

# **Watershed Education Plan**

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## **Reno/Sparks**

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### **Goal**

To outline potential watershed education opportunities in the Truckee Meadows community. Our goal is to encourage adults and students alike to learn and care for their local watershed.

### **About This Guide**

This watershed education plan was produced by One Truckee River ([onetruckeeriver.com](http://onetruckeeriver.com)). One Truckee River is a collaboration of public and private partners working together to ensure a healthy, thriving, sustainable river and an engaged community.

### **Acknowledgments**

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  - Northern Nevada Water Planning Commission
  - REI
  - Renown Health
  - Truckee River Fund at Community Foundation of Western Nevada
  - Washoe County State Question One Program
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## List of Acronyms

BLM	Bureau of Land Management
DRI	Desert Research Institute
GBI	Great Basin Institute
GBOS	Great Basin Outdoor School
IVGID	Incline Village General Improvement District
KTMB	Keep Truckee Meadows Beautiful
NDEP	Nevada Division of Environmental Protection
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
OTR	One Truckee River
SNJ	Sierra Nevada Journeys
TMPF	Truckee Meadows Parks Foundation
TMWA	Truckee Meadows Water Authority
TMWF	Truckee Meadows Water Reclamation Facility
TNC	The Nature Conservancy
TRWC	Truckee River Watershed Council
USFWS	U.S. Fish and Wildlife Service

# Introduction to the One Truckee River Management Plan

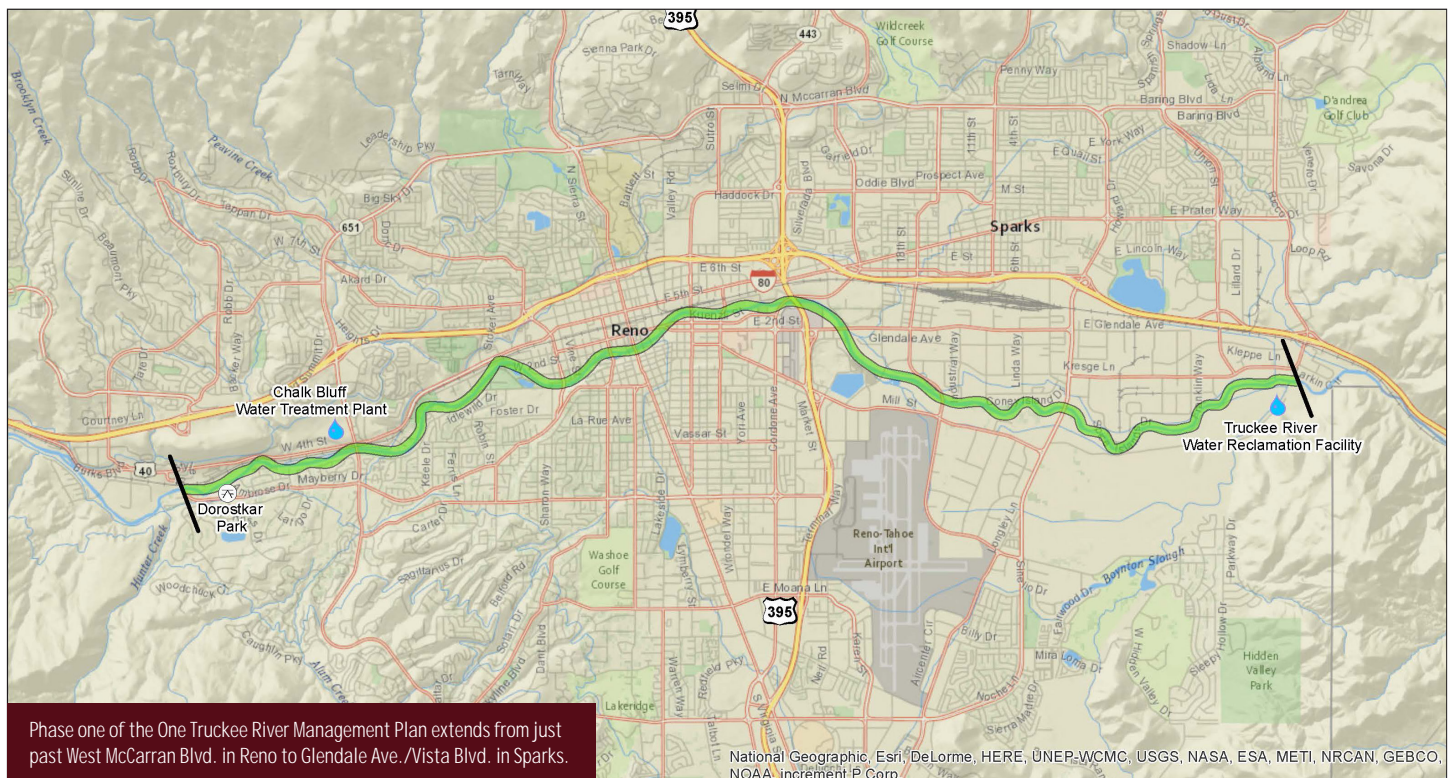
One Truckee River (OTR) is a collaboration of public and private partners working together for a Truckee River that flows clear and clean, quenches our thirst, sustains the river's natural ecology, cultural resources and wildlife, and connects residents and visitors to unparalleled opportunities for recreation and self-regeneration. The One Truckee River Management Plan identified four primary goals and over 120 strategies and action items to achieve the OTR vision. Numerous stakeholders participated during the 18-month-long process to develop the plan.

## Goals:

The One Truckee River Management Plan's primary goals are to

- 1) Protect water quality and ecosystem health;
- 2) Create and sustain a safe, beautiful and accessible river;
- 3) Build an aware community; and
- 4) Ensure the sustainable management of the river

The OTR Core Planning Team assessed the opportunities for and threats to the Truckee River, and identified key issues that would need to be addressed by the plan. Consensus emerged around nine categories that became the core One Truckee River emerging issues, and established the framework for the plan. The team also established the phases for the planning that have been dictated in part by available early funds for the effort, as well as by the pressing challenges unique to the more urban sections of the Truckee River. Phase one covers the Truckee River from West McCarran Boulevard in west Reno to Vista Boulevard in Sparks. Phase two will cover the section downstream from Vista to Pyramid Lake. Phase three will cover upstream from West McCarran Boulevard to the California state line.



