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Recreation and Water Quality Threats at Standley Lake

Executive Summary

Zebra and quagga mussels (ZQM) are an extremely aggressive invasive species that, once successfully established in a lake, overtake every hard surface in that water body. These mussels decimate local ecosystems, clog potable water intake facilities to the point of being unusable, and cause algae blooms that cause taste and odor issues or cause the formation of cyanotoxin-producing algae that could result in potable water “No Use Orders.” Additionally they can degrade or prohibit recreational opportunities on the water body. Zebra mussels cost the United States economy at least \$1 billion annually¹, and the cost to Westminster rate payers to mitigate for ZQM would be significant. The first year implementation of mitigation measures would result in the need for a water rate increase, estimated as high as 14%, in addition to the rate increase that would be necessary for normal operation and maintenance of the water utility.

ZQM were identified as a threat to Colorado reservoirs in 2007 and at that time work began to protect Standley Lake, Westminster’s sole water supply and key ecological and recreational asset. Westminster implemented the first ZQM protection program in the state. Even today, Westminster is a leader in ZQM protection programming.

ZQM continue to move from one body of water to the next in the western United States and Westminster Staff continuously evaluate the ZQM protection program for weaknesses. As Staff and the industry learn more about ZQM, it becomes clear that even Westminster’s robust program falls short of being fully protective of the Lake.

When the ZQM Protection program was first implemented, it included a full decontamination process and a mandatory seven day quarantine. Research by Myrick and Craft² showed that ZQM survivability in conditions similar to a ballast tank exceeded the seven day quarantine. Based on that study, the quarantine was extended to 14 days. Further research in 2013 showed that ZQM survival rates extended up to 27 days in conditions similar to a ballast tank.³ At that juncture, the quarantine was raised to 35 days, which is where the program is today.

The decontamination process itself has also changed through the years. Most recently, Colorado Parks and Wildlife (CPW) conducted a research study⁴ which identified that current spray units are ineffective at killing ZQM because of variability of temperature. Their research was presented this winter. Staff is currently purchasing tankless hot water heater units that were identified to hold a more consistent water temperature and should be more effective at killing ZQM.

Recently, Staff uncovered a new, much greater weakness to the program that necessitates immediate action. The week of January 28, 2019, Staff completed an extensive effort that

¹ Minnesota Sea Grant, http://www.seagrant.umn.edu/ais/zebramussels_threaten

² Myrick, Chris and Craft, Chris. July 2011. Department of Fish, Wildlife, and Conservation Biology. Colorado State University. “Evaluation of Quagga Mussel Veliger Thermal Tolerance” Prepared by Colorado Division of Wildlife.

³ Wook Jin Choi, et. al. 2013. *Estimating survival rates of quagga mussel (Dreissena rostriformis bugensis) veliger larvae under summer and autumn temperature regimes in residual water of trailered watercraft at Lake Mead, USA.* Management of Biological Invasions (2013) Volume 4, Issue 1: 61-69.

⁴CPW Decontamination Unit Temperature Study, Brown, Elizabeth, et. al., Colorado Parks and Wildlife, October 2016



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compared State records of boat launches to data produced from newly implemented software at Standley Lake.

Based on that research, Staff identified as many as 24 boats that circumvented the quarantine process in 2018. Staff has identified that some of the boats in question were on lakes known to be highly infested with ZQM (specifically Lake Powell) and did not go through the appropriate decontamination and quarantine processes after returning from those lakes. This new finding identifies a clear risk that warrants prompt action.

Staff has been in contact with the State as well. Based on this new information, the State has begun a similar analysis of launches on their lakes and have already identified dozens of similar cases of circumvention, and as a result, the State is also reevaluating its protection programs.

It is also critical to note that this analysis only compared launch data from actively monitored lakes. It would not pick up boats that were launched on non-monitored lakes or boats that were taken to states not participating in the coordinated ZQM Protection program.

Given this new information from recent findings, Staff evaluated options and made the decision to not permit trailered boats on Standley Lake beginning this summer due to increasing concerns of ZQM infestation until Staff can determine that there is a way to ensure these types of boats won't pose a substantial risk. Boaters were notified of this change on March 19, 2019, and boaters who had purchased permits are being issued refunds.

Background

Standley Lake Regional Park and Wildlife Refuge is a key resource for the City that serves dual purposes. Standley Lake is a healthy and productive wildlife habitat, home to bald eagles, a multitude of birds, mammals, and fish. It is a resource that provides special opportunity for recreation and enjoyment. Standley Lake is also Westminster's sole drinking water supply and serves a total of 300,000 people, including all of Westminster's residents and businesses; Thornton and Northglenn, with high quality drinking water. There is a symbiotic relationship between the wildlife refuge of Standley Lake and our water supply. Healthy, balanced ecosystems in and around the reservoir translate into high water quality, decreased water treatment expenses, more sustainable water treatment operations, and cleaner, safer potable water delivered to Westminster customers. Well managed recreation in and around Standley Lake can bolster stakeholder understanding of this important resource and also ensure this water resource is appropriately protected.

