



**CITY OF BOULDER
WATER RESOURCES ADVISORY BOARD
INFORMATION PACKET MEMORANDUM**

To: Water Resources Advisory Board

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Date: January 25, 2016

Subject: **Information Item: Boulder Reservoir Aquatic Nuisance Species 2015
Inspection Program Update**

EXECUTIVE SUMMARY

Boulder Reservoir, which serves as a City of Boulder (city) drinking water supply and recreational facility, is owned by the city and operated by the Northern Colorado Water Conservancy District (Northern Water). The city Parks and Recreation Department manages recreation activities on Boulder Reservoir and has been implementing an Aquatic Nuisance Species (ANS) inspection program since 2009. The ANS inspection program was formally adopted in the Boulder Reservoir Master Plan, which was completed in 2012. The Boulder Reservoir Master Plan requires annual reporting on the implementation of the Boulder Reservoir ANS program including ANS inspection program statistics, recommendations for program changes, if needed, the status of ANS infestation throughout the state of Colorado, and best management practices available for prevention and control of ANS.

This Information Packet Memorandum summarizes the 2015 ANS program at Boulder Reservoir and is intended to be informational and does not require WRAB action. This item is not scheduled as an Agenda Item, but WRAB members can ask questions or request that this item be scheduled as a future Agenda Item during the Matters from the Board portion of the meeting.

BACKGROUND

Parts of the Boulder Reservoir and surrounding area are managed and operated by different entities. The dams, facilities, and land underlying the reservoir are owned by the city Public Works Department, Utilities Division; the water supply storage and delivery facilities are managed and operated by Northern Water; and the city Parks and Recreation Department manages the majority of the land in the Boulder Reservoir area for active and passive recreation and wildlife and habitat conservation. The primary source of water to Boulder Reservoir is water from Carter Lake, which is delivered via the Boulder Feeder Canal. Several minor tributaries are along the west side of the reservoir. The city's Boulder Reservoir Water Treatment Facility can treat water directly from the Boulder Feeder Canal or from the reservoir.

Boulder Reservoir has three ANS species present: (1) curly-leaf pondweed; (2) waterflea; and (3) Asian clam. ANS are invasive animals and plants that are defined as "out of place" in Colorado's rivers, lakes, streams and wetlands. They are introduced accidentally or intentionally outside of their native range. Because they are not native to Colorado habitats, they have no natural competitors or predators. As a result, the invaders can reproduce rapidly and out-compete native species. Once introduced, most invasive species cannot be eradicated and are costly to manage. Aquatic plant and mussel species can be spread by recreational boating and angling, birds, and general recreation (e.g., hikers, dogs).

Aquatic Nuisance Species Detections in Colorado. During a multi-year statewide ANS sampling effort by the Colorado Division of Wildlife (now part of Colorado Parks and Wildlife (CPW)), zebra and/or quagga mussel larvae were detected in eight Colorado reservoirs in 2008. These invasive species adversely impact aquatic ecosystems and disrupt the natural food chain. Zebra mussel larvae were identified in 2008 in Pueblo Reservoir and Grand Lake (which is part of the Colorado-Big Thompson (CBT) Project). Quagga mussel larvae were also detected in Pueblo Reservoir. Prior to 2011, quagga mussel larvae were detected in three CBT reservoirs including Granby Reservoir, Grand Lake, and Shadow Mountain Reservoir. As of September 2015, the only waterbody listed as positive for quagga mussel larvae is Pueblo Reservoir; there are no positive waters for zebra mussel in the state. Attachment A identifies ANS animal and plant species distribution in Colorado as of September 2015.

Aquatic Nuisance Species Inspection Programs in Colorado. In May 2008, the Colorado Aquatic Nuisance Species Act was signed into law. The ANS Act was designed to limit the introduction and transport of ANS in the state, and provides authority for watercraft inspections, decontamination, and quarantine, if needed. Since February 2009, inspections and decontamination (if necessary) are mandatory for any watercraft entering the state or exiting known ANS positive waters. ANS inspection programs are currently funded by entities such as CPW, Counties and some Front Range cities, including Boulder, Westminster (Standley Lake), Denver Water (Dillon Reservoir), and Aurora (Aurora Reservoir). A list of inspection and decontamination stations in Colorado is available online:

<http://cpw.state.co.us/Documents/ANS/WatercraftInspectionStationList.pdf>.