The nine emerging issues identified by the Core Planning Team are:

- **Water Quality** – Many of the people, wildlife and plants in our region depend on the Truckee River to sustain them. Current policies leave room for improvement in the way we manage what pollutants end up in the river. Threats to the water quality will be exacerbated as the community grows. It is critical that we, as a community, keep the water in the Truckee River clean and healthy for all who depend on it.
  - **Social Issues** – The Truckee River is also impacted by challenges in our community to provide support and services to an at-risk population, including those suffering from homelessness. Substance abuse, mental health conditions and criminal activity may also factor into the equation. While these issues often create barriers to those recreating and using the river, the social issues are not just Truckee River problems; they impact the entire community.
  - **Stewardship** – How will we care for the Truckee River and manage its associated facilities? For it to be an accessible and inviting destination for residents and visitors alike, the Truckee River requires coordinated and consistent management by faithful stewards. Currently, federal, state and local jurisdictions play a role in protecting and maintaining the river, as do many non-profits, businesses, and other stakeholders.
  - **Ecosystem** – The entire region depends on the overall condition of the Truckee River ecosystem. It can also serve as an indicator of the health of the surrounding community. Ecosystem health includes both physical features (geomorphology) and living features (biological) of the river and is influenced by water quantity, quality and timing of delivery. The river ecosystem faces challenges from drought, flooding, climate change, development, invasive species and more.
  - **Quality of Life** – The Truckee River enhances the lives of local residents and visitors alike. To members of the Paiute and Washoe tribes, the Truckee River is a sacred place; and is integral to the history of Reno and Sparks. Tribal members find stillness and reflection along its banks. Communing with nature offers well-researched benefits for everything from healing heart disease to improving mental health. The Truckee provides a unique location for some of the region's most popular arts and cultural events, however, many people are still not aware of the opportunities the river presents and are not fully taking advantage of what it has to offer. Identifying and driving solutions that leverage the Truckee River will enhance the quality of life for all.
  - **Funding** – Implementation of the One Truckee River Management Plan to achieve the vision of One Truckee River will require both short- and long-term funding. A strategy to support the long-term sustainability of One Truckee River and to fund specific priorities and initiatives identified as part of the plan must be developed.
  - **Recreation** – The Truckee River offers recreational opportunities vital to the health and well-being of our community including swimming, fishing, kayaking, biking and walking. Future opportunities exist to improve the access, usability, and quality of existing facilities and resources in addition to providing new facilities. Identifying and creating solutions to enhance the recreational opportunities provided by the Truckee River are needed.
  - **Education** – For our community to truly become good stewards of the Truckee River, understanding of the river's central role in our environment, history and culture is needed, as well as the impacts of individual behaviors and choices. The river is also a wonderful resource that can be used in place-based teaching of biology, geology, history, and more. Avenues are needed to educate all ages within the community on the importance of the river, and to incorporate the river into the educational process.
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## Background of the Truckee River Watershed

The Truckee River flows for roughly 120 miles in a northeasterly direction. Beginning at Lake Tahoe and emptying into Pyramid Lake, its waters are an important source of irrigation along its valley and adjacent valleys. The Truckee River Watershed drains an area of about 3,060 square miles of Nevada and California. A watershed is an area of land that all drains into the same body of water. Our watershed includes the 63 streams and creeks that flow into Lake Tahoe and the one that flows out (the Truckee River).

The health of our river and the entire watershed is important for the survival of our community. For the Truckee Meadows community members to truly become good stewards of the Truckee River, understanding the river's central role in our environment, history and culture, and the impacts of individual behaviors and choices is vital. Programs are needed to educate all ages within the community on the importance of the river, and incorporate the Truckee River into the education process. We need a watershed-educated Truckee Meadows because “in the end, we will conserve only what we love; we will love only what we understand; and we will understand only what we are taught” (*Baba Dioum*).



## Vision and Objectives for the Watershed Education Plan

This education plan will help OTR achieve OTR Management Plan goal #3, to build an aware and engaged community that protects and cares for the Truckee River Watershed. The need for this comprehensive watershed education plan is driven by a growing population in the region; intensified extreme weather events due to climate change; and water quality impairments. The unified message in this education plan is “You live in the Truckee River

Watershed.” We need to be proactive to maintain a pristine Truckee River and help the public understand that whatever happens in their front and backyard may end up in the Truckee River.

The learning outcomes of the plan include:

1. We are all connected. Every single person lives in a watershed.
2. An understanding of why our connectedness matters. Through stormwater and storm drains, everything on impervious surfaces may end up in the Truckee River. Therefore, it is important to prioritize low impact development to reduce each person’s stormwater footprint.
3. Clean water matters to all of us! Humans and wildlife depend on water for drinking, recreation and irrigation. The Truckee River is our lifeline. We cannot live without our river.
4. What you, as a Truckee River Watershed citizen, can do to keep it pristine. One person can make a difference.

It is important to note that watershed messages can vary by audience. For example, the water quality message is different for landscapers than it is for policy makers. OTR will work with landscapers to emphasize our water quality message, that lawn owners must know the appropriate amount of fertilizer to apply. For policy makers, it is important that they know water quality affects the community’s health and can be mitigated with low impact development features. Contained within OTR messages must be the economic benefits derived from watershed protection. Healthy watersheds provide many ecosystem services that are necessary for our community’s social and economic well-being.

The OTR Community Watershed Knowledge Survey identified the best ways to deliver these messages.

- RGJ (online and print);
- Inserts in utility bills;
- PSAs; and
- Social media (the OTR website will serve as the repository for education materials)

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## **OTR Plan Goals**

### *1. Complete the OTR Community Watershed Knowledge Survey (OTR Management Plan strategy 4.2.a)*

Throughout the 2016-2017 year, the OTR education team devised and implemented a 51-question survey. Distributed throughout the local community, the survey was designed as an attempt to measure the community knowledge and perceptions about the Truckee River Watershed. Over 1,000 residents responded. The ultimate objective of the education team is to educate the public on proper practice and personal footprints to minimize impact to our river corridor. OTR enlisted the help of the Center for Economic Development at the University of Nevada, Reno to analyze the survey responses and prepare a Technical Report that highlighted major findings.

Key findings of the 68-page report include:

- Those who spend time by the Truckee River are more knowledgeable about where their tap water comes from and where water goes when it’s collected in gutters and storm drains.
- Those who rent their homes are statistically more likely to dispose of hazardous materials at proper collection sites.
- Most citizens in the area believe the biggest challenges facing the Truckee River are pollution, water quality, river access, and drought.

With the results of this survey and the gaps identified, OTR stakeholders will work to implement programs to improve the overall watershed knowledge in the area. Find the Executive Summary of this report in the Appendix, *Attachment A*, and the entire survey, results, and report at [onetruckeeriver.org](http://onetruckeeriver.org).

