



WATER QUALITY / QUANTITY COMMITTEE (QQ)

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QQ Quarterly Board Meeting Wednesday, June 29, 2016

Donovan Pavilion
[1600 S Frontage Rd W, Vail, CO 81657](http://www.nwccog.org/1600-S-Frontage-Rd-W-Vail-CO-81657)

AGENDA

- 9:15 *Pre-meeting introduction to QQ*
(targeted to elected officials and staff who are new to QQ, but all QQ members are welcome to attend)
- 10:00 **Welcome and Introductions**
- 10:05 Presentation: Sonoran Institute's water-related work
Stephanie Sklar, Chief Executive Officer, Sonoran Institute
- 11:00 Aquatic Invasive Species in the QQ Region- *Torie*
- 11:30 CO Water Plan Updates (Lean, Water Conservation/ Land Use
statewide efforts, CO Basin Roundtable) – *Torie, Lane, Barbara*
- 12:15 Lunch
- 1:00 Member updates
- 1:30 Water Quality (Basic Standards Rulemaking, SMPs, Grand Lake Clarity)
Lane & Lotie
- 2:15 2016 Legislative Session and Ballot Initiatives- *Torie & Barbara*
- 3:00 Adjourn



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



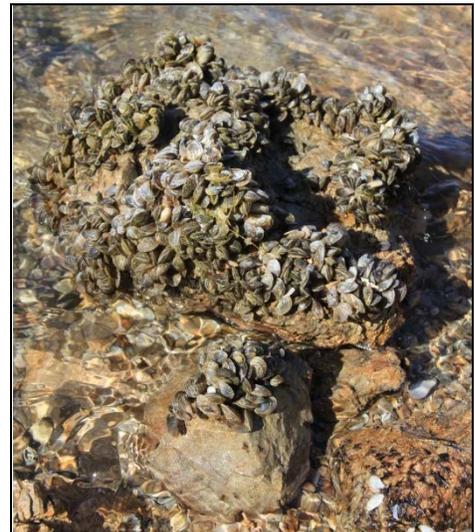
Colorado Parks and Wildlife January 2016

The Colorado Parks and Wildlife's (CPW) Aquatic Nuisance Species (ANS) Program has concluded another successful season protecting the state's water resources and infrastructure from harmful ANS. While western states such as Kansas, Texas, South Dakota, North Dakota and Arizona, that do not have aggressive ANS programs, continue to become infested with zebra or quagga mussels, Colorado has prevented the introduction of these awful invasive species due to the diligent efforts of watercraft inspection and decontamination staff, as well as monitoring, education and enforcement actions. In 2015, CPW intercepted a record number of infested watercraft from out of state and decontaminated them prior to allowing them into state waters. CPW's ANS Program, along with their partners, is critical to maintaining opportunities for recreation, preserving natural resources and protecting water supply and delivery infrastructure for municipal, industrial and agricultural use.

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. 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 2012-2015 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.



Quagga mussels covering the shoreline at Lake Mead in Nevada

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.

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. This year updated regulations were adopted by the Parks and Wildlife Commission. The updates include requiring boat operators to clean, drain and dry their

own watercraft and exempting paddle boards from mandatory inspections. Changes also reflect best management practices for decontamination and update organizational structure resulting from the merger of parks and wildlife.

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. 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 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.

Zebra and Quagga Mussels

There are no positive waters for zebra mussels in the state. The only positive water for quagga mussels in Colorado is Pueblo Reservoir. There has never been an adult zebra or quagga mussel found in Colorado.

Previous Detections 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 mussels is Pueblo Reservoir and 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

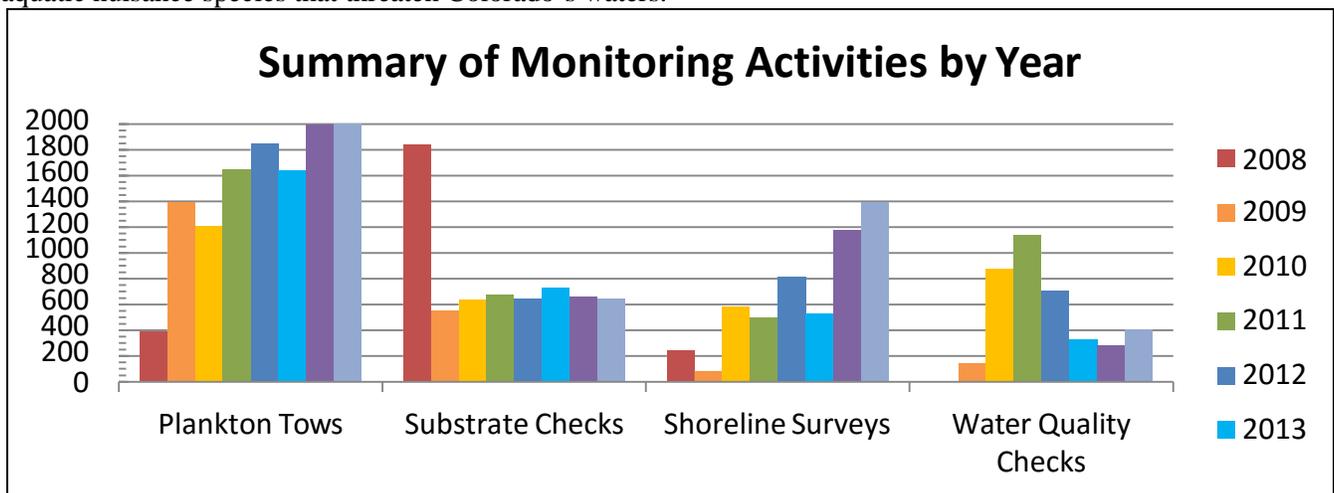
controlled with herbicides at a few Parks and other locations. Watercraft inspection and decontamination containment programs are in place at a few locations.

- 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. Recently in 2015, NZMS was discovered at Chatfield Reservoir State Park.
- 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 24 Colorado water bodies and Pueblo Hatchery. Of those, nine were discovered in 2015. CPW is currently working with the Fish Health Board to evaluate this species.

2015 Program Activities: Sampling/Monitoring

CPW has sampled 584 “at-risk” waters for aquatic invasive species over the last ten years. It was through this sampling program that invasive mussel veligers were first detected in Colorado. While CPW ANS 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 2015, crews sampled 196 standing and approximately 22 flowing waters statewide. In addition to the sampling efforts performed by Colorado Parks and Wildlife, the National Park Service contributed 19 plankton samples. A summary of the sampling efforts by Colorado Parks and Wildlife can be seen in the graph below. Substrate and plankton tow surveys remained consistent with the previous year. Shoreline surveys again saw a spike in 2015 resulting from full shoreline inventories of Chatfield Reservoir and many flowing waters within the state. Water quality checks also saw an increase as the program continues to expand its habitat suitability studies to additional aquatic nuisance species that threaten Colorado’s waters.



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 **2.7 million inspections** and **46,628 decontaminations** since 2008.

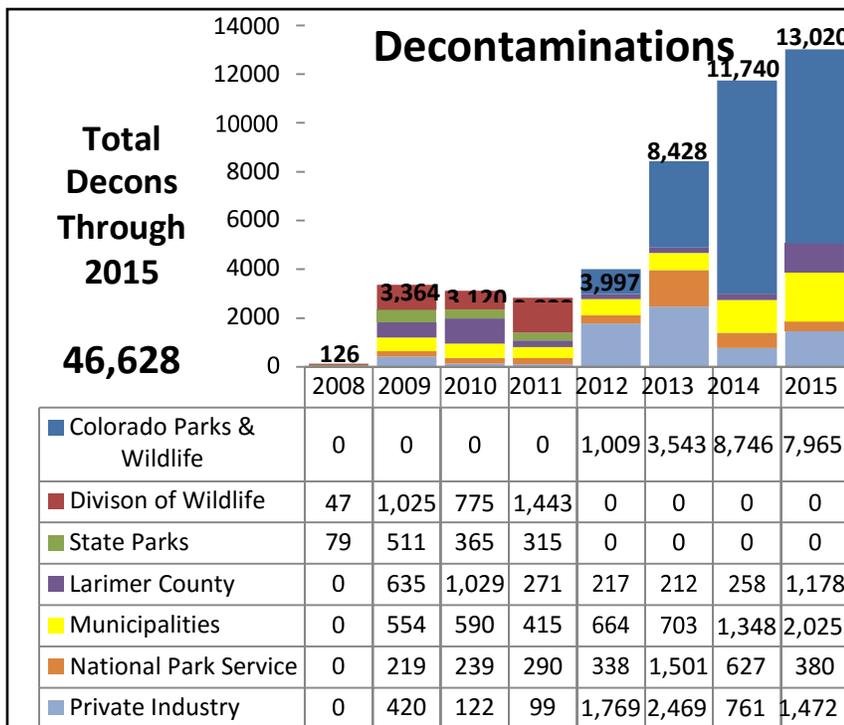
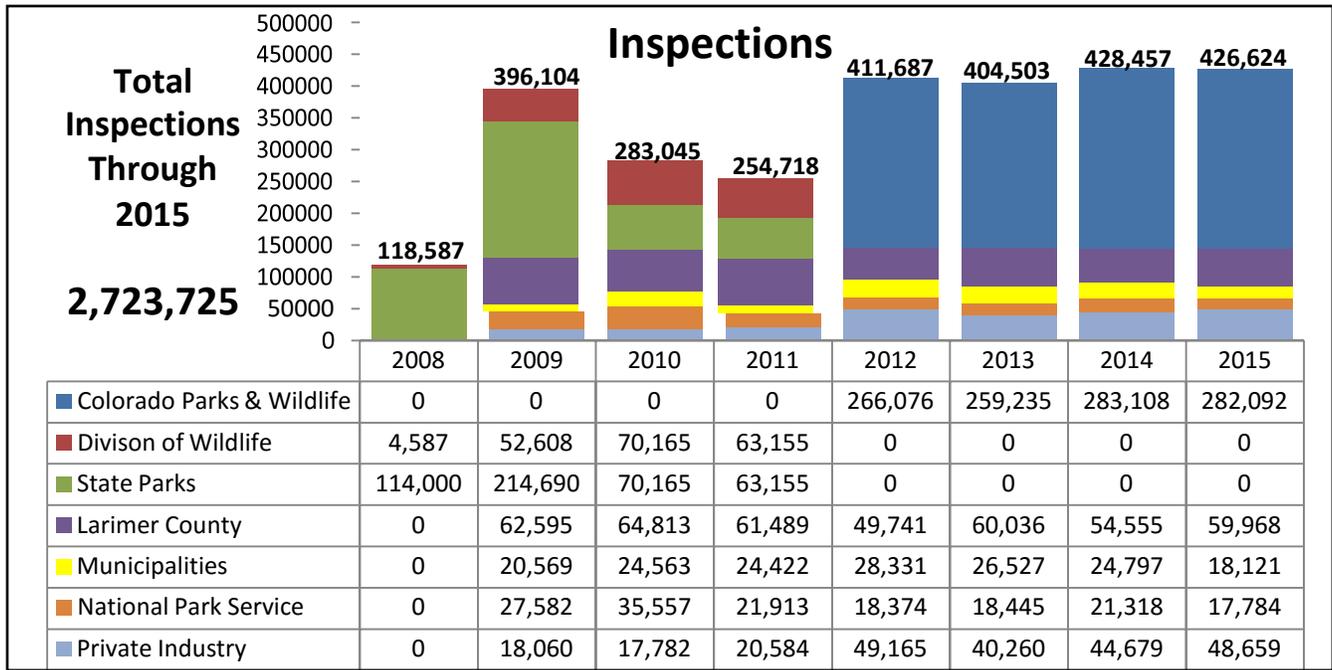
Per the State ANS Regulations, trailered watercraft must submit to an inspection, and decontamination if needed, prior to entrance in Colorado’s waters following boating out of state or boating on a positive or suspect water. Boaters are also required to submit to an inspection prior to entering a water 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 2015 including an online re-certification program for experienced inspectors and decontaminators, for a total of 635 trainings since the program’s inception. In addition to the online course for experienced staff, the Invasive Species Program within CPW also maintained two other new specialized courses: one for trainers, and one in advanced decontamination. CPW certified 657 individuals this year, for a total of 5051 certifications since the training program’s inception. Both the training and the inspections focus on educating the boaters.

