



State Aquatic Nuisance Species (ANS) Program Summary for Colorado Legislators per SB 08-226



Colorado Parks and Wildlife January 2015

The Colorado Parks and Wildlife's (CPW) Aquatic Nuisance Species (ANS) Program has concluded its second boating season as a fully merged statewide program. Prior to the July 1, 2011 merger of the former Division of Wildlife (CDOW) and Colorado State Parks (Parks), the two ANS Programs operated independently per SB08-226. Over the last three years, the program has phased in integration including staff functions, program services, protocols and procedures, and field implementation. For the purpose of this report, the activities occurring from 2008-2011 are attributed to the former CDOW and Parks agencies independently. Activities occurring in 2012, 2013, and 2014 boating seasons are attributed to CPW.

Background

Zebra and/or quagga mussel larvae were identified in eight reservoirs in Colorado in 2008 as a result of a multi-year statewide sampling effort conducted by the CDOW, in partnership with Parks, the U.S. Fish & Wildlife and the U.S. Bureau of Reclamation. Zebra mussels, and their close relative quagga mussels, are highly invasive aquatic species that negatively impact plankton communities, fisheries, and water based recreation; in addition to threatening our water storage and distribution systems for municipal, industrial and agricultural use.

The State Aquatic Nuisance Species (ANS) Act was signed into law May 2008. The Act defines ANS as exotic or nonnative aquatic wildlife or any plant species that have been determined to pose a significant threat to the aquatic resources or water infrastructure of the state. It makes it illegal to possess, import, export, ship, transport, release, plant, place, or cause an ANS to be released. The Act allocated funding to ANS programs in both the former CDOW and Parks. It provides authority for CPW to certify individuals as authorized agents qualified peace officers to inspect, and if necessary, decontaminate or quarantine watercraft for ANS. It also provides authority for trained authorized agents to inspect and decontaminate watercraft for ANS.



Quagga mussels covering the shoreline at Lake Mead in Nevada

The Parks Board passed regulations required by the Act on February 20, 2009. The rules require mandatory watercraft inspection, and if necessary, decontamination of all boats coming in from out of state, leaving known positive waters in Colorado, and those boats entering high-risk water where inspections and decontaminations are required by the managing agency. The rules set the standard for watercraft inspection, decontamination, impoundment, sampling, monitoring, identification and reporting.

The CPW Invasive Species Coordinator began on July 1, 2008. The CDOW internally reallocated resources to create a fulltime position to coordinate Invasive Species activities statewide. The Invasive Species Coordinator oversees implementation of the State Zebra and Quagga Mussel Management Plan (ZQM Plan), along with a variety of other invasive species management duties, such as noxious weed and forest pest coordination. The backbone of the ZQM Plan includes containment and prevention through watercraft inspection and decontamination, sampling and monitoring, education/outreach, communications and information, and applied research. CPW provides ANS support to all waters of the state, and to all inspection stations, regardless of

jurisdiction. Services provided include site-specific planning, training/certification, watercraft inspection and decontamination, quality control assessments, data collection development and support, law enforcement support, educational materials, workshops and conferences, sampling/monitoring, ANS identification and cost-share opportunities.

The ANS Act authorized 7 FTE to State Parks for ANS. One FTE was designated the ANS Program Coordinator for Parks. This position was moved to the Aquatic Section in the merged CPW Invasive Species Program. As provided for in the ANS Act, Parks hired 6 additional full-time employees to oversee watercraft inspection, decontamination and education at select Parks. Only 3 Parks FTE remain active today, as the other positions have been abolished per agency budget reductions.

Program Goal

The goal of the program is to protect the state's natural resources, outdoor recreation and water supply systems through prevention of new introductions and reduce the spread of costly invasive species, specifically ANS such as zebra or quagga mussels, in Colorado.

Current Status of Zebra and Quagga Mussels in Colorado

- Pueblo Reservoir State Park tested positive for zebra or quagga mussel larvae (veligers) in 2007, 2008, 2009 and 2011.
- Granby Reservoir, Grand Lake, Shadow Mountain Reservoir, Willow Creek Reservoir, Tarryall Reservoir and Jumbo Reservoir all tested positive for one zebra or quagga mussel veliger in 2008. There have been no verified detections at any of these waters since 2008.
- Blue Mesa Reservoir tested positive for quagga mussel eDNA in 2009, 2011 and 2012 by the U.S. Bureau of Reclamation.

De-Listing Positive Waters in January 2014

Colorado adopted the western regional standards for listing and de-listing water bodies for zebra and quagga mussels, as documented in the *Western Regional Panel's Building Consensus Effort's* August 2013 Denver meeting summary document. In doing so, Colorado de-listed Granby, Grand Lake, Shadow Mountain, Willow Creek, Tarryall, Jumbo and Blue Mesa in January 2014. Therefore, the only positive water for quagga mussel veligers in Colorado is Pueblo Reservoir. There are no positive waters for zebra mussels in Colorado.

Additional Aquatic Nuisance Species in Colorado

- Eurasian watermilfoil (EWM) – Known to many Front Range locations and the Rio Grande. The Colorado Dept. of Agriculture requires management per the State Weed Act. Currently EWM is controlled with herbicides at a few Parks and other locations. Watercraft inspection and decontamination containment programs are in place at a few Parks.
- New Zealand Mudsnails (NZMS) – First detected in Colorado in 2004. Angler education campaign is in place to minimize spread. Snails continue to be found in new locations annually. In 2013, they were discovered in Fountain Creek in Colorado Springs.
- Rusty Crayfish – Three known locations are being mechanically controlled through removal efforts. Regulation prohibits the live transport from known locations. Education and information is ongoing. There were no new detections of rusty crayfish in 2013.
- Waterflea (*Daphnia lumholtzi*) – First detected by CPW in Colorado in 2013. Waterfleas are now known to be present in 13 Colorado water bodies and Pueblo Hatchery. CPW is currently working with the Fish Health Board to evaluate this species.