2. Compile and assess existing Truckee River-related curriculum and educational programs (OTR Management Plan strategy 3.2.a)

As identified in strategy 3.2.c, we developed an educator resource page outlining educational programs and curriculum specific to the Truckee River. See the Appendix, *Attachment B*, for the one-page summary with this information. Many of the programs are soft funded by grants and donations, and OTR will continue to work with these organizations to leverage funding and expand watershed education opportunities.

The river is a wonderful resource that can be utilized in place-based teaching of biology, geology, history and more. We looked at the status and availability of existing watershed education programs in the region. To accurately determine how existing programs address OTR main messages, we surveyed organizations and agencies throughout the region. We sent an email questionnaire to 73 organizations. Out of the 39 responses returned, 30 responded that they do perform watershed education and 17 provide Truckee River-specific watershed education. Below are the questions asked of the 17 organizations that provide Truckee River-specific watershed education.

1. What grades/ages does your organization target?
2. What are your water related programs?
3. Is there a possibility to expand your existing programs?
4. Do you offer professional/teacher development opportunities?
5. Curriculum questions
  - a. Are you willing to share your curriculum?
  - b. Is the curriculum/program aligned with Next Generation Science Standards (NGSS)?

Below are the answers provided to us by the 17 organizations who provide Truckee-River specific watershed education.

**Local Watershed-Related Programs (Table)**

Organization	Grades Targeted	List of Watershed-Related Programs	Expansion Possibility?	Professional Teacher Development Program	Curriculum (Willing to Share, Aligned with NGSS)
<a href="#">Boys &amp; Girls Club</a>	Ages 6-18	STREAM & Trails summer camp, several times a year environmental organizations give a presentation (e.g. SNJ, Urban Roots)	Expand the STREAM & Trails camp to summer and fall, the B&G clubs have one main programming hour every day after school from 5-6pm where a “water expert” can give a talk; fun Fridays by the river (BBQ at Idlewild and Rock Park) – life-guard needed but great time to do watershed education	No	N/A

Organization	Grades Targeted	List of Watershed-Related Programs	Expansion Possibility?	Professional Teacher Development Program	Curriculum (Willing to Share, Aligned with NGSS)
<a href="#">Bureau of Land Management (BLM)</a>	Grade 7-12 “Hands on the Land” online curriculum (can be adapted for different grades)	Wetlands and Riparian Habitat “Hands on the Land” online curriculum; place-based learning (students go into the field and take qualitative and quantitative measurements. Activity includes STEAM prep-lab activity, field work activity, post-lab activity); Earth Day programming; Every Kid in the Park (free National Park passes to 4th graders)	BLM is producing field guides (for Swan Lake); future DRI Green Box (Pyramid Lake wants to adapt “Hands on the Land” and include a monitoring kit); Truckee River Trek (engaging young tribal members in natural resources, teach them about native plants, promote exercise)	Yes, Teachers on the Public Lands	Available online, NGSS aligned
<a href="#">Desert Research Institute - STEM Stream (DRI)</a>	K-12, Higher Education, Career Prep & Re-Entry, Professional Development, Lifelong Learning	<i>Youth:</i> Green Boxes with watershed focus (Force of Water, terminal watershed); Citizen Science (Stories in the Snow); Service Learning class at TMCC high school. <i>Adult:</i> DRI Graduate Students (Café Science Series); DRI experts speak at several water events (and are available upon request).	Take over and expand Truckee River Snapshot Day; water-related career development opportunities; scheduled expert talks; sharing Green Box lesson plans online (DRI is currently updating their online system to track metrics)	Yes (Four Force of Water Green Box workshops), teacher trainings and professional development	Not publicly available at this time, NGSS aligned
<a href="#">Terry Lee Wells Nevada Discovery Museum</a>	All ages	Permanent Truckee River exhibit (Clouds-water cycle; and Truckee Connects, multiple water use); Teen Advisory Committee; teen science nights; Speaker series (Science Distilled and Social Science); K-7 fall and summer Camp Discovery	Coordinate water-related topics into Science Distilled and Social Science talks; temporary exhibits; museum overnight water-related topic	Yes, Educator Night Out and more	N/A, Discovery Labs are NGSS aligned
<a href="#">Enviroolution</a>	K-12 with a high school focus	Project ReCharge - Water Heating, Water Efficiency (not Truckee River specific); Sustainability Tours - break programs, career development	Expand internship program, bring Sustainability Tours to TMWA and other water centers	Yes	Yes, Yes
<a href="#">U.S. Fish &amp; Wildlife Service (USFWS)</a>	K-12 schools, 4th grade (TREE)	Tours of Lahontan National Fish Hatchery (open all year) and Marble Bluff Fish Passage and Research Station (facility is open to the public during the spawning season March through early June); Lahontan Cutthroat Trout in the Classroom; School Yard Habitat Program; 4th grade Truckee River Environmental Education	Expand Trout in the Classroom to more schools	No	N/A



Organization	Grades Targeted	List of Watershed-Related Programs	Expansion Possibility?	Professional Teacher Development Program	Curriculum (Willing to Share, Aligned with NGSS)
<a href="#">Great Basin Institute – Galena (GBI)</a>	K-12 (watershed curriculum focus is 3-10 grade)	School field studies; school break camps (during summer, fall and spring breaks); Great Basin Naturalist Teen Exploration Camp during the summer; Galena Creek Visitor Center		No	N/A, NGSS aligned
<a href="#">Great Basin Outdoor School (GBOS)</a>	K-6	Outdoor science education field trips (Lake Tahoe and entire watershed education); Summer Day Camp at River School Farm		Yes, Project WET	N/A, NGSS aligned
<a href="#">Keep Truckee Meadows Beautiful (KTMB)</a>	4-5, adaptable to other grade levels and adults	Watershed Warriors (collaboration with SNJ and PWET); Weed Warriors; Waste Warriors; Adopt-A-River	Create a Watershed Warrior Green Box with DRI (\$5,000 to create a box); watershed talk specific to adults; watershed education with Adopt-A-River program	Yes, spring 2016 with DRI (not annual but hopefully another one in the future)	Free online lesson plans/supplemental materials/video, NGSS aligned
Lynell Garfield – Lorelai the Mayfly	K-5 focus but other ages may participate	The Secret Life of Streams is a children’s story/field guide about a talking mayfly’s underwater life. Lorelai is available for school assemblies, class presentations, and STEM Training	Lynell is working on her second book with macroinvertebrate identification guide compendium	Yes	N/A, no
<a href="#">Nevada Department of Wildlife (NDOW)</a>	All ages	Trout in the Classroom; <a href="http://nevadawild.org">nevadawild.org</a> podcast; Free Fishing Day (and poster contest for 4th and 5th graders); Oxbow Nature Study Area; Verdi Wildlife Education Center; volunteer opportunities (fish stocking & sampling, angler education); boating/water safety	Coordinate expert talks; work with fishing community on distributing watershed education; tabling opportunities	No	Macro-invertebrate identification guide online, No
<a href="#">Pyramid Lake Paiute Tribe (PLPT)</a>	All ages (Natural Resources employees, other tribes, tribal members)	Youth 3-day summer camp; participate in Snapshot Day; beach clean-ups (during flood years); plant native gardens (riparian vegetation); Pyramid Lake Paiute Tribe Museum and Visitors Center (open 5 days/week); coloring books available by contacting Pyramid Lake Environmental Department Water Quality Program	Expand beach clean-ups and native garden (riparian) plantings; work with BLM on Truckee River Trek	Natural Resources Proper Functioning Condition training (water quality sampling and stormwater runoff training)	No, N/A