As a part of recreational programs, Standley Lake currently allows motorized boating. Users must purchase a power boating permit, which is limited annually to 550 permits. 430 power boat permits were sold in 2018. Out of that number sold, 118 of these permits were sold to Westminster residents. The remaining permit holders were from other areas including Arvada, Denver and Broomfield.

Standley Lake Ownership

Standley Lake reservoir ownership is shared between Westminster, Thornton, Northglenn, and the Farmers Reservoir and Irrigation Company (FRICO). Westminster owns most of the land surrounding the lake and about half of the water storage in the reservoir. Thornton, Northglenn, and FRICO share the remaining half of the storage. Operation of the facilities is governed by a series of complex agreements among the organizations.



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Recreation Intergovernmental Agreement for Standley Lake

An intergovernmental agreement (IGA) between Westminster, Thornton, and Northglenn was signed in 1994 that granted Westminster recreational access to Standley Lake. That agreement set specific requirements for what Thornton and Northglenn would allow in Westminster's recreation program at the lake. Standley Lake represents Northglenn's sole drinking water supply and is a key component of Thornton's drinking water system. For these partner cities, water quality is their principle concern.

A key component of this IGA is that it holds Westminster solely responsible for any adverse impacts of recreation, including any introduction of aquatic nuisance species (ANS) and would require Westminster to cover not only its own costs to mitigate recreation impacts to water quality but Thornton and Northglenn's as well. Paragraph 10 of the IGA states:

If Thornton or Northglenn detect any change in the test results of water samples which test the water quality parameters established now or in the future by the Safe Drinking Water Act for Standley Lake which may be attributable in any way to recreational uses at Standley Lake and which negatively impact Thornton or Northglenn's drinking water supplies, Westminster agrees to mitigate said impact...The costs of mitigation for any impacts will not be borne by the Cities of Thornton or Northglenn and if Westminster is unable to find other parties to share such mitigation costs, Westminster shall be responsible for such costs.

The Standley Lake Recreation IGA is set to expire at the end of 2019. Staff is currently in discussions about the renewal of that IGA with partner cities. Conversations will largely center on how the IGA will continue to support safe, clean drinking water supplies while also allowing for appropriate recreational opportunities.

Standley Lake Regional Park and Wildlife Refuge Recreation Master Plan

The Draft Standley Lake Regional Park's Master Plan works to balance the demand for recreation usage with the need to protect and preserve critical water resources. The draft Standley Lake Master Plan (SLMP) will continue to move forward on a parallel path with the IGA to ensure that both documents are in agreement with each other and facilitate easier discussion and approvals with our partner cities.

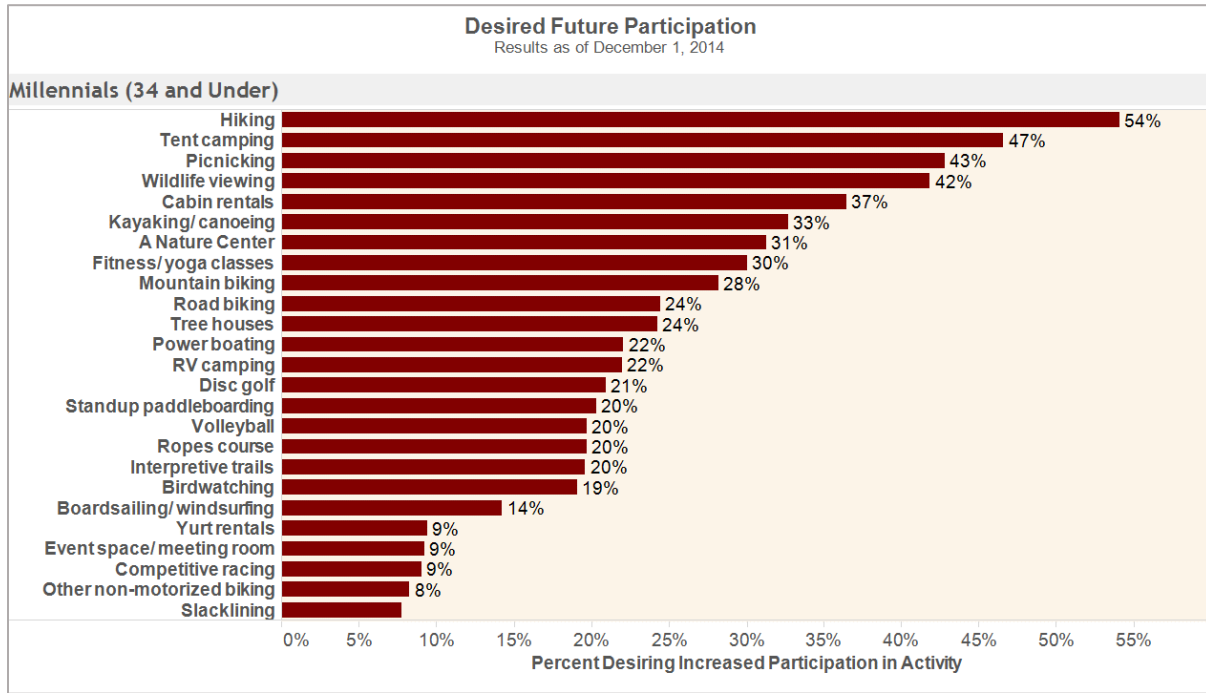
The intent of the master plan is to provide a thoughtful conceptual plan for the regional park that can provide recreational opportunities and address the sensitive resources, wildlife and water quality needs at Standley Lake. Collaboration with park officials, environmental scientists, key stakeholders, and the community will help determine the most effective guidelines and strategies for managing future improvements.