A committee consisting of CPW Leadership Team representatives evaluated and improved field procedures this year to account for waters positive for ANS other than zebra or quagga mussels. The team refined procedures to improve customer service and resource protection at waters with inspection and decontamination stations. As such, 71 locations were authorized to perform watercraft inspection and decontamination. Of the 71 total stations, Lake Pueblo State Park was operated as a containment operation for quagga mussels, 18 locations operated as other ANS containment and 52 locations operated as prevention locations. Prevention locations are those that are negative for all ANS or are not located at a waterbody (e.g. offices or marine dealers). The focus of the containment program is to inspect watercraft leaving the lakes/reservoirs to prevent boats from moving ANS overland into currently uninfested areas. Authorized Locations for WID are operated by a variety of entities, including CPW, the National Park Service, Larimer County, municipalities, marinas, private concessioners, private clubs and marine dealers.

Number of Authorized Locations by Entity								
Entity Type	2008	2009	2010	2011	2012	2013	2014	2015
Colorado Parks & Wildlife					41	40	40	37
State Parks	24	28	28	28				
Division of Wildlife	5	160	19	19				
Larimer County	0	2	2	2	2	2	2	2
Municipalities	3	7	11	9	8	8	8	8
National Park Service	0	1	1	1	1	1	1	1
Private Industry	3	11	51	30	21	23	24	23
Total:	35	209	112	89	73	74	75	71

A total of 426,624 inspections and 13,020 decontaminations were performed in Colorado in 2015. 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. 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. In the last year, South Dakota, North Dakota, Nebraska, Arizona and other states had new waters infested with zebra or quagga mussels because of the lack of prevention WID programs. Lastly, waters in close proximity to, or positive

for, NZMS, EWM or invasive waterflea 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

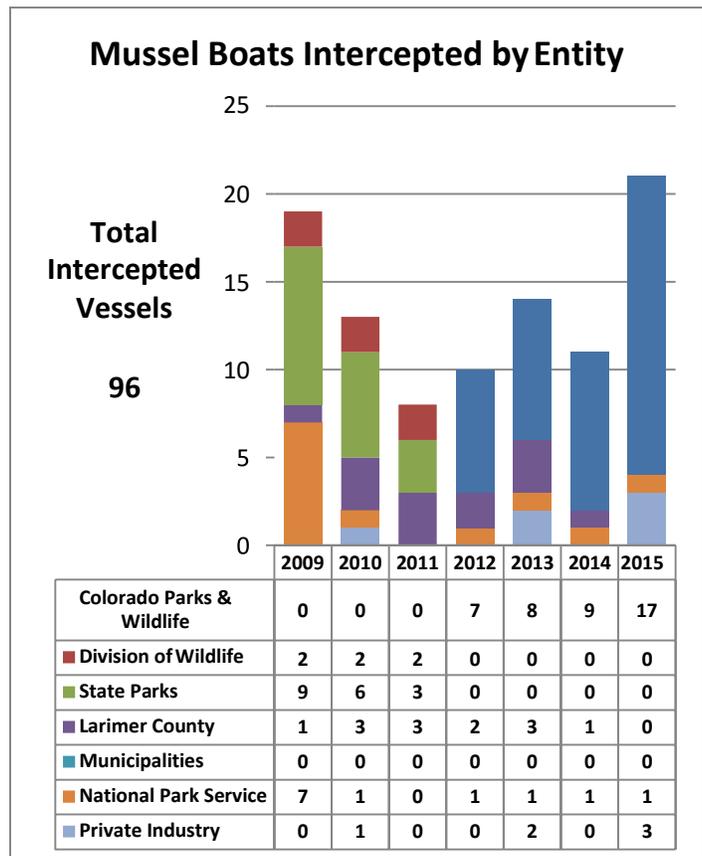
invasion from viable zebra or quagga mussel veligers living in standing water, to protect against watercraft coming from other state’s infested waters and to reduce the spread of other invasive species.

Colorado successfully continued utilizing the ANS Mobile data collection system at 35 authorized locations within the state of Colorado. This application is compatible on all iOS and Android devices which greatly reduces the effective cost of operating mobile data collection on boat ramps across the state, and reduces costs for data entry. It also provides for much greater reliability in data collected in the field at inspection stations.

Colorado continues to lead the way in mobile data collection. In 2015, the state of Utah joined the state of New Mexico in employing ANS Mobile as their primary form of data collection. With the addition of Utah to the inspection database, inspectors in Colorado were able to view inspection records from infested waters in a neighboring state for the first time! With the benefits of regional data sharing proving to be abundant, and the success of the Colorado system, the U.S. Fish & Wildlife Service provide a grant to CPW through the Quagga Zebra Action Plan for Western Waters (WRP, 2010). The CPW Invasive Species Program has taken the lead in developing a truly regional data system for deployment across the West in 2016. This system will improve communications amongst jurisdictions and assist watercraft inspectors in assessing the risk of watercraft intending to launch at their water body!

Mussel Boat Interceptions

This year the state intercepted more watercraft infested with zebra or quagga mussels than ever before! All watercraft were fully decontaminated prior to being allowed into Colorado’s waters. A total of 96 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, Boulder Marine, Canyon Marine, Carter, Cherry Creek, Chatfield, Crawford, Denver CPW Office, Dillon, Eleven Mile, Frisco Bay Marina, Grand Junction CPW Office, Great Lakes Marine, 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, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, 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). All 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,

per regulatory requirements. The team also ensured that stations were stocked with educational materials and provided on the job training to inspectors and supervisors. In 2015, CPW conducted 105 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 2016 with quality evaluations, announced visits, on the job training, supervisor audits and customer service evaluations.

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 was published in early 2015. The CPW training program is being taught nationally, as it has been proven to protect waters from ANS.

Information and Outreach

CPW and partner agencies have implemented a comprehensive, multi-faceted, Invasive Species public-education campaign. The cooperative effort focuses on boaters and anglers primarily to prevent the spread of ANS utilizing a variety of mediums, including billboards, boat ramp signage, brochures, agency Web pages, and staffing tradeshow and expo booths to convey this message.

Along with ANS, the invasive species program within CPW has been conducting information, education and outreach efforts for terrestrial and aquatic plants (noxious weeds), animals, insect and disease invasive species for a number of years. In 2016, the invasive species program intends to implement a comprehensive outreach strategic plan that utilizes community based social marketing to collaborate with all recreational users and change behaviors that will prevent all invasive species from being introduced and spread.

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. These efforts will be expanded in 2016 to more users and a larger variety of invasive species vectors (e.g. noxious weeds).

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. 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.

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 non-native *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 Arkansas River, Boulder,



Cherry Creek, Jackson, North Sterling, Prewitt, Prospect, Union and Windsor Reservoirs. Nine new waters were listed in 2015 which are Barr Lake, Bear Creek Reservoir, Boedecker Reservoir, Boyd Lake, Jumbo Reservoir, Horsetooth Reservoir, Boxelder #3/Smith Lake, Adobe Creek Reservoir and Holbrook Reservoir.

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.

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

There were no new detections of Rusty Crayfish in 2015. 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 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)

NZMS was detected in Chatfield Reservoir State Park during an aquatic noxious weed survey for Eurasian watermilfoil in 2015. 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.



All known populations are being monitored annually. 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 Noxious Weed Coordination

CPW has been the lead agency on aquatic noxious 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 Communications, Education and Outreach Committee for the Federal ANS Task Force
- Member of the Western Association of Fish and Wildlife Agencies' Invasive Species Committee

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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, from 2008-2013. 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 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 today.

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

Funding Source	FY12-13	FY13-14	FY14-15
Parks ANS Fund	\$1,976,874.41	\$2,628,232.88	\$2,642,082.46
Wildlife ANS Fund	\$2,167,550.53	\$1,799,940.39	\$1,794,138.54
CPW Cash	\$212,095.87	\$29,506.51	\$3,765.19
Total:	\$4,356,520.81	\$4,457,679.78	\$4,439,986.19

ANS fund expenditures remained consistent in FY14-15 from FY13-14. In FY13-14, expenses increased by \$101,158.97 due to a change in internal policy that required all CPW FTE staff to charge time working on ANS to the Parks' 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 for FY14-15. The agreements are multi-year and may be accounted for over several fiscal years.

Partner Agency	Direct Contribution
Colorado Springs Utilities	\$15,124.00
Denver Water	\$150,000.00
US Forest Service	\$75,000.00
Total:	\$240,125.00

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	\$155,040.95
U.S. National Park Service	\$421,617.00
Total:	\$576,657.95

CPW continues to spend reserve funds from savings during the first five years of the program to offset costs that were previously paid for with wildlife or parks cash. If possible, CPW plans to continue retaining budget carryover between fiscal years and utilizing these funds, 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.