Organization	Grades Targeted	List of Watershed-Related Programs	Expansion Possibility?	Professional Teacher Development Program	Curriculum (Willing to Share, Aligned with NGSS)
<a href="#">Sierra Nevada Journeys (SNJ)</a>	K-6, (watershed focus 3rd, 5th “Hands in the River”, & 6th Lake Tahoe)	Classrooms Unleashed; Overnight Outdoor Learning; Family Science Nights/Parent Engagement; summer camps	Community Family Watershed Science Nights on the river	Yes	Curriculum shown on a case-by-case basis, NGSS aligned
<a href="#">The Nature Conservancy (TNC)</a>	All ages can enjoy McCarran Ranch Preserve, 4th grade (TREE)	Various volunteer opportunities at McCarran Ranch Preserve; restoration work upstream; Truckee River Environmental Education	Advertise McCarran Ranch Preserve as an outdoor education destination; expand opportunities there	No	N/A
<a href="#">Truckee Meadows Parks Foundation (TMPF)</a>	All ages	Student Stewards Program; Junior Naturalist Program; Mini Bio Blitz; spring and summer camps; TMPF Talks; Truckee Meadows Trails Challenge; the Parks Rephotography Project; Discover Your Parks Walks (4 parks along the river)	Citizen science opportunities; coordinate water topics for TMPF Talks	Yes	No, NGSS aligned
<a href="#">Truckee Meadows Water Authority (TMWA)</a>	All ages (K-12 lesson plans), adult workshops	Smart About Water campaign; TMWA Academy short videos and downloadable curriculum for art, language arts, math, reading, social studies, and science; presentations and speakers are available to cover a variety of topics: smart water planning, our water system, Well Mitigation Program, and water quality; and more	Bring back the poster art contest (collaborate with stormwater committee); update TMWA Academy lesson plans; translate website into Spanish	No	TMWA academy free online lesson plans, No
<a href="#">Truckee River Watershed Council (TRWC)</a>	Adult education	Weed Warriors; Adopt-A-Stream and monitoring; Aquatic Monitoring Lab Night; River Talk; Truckee River Day; Family Friendly Landscaping)	TRWC focus is on Upper Truckee River and Lake Tahoe (OTR will expand their programs downstream)	N/A	N/A
<a href="#">University of Nevada at Reno Cooperative Extension</a>	All ages	Nonpoint Education for Municipal Officials (NEMO); Water Wise is an online educational program that complements NEMO; Calming the Waters: Learning to Manage Western Water Conflict curriculum	Have an agency/organization adopt NEMO; bring NV Naturalist Program to Reno	N/A	NEMO Action Guides all available online, n/a
<a href="#">Urban Roots</a>	All ages	Camps; Farm School; garden programs for schools - Water and Weather curriculum (lesson on the Truckee River watershed). Ages 5-15 throughout WCSD and on their farm. Work with downtown family shelter; VA hospital; Renown Hospital.		Quarterly curriculum trainings (cover everything)	Free online lessons, NGSS aligned

Other existing Truckee River Watershed education includes:

- *Adults chaperoning field trips:* This is an invaluable opportunity for parents to get outside. SNJ says parents who attend field trips leave excited about finding new natural areas, thinking about where their water comes from, the stormwater system and macroinvertebrate information.
- *Existing speaker series:* OTR will continue to promote the numerous speaker series in the region. These include talks by DRI, Galena Creek Visitor Center, Nevada Land Trust, Nevada Museum of Art, REI, Tahoe Environmental Research Center, Terry Lee Wells Nevada Discovery Museum Science (Distilled and Social Science talks), and TMPF.
- *Citizen science throughout the Truckee River Watershed:* One way to ensure watershed health and sustainability is to engage students as integral partners by undertaking initiatives to protect their watershed.

Citizen science allows students to use the same technologies that separate them from nature to help them understand and enjoy it. Smartphones get students involved in science with data collection, inquiry, and discovery of new knowledge and provide students ways they can each help protect our water resources. There are numerous chances for students and their classes to get involved with the Tahoe Research Center, Truckee River Guide, and DRI programs. The OTR Educator Resource Guide, located in the Appendix, *Attachment B*, provides greater detail on these citizen science programs.



One Truckee River AmeriCorps members joined the Source to Sea group for a portion of the adventure from South Lake Tahoe to Pyramid Lake.

- *Truckee River Source to Sea:* In 2017, nonprofit Rivers for Change embarked on a Truckee River “Source to Sea” adventure. OTR partnered with Rivers for Change to bring middle school students on a paddling journey from the Upper Truckee River on the south Shore of Lake Tahoe, across Lake Tahoe, along the entire Truckee River from Tahoe City to its terminus at Pyramid Lake.

This trip engaged communities and schools within the watershed and along the river through hands-on interaction, educational events, and paddling adventures while highlighting the unique ecological values and conservation efforts affecting the river. OTR will continue to work with Rivers for Change when they repeat the Truckee River trip every three years to engage a new group of middle school students.