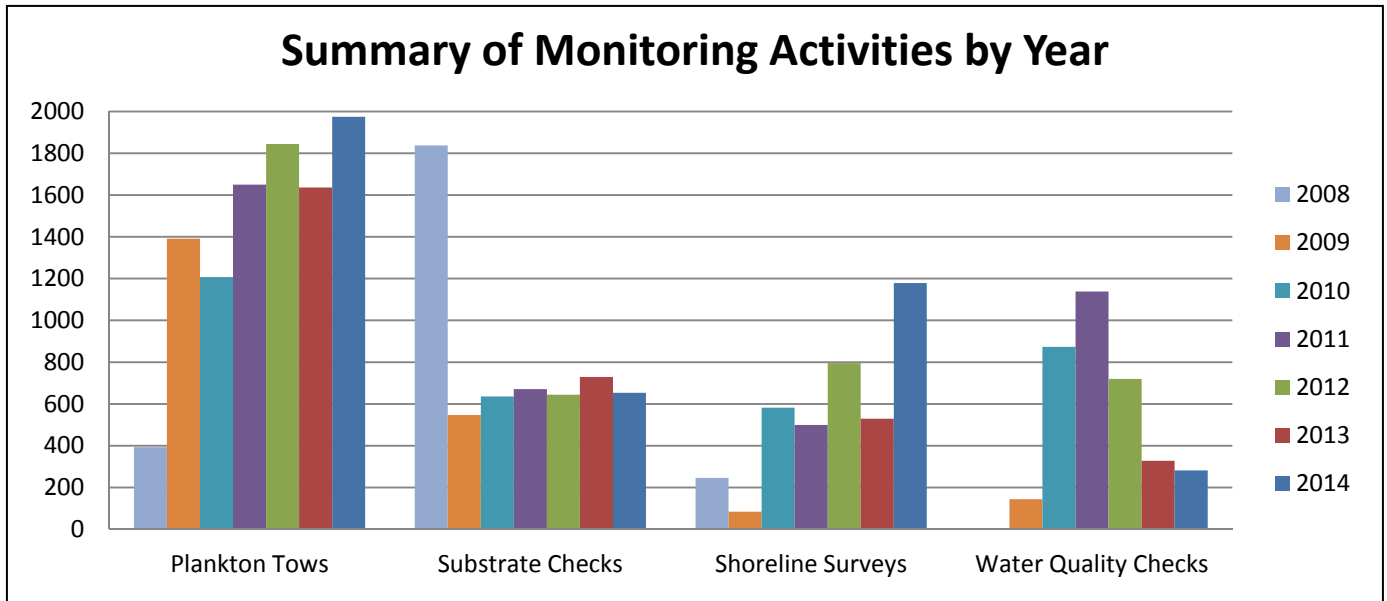
2014 Program Activities:

Sampling/Monitoring

CPW has sampled 421 “at-risk” waters for aquatic invasive species over the last nine years. It was through this sampling program that invasive mussel veligers were first detected in Colorado.

CPW staff monitors the state’s public waters for numerous invasive plants and animal species, the focus of sampling is on early detection of zebra and quagga mussels. As such, the state follows a three-tier sampling protocol targeting the three life cycles of the zebra or quagga mussel: (1) conducting plankton tows to find the veligers, (2) deploy and check substrates to find the juvenile “settlers” or attached adult mussels and (3) conduct surveys along the shoreline and existing structures for settled juveniles or attached adult mussels. The state requires three steps to identify, verify and confirm identification of zebra or quagga mussel veligers (1) visual analysis of plankton tows using a cross-polarized light microscope (2) DNA verification utilizing polymerase chain reaction [PCR] and (3) DNA confirmation utilizing gene sequencing to confirm genus and species.

In 2014, crews sampled 177 standing and approximately 8 flowing waters statewide. In addition to the sampling efforts performed by Colorado Parks and Wildlife, the National Park Service contributed 58 Plankton Tow samples. A summary of the sampling efforts by Colorado Parks and Wildlife can be seen in the graph below. Substrate and water quality checks remained consistent with the previous year. Shoreline surveys saw a spike in 2014 resulting from full shoreline inventories of two locations. Plankton Tows also saw an increase as the plankton tow protocol was expanded to accommodate sampling for waterfleas in addition to invasive mussel veligers.



CPW completed the development of an online ANS sampling and monitoring database in 2013. The system allows tracking a sample from collection to final identification, including the results from microscopy, PCR testing, and gene sequencing. After two years of use, this system will be enhanced prior to the 2015 sampling season to accommodate new sampling procedures and increase the reporting capacities of the application. These database enhancements will further our capacity to better communicate with our partners and reservoir owners/managers regarding our efforts specific to their water bodies.

Updated Zebra and Quagga Mussel Risk Assessment in 2014

As described above, CPW’s comprehensive early detection strategy provides for monitoring of the state’s public waters for invasive species. Field implementation of sampling and monitoring (e.g. frequency and quantity of monitoring), in addition to resource allocation for watercraft inspection and decontamination is largely based on a 2008 risk assessment, which identified 168 total lakes and reservoirs divided into very high risk waters, high risk waters, medium risk waters, and low risk waters.

Updating the original risk assessment includes a two-part analysis consisting of the risk of an invasive mussel introduction from watercraft (the likelihood mussels will be introduced to a specific reservoir or lake) and risk of establishment (could invasive mussels survive and reproduce at a specific reservoir or lake).