Boulder Reservoir ANS Inspection Program. Following requirements in the CPW ANS regulations, the city's Parks and Recreation Department began implementing an ANS inspection program at Boulder Reservoir in 2009. The ANS inspection program was formally adopted in the Boulder Reservoir Master Plan, which was completed in 2012. The current Boulder Reservoir ANS inspection program includes visual inspection of all watercraft, tagging of trailered watercraft, monitoring of ANS conditions in Colorado and data collection.

One of the key components of the ANS inspection program is educating boat owners and fishers and raising awareness of ANS issues. In addition, ANS inspections are conducted by state-certified city staff at Boulder Reservoir. Inspectors are present when the main entry gate is open to the public to help provide the level of protection and customer service required for the program. To offset the cost of the ANS inspection program, inspection fees are charged to all watercraft owners who have a Boulder Reservoir boating permit.

All watercraft are required to have an ANS inspection prior to launching on Boulder Reservoir. The types of inspections performed are based on the level of risk as follows:

- **Standard Inspection – Low Risk (no inspection fee)**
 - Watercraft has a current intact Boulder Reservoir “green tag” and non-detachable cable between the boat and trailer, with a matching receipt for the inspection.
- **High Risk Inspection (\$35 inspection fee)**
 - Watercraft has a green tag but no matching receipt to verify the inspection.
 - Watercraft has a green tag from a negative Colorado body of water
 - Watercraft has tag from CPW.
- **Decontamination (\$50 to \$175 decontamination fee)**
 - Tag from positive/suspect Colorado body of water.
 - Out of State (not Colorado).
 - No tag.

Based on the watercraft inspection findings, decontamination of the watercraft may be required, especially if the craft is not clean, drained and dry, or has suspect items on the craft and/or trailer.

Boulder Reservoir has three invasive aquatic species present: (1) curly-leaf pondweed; (2) waterflea; and (3) Asian clam. Note that curly-leaf pondweed and Asian clam are not identified in the state ANS tables in Attachment A because, according to a CPW official, they are not priority concern species because they are widespread within the state and nearly impossible to eradicate.

ANALYSIS

2015 was the seventh year of the Boulder Reservoir ANS inspection program to address possible infestation from aquatic plant species and mussels.

Watercraft Inspections. In 2015, non-motorized watercraft were inspected every time upon entry to the Boulder Reservoir. Permitted motorboats that passed inspection were tracked with a Boulder Reservoir green tag and non-detachable cable between the boat and trailer. Motorboats arriving at Boulder Reservoir with a city green tag and an intact cable were allowed to launch after a standard inspection. Motorboats arriving with a green tag but no matching receipt, a tag from a known negative body of water or a tag from CPW, were required to go through a high risk inspection, and if the watercraft failed the inspection, decontamination was required. After decontamination, another cable with a Boulder Reservoir green tag was then applied between the motorboat and trailer when leaving Boulder Reservoir.

The city Parks and Recreation boat inspection program not only protects against biological organisms but also against gas and oil residues. The city places an oil and grease absorbent pad in the bilge area of each motor boat when the annual initial inspection is conducted.

2015 Boulder Reservoir ANS Inspection Program Statistics. The Boulder Reservoir ANS inspection program has been self-funded since Utilities discontinued contributing funds in 2011. 2015 program costs were \$59,343 through November, which is lower than in 2014. The lower cost is partly attributed to the fact that \$6,000 in permit costs are being purchased with 2016 funding and were therefore not accounted for in 2015. Permit fees range from \$40 (for a small watercraft) to \$705 for a non-resident with a watercraft over 49 horsepower. Compared to 2014, more motorboat and non-motorized boat permits were sold in 2015, for a total of 1,164. In 2015 the number of motorboats inspected dropped by approximately 65% compared to the previous year. The drop in inspections is attributed to more boats being stored onsite, thereby eliminating the need for inspections. The number of high-risk inspections and decontaminations were also lower in 2015 compared to 2014. Statistics are presented in Table 2.

Table 1. Boulder Reservoir ANS Inspection Program Statistics for the years 2014 and 2015. 2015 data represent year-to-date (YTD) values through November.

Item	2014	2015 (YTD)
ANS Program Cost	\$76,140	\$59,343
Motorboat permits sold	216	218
Non-motorized boat permits sold	775	946
Motorboat inspections	8,260	2,857
Non-motorized inspections	4,679	4,343
Green tag placement inspection (leaving Boulder Reservoir)	1,543	1,538
High risk inspections*	187	116
Decontaminations±	~78	58

* Boats that fail the high risk inspection must be decontaminated. All boats coming from infected waters or from out of state must have a high risk inspection.