Matrix Design Group, with the help of GreenPlay, completed a public outreach campaign as a part of the master plan effort. The outreach campaign included a series of online surveys, traditional community meetings with interactive exercises and trend research. The number of responses from surveys and open houses was well above average and suggests a high degree of public interest in the future of Standley Lake Regional Park. Passive activities ranked among the highest preferences. Hiking, kayaking/canoeing, and wildlife viewing were the top three preferences for Westminster residences, metro residence guests and millennials versus non millennials. When surveyed for general preference categories of education, conservation and



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recreation at Standley Lake, conservation was considered the highest priority, which is consistent with the protection of Standley Lake as a critical water resource and wildlife habitat.



Standley Lake offers a variety of recreation opportunities beyond power boating. In addition to hiking, bicycling, camping, and wildlife viewing, the lake offers visitors numerous opportunities for fishing, leisure boating and paddling. Standley Lake also operates a robust paddle craft rental program allowing patrons that do not own their own equipment to explore the lake and engage in a variety of activities on the water. Based on trends in usage and stakeholder feedback, the future of recreation at Standley Lake should be primarily focused on passive recreation opportunities that support the park as a wildlife refuge. This provides equity across the public and additional opportunities for a larger portion of the population.

ZQM Risk

The largest risk to water quality and ecosystem health at Standley Lake, as it relates to recreation, is the introduction of aquatic nuisance species (ANS). There are a variety of invasive species that can be introduced through recreational activities. Of these invasive species, ZQM are the single biggest threat to Standley Lake that Staff is aware of. The highest risk is specific to powerboating, with new findings indicating that ballast tanks (specific only to powerboats) cannot be visually inspected, fully drained, or confirmed to be mussel-free.

ZQM are extremely aggressive, invasive species. They multiply at a massive rate once established in a reservoir. Within a few years after establishment, these mussels infest hard surfaces throughout the lake. Beaches become littered with sharp shells. Healthy ecosystems are severely impacted, resulting in water quality and recreational degradation. Intake pipes from the reservoir to the water treatment plants become clogged with mussels, causing significant operational and maintenance issues. The mussels filter a huge quantity of water virtually eliminating tiny phyto- and zooplankton that form the base of the lake’s ecosystem. A mussel



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infestation would be catastrophic to Standley Lake's ecosystem, water quality, hard infrastructure and recreation.

Once ZQM are introduced to a lake, there is no known way to eradicate them. Mitigating treatment is centered on preventing the mussels from clogging intake pipes and infrastructure from the reservoir into the water treatment plants. Little can be done to mitigate impacts on ecosystems, water quality, and recreation. A 2010 Report completed by HDR suggests two lake control strategies. Neither are viable for treatment in Standley Lake. One is not appropriate for drinking water supplies. The other has not been proven to be effective.⁵

ZQM were introduced in eastern North America in the 1980s. Since the 1980s, zebra mussels have spread, unchecked by natural predators, throughout much of the eastern United States. Populations of zebra mussels have been detected in California, Colorado, and Utah. In the western United States ZQM have spread entirely through recreational boat use.