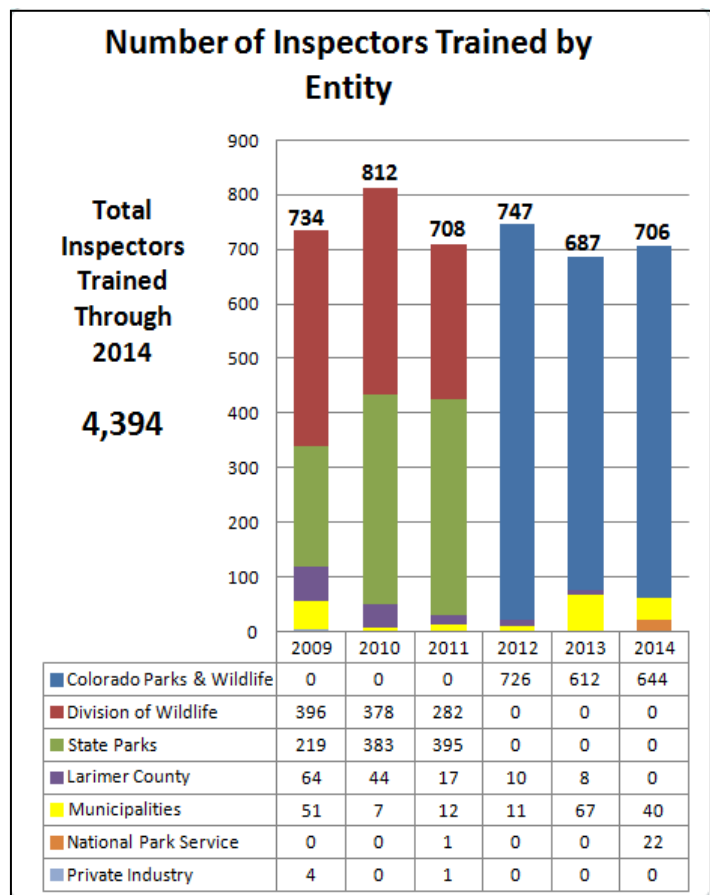
Over time, the state has collected data through both the watercraft inspection and decontamination program, and from sampling and monitoring, which provides more information for analysis than was previously available at the program’s inception. For example, in 2008 the state had very little data on boater demographics to determine the risk of invasion from watercraft. Following the CPW merger, we now have a complete set of statewide watercraft inspection data for 2012 and 2013. Another example is that the mussel habitat suitability score was based on calcium alone because other parameters were not available. Water quality experts at the Colorado Division of Public Health and the Environment processed samples collected by CPW ANS staff and provided analytical expertise for the risk of establishment.

The need for an updated risk assessment is clear in order to prioritize resource allocations based on the best available science as a fully merged statewide program. The data also has value that reaches beyond the invasive species program. The boater demographic and water quality data could prove useful for other CPW efforts, and could illuminate avenues to service the agency’s mission at a broader level in the future.

Watercraft Inspection and Decontamination (WID)

CPW coordinates the vast network of WID stations that are operated by CPW, the National Park Service, Larimer County, various municipalities and private industry locations including businesses, concessioners, marinas, clubs and private lakes. In total, the state has collectively performed over **2.5 million inspections** and **33,000 decontaminations** since 2008.

Per the State ANS Regulations, trailered watercraft must submit to an inspection, and decontamination if needed, prior to entrance in Colorado’s waters following boating out of state or boating on a positive or suspect water. Boaters are also required to submit to an inspection prior to entering a water body where inspections are required by the managing agency. All persons performing inspections and/or



decontaminations in Colorado must be certified by CPW.