Economic Report ZQM

Power Generation

- \$800,000 monitoring and control costs for zebra mussels, per Ontario power plant per year. year 2000¹
- 6 power plants in the Upper Peninsula, maintenance due to zebra mussels 1 million in 1993.²
- Wisconsin Power Plants/water utilities- maintenance ZQM \$250,000-\$500,000 per plant/yr in 2001³
- Great Lakes Power Plants (46 power plants) direct operating cost for zebra mussels, costs to power plants range from \$6,700 per hour for a 200-megawatt system to \$127 million annually for U.S. Great Lakes power plants year. Year 1993⁴
- Great Lakes Power Plants (46 power plants) direct operating cost: Plant re-design (damages) zebra mussels \$800 million year 1993⁵
- Throughout 35 US states /3 Canadian provinces surveyed in the Great Lakes Region. 339 facilities reported expenses relating to Zebra Mussel impacts totaling \$83 million in 1989-1995⁶

Industrial Facilities

- \$1.4 million for the removal of Zebra Mussels from 400 yds³ from one Lake Michigan paper company plant. year 1997⁷
- \$92,000 medium size facility/plant/yr. monitoring & control (zebra mussels). year 1993⁸
- \$439,000 large size facility/plant/yr. monitoring & control (zebra mussels). year 1993⁹
- 142 industrial facilities in the Great Lakes, direct operating cost: monitoring and control of zebra mussels 149 million year 1989-1994¹⁰
- Industry: intake pipes, water filtration equipment, and power plants operating costs for zebra mussel damages 3.1 billion over 10 years¹¹

Water Treatment

- \$400,000-\$450,000 per year for municipal water treatment facility in Windsor.¹²

¹ Colautti, R.I., S.A. Bailey, C.D.A. van Overdijk, K. Admunsen and H.J. MacIsaac. 2006. Characterised and projected costs of nonindigenous species in Canada. *Biological Invasions* 8: 45-59.

² Cataldo, "Musseling" in on the Ninth District economy, *Fedgazette*, Federal Reserve Bank of Minneapolis, 2001

³ Cataldo, "Musseling" in on the Ninth District economy, *Fedgazette*, Federal Reserve Bank of Minneapolis, 2001

⁴ The Economic Impacts of Aquatic Invasive Species: A Review of the Literature 1993 as found in Lovell, Stone, and Fernandez

⁵ The Economic Impacts of Aquatic Invasive Species: A Review of the Literature 1993 as found in Lovell, Stone, and Fernandez

⁶ O'Neill, C. (1997) Economic Impact of Zebra Mussels- Results of 1995 National Zebra Mussel Information Clearinghouse Study, Great Lakes Research Review, Vol. 3, No1, April 1997

⁷ US Geological Survey, Zebra Mussels Are Spreading Rapidly, USGS News Release, September 18, 1997

⁸ Park and Hushak, Zebra Mussel Control Costs in Surface Water Using Facilities 1999

⁹ Park and Hushak, Zebra Mussel Control Costs in Surface Water Using Facilities 1999

¹⁰ The Economic Impacts of Aquatic Invasive Species: A Review of the Literature 1993 as found in Lovell, Stone, and Fernandez

¹¹ Cataldo, "Musseling" in on the Ninth District economy, *Fedgazette*, Federal Reserve Bank of Minneapolis, 2001

¹² Colautti, Bailey, van Overdijk, Amunsen, MacIsaac, Characterized and projected costs of nonindigenous species in Canada, *Biological Invasions*, 2006

- Ontario Municipalities- GL, \$3,000 per infested facility per year for monitoring and control of quagga mussels in 2002, totaling 282,000 annually. ¹³
- \$229 per Ontario Lake cottage owner for filtration system installation due to damage from quagga mussels in 2002, totaling \$52,670 ¹⁴
- Municipal Water Treatment in the Great Lakes, Monitoring and Control of Zebra Mussels \$84,000-\$154,000 in 1993, per plant¹⁵
- Great Lakes water users with intake structures monitoring and control of zebra mussels 30 million in 1992-1994, 1989-1994 120 million ¹⁶

Recreation

- Boat Owners-Lake Erie Direct operating cost: Maintenance and Insurance for Zebra mussel \$660/yr./boat owner year 2004. *protective paints (average annual cost per owner was \$130), additional maintenance (\$240), and insurance costs (\$290)¹⁷

General

- Hydro-electric plant direct operating costs \$92,000/plant/yr. ¹⁸
- Fossil-Fuel Plant direct operating costs \$160,000/plant/yr. ¹⁹
- Nuclear Plant direct operating costs \$908,000/plant/yr. ²⁰
- Total U.S. Costs Damages and Control Zebra mussels \$1 billion/yr. ²¹
- Great Lakes total economic costs for zebra mussels 6.5 billion. year 1990-2000²²
- US Canada water users total economic costs for zebra mussels 5 billion. year 2000-2010²³

¹³ Colautti, R.I., S.A. Bailey, C.D.A. van Overdijk, K. Admunson and H.J. MacIsaac. 2006. Characterised and projected costs of nonindigenous species in Canada. *Biological Invasions* 8: 45-59.

¹⁴ Colautti, R.I., S.A. Bailey, C.D.A. van Overdijk, K. Admunson and H.J. MacIsaac. 2006. Characterised and projected costs of nonindigenous species in Canada. *Biological Invasions* 8: 45-59.

¹⁵ Park and Hushak, Zebra Mussel Control Costs in Surface Water Using Facilities, Ohio Sea Grant Program, 1999

¹⁶ Park and Hushak, Zebra Mussel Control Costs in Surface Water Using Facilities 1999

¹⁷ U.S. Geological Survey as found in Lovell, Stone, and Fernandez

¹⁸ U.S. Geological Survey as found in Lovell, Stone, and Fernandez

¹⁹ U.S. Geological Survey as found in Lovell, Stone, and Fernandez

²⁰ U.S. Geological Survey as found in Lovell, Stone, and Fernandez

²¹ OTA 1993 and Army Corp of Engineers 2002 as cited in Pimentel et al, 2004

²² U.S. Fish and Wildlife Estimate as found in Lovell, Stone, and Fernandez, The Economic Impacts of Aquatic Invasive Species: A Review of the Literature, Agricultural and Resource Economics Review, April 2006

²³ GLSC fact sheet, Zebra Mussels Cause Economic and Ecological Problems in the Great Lakes 2000

CPW ANS Budget - Site Allocations for Watercraft Inspection and Decontamination

WID Site	Region	Annual Cost*	Recreational Manager	Funding Source	Federal Dam?	Notes - Gaps
ANTERO RESERVOIR	NE	\$ 100,000.00	Denver Water	CPW + Denver Water	No	A contract with Denver Water provides \$50,000 a year for this program. CPW pays the rest. CPW supervises and manages site operations.
BARR LAKE	NE	\$ 19,325.00	CPW - Park	CPW	No	N/A
BLUE MESA	SW	\$ 511,689.00	National Park Service	CPW + NPS	Yes - NPS	CPW funds \$100,000 (6 temps) and NPS funds \$400,000. State and Federal inspectors work side by side on the ramps.
BOYD LAKE	NE	\$ 110,000.00	CPW - Park	CPW	No	N/A
CBT - Grand, Granby, Shadow Mountain	NW	\$ 380,000.00	USFS	CPW	Yes - BOR	USFS provided funding for cost share at this location from 2009-2015. As of 2016 there is no longer USFS funds available. CPW is seeking 50% cost share funds to continue this program.
CHATFIELD	NE	\$ 381,417.00	CPW - Park	CPW	Yes - ACOE	N/A
CHERRY CREEK	NE	\$ 197,875.00	CPW - Park	CPW	Yes - ACOE	N/A
CLEAR CREEK RESERVOIR	SE	\$ 38,118.00	CPW - SWA	CPW	No	N/A
CRAWFORD	SW	\$ 36,437.00	CPW - Park	CPW	No	N/A
ELEVEN MILE	NE	\$ 100,000.00	CPW - Park	Denver Water	No	A contract with Denver Water fully funds this program. CPW supervises and manages site operations.
ELKHEAD	NW	\$ 45,300.00	CPW - Park	CPW	No	N/A
GREEN MOUNTAIN	NW	\$ 78,000.00	USFS	CPW	Yes - BOR	From 2009-2014 this was 100% paid for by USFS. In 2015, the USFS elected not to fund the reservoir and CPW took over fully funding the site. CPW is seeking 50% cost share to continue the program.
HARVEY GAP	NW	\$ 30,857.00	CPW - Park	CPW	No	N/A
HIGHLINE LAKE	NW	\$ 63,250.00	CPW - Park	CPW	Yes - BOR	N/A
JACKSON LAKE	NE	\$ 42,450.00	CPW - Park	CPW	No	N/A
JOHN MARTIN	SE	\$ 56,229.00	CPW - Park	CPW	Yes - ACOE	The Army Corp of Engineers provides 2 inspectors to help this program.
JUMBO RESERVOIR	NE	\$ 76,710.00	CPW - SWA	CPW	No	N/A
LARIMER COUNTY: Carter & Horsetooth	NE	\$ 361,328.00	Larimer County	CPW	Yes - BOR	CPW has fully funded this program since its inception in 2009. Larimer County has the 2nd highest mussel boat interception rate in Colorado. CPW is seeking 50% cost share to fund this program in the future.
LATHROP	SE	\$ 70,624.00	CPW - Park	CPW	No	N/A
MANCOS	SW	\$ 10,000.00	CPW - Park	CPW	No	N/A
MCPHEE RESERVOIR	SW	\$ 87,500.00	USFS	CPW	Yes - BOR	From 2009-2014, this program was a cost-share between USFS and CPW. In 2015, CPW fully funded the program following the USFS Regional Office eliminating funding for ANS. In 2016, the San Juan NF got a small grant for \$15,000, the Dolores Water Conservancy District is providing \$25,000 and CPW is providing \$47,500.
NAVAJO	SW	\$ 188,500.00	CPW - Park	CPW	Yes - BOR	N/A