In January 2007, quagga mussels were detected in Lake Mead and Lake Powell. In the following decade, ZQM spread reservoir by reservoir across the West. In 2017, quagga mussels were detected in Green Mountain Reservoir that sits less than one hundred miles away from Standley Lake. Thanks in part to strict ZQM programs across the State, the majority of the cases of ZQM positive tests have not resulted in established populations; however, the number of lakes testing positive for ZQM is rising. Standley Lake provides ideal conditions for ZQM and could support a thriving ZQM population.⁶

Water Quality Impacts of ZQM

Successful establishment of a ZQM population is catastrophic to the ecosystem of the reservoir. Once the ecosystem is out of balance, algae blooms become much more common and tend to be larger in magnitude. In particular, blue-green algae often do well in the altered environment. Blue-green algae can cause taste and odor concern as well as produce compounds called cyanotoxins.

Westminster has dealt with very few taste and odor events in the last few decades. The last significant taste and odor issue was in the late 1980s when Coors discharged a large amount of nutrient-rich water into the ditches feeding Standley Lake. The nutrient-rich water fed an algae bloom that resulted in significant taste and odor customer complaints for just over a month. Agreements were put in place following this event to prevent this from happening again.

Beyond aesthetic taste and odor complaints, blue-green algae can also produce cyanotoxins. Cyanotoxins cause fish and bird kills and are also not safe for human consumption or contact. If cyanotoxins are present in a reservoir, all human contact with the water must be prohibited. Cyanotoxins are also very difficult to treat in water plants. If these toxins cannot be treated, a "Do Not Use" order must be enacted. This means customers cannot drink, bath, wash dishes, or come in contact with the water delivered to their home.

⁵ HDR. Clark, Sarah. 2010. Quagga/Zebra Mussel Risk Assessment and Treatment Study. City of Westminster

⁶ HDR. Clark, Sarah. 2010. Quagga/Zebra Mussel Risk Assessment and Treatment Study. City of Westminster



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Colorado Intergovernmental Risk Sharing Agency

The City is currently evaluating if the City insurance coverage through the Colorado Intergovernmental Risk Sharing Agency (CIRSA) would be available to the City in the event of a ZQM infestation.

Other Threats

While ZQM are a serious threat to our reservoir, Staff is also aware that there are already other invasive species in the lake. Of specific note is a plant called Eurasian Milfoil. This plant was discovered at Standley Lake in the late 1990s. At its worst, milfoil covered almost all the shoreline of Standley Lake up to 20 feet of depth. Since that time, Staff has implemented active management strategies to mitigate milfoil. This included the introduction of milfoil weevils that feed on milfoil. Through intensive efforts of the overall source water quality program and environmental factors, Standley Lake now has the only sustained population of milfoil weevils in the State. The weevil population has integrated into the Standley Lake ecosystem and is now successfully controlling milfoil without the need for expensive chemical treatment.

There are no longer any commercially available weevils to supplement the existing population. Other entities have shown an interest in using Standley's weevil population to mitigate for milfoil in other reservoirs. Consequently, it is critical to protect this sensitive species. High speed boating activities, including water skiing, wakeboarding, and tubing, can fragment milfoil and increase its spread and negatively impact the weevil population. Additionally, these activities exacerbate shoreline erosion, degrade shallow water habitat, and increase suspension of sediments that negatively affect water quality.

Introduction of ZQM

According to a report by HDR, "Recreational activities on Standley Lake, particularly motorized boating, by far represent the largest and most credible pathway for the introduction and growth of a viable population of ZQM in the City of Westminster's water system."⁷ ZQM can be transferred on boats by affixing themselves to hard surfaces on the outside of the boat, on trailers, in boat compartments, boat ropes and anchors, and any hard surface of the boat that has come in contact with water in an infested lake. Mussels affixed to any exterior area of boats, trailers, and equipment can be physically sprayed off with hot, high pressure water in the decontamination process.

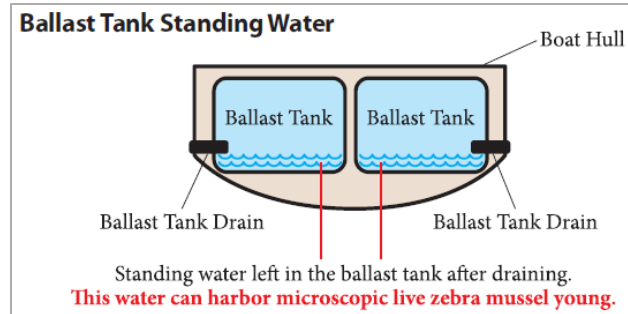
While the exterior of boats and associated equipment can be successfully decontaminated, ballast tanks cannot be visually inspected, fully drained, or confirmed to be mussel-free. These tanks are filled with lake water to stabilize the boat and allow them to ride lower in the water to create larger wake. Even after tanks have been pumped out, up to two gallons of water can remain. A few gallons of water from another reservoir could contain millions of microscopic ZQM larvae or other ANS. Because the water is typically shaded in somewhat cooler parts of the boat, ZQM has been shown to survive for up to 27 days.⁸