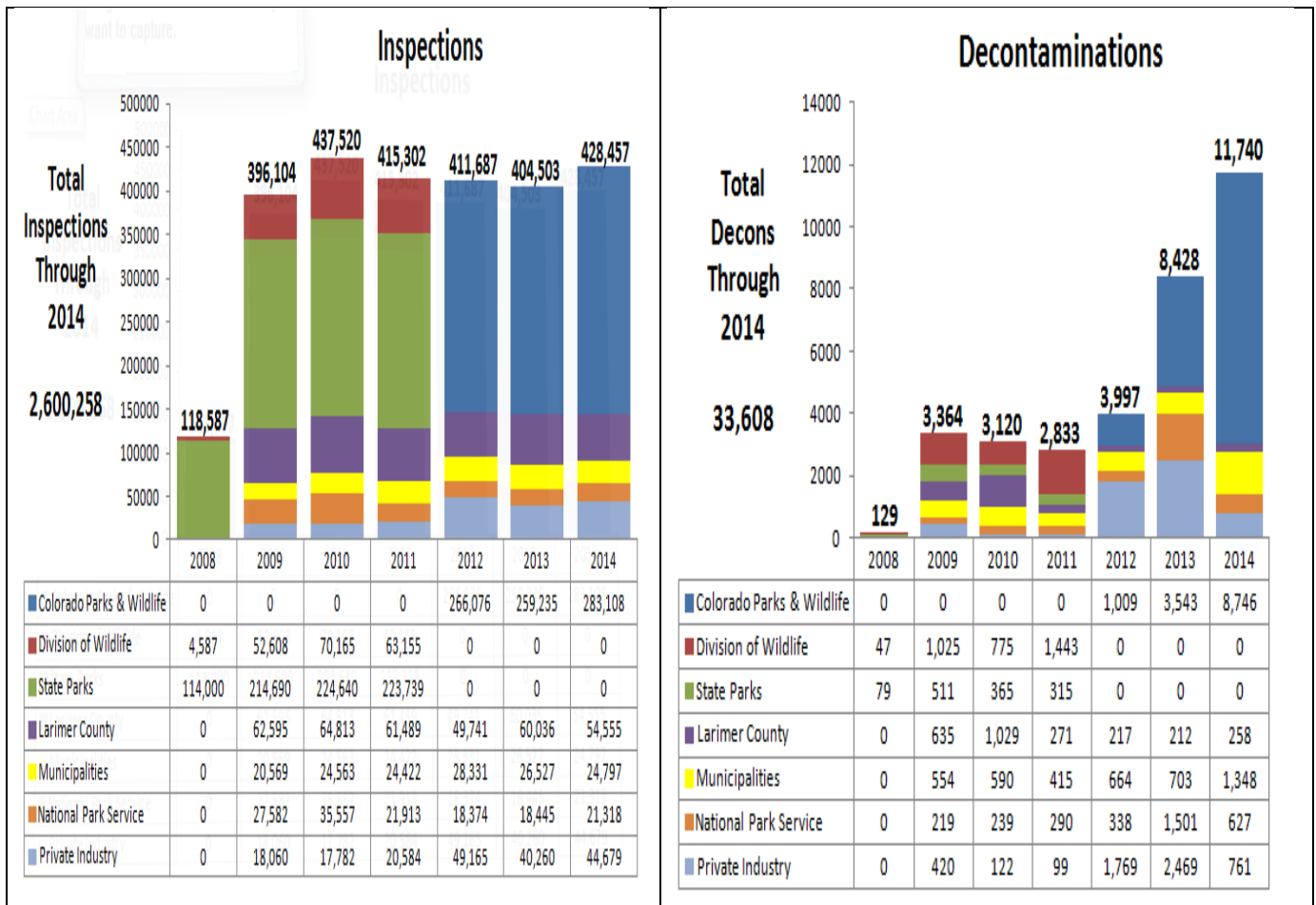
CPW and their partners taught 67 watercraft inspection and decontamination certification courses in 2014 including the piloting of an online re-certification program for experienced inspectors and decontaminators. In addition to the new online course for experienced staff, the Invasive Species Program within CPW also deployed two other new specialized courses: one for trainers, and one in advanced decontamination. CPW certified 706 individuals, for a total of 4,394 certifications since the training program’s inception in 2009. Both the training and the inspections focus on educating the boaters.

A total of 73 locations were authorized to perform watercraft inspection and decontamination in 2013. Of the 73 total stations, Lake Pueblo State Park was operated as a containment operation for quagga mussel veligers. In addition, Pueblo is also positive for an aquatic weed, Eurasian watermilfoil, and invasive waterfleas. Four locations (Eleven Mile State Park, Spinney Mountain State Park, Lathrop State Park and Standley Lake) implemented containment protocols in response to infestations of Eurasian watermilfoil, NZMS, or both. The focus of the containment program is to inspect watercraft leaving the lakes/reservoirs to prevent boats from moving mussels or other ANS overland into currently uninfested areas.

The other 68 authorized locations were implemented to prevent the introduction of mussels and other ANS into currently uninfested waters, including boat ramps at lakes or reservoirs and off-water locations such as at CPW offices and private industry locations. Prevention stations focus on inspecting watercraft prior to entering an uninfested water to prevent a new invasive species from being introduced. The prevention stations are operated by a variety of entities, including CPW, Larimer County, several municipalities, the National Park Service, marinas, private concessioners, private clubs and marine dealers.

Number of Authorized Locations by Entity							
Entity Type	2008	2009	2010	2011	2012	2013	2014
Colorado Parks & Wildlife	-	-	-	-	41	40	40
State Parks	24	28	28	28	-	-	-
Division of Wildlife	5	160	19	19	-	-	-
Larimer County	0	2	2	2	2	2	2
Municipalities	3	7	11	9	6	6	6
National Park Service	0	1	1	1	1	1	1
Private Industry	3	11	51	30	21	23	24
Total:	35	209	112	89	71	72	73

A total of **428,457** inspections and **11,740** decontaminations were performed in Colorado in 2014. A summary of annual inspection numbers and a summary of inspections and decontamination performed by entity type each year can be found on the following page.



There continues to be a large increase in the number of decontaminations performed as a direct result of CPW adapting to mitigate new threats. Recent research publications indicate zebra or quagga mussel veligers can survive up to 27 days in standing water on watercraft which increased the need to decontaminate parts of watercraft which can't be drained (e.g. ballast tanks). Another factor increasing Colorado's need for decontamination is the increase in mussel infested waters in other states, including Lake Powell and several northern Texas State Parks and Kansas reservoirs. Lastly, waters in close proximity to, or positive for, NZMS or EWM infestations perform more decontaminations to limit their spread in state. CPW and their partners revised mandatory standing water decontamination triggers in 2012 to reduce the threat of invasion from viable zebra or quagga mussel veligers living in standing water, to protect against watercraft coming from other state's infested waters and to reduce the spread of other invasive species.

Colorado has led a regional effort, in partnership with private industry, to develop solutions to limit veliger movement in standing water. This year, a ballast filter was approved that is now being installed on new and older boats to eliminate veliger movement and the need for decontaminations of systems with the filter installed. This provides for less decontaminations which will save money and improve boater experience. The filter is described in more detail in the research section of this report.