CPW ANS Budget - Site Allocations for Watercraft Inspection and Decontamination

WID Site	Region	Annual Cost*	Recreational Manager	Funding Source	Federal Dam?	Notes - Gaps
NORTH STERLING	NE	\$ 43,000.00	CPW - Park	CPW	No	N/A
PAONIA	SW	\$ 9,000.00	CPW - Park	CPW	Yes - BOR	N/A
PUEBLO	SE	\$ 472,831.00	CPW - Park	CPW	Yes - BOR	N/A
RAMPART	SE	\$ 28,000.00	USFS	Colorado Springs Utilities	No	A contract with Colorado Springs Utilities fully funds this program. CPW supervises and manages site operations.
RIDGWAY	SW	\$ 63,500.00	CPW - Park	CPW	Yes - BOR	N/A
RIFLE GAP	NW	\$ 67,125.00	CPW - Park	CPW	No	N/A
RUEDI RESERVOIR	NW	\$ 55,000.00	USFS	Ruedi Water and Power, Counties, & CPW	Yes - BOR	Historically this program was funded with a cost share between RWAPA, CPW and USFS. As of 2015, there are no longer USFS fund available. RWAPA was able to raise funds from the local governments to cover the USFS share in 2015 and 2016. Long term sustainable funding is needed to continue in 2017.
SPINNEY MOUNTAIN	NE	\$ 71,050.00	CPW - Park	CPW	No	N/A
STAGECOACH	NW	\$ 25,310.00	CPW - Park	CPW	No	N/A
STEAMBOAT LAKE	NW	\$ 42,050.00	CPW - Park	CPW	No	N/A
SWETIZER	SW	\$ 23,450.00	CPW - Park	CPW	No	N/A
TARRYALL	NE	\$ 35,634.00	CPW - SWA	CPW	No	N/A
TAYLOR PARK	SW	\$ 46,000.00	USFS	CPW + USFS	Yes - BOR	The GMUG NF is contributing cost-share funds to maintain this program following the USFS Regional Office pulling funding in 2015. This program is secure assuming the GMUG continues its commitment in 2017 and beyond, which is expected. The GMUG is using the forest's natural resource budget to provide cost-share.
TRINIDAD	SE	\$ 44,000.00	CPW - Park	CPW	Yes - ACOE	N/A
VALLECITO	SW	\$ 45,500.00	Pine River Irrigation District	CPW	Yes - BOR	This program has always been fully funded by CPW. CPW is seeking 50% cost share funds to continue this program.
VEGA	NW	\$ 41,200.00	CPW - Park	CPW	Yes - BOR	N/A
WILLIAMS FORK	NW	\$ 58,000.00	Denver Water	CPW + Denver Water	No	N/A

CPW ANS Budget - Site Allocations for Watercraft Inspection and Decontamination

WID Site	Region	Annual Cost*	Recreational Manager	Funding Source	Federal Dam?	Notes - Gaps
Statewide ANS Program	All	\$ 1,121,904.00	All	CPW	N/A	Statewide program budget for everything that is not a temporary employee (inspector/decontaminator) on a boat ramp. This includes coordination and support for all WID stations including decontamination units and repair, seals, receipts, forms, data collectors, uniforms, educational materials, signs, research, training, quality control, data mgmt, outreach, etc. This budget item also includes the statewide sampling and monitoring program, lab analysis, Eurasian watermilfoil noxious weed control, Rusty crayfish removals, technology, vehicles, travel and general operating expenses.

\$ 5,278,163.00

The following sites are fully funded by the managing entity and require no direct fiscal resources from CPW, except support services listed in line 42:

Arvada
 Aurora
 Bear Creek Lake
 Boulder
 Dillon Marina
 Frisco Marina
 Quincy
 Standley Lake
 Wolford Mountain

The following WID Stations were eliminated by CPW in 2015:

Prewitt
 Sanchez
 St. Vrain
 San Luis Lakes
 State Forest

**March 15, 2016 - Subject to Change*

31.53 STATEMENT OF BASIS, SPECIFIC STATUTORY AUTHORITY AND PURPOSE; JUNE 13-14, 2016 RULEMAKING

The provisions of sections 25-8-202(1)(b), 25-8-204; and 25-8-402, C.R.S., provide the specific statutory authority for adoption. The Commission also adopted, in compliance with section 24-4-103(4) C.R.S., the following statement of basis and purpose.

BASIS AND PURPOSE

In this rulemaking the Commission considered revisions to criteria and revisions to implementation methodologies. The Commission adopted changes as detailed below.

I. TEMPERATURE

In 2007, the Commission adopted temperature criteria and implementation methods for Colorado's surface waters. The criteria were derived from laboratory-based studies of individual fish species' tolerance to elevated water temperatures. The implementation methods were developed based on review of other states' methods and adaptation of methods for implementation of other water quality standards. Since that time, the Division and stakeholders have gained a great deal of experience with empirical records showing spatial and temporal patterns of temperature in surface water and effluent. Experience has shown that the adopted standards often are not attainable due to natural environmental constraints that are closely tied to elevation and may be affected by other factors as well. Consequently, revisions may be needed to incorporate those natural constraints that are an appropriate incremental improvement to the current standards. The revisions discussed in this rulemaking build on a decade of practical experience gained from massive data collection efforts and they chart a path forward to improve the basis for the standards, incorporate the effects of elevation on attainability and ensure more consistent implementation.

There are ~~two~~ four parts to the temperature standards that were discussed in this hearing~~revisions to this regulation~~. The first ~~revision~~, Part A, is a change to the definition of existing quality to clarify the implementation of exceedance frequency ~~and eliminate unworkable excursions~~. The second part, Part B, revises criteria to incorporate new information about the temperature tolerances of fish. Part C provides policy direction to address consideration of temperature standards at elevations below which the physiologically-based temperature standards cannot be attained routinely. Part D provides policy direction to address consideration of temperature standards in the shoulder seasons.

A. Definition of Existing Quality

The Commission restructured the definition of existing quality (EQ) at 31.5(20) and modified the portion about temperature to allow one warming event above standards with a 3 year average exceedance frequency. EQ is a characteristic of the ambient condition that is used in two contexts: 1) comparing the ambient condition to water quality standards to determine whether standards are attained; and 2) characterizing the upstream water quality for calculating permit effluent limits. It has also been used when setting ambient standards. Changes were made to clarify the definition of EQ for temperature so that it can be consistently applied in each programmatic context.

The revised definition specifies that the value for EQ is the maximum DM and MWAT which allows for one warming event with a 3-year average exceedance frequency. The Commission recognizes the potential for natural systems to occasionally exceed numeric standards and that limited exceedances of the standard are expected. The Commission's intent is that thermal conditions should be sufficient for longer lived fish species to complete their lifecycles, and evidence derived from the literature suggests that 3 years is sufficient for most stream fish in Colorado. Additionally, the Commission recognizes that autocorrelation is inherent in stream temperatures, and that several days exceeding the standard may be the result of a single warming event. For standards attainment, the Commission intends that the average

recurrence frequency of these warming events be limited to once every 3 years. (Table 1, footnotes 5a and 5b were edited to reflect this.) Therefore, where data records are 3 years or less, EQ will be the maximum DM or MWAT. For data records of 4 to 6 years, an allowance will be made for one warming event in either the summer or winter. For data records of 7 to 9 years two warming events are allowed. The definition of a “warming event” will be determined with statistically appropriate tests and representative data defined in the next 303(d) listing methodology process. In addition to consideration of the frequency of “warming events”, the Commission would like the Division to look at the impacts of duration, multiplicity and cumulative effects.

For permitting, the Commission intends that EQ will also incorporate an allowable exceedance frequency for monthly determination. EQ will be the maximum DM or WAT with 3 or less years of representative upstream data. For data records with 4-6 years, the second highest monthly DM or WAT may be selected for one month in either winter or summer and the remaining months shall be the max DM or WAT. Allowances for each month are not appropriate because the allowable exceedance frequency (the recurrence interval) is based on the time that it takes for the aquatic community to recover from a harmful event.

~~The Commission also deleted the low flow and air temperature excursions at 31.16 Table I – Footnote 5(c)(i) and (ii). These excursions proved to be problematic to implement with little apparent regulatory relief. Furthermore they allowed for situations where exceedances occurred more frequently than once in three years. The Commission retained the temperature excursions at 31.16 Table 1 – Footnote 5(c) so they could be addressed along with shoulder seasons and transition zones in a future rulemaking.~~

The requirement for “adequate refuge” has been awkwardly split between the temperature footnote (5(c)) and the dissolved oxygen footnote (9(c)). Footnote 5(d)(iii), the allowance for temperature exceedances in lakes where adequate dissolved oxygen is present below the mixed layer (the refuge allowance), was deleted. To maintain the requirement but simplify the regulation, in footnote 9(c), the reference to footnote 5(c)(iii) has been replaced by a clear statement that adequate refuge is required and a description of adequate refuge.

B. Temperature Criteria

Temperature Database Updates: As part of the Division’s routine review, the Colorado Temperature Database was updated using the most recent literature regarding the thermal requirements of Colorado’s fishes. This effort was an initial step to support revision of the warm water winter acute values (discussed below) and also allowed for general updates of cold and warm water acute and chronic values. New acute and/or chronic thermal tolerance information was found for several species, both cold and warm water, including brook trout, brown trout, cutthroat trout, lake trout, mountain whitefish, rainbow trout, black crappie, bonytail, channel catfish, largemouth bass, mountain sucker, and stonecat. Based on this information, the Commission adopted revisions to the existing temperature standards found in Table I.

A new critical thermal maxima value for lake trout was added to the database as part of the updates. This new acute value, combined with existing chronic data, allowed for the derivation of DM and MWAT values for lake trout. Including lake trout in the Cold Lakes & Reservoirs and Cold Large Lakes & Reservoirs DM and MWAT calculations would result in MWAT values of 16.7°C for both tiers. Lake trout are currently managed in only 30 individual lakes/reservoirs, which are in a total of 17 segments; these segments comprise less than 9% of all lakes/segments. Due to the relatively small number of segments containing lake trout, the Commission decided to not include the lake trout data in the derivation of statewide lakes/reservoirs temperature standards. Instead, the Commission adopted a footnote to Table I stating that where lake trout do occur and protection from thermal impacts is necessary and appropriate, the literature-based summer MWAT and DM for lake trout of 16.6°C and 22.4°C, respectively, should be applied. The Commission intends for these lake trout populations to be covered by the “adequate refuge” provision that requires concurrent attainment of the literature-based summer MWAT and DM values and dissolved oxygen standards.