⁷ HDR. Clark, Sarah. 2010. Quagga/Zebra Mussel Risk Assessment and Treatment Study. City of Westminster

⁸ Wook Jin Choi et.al., 2013. Estimating survival rates of quagga mussel (*Dreissena rostriformis bugensis*) veliger larvae under summer and autumn temperature regimes in residual water of trailered watercraft at Lake Mead, USA. *Management of Biological Invasions* (2013) Volume 4, Issue 1: 61-69



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**From ANS tips for Boats with Ballast Tanks, Colorado Division of Wildlife*

Paddle craft and other non-trailer craft do not pose a significant risk due to the simplicity of their design. There are no live wells, ballast tanks, trailers, deck compartments or any other closed compartments that can contain water. Paddle craft can be completely decontaminated and visually inspected.

Westminster's Quarantine and Decontamination Protocols

Westminster implemented the first ANS prevention program in the State in 2007. The program has changed over time as new information became available. It is designed to minimize the possibility of ZQM or other ANS introductions. Westminster's program remains the most robust program in the State. Despite these efforts, the risk of ZQM introduction remains. These protocols include:

- **Inspection** – Staff physically and visually inspect vessels, trailers and equipment for ANS.
- **Decontamination** – All trailer craft are required to go through a decontamination and engine flush. Boats are decontaminated using hot water (120°–140° Fahrenheit) to kill mussels and other ANS. The exterior of the boat and trailer are sprayed with a high pressure rinse to remove the mussels or ANS from the boat. The interior compartments and the engine/motor are flushed or rinsed with low pressure hot water. For the 2019 season, new, more-effective equipment will be used for the decontamination process.
- **Quarantine** – Trailer craft have been subject to a mandatory 35-day quarantine. This quarantine period was necessary due to data that has shown that ZQM larvae can survive for approximately 27 days in the residual water of trailer craft. Even though the boats were inspected and washed, the quarantine periods were an important part of the efforts to protect Standley Lake. Boats were then issued a “red tag” that indicates that the boat is in the quarantine period. Once the boat had been quarantined for 35-days, the red tag was replaced with a clear tag.
- **Tagging** (inspection seals) - Boat seals (tags) temporarily attached the boat to the trailer so that Staff knows the boat has not launched since its last inspection. Clear (Westminster) tags indicate that the boat met the inspection, decontamination and quarantine requirements. Once boats met the initial quarantine period, they were allowed on Standley Lake with no delays each time they return, provided they have not been to another lake. The only time they had to be re-inspected or quarantined was when the tag on the boat had been disturbed or the boat had been on another lake. At this point the boat would be inspected, cleaned, re-tagged and quarantined for the appropriate amount of days (35) before it would be allowed on the lake. Staff would remove the tag when a boat launched on the lake and replaced the tag upon exit.



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Quarantine and Decontamination Circumvention

Recent facts have come to light that amplify concerns that this strict ANS prevention program may not be enough to prevent a ZQM infestation.

In December, Staff was notified by Robert Walters, the Colorado State Invasive Species Specialist from CPW, that in 2018 approximately 20% of Standley Lake permit holders also boated on Lake Powell, known to be highly infested with quagga mussels. This information caused Staff to do a thorough evaluation of launches at Standley Lake to ensure there were no issues of circumvention of the quarantine and decontamination program.

Staff implemented a new software system in 2018 that allowed for permitting and launching activities to be documented in an electronic database format. This database was then cross referenced with the State's database. Based on the results of this evaluation, 24 boats appear to have launched on other lakes and returned to Standley Lake without completing the decontamination or quarantine. Of these boats, some boated on infested waters just days before launching on Standley Lake. Some instances were exceptionally egregious with the boat being launched multiple times on other lakes before launching, without decontamination, on Standley Lake.

The circumvention of this important protection program poses a clear threat to the health of Standley Lake, its ecosystems, recreation, and water supply.

It is also critical to note that this analysis only compared launch data from actively monitored lakes. It did not pick up boats that were launched on non-monitored lakes or boats that were taken to states not participating in the coordinated ANS program.

Other Recently Identified Threats

Another unexpected threat identified recently is related to new boats from local boat dealers. Because the boats were new, boat dealers were granted access to Standley Lake without a quarantine period to allow customers to test drive these boats. This practice was allowed through a "clear tag" permit. Through some extensive effort of the Water Quality team and support of Park Rangers, it came to light that these new boats had been test run in infested waters in Tennessee prior to being delivered to Colorado for sale. The clear tagging permit process was immediately ended upon this discovery.