Over the last three years, a pilot project was conducted with the goal of providing a mechanism for electronic data collection at boat inspection and decontamination stations. In 2012, the ANS Utility Data Collection System was deployed successfully statewide. By collecting boat inspection records electronically and not on paper logs (as

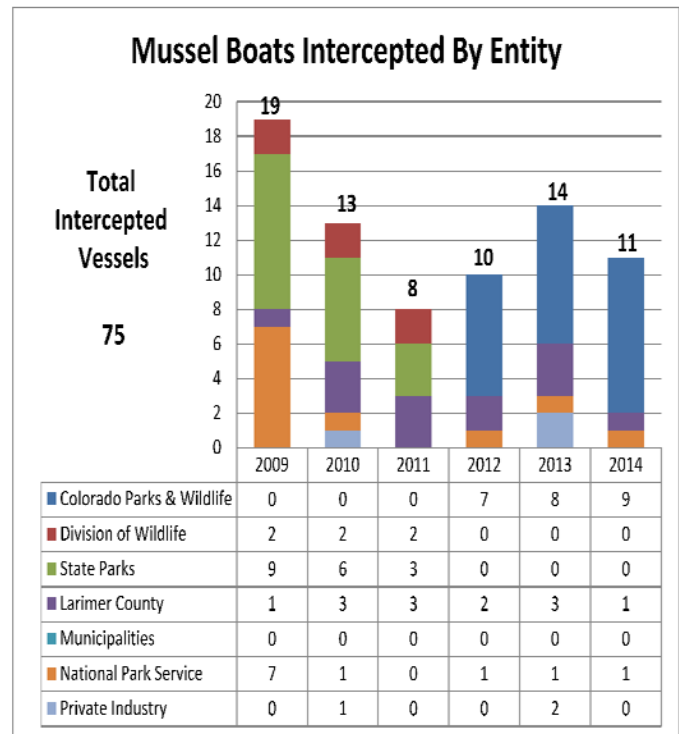
was the method at most sites), the ANS Program anticipates saving money currently being spent on data entry technicians to type the data into a database and gain great efficiencies on busy boat ramps. For 2014, ANS Utility was deployed at 42 unique inspection stations at 25 reservoirs across the state and collected 342,765 inspection records successfully (80% of total inspections). In addition to ANS Utility, the ANS Program also piloted a new mobile data collection system, ANS Mobile with an accompanying website for managers. This application was used exclusively at three locations across the state and successfully collected 38,561 inspection records (9%). The additional 47,130 (11%) of inspections records were collected on paper logs and transcribed into the database.

In addition to the new ANS Mobile application, a corresponding website, ANS Web, was developed and deployed for the 2014 season. This new platform allows managers and supervisors much greater reporting capacity and access to the inspection data they provide and also provides program staff with a much higher level of administrative control of the application. In addition to the benefits already stated, the ANS Mobile application is compatible with most Android and iOS devices. As a result, the program is no longer tied to a single device and can utilize current technology at a drastically reduced cost. Both ANS Mobile & ANS Web were well received in their pilot year and will be deployed statewide for the 2015 boating season.

As a result of the continued success of the CPW ANS Mobile Data Collection system, surrounding states have also begun to use the ANS Mobile application. In 2014, New Mexico came on board as the first state outside of Colorado to utilize and contribute data to the CPW watercraft inspection database. This was a critical success for our shared reservoir and State Park, Navajo. For the first time, the ANS Program is in a position to be able to share data across state lines which reduces the potential for inoculations from watercraft coming from out of state. In 2015 the program will be expanded to include the state of Utah which will provide us the unique opportunity to see data regarding watercraft exiting Lake Powell and traveling towards Colorado. Continued utilization of this application on a regional basis will provide great insight into the patterns of interstate movement of watercraft – the greatest threat of introduction of aquatic invasive species to Colorado’s waters.

Mussel Boat Interceptions

A total of 75 boats with attached adult zebra or quagga mussels have been intercepted coming into Colorado’s waters from out of state at watercraft inspection and decontamination stations since 2009. Infested vessels were intercepted at Blue Mesa, Canyon Marine, Carter, Cherry Creek, Chatfield, Crawford, Denver CPW Office, Dillon, Eleven Mile, Grand Junction CPW Office, Highline, Horsetooth, Jackson, Lathrop, Navajo, Pueblo, Ridgway, Shadow Mountain, Spinney Mountain, Taylor Park, Turquoise, Vallecito and Williams Fork. The infested vessels were coming from Arizona, California, Illinois, Indiana, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, New York, Nevada, Oklahoma, Ohio, Texas and Wisconsin. The majority of the intercepted vessels were coming from the Great Lakes, the Mississippi River, or Arizona (Lake Pleasant or Lake Havasu). These boats were fully decontaminated to ensure all mussels were dead, and no mussels were visibly attached to the vessel.



WID Quality Control

The CPW Quality Control and Field Support Team perform quality control evaluations annually at all state certified watercraft inspection and decontamination stations to ensure that standard procedures are being followed and stations are adequately stocked with educational materials and proper signage. The team also provides on the job training to inspectors and supervisors. In 2014, CPW conducted 56 secret shopper evaluations at WID stations. CPW also called 31 state, local and federal offices, private businesses and inspection stations to assess the quality of telephone customer service with respect to ANS. The quality control program will continue in 2015 with secret shopper evaluations, announced evaluations, on the job training and customer service evaluations.