A similar approach was taken for mountain whitefish. Early life stages of this species are known to be more thermally sensitive than other CS-I and CS-II species and adult mountain whitefish are known to migrate into cold tributaries to spawn. To ensure protection of sensitive early life stages, the Commission adopted a footnote to Table I stating that where and when spawning and sensitive life stages of mountain whitefish are known to occur, the literature-based summer MWAT and DM of 16.9°C and 21.2°C, respectively, should be applied.

Warm Water Winter Acute Table Values: When seasonal temperature standards were adopted in 2007, warm water winter acute and chronic standards were simply set at half the summer season values, recognizing a pattern seen in cold waters. The acute winter table values for warm water fish were revised based on lethal temperature thresholds established in laboratory experiments for fish acclimated to “winter” temperatures. This new method protects warm water fish in winter from acute effects. The Commission adopted the resulting warm tier temperature winter standards in Table I.

C. Additional Flexibility in Transition Zones

The physiologically-based summer temperature standards are not attainable in every year in every segment where they have been adopted. The attainability problem is not tied to specific watersheds or isolated locations, but is instead a statewide phenomenon that shows a clear spatial pattern related to elevation and could be affected by other factors. The problem arises from an unavoidable conflict between the historical distributions of fish species and the expectation that protective conditions for all life history stages can be sustained in every year throughout a segment. The environment varies naturally and fish move in response to environmental stimuli.

Temperature tiers have been adopted on the basis of the best available information concerning the fish species that have been found in the segment. The assignment of temperature tiers is logical and defensible, but an implementation problem arises if the assignment is accompanied automatically by the assumption that temperature standards are always attainable throughout the segment.

Water temperature in unimpacted streams is primarily governed by physical factors (e.g., solar radiation) that affect heat gain and loss, for which elevation is a practical surrogate. Current evidence shows that because of this natural phenomenon, maximum temperatures are expected to exceed the physiologically-based standards in some years at lower elevations for some temperature tiers.

The Division proposed a statewide elevation adjustment for the summer MWAT (the MWAT_{elev}) to define a modified expectation for maximum temperatures. The elevation range where the adjustment was proposed to be applied is called the transition zone. The Commission declined to adopt this approach in favor of a basin-by-basin consideration of attainability issues. Elevation is ~~may be a surrogate for the natural factors that constrain water temperatures throughout the state.~~ This adjustment informs, but does not change, the narrative standard which requires maintenance of a normal pattern of increase and decrease in water temperature. The basin-by-basin approach will allow consideration of ambient - quality-based site-specific standards proposals in accordance with section 31.7(1) where elevation is the natural, irreversible factor. Unlike the basis for most other ambient-standards proposal, elevation occurs everywhere and has a predictable effect on water temperature. The basin-by-basin approach will provide an opportunity to consider this elevation adjustment as one of multiple lines of evidence and more specifically the basin hearings will provide for consideration of site-specific contravening evidence. The Commission intends for the experiences of this approach to inform potential changes to the Basic Standards in the future. However, the Commission does not intend that this approach is a de facto adoption of statewide standards through segment specific changes.

At this time, the Commission has not considered the same adjustment to the Daily Maxima temperature standards. Such an adjustment could be considered on a site-specific basis and future analysis may identify the same statewide attainability issues that can be addressed in future rulemaking.

Lakes

Temperature standards for lakes apply to the upper, mixed layer where water temperatures are governed by physical factors (e.g., solar radiation). Elevation has may proven to be a useful surrogate for the suite of physical factors driving temperature in lakes. The Division presented evidence based on 574 lake-years of data from 116 lakes sampled over a broad range of elevations during the last 20 years. To be included in this analysis, a lake had to have been sampled during a 6-week period in mid-summer (11 July to 21 August) when maximum temperatures (MWAT) are expected. Several lakes showed evidence of anthropogenic influence in the form of “tailwater” effects from upstream reservoirs (e.g., Morrow Point) or very short retention times (e.g., Estes); these were excluded.

Regression analysis was used to define the relationship between summer MWAT and elevation. Lines for individual years were compared to assess interannual variability, which was small for the slope. The exceedance frequency was addressed by developing a regression line for the 66.7th percentile MWAT at each of the 33 lakes with at least 5 years of qualifying data. ~~In the resulting equation, elevation explains more than 90% of the variability in MWATs for~~ the lakes analyzed in this hearing.

$$\text{MWAT}_{\text{elev}} = -0.001651 (\text{elevation}) + 32.43$$

At the time of the next routine review of each basin, the MWAT adjustment ~~should~~ could be considered for lakes where the $\text{MWAT}_{\text{elev}}$ is predicted to exceed the adopted standard. For example, the MWAT adopted for Cold Large Lakes currently is 18.3 °C, and the equation predicts that it is not routinely attainable in lakes at elevations below about 8560 ft and warm lakes below 3774 ft. This is consistent with the elevations of lakes for which site-specific temperature standards have already been adopted.

Streams

Like lakes, water temperatures in streams are governed by physical factors and elevation is may be a useful surrogate for these factors. The Division presented evidence from analysis of water temperature records from 267 sites in Colorado over a broad range of elevations and throughout Colorado’s varied landscape. Data from approximately 1162 site-years was used to examine the relationship between summer maximum temperatures and elevation. All sites were screened for likely anthropogenic influences from waste water treatment facilities and reservoirs (tailwaters). Of 10 different physical and geographic watershed and site attributes, site elevation most strongly predicts annual MWATs ~~across the state~~ for the analyzed sites. Additionally, residuals (unexplained variance) from the relationship between each year’s MWAT and elevation were analyzed to determine whether the remaining variance was related to the following attributes: slope, aspect, Strahler stream order, percent canopy cover, 30-year max air temperature, CHILI Index (an index of solar radiation, slope, latitude and aspect), watershed area, upstream active diversions count, and sum of absolute and conditional diversion rates. Regression analysis between the summer MWAT and elevation showed that over 80 percent of the variance is explained by elevation alone. Annual variability was examined by comparing the relationships for individual years; slopes were in close agreement. The exceedance frequency was addressed by developing a regression line for the 66.7th percentile MWAT at each of the 79 sites with at least 5 years of data. This value is an interpolated estimate of the once in three year exceedance value of existing quality. The resultant equation is:

$$\text{MWAT}_{\text{elev}} = -0.002145 (\text{elevation}) + 32.97$$

At the time of the next routine review of each basin, the MWAT adjustment ~~shall~~ could be considered for sites in the transition zone along with other lines of evidence. For example, for a site in a Cold Stream Tier II segment at 6800 feet elevation, the $\text{MWAT}_{\text{elev}}$ of 18.5°C could be the operative standard instead of the 18.3°C standard for the segment.

D. Additional Flexibility in Shoulder Seasons

For each temperature tier, there are summer and winter criteria, and the shift from one season to the next occurs abruptly on a single date. The rigid, first-of-the-month changeover of seasons does not reflect the natural pattern of gradual, predictable change in temperature, nor does it provide flexibility to allow for inter-annual variability in the timing and rate of temperature change. These two factors reflect the natural constraints on temporal patterns of water temperature in streams and lakes, partially as a function of elevation.

The Division proposed to revise the table values for each stream and lake temperature tier to substitute the existing narrative standard for the months on either side of the transitional date (i.e., the shoulder seasons). Support for applying the narrative standard was provided by the elevation-related trend in the duration of winter (i.e., consecutive days below the adopted winter standard) and the natural variability documented for the fall and spring transition dates at individual sites. The Commission declined to adopt this approach, in favor of a basin-by-basin consideration of these issues. The Commission intends for the experiences of this approach to inform potential changes to the Basic Standards in the future. However, the Commission does not intend that this approach is a de facto adoption of statewide standards through segment specific changes.

One approach that ~~will~~ could be considered in hearings at the basin level is revising the segment-specific standards so the numeric criteria would apply only for the core winter and summer months. The narrative standard would continue to require a normal pattern with no abrupt changes.

Attainment of the narrative standard during the fall and spring could then be assessed for 303(d) purposes by determining the direction of the general temperature trend, using the average WAT of each month. If the surface water is cooling or warming at the appropriate season, then it would not result in an exceedance of the narrative temperature standard.

For the purposes of implementation in permits, the intent would be to ensure that the natural seasonal progression is maintained. For each of the months in the shoulder seasons, simple linear interpolation could be used to establish a value for the water quality standards that could be used in the mass balance equation for setting permit limits.

C. — Recognition of Natural Environmental Gradients and Normal Pattern

~~Over the past decade, a great deal of water temperature data has been collected. Assessment of Colorado data show that there are widespread summertime MWAT attainment issues, particularly in, but not limited to, Cold Stream Tier II streams and Cold Large Lakes. There are also shoulder season problems particularly in, but not limited to Cold Stream Tier 1 and 2 streams. Further, data analysis shows that that the pattern of non-attainment is linked to elevation. Literature identifies that other natural physical factors also influence stream temperature. Consequently, revisions are needed to recognize how physical factors influence attainability.~~

~~In this hearing, the Division proposed modifications to the temperature table values to acknowledge elevation's influence on attainable maximum temperatures ("transition zone" equations), and to rely on narrative standard instead of numeric table value standards during the spring and fall ("shoulder seasons"). The Commission has considered the statewide analysis of temperature data presented at this hearing and finds that it has value for making site-specific adjustments to temperature standards. The analysis represents significant, incremental progress in our understanding of temperature attainability issues.~~

- ~~1. — Delayed Effective Date: Having considered the evidence submitted in this rulemaking, the Commission has not adopted the Division's proposal as noticed. Rather, the Commission has determined that adoption of the transition zone equation and shoulder season adjustment should be adopted with a delayed effective date of July 1, 2019. This is an appropriate policy choice to encourage cooperative efforts to improve temperature provisions prior to the time that the revisions go into effect, while ensuring that the work of the Division and the parties is not lost. All parties agreed that improvement in temperature standards is necessary and desirable. The~~

~~Commission strongly encourages interested stakeholders to work together in the interim to further develop the temperature standards. Information developed during this interim may be considered by the Commission to refine the temperature standards in Regulation 31 in the future.~~

- ~~2. Focus on Site-Specific Considerations: The Commission endorses elevation-based adjustments to temperature standards based on equations developed in this hearing. The Commission directs the Division to bring proposals to the San Juan Basin and Gunnison Basin hearings that will facilitate consideration of site-specific adjustments for implementation of temperature standards including elevation-based MWAT and shoulder season adjustments. Those proposals shall begin with the elevation-based adjustments as described below.~~