- *Incline Village outreach efforts:* The Incline Village General Improvement District (IVGID) reaches over 100,000 people with its outreach programs. OTR will work with the district to expand student field lessons and outreach at special events.
- *Nevada Department of Transportation (NDOT) stormwater messaging:* NDOT has implemented numerous projects to promote stormwater education in Nevada. Their programs include a pilot project to evaluate technology to continuously track and view water quality information in real time in certain locations around the state; a Love NV Waters Drawing Contest; a YouTube NDOT Channel with videos such as “What is stormwater?”; a “Guide for the NDOT Stormwater Management Program,” including a Nevada hydro-region map; and stormwater fact sheets for homeowners, and construction, industrial and mining sites.
- *Nevada Museum of Art works to bring the arts into science, technology, engineering, and math:* The Nevada Museum of Art worked with Daniel McCormick and Mary O’Brien to create a living Watershed Sculpture in 2014 for TNC’s preserve on the Carson and Truckee rivers. A 360-foot-long woven sculpture at the River Fork Ranch Preserve in the Carson Valley is part erosion control, part habitat development. Everyone involved in this process was engaged in hands-on watershed education. The museum also hosts many STEAM (science, technology, engineering, art, and math) teacher and professional development trainings. These trainings provide NGSS-aligned activities for teachers to bring into their classrooms. Many of the lessons are focused on various aspects of our watershed.
- *The Nevada Flood Awareness Committee’s library of flood resources:* The Nevada Flood Awareness Committee formed in late 2013 to raise awareness among Nevadans that serious flooding occurs regularly in our state, and that there are steps residents can take to mitigate the risk. The objectives of the committee are to effectively disseminate flood, flood preparedness and flood insurance information to Nevadans through annual activities in northern and rural Nevada and [NevadaFloods.org](http://NevadaFloods.org). Use this website to learn if your neighborhood floods, about the flood history of the Truckee River Watershed, the facts about floods in Nevada, and much more.
- *OTR mile markers increasing your familiarity with where you are along the river:* OTR began installation of the mile markers along the river in spring of 2017 to serve as emergency locations. A specific number is displayed on each marker, to be relayed to the 911 operator in an emergency situation or for maintenance issues. The creation and installation of the mile markers is a collaborative effort between One Truckee River and the Reno and Sparks fire departments, specifically the Water Entry Teams. The number displayed on the mile marker also shares how many miles the viewer is from Lake Tahoe. This is a great reminder of the size and diversity of our watershed.



Mile markers are placed along the Truckee River every 1/10 of a mile in Reno & Sparks. These serve as emergency response or recreation locaters.

### 3. Gap Analysis of Watershed Education Programs

After completing comprehensive research of what existing programs are occurring throughout the region, we now have an understanding of the gaps in watershed education. The main grades receiving watershed education are 4th, 5th, and 6th grades. Only high school students enrolled in an elective environmental science class are guaranteed some semblance of watershed education. The Next Generation Science Standards (NGSS) are K–12 science content standards that Nevada has adopted to improve science education for all students. These standards promote watershed education, but there are limited opportunities for place-based education. OTR has recommendations for how students can increase their understanding for where they are in their watershed. Through a unified speaker series, community outreach events, and watershed messaging via various media outlets, OTR can increase the adult population’s understanding for how they can protect the Truckee River. Educating every demographic in the Truckee River Watershed is central to maintaining our river resource. We elaborate in Goal 4 where there are opportunities for expanding, reenacting and creating future programming.

### 4. Recommendations for Future Educational Opportunities & Programming

- *Promote watershed education in grades K-12:* Next Generation Science Standards (NGSS) recognizes the importance of watershed education. Due to its conceptual framework, watershed education provides an opportunity to gain problem-solving skills. These skills include thinking about water systems and their complexity, analyzing the dynamics of interdependence and competition, understanding ecological limits and scale, and perceiving and documenting environmental change.
- *Continue identifying individual teachers’ needs to incorporate watershed education in their classroom:* As mentioned above, the main grades receiving watershed education are 4th, 5th, and 6th grades. Only high

school students enrolled in an elective environmental science class are guaranteed some semblance of a watershed education. There is a strong possibility that other grades have watershed education woven into the curriculum, but we were unable to identify what lessons are taught in every classroom in Washoe County. There are over 100 public and charter schools (elementary, middle, and high schools) in the county. This does not include home schools, online schools, and private schools. Identifying individual teachers' needs is an ongoing task for OTR educators.

- *Provide teachers with outside resources:* We developed an OTR Educator Resource Guide that highlights outside programs specific to the watershed that teachers can utilize. OTR will continue fostering a working relationship with the Washoe County Schools District. As other water-related opportunities arise, OTR will share the information on our website and with the district.
- *Facilitate Truckee River Watershed place-based learning:* We found that it is difficult to get a class to the Truckee River (whether because of buses, timing, or testing responsibilities), and many classes do not get outside as a result. This limits the opportunities for students to become familiar with where they live in the watershed. OTR created a GIS map that shows the schools in the Truckee River hydrobasin and their closest park and closest waterbody. The intent is to get teachers and their students into place-based instruction using the OTR Truckee River identification guides and teaching the students about the interconnectedness of the watershed. Visit [onetruckeeriver.org/education](http://onetruckeeriver.org/education) to utilize the map.
- *Integrate Trout in the Classroom (TIC) into existing classroom curricula:* TIC is a positive, hands-on, educational tool, appropriate for all grade levels. NDOW, USFWS, Cabela's, Truckee River Fly Fishers, and the Tahoe Environmental Research Center are all involved in TIC. Although there are limitations to what classrooms can implement in this program, OTR will work with stakeholders to improve teacher and student understanding, appreciation, and stewardship of aquatic ecosystems.
- *Expand Truckee River Snapshot Day:* Snapshot day is a one-day volunteer-based annual event that takes a picture of one moment in time of the Truckee River Watershed. Volunteer monitoring teams (primarily students) go out to various sites to perform a stream walk, collect field data, grab samples and take photos. All equipment is provided by the Nevada Division of Environmental Protection. OTR is working with DRI to expand this hands-on program to a greater number of students and keep them involved throughout the year. Once an annual program is established, grades 7-12 will have a curriculum to keep them engaged with their watershed.
- *Bring the River Wranglers or similar program to the Truckee River:* To engage high school students, OTR will work to expand the Carson River's River Wranglers Program. River Wranglers incorporates water quality monitoring of the Carson River into high school science programs, provides field experience for science students, and works with local, state and federal agencies, local schools and citizen groups to help implement several events. This program (or something similar) would be perfectly suited for the Truckee River.
- *Increase the number of watershed-related career development programs:* Envirolution ([envirolution.org](http://envirolution.org)) has paved the way for environmental career development programs to be incorporated into watershed curriculum. Envirolution and DRI are great partners at expanding these internships and STEM workforce development opportunities. OTR wants to inspire stewards of the river and one way to do that is to heighten the awareness of water-related career opportunities. For example, when TMWA works with the Washoe County School District to implement non-potable watering solutions at Reno High School, there could be student involvement with this project. This would require more collaboration and effort, but the benefits of hands-on learning about conservation is invaluable.