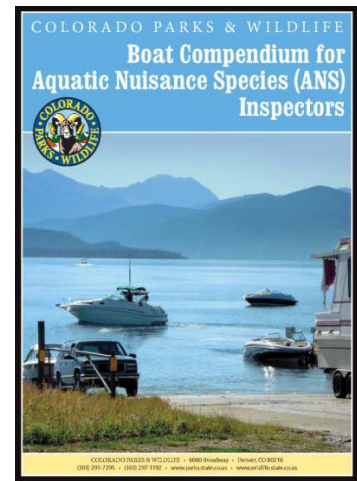
Piloting Multi-State Reciprocity for WID Stations

Colorado piloted reciprocity with Wyoming and New Mexico in 2014. The goal of reciprocity is to provide a greater protection of natural resources, as well as much improved boater experiences and more efficient use of state dollars, through a multi-state cooperative approach to boat inspections. Through the *Western Regional Panel's Building Consensus Effort*, Chaired by Colorado, the 19 western states have been engaged in defining standard language and protocols for watercraft inspection and decontamination programs in the Western USA, along with data sharing, sampling, and education. Colorado, Wyoming and New Mexico accepted each other's ANS boat seals and receipts in 2014, providing that inspectors be trained alike, follow the same field procedures, and are held to the same quality control standard. Through the acceptance of each other's boat seals and receipts, duplicate inspections are being eliminated which improves boater experience and saves state's money. The communication between states also allows for increased interceptions for greater protection of natural resources.

Protocol Development for Watercraft Inspection and Decontamination

To ensure the protection of the state's waters and the validity of the state certification program, CPW has strict field protocols and training regiments since the program's inception. All watercraft inspection and decontamination staff in Colorado attends the same training and adheres to the same protocols. Development and implementation of effective standardized protocols is a priority. Many other states base their procedures and training programs off Colorado's numerous publications.

In 2014, the Western Regional Panel on ANS and the 100th Meridian Initiative adopted the Colorado training program as the regional standard for certification of boat inspectors and decontaminators. The student and trainer's curriculum, as well as field procedures, have been adapted for other states and will be published in early 2015. The Colorado training program is being taught nationally.



Research – New Ballast Filter

CPW is actively engaged in research projects related to invasive species management. The most recently completed project was conducted by the University of Nevada Reno and funded through a partnership with the Pacific States Marine Fisheries Commission, National Park Service, Lake Tahoe, State of California and the National Marine Manufacturers Association. This project tested of a ballast tank filter, developed by Wake WorX, which restricts the movement of ANS in recreational ballast tanks. The filter eliminates the need for decontamination of these systems to kill veligers in standing water, which would greatly increase the efficacy of WID stations and reduce operational costs. The research proved the filter successfully keeps veligers, waterfleas and other plankton out of ballast tanks. It is now being implemented by ballast boat manufacturers around the country and is available for installation in both new and used boats.

As a result of this landmark breakthrough and the newly found partnership with the marine industry on a national level, the American Boating and Yachting Council, the National Marine Manufacturers Association and the U.S. Fish and Wildlife Service are holding a workshop in January 2015 which will bring together inspection and decontamination experts, with original equipment manufacturers from the marine industry to discuss alternatives to boat engineering, construction and design that could reduce the ability of recreational watercraft to transport ANS and/or provide for faster, more efficient inspections or decontamination processes. Colorado will continue to play a leadership role in this effort in 2015 and upcoming years.

Other completed research projects include:

- Economic Analysis of Invasive Species in Colorado; Focus on Noxious Weeds. Colorado State University. December 2013.
- A risk assessment of recreational boating traffic and aquatic nuisance species (*Dreissena* mussel) invasion to lakes, rivers and reservoirs of the Western United States. Western Regional Panel and University of California Davis. March 2011.
- Potential Zebra and Quagga Mussel Control Studies: Focus on Boat Decontamination of Interior Compartments. Colorado State University. May 2011.
- A Cost-Benefit Analysis of Prevention Management for Zebra and Quagga Mussels in the Colorado Big-Thompson Project. Colorado State University. July 2010.
- Statewide Risk Analysis and Modeling of *Dreissena* Mussels. University of Toledo. September 2010.
- Colorado State Parks Risk Analysis and Modeling of *Dreissena* Mussels. University of Toledo. September 2010.
- Assessment of Quagga Mussel Veliger Treatments for Pueblo State Fish Hatchery Transport. Reclamation. October 2010.

Information and Outreach

CPW and partner agencies have developed a comprehensive, multi-faceted, public-education campaign to inform boaters and anglers about zebra and quagga mussels and how to prevent the further spread of these harmful species and other ANS in Colorado's waterways. Over the last six years, the cooperative effort utilized a variety of mediums, including billboards, boat ramp signage, ANS brochures, agency Web pages, and staffing tradeshow and expo booths to convey this message. Accomplishments include distribution of tens of thousands of printed rack cards, brochures, handouts, DVDs, posters and signs at offices, boat ramps and water-access points. In addition, we have implemented an aggressive media relations campaign, using press releases and conducting web-based, radio, print and television interviews. CPW staff hosted numerous outreach seminars to boating and angling groups, marine dealers, HOAs, watershed groups, basin roundtables, ditch companies, municipal water managers and providers.

In 2014-2015, the priority for education and information continues to focus on the nursery and pet industry with the goal of reducing invasive species sold in Colorado to reduce the risk those invaders will escape or be dumped into native ecosystems or wildlands. The CPW Invasive Species Program is also striving to incorporate prevention messaging for terrestrial invasive species, such as noxious weeds or forest pests, into educational and information items for sportsmen and outdoor recreationists. Increasing educational efforts towards Colorado residents to prevent invasive species introductions within Colorado, and to those visiting or doing business in our state, is a top priority for CPW.

State Fish Hatchery Program and Aquatic Biologists

To date, no zebra or quagga mussels have been identified in any Colorado hatchery, including the hatchery at Pueblo Reservoir. However, proactive measures have been put in place statewide to protect hatcheries and state waters from an invasive species introduction. Those measures include annual fish health inspections, hazardous analysis and critical control point plans (HACCP), trainings and workshops. Hatcheries are monitored for ANS.