~~The basin rulemaking approach will allow consideration of ambient-quality-based site-specific standards proposals in accordance with section 31.7(1) where elevation is the natural, irreversible factor. Unlike the pollutant sources prompting development of most other ambient standards proposals, elevation occurs everywhere and has a predictable effect on water temperature. The site-specific approach planned for upcoming basin reviews will provide an opportunity to consider this elevation adjustment as one of multiple lines of evidence and more specifically for consideration of site-specific contravening evidence. The basin hearing is also an opportunity to consider appropriate use classifications, including modifications thereof, with the goal of identifying temperature standards that are protective and attainable.~~

- ~~3. Transition Zones~~

~~The physiologically-based summer temperature standards are not attainable in every year in every segment where they have been adopted. The attainability problem is not tied to specific watersheds or isolated locations, but is instead a statewide phenomenon that shows a clear spatial pattern related to elevation. The problem arises from an unavoidable conflict between the historical distributions of fish species and the expectation that protective conditions for all life history stages can be sustained in every year throughout a segment. The environment varies naturally and fish move in response to environmental stimuli.~~

~~Temperature tiers have been adopted on the basis of the best available information concerning the fish species that have been found in the segment. The assignment of temperature tiers is logical and defensible, but an implementation problem arises if the assignment is accompanied automatically by the assumption that temperature standards are always attainable throughout the segment.~~

~~Water temperature in unimpacted streams is primarily governed by physical factors (e.g., solar radiation) that affect heat gain and loss, for which elevation is a practical surrogate. Current evidence shows that because of this natural phenomenon, maximum temperatures are expected to exceed the physiologically-based standards in some years at lower elevations for some temperature tiers.~~

~~In this rulemaking the Commission adopted a statewide elevation adjustment for the summer MWAT (the MWAT_{elev}) that to defines a modified expectation for maximum temperatures, with a delayed effective date of July 1, 2019. The elevation range where the adjustment is will be applied is called the transition zone. As a policy matter, the Commission chose to include this adjustment to the table values in Table I (Physical and Biological Parameters) in section 31.16, at Footnote 5(c). Elevation is a surrogate for the natural factors that constrain water temperatures throughout the state. This adjustment informs, but does not change, the narrative standard which requires maintenance of a normal pattern of increase and decrease in water temperature. This adjustment does not eliminate the opportunity for site-specific numeric standards. At the time of the next routine review of each basin regulation following the effective date of July 1, 2019, this elevation adjustment will be implemented. Prior to the effective date, the Commission will also consider elevation adjustments based on site-specific information.~~

~~At this time, the Commission has not considered provided the same adjustment to the Daily Maxima temperature standards. Such an adjustment could be considered on a site-specific basis and future analysis may identify the same statewide attainability issues that can be addressed in future rulemaking.~~

Lakes

Temperature standards for lakes apply to the upper, mixed layer where water temperatures are governed by physical factors (e.g., solar radiation). Elevation has proven to be a useful surrogate for the suite of physical factors driving temperature in lakes. The Division presented evidence based on 574 lake-years of data from 116 lakes sampled over a broad range of elevations during the last 20 years. To be included in this analysis, a lake had to have been sampled during a 6-week period in mid-summer (11 July to 21 August) when maximum temperatures (MWAT) are expected. Several lakes showed evidence of anthropogenic influence in the form of “tailwater” effects from upstream reservoirs (e.g., Morrow Point) or very short retention times (e.g., Estes); these were excluded.

Regression analysis was used to define the relationship between summer MWAT and elevation. Lines for individual years were compared to assess interannual variability, which was small for the slope. The exceedance frequency was addressed by developing a regression line for the 66.7th percentile MWAT at each of the 33 lakes with at least 5 years of qualifying data. In the resulting equation, elevation explains more than 90% of the variability in MWATs for lakes.

$$MWAT_{elev} = -0.001651(\text{elevation}) + 32.3143$$

The MWAT adjustment shall be used for lakes where the $MWAT_{elev}$ is predicted to exceed the adopted standard. For example, the MWAT adopted for Cold Large Lakes currently is 18.3 °C, and the equation predicts that it is not routinely attainable in lakes at elevations below about 8630 ~~8560~~ ft and warm lakes below 3774 ft. This is consistent with the elevations of lakes for which site-specific temperature standards have already been adopted.

Footnote 5(d)(iii), the allowance for temperature exceedances in lakes where adequate dissolved oxygen is present below the mixed layer (the refuge allowance), was deleted. The requirement for “adequate refuge” has been awkwardly split between the temperature footnote (5(c)) and the dissolved oxygen footnote (9(c)). To maintain the requirement but simplify the regulation, in footnote 9(c), the reference to footnote 5(c)(iii) has been replaced by a clear statement that adequate refuge is required and a description of adequate refuge.

Streams

Like lakes, water temperatures in streams are governed by physical factors and elevation is a useful surrogate for these factors. The Division presented evidence from analysis of water temperature records from 267 sites in Colorado over a broad range of elevations and throughout Colorado’s varied landscape. Data from approximately 1162 site-years was used to examine the relationship between summer maximum temperatures and elevation. All sites were screened for likely anthropogenic influences from waste water treatment facilities and reservoirs (tailwaters). Of 10 different physical and geographic watershed and site attributes, site elevation most strongly predicts annual MWATs across the state. Additionally, residuals (unexplained variance) from the relationship between each year’s MWAT and elevation were analyzed to determine whether the remaining variance was related to the following attributes: slope, aspect, Strahler stream order, percent canopy cover, 30-year max air temperature, CHILI Index (an index of solar radiation, slope, latitude and aspect), watershed area, upstream active diversions count, and sum of absolute and conditional diversion rates. This analysis indicated that these attributes did not exert a bias, with the possible exception of sites with more than 1000 upstream active diversions. These few sites had slightly warmer water than expected for sites at similar elevations. Data from these highly diverted sites were not used in the final equation. Regression analysis between the summer MWAT and elevation showed that roughly over 80 percent of the variance is explained by elevation alone. Annual variability was examined by comparing the relationships for individual years; slopes were in close agreement. The exceedance frequency was addressed by developing a regression line for the 66.7th percentile MWAT at each of the 79 sites with at least 5 years of data. This value is an interpolated estimate of the once in three year exceedance value of existing quality. The resultant equation is:

$$MWAT_{\text{elev}} = -0.002145 (\text{elevation}) + 31.93132.97$$

~~The MWAT adjustment shall be used when a temperature logger sites is in the transition zone along with other lines of evidence. For example, for a site in a Cold Stream Tier II segment at 6800 feet elevation, the MWAT_{elev} of 18.5°C would could be the operative standard instead of the 18.3°C standard for the segment.~~

~~4. ——— Shoulder Seasons~~

~~For each temperature tier, there are summer and winter criteria, and the shift from one season to the next occurs abruptly on a single date. The rigid, first-of-the-month changeover of seasons does not reflect the natural pattern of gradual, predictable change in temperature, nor does it provide flexibility to allow for inter-annual variability in the timing and rate of temperature change. These two factors reflect the natural constraints on temporal patterns of water temperature in streams and lakes, partially as a function of elevation.~~

~~The Division proposed to Commission revised the table values for each stream and lake temperature tier to substitute the existing narrative standard for the months on either side of the transitional date (i.e., the shoulder seasons). Support for applying the narrative standard was provided by the elevation-related trend in the duration of winter (i.e., consecutive days below the adopted winter standard) and the natural variability documented for the fall and spring transition dates at individual sites. The Commission delayed statewide implementation in favor of a basin-by-basin consideration of these issues. Prior to the effective date of this regulation, the Commission will consider shoulder season adjustments based on site-specific information.~~

~~One approach that will be considered in hearings at the basin level is revising the standards so tThe numeric criteria now would apply only for the core winter and summer months. The narrative standard would continues to require a normal pattern with no abrupt changes. Because this change applies to all temperature tiers, the Commission deleted Footnote 5(iv) to Table I in Regulation #31 at 31.16, which addressed winter shoulder season excursions.~~

~~Attainment of the narrative standard during the fall and spring will could then be assessed for 303(d) purposes by determining the direction of the general temperature trend, using the average WAT of each month. If the surface water is cooling or warming at the appropriate season, then it is would not result in an exceedance of the narrative temperature standard. Further refinement of this assessment method may be defined in the 303(d) Listing Methodology.~~

~~For the purposes of implementation in permits, the intent would be is to ensure that the natural seasonal progression is maintained. For each of the months in the shoulder seasons, simple linear interpolation could be is used to establish a value for the water quality standards that can could be used in the mass balance equation for setting permit limits.~~

II. OTHER CRITERIA

A. Methylmercury (human health)

To protect human health, the Commission adopted a methylmercury fish tissue basic standard at new subsection 31.11(7) and revised Footnote 6 to Table III (Metal Parameters) at 31.16. This water quality criterion of 0.3 milligrams (mg) methylmercury per kilogram (kg) fish tissue wet weight describes the concentration of methylmercury that protects consumers of fish and shellfish among the general population. The criterion is consistent with EPA's section 304(a) water quality criterion for methylmercury. This new standard applies to all waters of the state because fish migrate and contribute to food webs that integrate large geographic areas; therefore, it is not sufficiently protective to apply the standard only in locations where fish are expected to be caught and consumed.

Adoption of this threshold as a standard in Regulation #31 recognizes the Commission's practice in the context of Regulation #93 (Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation Lists). The Commission has made listing decisions using an average fish tissue criterion of 0.3 mg/kg as a numeric threshold for determining attainment of the aquatic life use.

Adoption of the 0.3 mg/kg methylmercury criterion does not represent a policy change. The current water column standard of 0.01 µg/L total mercury remains in place and is intended to be implemented alongside the fish tissue standard. The Commission expects that in some circumstances, site-specific water column standards may be developed where data are available.

B. Arsenic (water supply)

After the 2010 rulemaking hearing, EPA disapproved a modification of Footnote 14 to Table III (Metal Parameters) which applies to arsenic. This footnote stated that the arsenic effluent limits would be calculated so that the arsenic concentration at the point of intake to the domestic water supply would not exceed the standard. EPA disapproved this concept because standards must protect the designated use, whether or not the use is an "actual" use. In today's action the Commission deleted Footnote 14 and renumbered the remaining footnotes and deleted the reference to Footnote 14 in Table III. The Commission found that in the majority of segments, the footnote has no effect. Most segments have a water+fish standard for arsenic that is more stringent than the water supply standard.