Staff is using best known available techniques to prevent introduction of ANS; however, despite best efforts, these techniques do not guarantee protection from ZQM infestation. While the current ZQM program strives to prevent any ZQM introductions, no program is 100% effective.

ZQM Risk and Cost

The 2010 report from HDR identified infrastructure and operational costs that would be incurred in the event of a ZQM infestation. The study evaluated the watershed for risk of contamination, survivability of ZQM in the watershed, and evaluated mitigation treatments and associated costs.

The results of the study demonstrated that ZQM infestation is unlikely within the Clear Creek watershed itself; however, it identified that Standley Lake has optimal conditions for ZQM infestation.



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The study evaluated a variety of possible mitigation methods that would alleviate the clogging of intake pipes from the lake to the water treatment plants. It did not encompass an analysis of water quality impact, ecological impacts, or recreational impacts to the lake that largely cannot be mitigated. The most effective mitigation method includes a system that would feed chlorine to the reservoir's pipe intakes.

That study has been updated and was released to the City in mid-February of 2019. The results of the updated study are largely the same as was found in the 2010 study with only minimal changes. Additional treatment methods have been developed, the most promising of which is copper ion treatment at the intake pipe. Unfortunately this is not a viable option for treatment as it would cause Westminster and Northglenn both to be out of compliance with discharge permits at their wastewater plants; therefore, the installation of a chlorine feed remains the most viable option. It is important to note that the introduction of chlorine at the intake is the most viable option to keep intake pipes operational; however, it does cause other negative water quality impacts. Specifically, the introduction of chlorine in the raw water intake facilities will likely increase disinfection byproducts (DBP) that are regulated carcinogenic compounds created when chlorine reacts with organics in water.

The cost estimate for the chlorine feed system as shown in the 2019 HDR study includes the cost impact for maintaining inlet pipe infrastructure for the partner cities (which Westminster would be solely responsible for) and includes only impacts to potable water intake structures themselves. The study does not evaluate impacts to recreation and wildlife, nor does it evaluate the financial implications for recreation programs at the lake.

The study identifies an initial cost of \$10 million for capital improvements necessary to install appropriate equipment. Additionally, the HDR study notes that the City would be required to spend \$3 million annually to operate, clean, and maintain the system. In addition Staff has also identified that the decrease in water quality, specifically if and when algae blooms occur, could result in additional treatment and chemical costs of approximately \$1 million annually.

Based on the IGA between Westminster, Thornton, and Northglenn, the entire cost of these mitigation activities could be borne solely by Westminster. Using the rate model recently developed by Raftelis Financial in 2018, Staff identified that the first year of implementation of these mitigation programs could necessitate an estimated 14% water rate increase in addition to the rate increase that would be necessary for normal operation and maintenance of the water utility. Degraded raw water quality could result in increased treatment costs at both Thornton and Northglenn. Westminster would also potentially be responsible for those increased treatment costs as well. These numbers are not reflected in the figures above. Additionally, the revenue impacts resulting from degraded recreational opportunities are not included in these figures.

Recreational Revenue

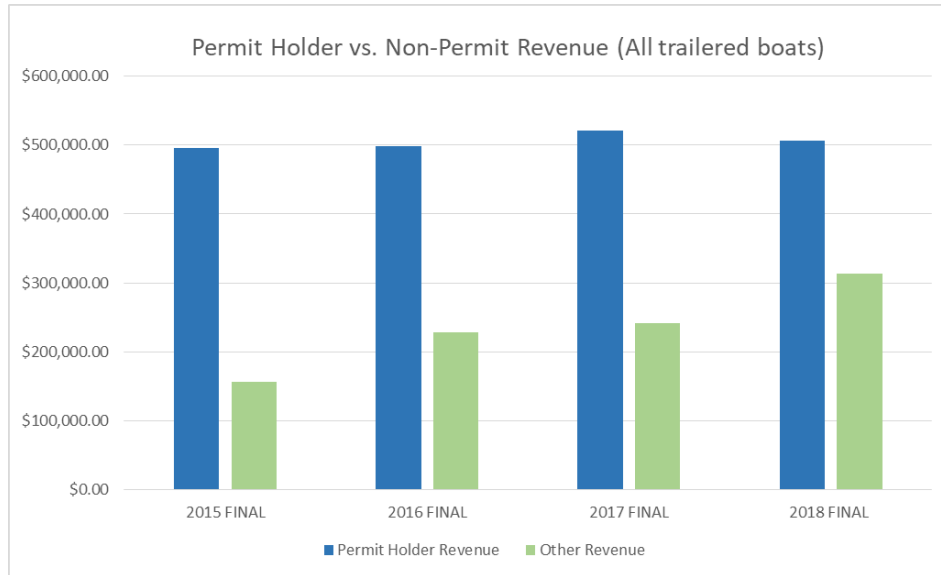
The following discussion addresses the fiscal implications of boating not being allowed on Standley Lake.