Statewide preventative measures also include implementation of standardized disinfection protocols for wild spawn, fish transfers and egg transfers. Through a contract with the Bureau of Reclamation, the CDOW explored methodologies for disinfection for fish being transported from Pueblo Fish Hatchery. In addition, specialized trailer units have been constructed for all wild fish spawning operations to ensure no ANS are transported.

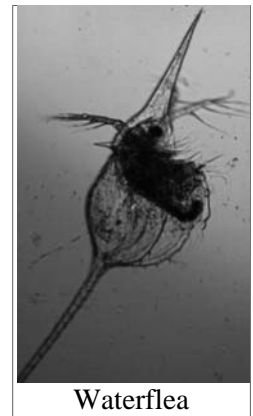
Aquatic biologists should be certified inspectors and decontaminators. All biologists have access to a watercraft decontamination unit to clean boats, gear and equipment in between each use. When hot water decontamination units are not available, they have alternate methods, including freezing, drying and disinfectants, available to decontaminate gear and equipment in between each and every use.

Other ANS of Concern

Invasive Waterflea (*Daphnia lumholtzi*)

The newest aquatic invasive species detected in Colorado are invasive waterfleas. There are three types of invasive waterfleas (*Bythotrephes longimanus* (spiny), *Ceropagis pengoi* (fishhook) and *Daphnia lumholtzi* (waterflea). Only the *Daphnia* has been found in Colorado. In 2013, it was detected in Chatfield, Douglas, John Martin, Navajo and Pueblo Reservoirs, and Pueblo Hatchery. In 2014, it was also detected in Boulder, Cherry Creek, Jackson, North Sterling, Prewitt, Prospect, Union and Windsor Reservoirs.

There are no control methods for waterfleas. Similar to zebra or quagga mussels, they move to new lakes or reservoirs in standing water on watercraft and once established they can be moved downstream into new impoundments in the natural flow of water. Educating the public and following strict watercraft inspection and standing water decontamination procedures are the best method to contain current infestations and prevent further spread to new waters.



Waterflea

Water fleas are planktonic zooplankton aquatic crustaceans that have a jumpy or jerky mode of swimming. The *Daphnia* waterflea was introduced accidentally as contaminants in the aquarium trade and fish stocking. They are native to Africa, Asia and Australia. Like invasive mussels, the *Bythotrephes* and *Ceropagis* were introduced into the Great Lakes from ships' ballast water coming from Eurasia. It only takes one microscopic adult or egg to start a new infestation. If a female dies out of water, under certain conditions they produce eggs that can resist drying and freezing, which can establish a new infestation later.

Waterfleas out-compete native juvenile fish for food, causing low survival rates. They have sharp barbs that stick in the throats of predatory fish and make them unpalatable especially to juvenile or smaller fish. They can avoid predation by larger fish by retreating to deeper waters during the day where they are less visible and ascending at night where food is abundant and temperatures higher, increasing metabolism and growth rates. Their long spines can cause them to become entangled on fishing lines and can clog eyelets of fishing rods.

Rusty Crayfish

Rusty crayfish is an invasive species that was first discovered in 2009 in a main-stem impoundment of the Yampa River and at two river locations between Stagecoach Reservoir and Steamboat Springs. The CDOW conducted extensive surveys statewide and detected a population in Sanchez Reservoir State Wildlife Area in 2010 and Stagecoach State Park in 2011. Populations have been managed through manual removal of adult rusty crayfish to reduce the reproducing population in the reservoirs and limit impacts to native communities and users.

The Director issued an Emergency Administrative Restriction: Crayfish Collection Closure for Sanchez Reservoir, which restricts the taking of a live crayfish from Sanchez. CPW implemented regulations passed by

the Wildlife Commission in November 2010, in an effort to stop the spread of ANS and diseases. Those regulations included substantive changes to further prohibit the transport and use of live baitfish, which now must be used in the same body of water from which they were taken, except for those fish captured within the Lower Arkansas River Basin (below Pueblo), which may be transported and used in other counties within that area. In addition, all crayfish caught west of the Continental Divide must now be immediately killed and taken into possession, or immediately returned to the water from which they were taken. There are no crayfish native to the Western Slope. The same restriction applies to Sanchez Reservoir on the Eastern Plains due to the invasive rusty crayfish found there in 2010.



Rusty Crayfish

Rusty crayfish are native to the Ohio River Basin and have expanded their native range to include several U.S. states and Ontario, Canada. They colonize lakes, rivers, and streams throughout North America. They are more aggressive than native crayfish, better able to avoid fish predation, and can harm native fish populations by eating their eggs and young. They can displace native crayfish and hybridize with them. They graze on and eliminate aquatic plant populations that provide necessary habitat and food source for native fish and waterfowl.

New Zealand Mudsnail (NZMS)

There were no new detections of NZMS in 2014. Previously, there were detections from 2010-2013 in Fountain Creek in Colorado Springs, Spinney Mountain State Park, Eleven Mile State Park, Delaney Buttes State Wildlife Area, College Lake at CSU in Fort Collins, and Dry Creek within the City of Boulder. The invasive snail was first found in Colorado in 2004 in Boulder Creek, the South Platte River below Eleven Mile dam and the Green River in Dinosaur National Monument. There were no detections from 2005-2009.



New Zealand Mudsnail

All known populations were mapped from 2012-2014 and long term monitoring processes were put into place for future impact analysis. There is no viable method for control of these very small, asexual animals. CPW places a strong emphasis on angler education providing wader brushes and instructional rack cards to anglers. The only way to stop the spread of these tiny invaders is through educating anglers to clean their waders in between each and every use!