C. Nitrate (water supply)

After the 2010 rulemaking hearing, EPA disapproved a modification of Footnote 4 to Table II (Inorganic Parameters) which applies to nitrate. As in the arsenic footnote described above, this footnote stated that the combined total of nitrate plus nitrite at the point of intake to a domestic water supply would not exceed 10 mg/L. EPA disapproved this concept because standards must protect the designated use whether or not the use is an "actual" use. In today's action the Commission repealed Footnote 4 with a delayed effective date of December 31, 2022. A delayed date allows time for stakeholders to bring forward site-specific proposals for use removal and/or resegmentation in the next round of basin hearings, and also time to obtain permit modifications before the footnote repeal date.

D. Acute Chlorine for Class 2 Waters

The Commission adopted an acute chlorine standard of 0.019 mg/L for Class 2 waters to protect aquatic life. In 2005, the chronic chlorine standard of 0.011 mg/L was adopted for Class 2 waters, and it is unclear why an acute standard was not also adopted at that time. Because chlorine is a fast-acting toxicant, both acute and chronic chlorine standards are necessary to protect the aquatic life use.

III. ANTIDegradation Provisions

A. Baseline Date for Significance Determination

The Commission adopted revisions to 31.8(3)(c) to clarify the procedures for segments where the antidegradation designation changed from Use Protected to undesignated (i.e. Reviewable) after the previously established baseline date of September 30, 2000. The revision added the phrase "or the effective date when the Use Protected designation is removed." At the same time, subsection 31.8(3)(c)(ii)(B) was split into two sections for ease of application.

B. Temporary Impacts in Outstanding Waters

The Commission revised the regulatory language to clarify that short-term degradation associated with certain types of activities is consistent with the Outstanding Waters designation. The Commission does not intend this to change policy or procedures regarding determining the meaning of waters being "maintained and protected at their existing quality."

Examples of activities that result in long-term ecological or water-quality benefit include, among others: use of rotenone or other pesticides to remove invasive species; construction of fish barriers to prevent the spread of non-native species; construction of bridges at stream crossing to minimize damage to the stream and improve water quality; or construction of aquatic habitat improvement.

A determination that activities will result in only “short-term” degradation will occur as part of a permitting or 401 certification action by the Division. It is difficult to give an exact definition of “short-term” because of the variety of activities that might be considered. However, in broad terms, “short-term” should be weeks and months, not years. In some cases, projects may need to extend over multiple work seasons, but in all cases the impacts of a project over time must be considered. The Commission expects that in those actions the Division will ensure that conditions are imposed as necessary and appropriate to ensure that degradation occurs for the shortest amount of time possible.

Examples of “clear public interest” activities ~~include~~ shall only be those that address public health, welfare and safety ~~such as which could include in some cases~~: construction of public roads for the purpose of public safety, maintenance of public roads, bridges and roadways, including shoulder weed control; control of mosquitoes or other disease vectors; enhancement of significant historical and archaeological resources; and suppression of wildfires or fire pre-suppression or restoration activities.

C. Antidegradation: Iron, Manganese, and Sulfate (water supply)

The Commission revised section 31.8(1)(b) and added two new subsections (i) and (ii) to exempt dissolved iron, dissolved manganese, and sulfate from antidegradation consideration. Federal requirements for antidegradation protection only extend to assimilative capacity for criteria that protect CWA § 101(a)(2) uses (commonly known as “fishable/swimmable”). Dissolved iron and manganese and sulfate do not fall in those categories; rather they are water supply standards which originated as secondary Safe Drinking Water Act criteria. The Colorado framework treats these secondary water supply parameters differently.

The criteria for iron, manganese and sulfate remain in place, unchanged, to protect the water supply use. These criteria do not act as surrogates for any criteria that would protect a fishable/swimmable use (e.g., chloride acts as a surrogate for an aquatic life criterion). This exemption does not negate the requirement for an antidegradation review in regards to standards that protect other classified uses.

D. Default Use Protected Designation for Effluent-dependent/Effluent-dominated Waters

After the 2010 rulemaking hearing, EPA disapproved a modification of section 31.8(2) (b)(i)(c) which allows the Commission to designate a waterbody as Use Protected if the waterbody was effluent-dominated or effluent-dependent during the period of 2000-2009. EPA disapproved this concept because federal policy is that antidegradation designations are to be made based on the quality of the water, not on the source of the water.

In today's action the Commission repealed section 31.8(2)(b)(i)(C) with a delayed effective date of December 31, 2019. In taking this action, the Commission considered that for all reviewable waters, affected entities have an opportunity to submit an alternatives analysis (i.e., to support decisions regarding whether allowing water quality is necessary to accommodate important economic or social development). But the Commission also acknowledges stakeholder concerns regarding uncertainty about the process and criteria for alternatives analyses. Therefore, the Commission is repealing the provision with a delayed effective date to allow the Division and interested stakeholders time to work together to review alternative analyses submittals and approvals that have been done to date, and discuss whether a new alternatives analysis guidance document should be developed, and if so, to develop guidance prior to the repeal date. The delayed effective date is also intended to allow the Division and interested stakeholders time to engage in further discussions regarding an appropriate water quality test for effluent-dependant and effluent-dominated waters. The Commission may consider a proposal to amend or replace section 31.8(2)(b)(i)(C) in a rulemaking before the repeal effective date.

E. Alternatives Analysis – Selection of Alternative

The Commission added a sentence to section 31.8(3)(d)(iii) to better align the Basic Standards rule with the recently-revised EPA water quality standards regulation. This modification was adopted because the Colorado antidegradation rule did not explicitly address what outcome is required in situations where, as part of a necessity of degradation determination, one or more non-degrading or less degrading alternatives are identified. It now explicitly requires selection of a non-degrading or less degrading alternative. The Commission does not intend this to change current Colorado policy or procedures.

IV. REVISION OF SECTION. 31.14 "IMPLEMENTATION IN DISCHARGE PERMITS"

Substantial changes were made to the portions of the Basic Standards that address the way the standards are implemented in discharge permits. Many provisions that were in 31.14 were deleted to reduce redundancy with other regulations (namely, Regulation #61, "Colorado Discharge Permit System Regulations") and to eliminate language that has outlived its useful life. Other provisions were moved to section 31.9, to consolidate the provisions that address implementation of standards. Section 31.10 continues to contain the provisions that address Mixing Zones.

Restructuring: The title of section 31.9 was changed from "Flow Considerations" to "Implementation of Standards." Even before today's rulemaking, the section contained provisions that went beyond flow considerations. Most of the material from section 31.14 that was deemed to be still relevant was moved to section 31.9.

Results of Review of 31.14: Section 31.14 now is blank and the section is "reserved." The history of each subsection, its origin (where known), and fate are described below:

- 31.14(1): This section pre-dates 1987 and there is no record of how or why this section was added to the Basic Standards. It appears to never have been used. The reasons behind the reference to Regulation #71 (the Dillon Control Regulation) are unclear. For these reasons, this section was deleted.
- 31.14(2): This section pre-dates 1987 and there is no record of how or why this section was added to the Basic Standards. It was deleted because it is redundant with section 61.8, and is also in the federal rules for state programs at 40 CFR § 130.3.
- 31.14(3): This section pre-dates 1987 and there is no record of how or why this section was added to the Basic Standards. It was deleted because it is redundant with section 61.8, and is in the federal rules at 40 CFR § 130.7.
- 31.14(4): This section pre-dates 1987 and there is no record of how or why this section was added to the Basic Standards. The portion that authorizes Compliance Schedules was moved to 31.9(2) and expanded to match the language in Regulation #61. The portion that states that effluent limits "may" be established was deleted because there was a conflict between the Regulation # 61 version ("must") and this version ("may"). The portion that describes how effluent limits shall be established was moved to Regulation #61 to replace an existing cross-reference. The statement that a rulemaking hearing can subsequently be held was moved to the statement of basis and purpose provisions of Regulation #61.
- 31.14(5): This section was added in 1988 (see 31.24.1). The "innovation" language was added to 31.3 at the same time that this provision was added to 31.14. In order to capture the concept of using innovative approaches, such as trading programs, in various water quality contexts, the language "TMDLs, Waste Load Allocations antidegradation reviews, and permits" is also being added to 31.3. Section 31.14(5) is generally redundant with the concepts in 31.3 and is also

captured at 61.8(3)(r) of Regulation #61. A new section was also adopted during this rulemaking proceeding at 61.8(3)(u) to capture the “innovation” concept in the context of permits, and thus this section 31.14(5) was deleted.

- 31.14(6): There is no record of when this section was added. Section 61.8(4)(a) addresses this concept, and thus this section 31.14(6) was deleted.
- 31.14(7): This section was added in 1987 (see 31.22 C). This section is now redundant with Regulation #61, 61.8(2)(B)(vii), and thus this section 31.14(7) was deleted.
- 31.14(8): This section was added in 1988 (see 31.24 E and F). This material is covered in sections 31.7, 31.9 and 31.16, and thus this section 31.14(8) was deleted.
- 31.14(9): This section was added in 1989 (see 31.25 E). This section was deleted because practical quantification limits (PQLs) are now covered in a separate policy.
- 31.14(10): This section was added in 1989 (see 31.25 E). Section 61.8(4)(a) of Regulation #61 addresses this concept, and thus this section 31.14(10) was deleted.
- 31.14(11): This section was added in 1989 (see 31.25 E) when organic standards were added to Regulation #31. This section was deleted because this authority is already provided to the Division. It serves no purpose substantive now, and thus was deleted
- 31.14(12): This section was added in 1989 (see 31.25 E). Section 61.8(4)(a) of Regulation #61 addresses this concept, and thus this section was deleted.
- 31.14(13): This section was added in 2000. The Division is not aware of any current permits that have implemented this provision. Colorado’s intake credit provisions are found at section 61.8(2)(d) of Regulation #61. It is not clear how this provision is intended to be used, and thus it was deleted.
- 31.14(14): This section was moved to 31.9.
- 31.14(15) and (16): These sections were consolidated and were moved to 31.9. The Commission made revisions to these provisions to align them with the Division’s practice since 2007, as expressed in various basin regulations for implementing “current condition” temporary modifications. Specifically, the Commission added references to “existing discharges” to clarify that effluent limits based upon temporary modifications only apply to existing discharges, and that effluent limits for new and expanded discharges must generally be set to the underlying standard. Additionally, the previous reference to 31.14(4) was deleted because all compliance schedules must be issued in accordance with the provisions authorizing compliance schedules.
- 31.14(17): This section was moved to 31.9. The phrase “compliance schedule” in subsection (a) was changed to “permit condition” to allow more flexibility for permitting approaches.