The boating program was a significant revenue generator. Boat permit sales (power, fishing and sail boats) account for approximately 58% of the Lake's total revenue. In 2018, Standley Lake



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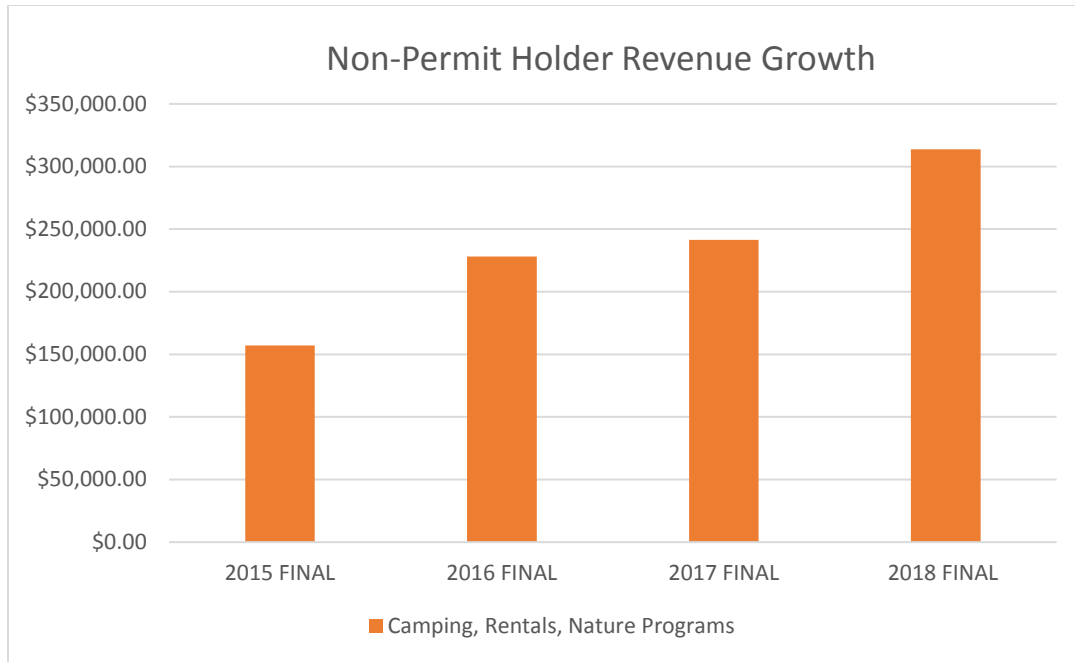
generated a total of \$819,652 in revenue. Boat permit sales accounted for \$479,715 of that total.



For the past five years, Staff has looked at creating more equitable opportunities that allow for public access and use of the lake as well as expanding land based recreational opportunities throughout the park. These changes resulted in over \$300,000 of increased, non-permit holder generated revenue in 2018 alone. Standley Lake has seen a 40% increase in park visitation since implementing these changes. Continued expansion of land and water-based recreational opportunities will continue to generate increased revenue. Based on recent projections by Staff, revenue losses resulting from the elimination of boating could potentially be offset and mitigated within three years. This estimate would look to bolster and expand existing programming as well as add additional recreational opportunities. Staff further believes that elimination of motorized boating could generate increased interest and usage in other activities, including revenue generating activities.



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Program Comparisons

Staff completed an analysis of other lakes around the State that serve as a direct use drinking water supply, meaning that water treatment plants are directly connected to the lake. There are 68 reservoirs that are classified as direct use in Colorado. 71% of those reservoirs do not allow motorized boating. Many of those that do allow boating have no-wake rules or have only private access. Additionally, only five reservoirs that serve as a sole drinking water supply allow motorized boating activities. Standley Lake is the sole drinking water supply for both Westminster and Northglenn and is a major supply for Thornton.

Actions Taken

The current tagging system for both the City and the State is not tamper-proof and the decontamination procedures are not fail-safe. Based on the information currently available, action is needed to adequately protect Standley Lake and the City’s drinking water supply. Staff determined the current decontamination program to be less than adequate for water quality protection. Therefore, effective March 19, 2019, an immediate and indefinite restriction of trailered boats was implemented.