- *Engage students in hands-on projects, including the Washoe County Conservation and Sustainability Policy:* Washoe County recently approved a Conservation and Sustainability Policy that, along with many other actions, will introduce students to curriculum to allow them to understand the variety of sustainability issues encountered in schools, and require all district schools and facilities to implement a sustainability plan. It is vital that the students are involved in the process of retrofits at their schools. To facilitate this, OTR will coordinate with GREENevada and the Washoe County School District's Energy Conservation & Sustainability Program Manager.



- *Schools will work within their community to identify their watershed impacts:* One way to do this is through Parent Teacher Associations (PTA) and Parent Teacher Organizations (PTO). PTA and PTO involvement vary greatly by school. Regardless of how present these organizations are, it is worth having conversations with the parents about how important it is for themselves, their children, and the schools to reduce their footprint throughout the watershed. To facilitate this, OTR will coordinate with GREENevada and the Washoe County School District's Energy Conservation & Sustainability Program Manager.
- *Work with GREENevada to bring back the Sustainability Summit:* Environmental clubs provide students with another opportunity for watershed lessons. Unfortunately, the number of environmental clubs continues to shrink. This may be a result of the lack of interest and attainable goals the clubs can achieve. OTR wants to bring back competition amongst Washoe County schools. This would increase Truckee River innovation and watershed knowledge.

One way to achieve this is to fund another GREENevada Sustainability Summit. In 2011, GREENevada was granted \$50,000 from Pepsi REFRESH. This money went to put on a sustainability competition where \$28,000 was awarded to nine participating Washoe County high schools whose student teams came up with their own plans to make their schools more environmentally friendly and energy efficient. Each team submitted a written proposal and budget, and made a visual presentation in front of a panel of expert judges. OTR can coordinate with GREENevada and Tesla to make this happen again with a greater focus on the Truckee River Watershed.

- *Work with science fairs to recognize watershed-specific projects and display these at the OTR Forum:* OTR should have a presence at science fairs and have a unique prize for water-related projects. This will be another incentive for students to be thinking about their role in the watershed. To make this a reality, we will collaborate with Washoe County schools' science fairs, Western Nevada Regional Science and Engineering Fair, Reno Earth Day Earth Innovations Science Fair, and UNR's MESA/First Generation Engineering Camp. The student winners can be showcased at the OTR Forum and throughout the month of May (One Truckee River Month).

The Monterey Bay Aquarium's Ocean Plastic Pollution Summit provides a great model. A requirement for the Monterey Summit is to implement a student-led action project that reduces single-use plastic consumption in your school or community. OTR's forum message could be even broader, for example, implement a project that demonstrates your school's impact to the watershed.

- *Increase the number of student contests and competitions:* Another way for students to become involved is for OTR to work with stakeholders such as TMWA and NDOT on poster and video contests for kids to celebrate World Water Day, Boating Safety Week, National Water Conservation Day, and Public Lands Day as well as other "holidays." Currently, NDOW has a Free Fishing Day Poster Contest that OTR will also promote. Winners of these contests will be displayed at the OTR Forum.

- *Increase the number of watershed-focused break and after school programming:* Along with opportunities that can augment watershed education in the classroom, there is still time when students are not on the school's clock. Break and after-school programs provide a greater number of chances to get children and teens outside thinking about water. Several outside organizations provide break programs that teach watershed topics. All are identified in the existing watershed education table above. OTR is working with Boys & Girls Club on their STREAM & Trails fall and summer break camp (ST(R)EAM = Science, Technology, (Reading), Engineering, Art and Math). This is another opportunity for OTR to collaborate with many of our stakeholders and demonstrate the connectedness between OTR issue areas.
- *Identify a sponsor and implement an OTR Speakers' Bureau on our nine issue areas:* OTR will coordinate a speakers' bureau to hold educational river-based events. The OTR Speakers' Bureau will cover all of OTR's issue areas to attract a wider audience who might only come to a talk on specific subject matter. GREENevada's adult education group will continue to work with OTR on curating a list of existing talks.

Ideas for subject matter for our Speakers' Bureau include but are not limited to:

1. Water Quality: tours and speakers from TMWA, DRI, UNR Global Water Center, Truckee Meadows Water Reclamation Facility
2. Recreation: Gilligan's Guide Service (fishing), Charles Albright (kayaking), Janet Phillips (biking), Lahontan Audubon Society (birding), Great Basin Bird Observatory (birding), Patagonia ambassadors at the Reno outlet store (fly fishing), water-related films (hosted by Patagonia, Friends of Nevada Wilderness)
3. Education: SNJ (community watershed education night), NDOW speaker, KTMB (Watershed Warriors), Truckee River Watershed Council (River Talk)
4. Quality of Life: Reno-Sparks Indian Colony, REI (Wednesday Night talks)
5. Social Issues
6. Funding
7. Public Safety
8. Ecosystem: TNC Conservancy (restoration efforts)
9. Stewardship: local watershed council, local soil and water conservation district, benefits of rain gardens



Attendees of Nevada Land Trust's Coffee & Conservation. This group could assist with the implementation of an OTR Speakers' Bureau.