± Boats decontaminated using the on-site decontamination station. Hot water used to pressure spray boats. Waste is disposed of in the sewer system.

In 2015 ANS monitoring was conducted on Boulder Reservoir by CPW twice during the summer season. Monitoring included plankton tows and substrate placement. In 2015 monitoring was funded by the State of Colorado but 2016 funding is uncertain at this time. Results from the 2015 monitoring on Boulder Reservoir have not yet been provided to city staff. However, staff at the Boulder Reservoir has documented the presence of waterflea and Asian clams. Curly leaf pondweed is likely also still present but may not have been identified by CPW since it was not a target species.

NEXT STEPS

The Boulder Reservoir ANS inspection program will continue in 2016 and beyond. In addition to standard ANS inspection procedures, additional work will be performed by Parks and Recreation staff in 2016 to minimize small watercraft entrance to Boulder Reservoir from the north shore entrance. City of Boulder Utilities and Parks and Recreation staff will provide the next annual update to the WRAB in early 2017.

ATTACHMENTS

Attachment A – 2015 Known Positive Waters for Aquatic Nuisance Species in Colorado

ATTACHMENT A

2015 Known Positive Waters for Aquatic Nuisance Species in Colorado

Data current as of September 2015. Provided by Robert Walters, Colorado Parks and Wildlife, January 6, 2016.

Definition from the ANS Act (SB08-226): “Aquatic nuisance species” means exotic or nonnative aquatic wildlife or any plant species that have been determined by the Board to pose a significant threat to the aquatic resources or water infrastructure of the state.

Table 2. Status of aquatic nuisance animal species in Colorado as of September, 2015.

Common Name	Scientific Name	Status in Colorado	Location in Colorado
Crayfish, rusty	<i>Orconectes rusticus</i>	Present in CO	Catamount Reservoir, Yampa River, Stagecoach Reservoir, and Sanchez Reservoir
Mussel, quagga	<i>Dreissena rostriformis bugensis</i>	Present in CO	Pueblo Lake State Park
Mussel, zebra	<i>Dreissena polymorpha</i>	Not Present in CO	No known
New Zealand mudsnail	<i>Potamopyrgus antipodarum</i>	Present in CO	Bear Canyon Creek, City of Boulder - Boulder Creek, Dry Creek (2), Chatfield Reservoir, Dinosaur NM – Green River, Pike NF - South Platte River below Eleven Mile Dam, Eleven Mile Reservoir State Park, Spinney Mountain Reservoir State Park, Charlie Meyer State Wildlife Area (Dream Stream), South Delaney Buttes Reservoir and East Delaney Buttes Reservoir in Delaney Buttes State Wildlife Area, College Lake at CSU Fort Collins, Fountain Creek in Colorado Springs
Waterflea, spiny	<i>Bythotrephes cederstroemi</i>	No verified presence	No Known
Waterflea, fishhook	<i>Cercopagis pengoi</i>	No verified presence	No Known
Waterflea	<i>Daphnia lumholtzi</i>	Present	Arkansas River (below Pueblo Dam), Adobe Creek, Barr Lake, Bear Creek, Boedecker, Boulder Reservoir, Boxelder Lake #3, Boyd, Chatfield, Cherry Creek, Douglas, Holbrook, Horsetooth, Jackson, John Martin, Jumbo, Navajo, North Sterling, Prewitt, Prospect Lake, Pueblo Res, Pueblo Hatchery, Union, Windsor

Table 3. Status of aquatic nuisance plant species in Colorado as of September, 2015.