Disallowing trailered boats is the single most effective option available to prevent the introduction of ZQM into Standley Lake. It is the best option to prevent significant impacts to this recreational and ecological resources. It is also the most protective option for Westminster, Thornton, and Northglenn’s water supply and the associated financial impacts to Westminster water rate payers. This option addresses the issue of permit holders circumventing the decontamination and quarantine process. It also eliminates risks associated with difficult to clean and inspect ballast tanks.

This option has significant impacts on around 120 permit holders that live in Westminster and around 300 permit holders that live outside of Westminster City Limits. The initial impact to Standley Lake recreation revenues could be \$479,715.



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Other boating opportunities do exist for the community. A recent evaluation of reservoirs within a 50 mile radius show that there are 12 bodies of water that allow recreational activities. Six nearby reservoirs allow power boating and the other 6 allow paddle craft and/or boats with electric motors.

Consideration of Alternatives

Staff has researched other considerations and is interested in learning new information that helps promote water quality protection. Staff also considered these potential alternatives:

- ***Disallow trailered boats with ballast tanks***

Ballast tanks are a key vehicle for the transport of ZQM between reservoirs. They cannot be visually inspected to ensure complete decontamination. They often cannot be completely drained, which means water from other lakes with potentially thousands of ZQM larvae could be introduced into Standley Lake. Having a boat bypass the decontamination and quarantine process makes the risk of ballast tanks that much greater. Non-compliant boats could enter Standley Lake with water in their ballast tanks that is well within the survival period of ZQM. Additionally, the larger wake produced by boats with ballast tanks have other water quality and wildlife habitat impacts with the increased bank erosion and sediment suspension.

This option could allow less-risky leisure boats access to the reservoir. Because these boats can be successfully decontaminated and inspected, they pose less risk than boats with ballast tanks. In the event these boats bypass the decontamination and quarantine process, they are less likely to have significant contaminated water transported from another reservoir. These boats still can pose some risk to Standley if they are not appropriately decontaminated and quarantined. Additionally this alternative does not account for potential contamination of trailers utilized for other types of boats without ballast tanks.

Eliminating only boats with ballast tanks would not have as significant an impact on the revenue, but would still be substantial. Approximately 75% of the boats used on Standley Lake have ballast tanks. Staff estimates this could result in a loss of revenue of approximately \$360,000.

- ***Required Onsite Storage***

Currently some boaters will take their boats to other lakes, come back to Standley Lake and appropriately go through the decontamination and quarantine processes. Additionally, many boats are stored offsite. Unfortunately, by allowing boats to come and go, it leaves vulnerabilities in the quarantine program. By tampering with tags, boats can launch on other reservoirs and potentially introduce ANS into Standley Lake.

This option would require that any boat that leaves Standley Lake for almost any reason would have to go through the decontamination and 35 day quarantine. Boats would have to be stored in onsite boat storage and would only be allowed to leave for short periods of time to fuel their boats. The number of available permits would be limited to the amount of boat storage available onsite, roughly half of permits sold in 2018. For a boat to be taken to the mechanic for work, the boat would have to go through the decontamination and quarantine process when re-entering Standley Lake.



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Alternatively, Staff is reviewing tamper-proof Global Positioning System (GPS) options. Tamper-proof GPS equipment has to be connected to the boats electrical system, has to be installed by a certified installer, and requires holes be drilled into the boat. There is potential risk in damaging private property through this process. Additionally, costs associated with this option could be significant.

This option will require increased staffing at Standley Lake to monitor boats entering or leaving the property and/or monitor GPS data. Additional equipment will be necessary to facilitate a punch-in/punch-out system to allow boats to leave for fueling. This additional equipment is expected to cost approximately \$50,000.

This option would allow for 280 boating permits based on the available capacity of the boat storage facility. It would minimize the risk of introduction of ZQM. Revenue impacts from the reduction in boating permits allowed would be approximately \$200,000.

- *Continue boating program with additional protective measures.*
Staff is evaluating using the same electronic application as CPW to log and monitor boat launches. When Staff and CPW identified the tag tampering issue, CPW identified that an update to the current application could provide a notification showing the last place the boat had launched (assuming the boat was launched on monitored reservoir that also uses this application). By using this same application, Staff would have both State and Standley Lake data to better ensure that at least most boats circumventing the system would be caught prior to launch. This application is still in development and timing of its availability is unknown. Additionally, strong penalties would be implemented and strictly enforced to act as further deterrent for circumventing the protection program.

This is the least protective option available. It does not ensure that all boats have been through the appropriate decontamination and quarantine process. Moderate risk of ZQM introduction would still remain.

FAQs for the public have been posted at www.CityofWestminster.us\boating