- *OTR will be a community partner with the new UNR Global Water Center:* UNR's Global Water Center is a response to societal demands for creative, integrative approaches in addressing complex issues related to water resources. The Global Water Center's mission is to solve large-scale and long-term problems related to water sustainability. The center currently has a series of Water Talks. OTR will help advertise for those, as well as participate as a community partner with the center's work in the Truckee Meadows.
- *Work with Osher Lifelong Learning Institute (OLLI) at UNR to provide more water-related opportunities to adults:* OLLI offers a distinctive array of courses and activities for adults 50 and older interested in learning for the joy of learning. The Truckee River Watershed Council is giving a fall 2017 lecture, and they have numerous outdoor classes along the river. OTR will collaborate with stakeholders to give presentations and provide more water-related opportunities to this group.
- *Implement the Nevada Naturalist program in the Truckee River region:* OTR will coordinate with GREE-Nevada and the UNR Cooperative Extension to bring the Nevada Naturalist program to Reno. Nevada Naturalist provides science-based education about natural resources to communities faced with a need for an informed leadership to educate and act to increase environmental literacy and protection. There is a large cohort of participants in Las Vegas where they complete a minimum of 60 hours of classes in basic environmental education topics, including ecology, taxonomy, soils, water, endangered species, geology, native plants and animals, insects, invasive species, environmental laws and regulations, adult/child learning techniques, and biological diversity.
- *Work with our stakeholders to fund or find a new home for the UNR Cooperative Extension's Nonpoint Education for Municipal Officials (NEMO) program:* The NEMO network includes 33 states across the nation. NEMO is an educational program for land use decision-makers addressing the relationship between land-use and water resource protection. As our community continues to grow, the rapid rate of construction and development can have negative impacts on our water quality and quantity. The NEMO Nevada program is designed to provide education and technical assistance to land use decision-makers, including planning commissioners and staff, citizen and neighborhood advisory board members, and other advisory groups. NEMO is not currently available as a training in Washoe County, however, efforts are underway with the Truckee Meadows Stormwater Permit Coordinating Committee to incorporate the messaging into their updated trainings. See Appendix, *Attachment D*, for a NEMO handout example, and find all their topics online.
- *Continue to inform municipal officials and developers on the importance of a stormwater utility:* OTR wants the public to understand what stormwater is and how they can reduce their impact. The current structure of the stormwater fees in the region do not incentivize personal stormwater reduction, creation of low impact development, or even an understanding of stormwater. The creation of a stormwater utility is vital in maintaining and improving the Truckee River Watershed's stormwater infrastructure to have the maximum flood capacity and have the least impact on water quality.

The most effective way to accomplish this is to charge ratepayers by Equivalent Residential Units (ERUs). This fee system's credits/exemptions are often built into the ordinance, and can be used to provide incentives for certain practices or relief from utility fees to certain types of land uses. Credits/exemptions are some of the most effective ways to get the public interested and aware of stormwater. Credits should be clearly described and can include installation of approved best management practices (BMPs) such as rain-spout disconnections or porous pavers, and educational programs for employees.

- *Work with the Washoe County Planning and Building Division, local real estate agents, Neighborhood Advisory Boards (NABs), Community Advisory Boards (CABs), and Home Owners Associations (HOAs) to keep them aware and informed of watershed education as new residents move to our watershed:* The Northern Nevada Regional Growth Forecast estimates that by 2019, the Washoe County area is forecasted to have an additional 42,395 residents for a total of 638,302. This is a jump of 7.1 percent during their five-year study period from 2015 through 2019, or 1.4 percent growth per year. This will put a strain on our water resources. OTR will coordinate with our partners to create a concise, easy-to-understand list of what new residents need to know about our watershed.
- *OTR and stakeholders will have a growing presence at every community event on the river:* Truckee River Watershed residents are more likely to care for the river if they see it, and watershed education messages are more likely to be remembered if participants are near the water. OTR and our stakeholders will attend community events (whether there is an environmental theme or not) to reach the widest audience. OTR will continue to identify these events and work with NDOW and other GREENevada organizations to provide watershed education. At these events, OTR will set up a table and have displays with pamphlets and giveaway material.

Downtown running events provide an opportunity to educate a different audience utilizing the river. There are several existing runs throughout the year that either start or end at a park along the river or a creek. Each year more events are included and OTR must stay informed. Some of the existing events include the Downtown River Run, Moms on the Run, and the Arch Rivals Superhero Run.



A One Truckee River table at the BANFF Film Festival in Reno. OTR wants to attend as many tabling events in the community as possible.

- *Community outreach at dog-related events to increase pet waste awareness:* Coordinated efforts to educate dog owners about the importance of picking up their dog waste can be improved by providing pet waste awareness information at dog events. OTR was at Hike for Hounds and Art Paws in 2017, but next year we will also have a presence at Jog with your Dog in Wingfield Park, Dogs of Rotary, and other dog walks/events in the region. OTR will work with the Truckee Meadows Stormwater Permit Coordinating Committee on delivering their stormwater messaging and handing out pet waste bag carabiners, and with Friends of Nevada Wilderness on coordinating trailhead pet waste education efforts.

This is vital because *Escherichia coli* (*E. coli*) from pet waste is the third biggest pollutant in some sections of the Truckee River Watershed. Washoe County Regional Animal Services estimates that there are 116,000 dogs in Washoe County. If on average every dog poops ½ lb. a day, that is 58,000 lbs. of poop every day in

our county. Nationally, it is estimated that 40% of dog owners do not pick up their dog waste. Conversely, the OTR Community Watershed Knowledge Survey's results indicated that 73% of respondents always pick up after their dog.

An example of a successful activity at a local dog event booth is to create an obstacle course that looks like a trail. The challenge is for the dog owner to stop with their dog to pick up poop (a pinecone) and carry it the rest of the obstacle course/the mock trail and throw it away at the end. This demonstrates how simple it is to leave no trace.

- *Ensure that every pet waste dispenser in the Truckee Meadows is full of bags and has pet waste information on the dispenser:* OTR will continue to work with TMPF and KTMB to fill the City of Reno pet waste dispensers. City of Sparks maintains its own pet waste dispensers.
- *Work with Waste Management on reducing the amount of dog waste that ends up in the landfill:* Many cities are exploring programs to divert bags of dog waste from landfills. Aimee Christ's 2013 Feasibility Study on Anaerobic Digestion and Other Alternatives for Dog Waste Management and Education in Thurston County, Washington researches various ways to achieve this.

OTR will also work to educate the Nevada Division of Environmental Protection and the Nevada Department of Health and Human Services working on dog waste education and awareness.

- *Reintroduce the OTR Pledge to protect the Truckee River:* OTR will coordinate a stewardship pledge for people to publicly commit to being good stewards to the river. By respecting, protecting, and preserving our water resources, we ensure future generations of Truckee Meadows residents have the same opportunities we have today.

By committing to the pledge, the community can join forces with OTR and our stakeholders in our efforts to make the Truckee River a sustainable river connected to the hearts and minds of the community. It is tangible, pragmatic, and practical, and allows Truckee Meadows Watershed residents to make a long-lasting and positive impact on the water resources around them.

From 2/22/2016 to 10/12/2016 225 people signed the pledge (*Attachment F*). The pledge was recently removed from the OTR website, but we will upload and update the pledge as well as provide a monetary way someone can pledge their support. The new updated OTR pledge will be available online and at all tabling events. See Appendix, *Attachment E*, for the entire Champion Guide.