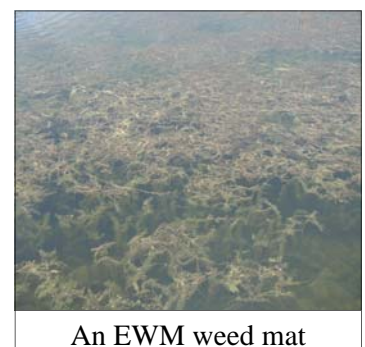


Aquatic Weed Coordination

CPW has been the lead agency on aquatic weed mapping and education, in close partnership with the Colorado Department of Agriculture's Noxious Weed Program. A few distinct CPW efforts are summarized below.

Eurasian watermilfoil (EWM)

The Invasive Species Program has coordinated EWM management statewide since 2005. A detailed Geographic Information System (GIS) database of EWM locations and control efforts was developed and is maintained by CPW. The database is updated annually. CPW is actively controlling EWM with herbicide treatments at Lathrop State Park, St. Vrain State Park, and Chatfield State Park.



An EWM weed mat

Purple Loosestrife

Beginning in 1993, the CDOW has been the lead coordinator on the Denver metro purple loosestrife management effort. The goal of the program is to make sure that purple loosestrife is controlled to protect waterfowl habitat and maintain in-stream flow. Approximately 31 cities and counties, public agencies, private landowners and private entities are involved. For example, Parks aggressively controls purple loosestrife at Cherry Creek with spraying and hand pulling small plants and seed head cutting on larger plants and continues to shrink the population there. The CPW and CDA share the responsibilities for the continuance of this program.



Purple Loosestrife

Regional Participation

CPW's Invasive Species Coordinator provides regional and national leadership on efforts to stop the spread of zebra and quagga mussels and other ANS, including:

- Chair of the Western Regional Panel on Aquatic Nuisance Species
- Chair of the Western Invasive Species Coordinating Effort
- Chair of the Education Committee for the Federal ANS Task Force
- Member of the Western Association of Fish and Wildlife Agencies' Invasive Species Committee
- Member of the Association of Fish and Wildlife Agencies' Invasive Species Committee

Operating and Financial Statement

Senate Bill 08-226 created the Division of Wildlife Aquatic Nuisance Species fund within the state treasury and authorized a funding of \$3,917,244 in FY 08-09 towards the prevention, containment and eradication of aquatic nuisance species in state waters. This funding was a mix of \$1,250,000 wildlife cash combined with \$2,667,244 of funding from the operational account of the severance tax (Tier II). SB 08-226 appropriated \$1,304,544 of severance tax funding for the state fiscal year commencing July 1, 2009 and for every state fiscal year thereafter. The CDOW did not receive appropriated funding prior to July 1, 2008, so expenditures made for the 2008 Boating Season, prior to July 1, 2008 were paid for out of wildlife cash. Permanent CDOW staff time spent on aquatic nuisance species work was paid for with wildlife cash, including the Invasive Species Coordinator. As of July 1, 2013, the Invasive Species Coordinator and other CPW FTE are now being paid out of the Parks ANS Fund to reduce wildlife and parks cash expenditures.

Senate Bill 08-226 also created the Colorado State Parks Aquatic Nuisance Species fund within the state treasury and authorized funding from Severance Tax (Tier II) in FY 08-09 of \$3,289,392. For FY 09 and beyond the Parks are funded at \$2,701,461. SB 08-226 authorized seven ANS FTE in Parks. In 2011, two FTE were eliminated and in 2012, one more of these FTE were eliminated. Only four FTE remain active in 2014-2015.

Below is a summary of CPW's ANS expenditures for the last two fiscal years.

Funding Source	FY12-13	FY13-14
Parks ANS Fund	\$1,976,874.41	\$2,628,232.88
Wildlife ANS Fund	\$2,167,550.53	\$1,799,940.39
CPW Cash	\$212,095.87	\$29,506.51
Total:	\$4,356,520.81	\$4,457,679.78

ANS fund expenditures increased by \$101,158.97 in FY1314 due to a change in policy that required all CPW FTE staff to charge time working on ANS to the ANS fund. Previously, FTE salaries and benefits were charged to wildlife or parks cash. Parks cash expenditures on ANS were not tracked prior to the merge.

CPW has leveraged SB08-226 funds with federal and local grants in order to maintain the ANS Program at its current level and provide the services Coloradan’s have come to expect. Federal grants have almost all gone away and there are only two local government contracts remaining. The following table details new agreements signed in FY1314. The agreements are multi-year and may be accounted for over several fiscal years.

Partner Agency	Direct Contribution
Colorado Springs Utilities	\$22,228
Denver Water	\$200,000
US Forest Service	\$205,000
Total:	\$427,228

The figures in the following table represent in-kind contributions of partners directly to jointly implemented WID stations. These funds are not provided to, or spent by, CPW.

Partner Agency	In Kind Contribution
Larimer County	\$158,704.69
US National Park Service	\$375,000.00
Total:	\$533,704.69

CPW is planning to continue retaining budget carryover between fiscal years, as permitted in the ANS Act, because the boating season and some projects span two fiscal years. Federal contributions and grants continue to decline or evaporate. CPW has contingency plans to respond to new zebra or quagga mussel detections in new waters during the middle of a boating season. The cost of operations at a major recreational water body following infestation could double in order to implement containment measures. The future risk of infestation could be moderate if more monitoring is conducted and other agencies within Colorado and surrounding states put in place programs to prevent the spread of zebra and quagga mussels.

