitoring and testing protocol that could be improved. We are developing an infested waters protocol and have some rough drafts of that floating around; when we have something more coherent, we will be sending it out for review. We also need constant and close coordination with basically everybody. One of our issues, and I don't know how we are going to address this anytime soon, is that decontamination is expensive. We need to set up a system where boat owners pay to decontaminate their boats as they do in most states. We must develop decontamination guidelines for other AIS; we need to put something together for Rocksnot and get that information on the web. We need to purchase decontamination equipment; hopefully we will have that at the start of the year.

Another issue is determining suitable decontamination sites. Because we are using hot water, and the process requires a lot of water leaving significant wastewater, we have to determine how best to dispose of that waste. This is tricky to say the least. And we also need to dispose of the solid waste such as mussel shells. Because we use PCR testing, we are testing for DNA of these aquatic Zebra mussels in the water, and if these shells get into the water, the DNA is in the water and thus we will think we have infested waters. It is really important to keep any DNA of these species out of the water. We don't want to decontaminate right on the beach, but we want to do the procedure close to where that boat was trying to get into the water. Hiring a full-time AIS coordinator is something I really hope we can do by next fiscal year.

Aquatic Wild is one of our educational outreach programs for school children and we are trying to incorporate AIS into early education for younger people. We will continue presentations and events, working on the billboards, and we very much need to expand our Web site. We are discussing doing an AIS hotline where a concerned citizen or anybody who is worried about a boat or any kind of equipment being infested can call and leave a message and we will follow up. The message could be done anonymously.

For more information, our current Website is http://www.wildlife.state.nm.us/publications/press_releases/documents/2009/040609ais.html, or you can contact me. I am happy to speak with you individually or give a presentation to any group or coordinate with any group. With that, I will take any questions.