V. OTHER CHANGES TO METHODOLOGIES

A. Site-specific Ambient-based Standards

The Commission adopted revisions to section 31.7(1)(b)(ii) that identify two types of ambient-based standards, “feasibility-based” and “natural or irreversible quality-based” standards, to recognize that in some cases water quality can be improved, but not to the level required by the table value.

Where the only sources and causes of the pollutant(s) are natural, ambient quality-based ambient standards continue to be the Commission’s preference. However, where the sources and causes are to

some extent anthropogenic, more clarity is needed to assure that classifications and standards are set to protect the highest water quality attainable.

The provision (the downgrading factors) that provides the authority for ambient-based standards is based on the same provisions that authorizes discharger-specific variances (DSVs) (40 CFR § 131.10(g) and 31.6(2)(b)), except that the cause is not a permitted point source, and this action would apply to the entire segment. Since it is the same regulatory foundation, it is appropriate to use the same feasibility bar for determining what improvements are appropriate. As with DSVs, this type of change to numeric standards is authorized only where a comprehensive alternatives analysis demonstrates that there are no feasible alternatives that would provide better water quality.

The Commission continues to believe that adopting ambient standards for a constituent(s) is preferable to downgrading or removing entire uses and their associated water quality standards. Adopting an ambient standard in effect creates a sub-category of the use and is a regulatory downgrade. These ambient standards protect the highest attainable use and are consistent with 31.6(1)(e), which requires that classifications should be for the highest water quality attainable. To that end, "highest attainable use" was defined and added to section 31.5.

The revisions also provide clarity regarding the analysis and documentation that is required to make the "no feasible alternatives" demonstration. The Commission encourages proponents to complete the Division's checklist to ensure that their supporting information is adequate.

B. Temporary Modifications set to Current Condition

The Commission revised section 31.7(3) to incorporate a new subsection (d) that explicitly addresses the operative value that is in place during the term of a temporary modification. These changes recognize current policy and are not meant to change that policy, only to clarify and expressly approve its use. This change authorizes the use of the narrative statement "current condition" as the operative value to preserve the status quo for the discharger and the waterbody during the term of the temporary modification. The Commission indicated that if the standards database can be adjusted to accommodate it, that future proposals for temporary modifications should include in the table the date on which the temporary modification was adopted. Temporary modifications are only appropriate where a compliance problem exists, and the adoption of the temporary modifications are intended to temporarily relax the control requirements, including direct discharge permits, indirect discharge permits, and other control mechanisms such as local limits while the uncertainty regarding the underlying standards is addressed. The Commission recognizes that during the temporary modification permitted dischargers' effluent quality may be marginally changed and that variability in effluent quality may occur. Because the status quo is to be maintained, the Commission does not intend that temporary modifications set at "current condition" apply to new or expanded discharges. Protection of existing uses means protection of the actual uses rather than protection of the full use classification. The Commission intends that the revisions to section 31.7(3) apply prospectively only, and do not retroactively change the basis for or implementation of previously adopted or extended temporary modifications set at "current conditions."

C. DSV Alternative Effluent Limits

The Commission revised section 31.7(4)(b) to clarify that the Division, not the Commission, sets the alternate effluent limits of a discharger-specific variance, and that these limits are to be expressed as a temporary hybrid standard. The hybrid approach establishes a cap on the effluent limit, but does not actually set the level of the effluent limit. The Commission added three new subsections (i), (ii) and (iii) to describe the format of the hybrid standard and how it is used by the Division to set control requirements such as discharge permit effluent limitations.

Based upon the results of a comprehensive alternatives analysis, the Commission will determine specifically which alternative(s) provide the highest degree of protection of the classified use that is feasible. The alternative effluent limit establishes conditions to be met through implementation of the selected alternative(s). The Commission expects that in most cases, the alternative effluent limit will be a

numeric limit. In cases where there is a high degree of uncertainty regarding the improvement or effluent concentrations that will be achieved, the Commission may adopt an alternative effluent limit as a narrative condition that identifies specific actions to be completed through implementation of the selected alternative(s).

D. Downstream Protection

The Commission adopted modifications at section 31.3 to more clearly identify that water quality classifications and standards must protect downstream waters. In the past, the Commission and Division have relied on section 31.6(1)(c) and Regulation #61 to provide this protection. This modification implements 40 CFR § 131.10(b) and is not intended to change Colorado's current practice that already considers and ensures the protection of downstream water quality during the development of designated uses and water quality standards.

VI. HOUSEKEEPING

The Commission added clarification to a number of items and corrected minor typographical errors:

- Definition of MWAT and WAT: The definitions of Maximum Weekly Average Temperature (MWAT at 31.5(26)) and Weekly Average Temperature (WAT at 31.5(50)) were clarified. The MWAT definition was shortened and does not repeat the details that are in the WAT definition. The word "mean" was inserted in the WAT definition to clarify that the WAT is calculated from daily average temperatures. This is consistent with the current implementation methods of the Permits and Assessment. The words "multiple" and "equally spaced" in the WAT definition were removed to reflect current assessment methodology.
- 31.6(4)(b): A missing parenthesis was added to this subsection.
- 31.6(2)(b)(iv): The phrase "result in attainment or the use" was corrected to "result in attainment of the use."
- 31.7(3)(a)(ii)(C): This section was deleted as it describes a condition for granting a temporary modification that is addressed through the discharger-specific variance provisions, and was repealed effective 10/01/2013.
- 31.11(3): The content of Footnote 5 to the Table of Basic Standards for Organic Chemicals was deleted as unnecessary and replaced with the word "deleted." The Commission notes that practical quantification limits are now located in a Division policy document and not in Regulation #61.
- 31.16 Table III – Footnote 3: The word "aluminum" was added to replace the chemical abbreviation, and a space was deleted.
- 31.16 Table III – Footnote 5: The word "total" was deleted from the phrase "50 µg/L total chromium" to clarify that the sum of hexavalent and trivalent chromium is not to exceed 50 µg/L. Capitalization, spacing, and symbol use was also corrected for portions of this footnote.

NWCCOG Water Quality/Quantity Committee

2016 Bills of Interest

Bill No.	Description	Sponsor	Status	Official Position unless otherwise noted
HOUSE BILLS				
HB 16-1005	Allowing for residential rainwater collection from rain barrels	Reps. Esgar & Danielson and Sen. Merrifield	Signed by Governor	Support
HB 16-1109	Stating limits on federal agency ability to impose conditions on water rights owner because of Colorado water law	Reps. Becker, J and Becker, K, Coram, Brown, Buck, Doe, Lebsock, Mitsch Bush, and Sens. Sonnenberg and Donovan, Baumgardner, Cooke	Signed by Governor	Monitor
HB 16-1228	Alternate transfer mechanism permitted renewable one-year transfers of a portion of an agricultural right	Reps. Arndt & Becker, J., Brown; Sen. Donovan & Sonnenberg	Signed by Governor	Support
HB 16-1256	South Platte Water Storage Study	Rep. Brown & Sen. Sonnenberg	Signed by Governor	Support
HB 16-1413	Refinancing the Water Quality Control Division fee structure	Rep. Rankin & Sen. Grantham	Signed by Governor	Monitor
SENATE BILLS				
SB 16-021	Designating "Public Lands Day"	Sen. Donovan, Rep. Mitsch Bush	Signed by Governor	Support
SB 16-145	Colorado River District Subdistrict Formation	Sens. Baumgardner & Donovan; Reps. Mitsch Bush & Willet	Signed by Governor	Support
SB 16-167	Reducing Severance Fund Operational Reserves for FY 2016-2016	Sen. Grantham, Rep. Rankin	Signed by Governor	Monitor
SB 16-174	CWCB Projects Bill	Sen. Sonnenberg; Rep. Vigil & Coram	Signed by Governor	Support

NWCCOG Water Quality/Quantity Committee

2016 Bills of Interest

SB 16-200	Creating "Director of Water Project Permitting"	Sen. Sonnenberg; Rep. Vigil & Coram	Signed by Governor	Monitor
SJM 16-001	Urging US Congress to pass Good Samaritan legislation	Sen. Roberts, Reps. Coram & Mitsch Bush	Signed by Governor	Support
SJR 16-003	Water Projects Eligibility Lists	Sen. Sonnenberg; Rep. Vigil	Signed by Governor	Support

QQ-related Ballot Initiatives, 2016.

Updated June 24, 2016

Upcoming Dates:

- **August 8:** Last day to submit signatures to Secretary of State; number of valid signatures needed: 98,492
- **September 7:** Last day for Secretary of State to determine sufficiency of signatures
- **November 8:** Election day

Only Approved Initiative:

- **#20. [State Health Care System](#).** Seeks to create a new single-payer health care financing system called ColoradoCare that operates as a political subdivision of the state. Initiative #20 will appear on the ballot as Amendment 69.

QQ-related Pending Initiatives:

- **#40. [Right of Local Community to Self-Government](#).** Rights of local citizens can include the ability to limit or deny rights of corporations.
- **# 63. [Right to a Healthy Environment](#).** States that a healthy environment (as defined in initiative) is an essential component to citizens' health, safety and welfare. State and local governments "shall assign the highest priority to the protection of a healthy environment." Local governments have the authority to regulate to provide a healthy environment, and if in conflict with a state law, the more protective regulation governs.
- **#75. [Local Control of Oil and Gas Development](#).** Explicitly grants authority to local governments to regulate the development of oil and gas, including "prohibitions, moratoria, or limits" that may be more restrictive than state regulation. Such regulations would not be subject to preemption by state regulation.
- **#78. [Mandatory Setback from Oil and Gas Development](#).** Established a setback of 2,500 feet from an occupied structure or "area of special concern." Local governments may establish larger setbacks, but not smaller.
- **#96. [Requirements for Initiated Constitutional Amendments](#).** A petition for an initiated constitutional amendment requires signatures from every state senate district totally at least two percent of the population for each district. Once on the ballot an initiative must carry 55% of the statewide vote.
- **#138. [Local Control of Oil and Gas Development \(from Industry\)](#).** States that local governments may not enact regulations related to oil and gas development that are stricter than state regulations or that conflict with state regulation by the COGCC, other state agencies, or the legislature. (title approved; signature forms have not been submitted for approval.)