Common Name	Scientific Name	Status in Colorado	Location in Colorado
African elodea	<i>Lagarosiphon major</i>	No verified presence	No Known
Brazilian elodea	<i>Egeria densa</i>	No verified presence	No Known
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>	Present in CO	Adobe Creek SWA, Arvada Reservoir, Bear Canyon Creek, Bessemer Ditch, Big Dry Creek, Blue Heron Ponds, Boulder Creek, Chatfield Reservoir, CU Ponds in Boulder, Bow Mar Lake, Bowles Reservoir, Brush Hollow Reservoir, Charlie Meyer SWA, Douglas Reservoir, Eleven Mile State Park, Gateway Reservoir (Private), Horseshoe and Martin Reservoirs in Lathrop SP, Lake Minnequa, Lowell Ponds, Marston Reservoir, Minnequa Canal (Fremont Canal), Navajo Reservoir(NM Side), North Poudre Reservoir #4, Panama Reservoir #1, Pathfinder Park Pond, Pavlakis Open Space, Pella Crossing Ponds, Prospect Lake, Pueblo Reservoir, Pueblo Steel Mill, Rio Grande River, Saint Charles Reservoir#2, #3, Saint Vrain Creek, Saint Vrain State Ponds, Sawhill Ponds, Sheets Lake, South Platte River, Standley Lake (Westminster), Swift Ponds, Tucker Lake, Tule Lakes, Walden Pond, Ward Road Ponds, Wellington Reservoir #4, West Lake, West Prospect Park Lake.
Hybrid invasive watermilfoil	<i>Myriophyllum spicatum x Myriophyllum sibiricum</i>	Present in CO	Cigar Pond in Chatfield State Park Cherry Creek Reservoir State Park (near swim beach) Golden Pond in Longmont
Giant salvinia	<i>Salvinia molesta</i>	No current verified presence	No Known
Hyacinth, water	<i>Eichhornia crassipes</i>	Present in CO	Alamosa (2006) Centennial (detected and eradicated in 2010)
Hydrilla	<i>Hydrilla verticillata</i>	No verified presence	No Known
Parrotfeather	<i>Myriophyllum aquaticum</i>	No verified presence	No Known

Common Name	Scientific Name	Status in Colorado	Location in Colorado
Yellow floating heart	<i>Nymphoides peltata</i>	No verified presence	No Known

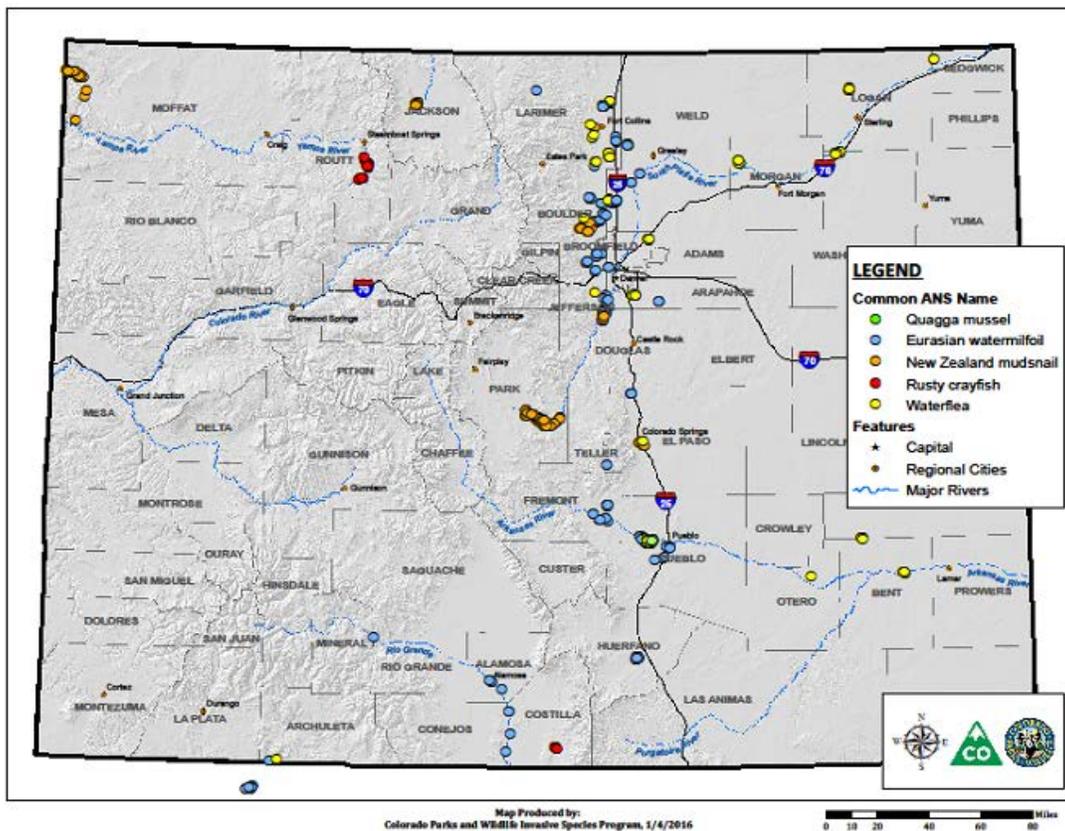


Figure 1. Aquatic nuisance species distribution in Colorado as of September, 2015.