- *Create a "Celebrate the Truckee River" event for the entire river corridor that could be expanded to a week- or month-long event:* OTR will coordinate with Renown Health and our other stakeholders to provide more river relevant activities, events, and entertainment. These efforts are to allow people to stay healthy and form their own connection with the river resource. May 2018 will be the first annual May is One Truckee River Month. This is in cooperation with Renown Health to create a "Healthy Rivers, Healthy People" campaign. During the month of May, we will increase the number of bird and plant walks/hikes, historic walks, bike and bus tours, and more activities available for the community.
- *Work to increase family river involvement with SNJ Community Watershed Science Nights:* In the past, SNJ has had success running Family Watershed Nights in the Carson River Watershed and OTR will coordinate with SNJ to implement this on the Truckee River. Activities that were included in past watershed events include: watershed models, groundwater models, watershed mapping, storm drain models, and nonpoint source pollution models.

- *Increase watershed education with “Take Care” campaign signage:* Spread the “Take Care” campaign throughout the river corridor. The campaign aims to promote a culture of environmental stewardship, using one voice to inspire people to take care of the Truckee River. This campaign was used at Tahoe and is a series of small reminders that poke fun at the mistakes we all make when we’re not paying attention. The hope is that we will inspire a culture of caretaking across residents and visitors, old and young.



- *Create a guided tour for general members of the public to navigate the entire river corridor:* OTR wants to create a public bus tour, similar to the Carson City Subconservancy District Carson River Watershed Tour and the Truckee River Field Study Course (bus tour) hosted by the Nevada Water Resources Association. The current tour on the Truckee River is directed towards Nevada engineers and architects. OTR will work with our partners on a proposed itinerary as well as sponsors for a community-focused Truckee River Tour.
- *Have a constant watershed education presence on the river with a Junior River Rangers program:* The program will ensure the community feels they are part of OTR. Students will become passionate, inspired and motivated, active members of our watershed efforts. The program will involve lessons ranging from the history of the Truckee River and where it comes from to interactive questions about what the rangers would like the river to become. It will allow the students/volunteers to learn and educate others about what’s in their own backyard.

2017 was the first year OTR worked with Rivers for Change to bring a Source to Sea educational river trip to the Truckee. The relationships Rivers for Change established with the school districts when giving presentations and choosing middle school ambassadors will continue. This is an ideal set of students to introduce the Junior River Ranger Program to.

This position would serve as a community educator along the Truckee River. Similar to the South Yuba River Ambassadors Program, the Junior River Ranger Program would use a friendly, non-confrontational approach to promote ethical, responsible, non-polluting use of the river by educating the public about the polluting impacts of trash and dog waste, the dangers of broken glass, and the catastrophic potential of wildfire. Currently, nationwide, Junior River Ranger programs are associated with National Park Service or other federal land agencies. Eventually the Junior River Rangers Program will augment the duties of the paid River Ranger position.

- *Work with the local jurisdictions to implement some type of “River Ranger” program for the entire urban river corridor section.* The River Ranger position could be developed through a variety of means:
  1. Once sustainable funding is established throughout the river corridor, a Memorandum of Understanding (MOU) between Reno, Sparks and Washoe County to fund a River Ranger position that patrols the river and crosses jurisdictional boundaries.
  2. Develop a public/private partnership between the local jurisdictions and nonprofit groups that could implement a River Ranger program (South Yuba River Citizens League). The South Yuba River Citizens League River Ambassadors are volunteers acting to motivate and educate the community to care for the South Yuba River.
  3. Work with the Washoe County Sheriff’s Department to create a River Ranger who serves as a deputized volunteer (like the City of Boise).
- *Expand the reach of watershed education through various media outlets:* The OTR Community Watershed Knowledge Survey’s results for “Where do you get most of your information about local water quality or water pollution?” will guide our education efforts. Recently we have seen the power of video in making content accessible and digestible. We will continue to collaborate with stakeholders on public service announcements (PSA). Messaging will cover topics ranging from the hazards of pet waste to the importance of wearing a life jacket. Other agencies effectively using video to get their messages across to the public include TMWA, and NDOT’s stormwater messages.



OTR AmeriCorps member Meg Parker is the spokesperson for an OTR public service announcement about stormwater drains.

OTR will also work with the Truckee Meadows Stormwater Permit Coordinating Committee to develop seasonal messaging for radio shows about pollutants and pet waste. Stations such as KKOH and Wilks Radio have a positive track record of working with environmental organizations and we hope to expand their messaging. NDOW's Nevada Wild podcast delves into relevant water topics and OTR will continue to work with them to get our messaging out. OTR will continue to foster a relationship with the RGJ and release seasonal messaging through their online and print outlets. OTR will work with TMWA to provide watershed education through bill inserts and/or newsletters.

- *Create a clearinghouse for all watershed-related education, volunteer, and service learning opportunities:* The OTR website will house public watershed education, volunteer, and service learning opportunities. Examples include KTMB's Truckee River cleanup; the Truckee Meadows Stormwater Permit Coordinating Committee storm drain stenciling effort; Truckee River Watershed Council water quality testing events; TNC's McCarran Ranch volunteer days; becoming an NDOW volunteer for fish stocking; fish sampling; angler education; and more.
- *Engage the Truckee River fishing community:* There are several fishing groups throughout the watershed that OTR will coordinate with and supply watershed education. NDOW has Free Fishing days at the Sparks Marina. Cabela's has various programs to engage kids and adults and teach them about fly-fishing. The Reno Fly Shop, Reno Fly Fishing Outfitters, Arlo's Fly Fishing Service, Gilligan's Guide Service and more all reach a demographic that OTR could do outreach to.
- *Expand and provide trainings for landscaping companies and the general public to ensure they are aware of the correct amount and frequency of fertilizer they should apply:* OTR will coordinate with the UNR Cooperative Extension's Grow Your Own, Nevada! Program regarding water quality information. Over-fertilizing lawns is a major contributor to phosphorus and nitrogen pollution in the Truckee River. OTR will work with the Truckee Meadows Stormwater Permit Coordinating Committee on getting their "urban slobber" message out through various media outlets. OTR will coordinate with the Nevada Landscape Association in educating about non-point source pollution.
- *Work with the Truckee Meadows Stormwater Permit Committee to develop specific messaging on storm drains:* Where does the water go? Storm drains carry water away from streets, parking lots and lawns into the nearest river, creek, or lake. Storm drains are different than the drains in a house. The ones in your house (the sink, toilet, and shower) all lead to pipes which lead to huge cleaning facilities at TMWRF (Truckee Meadows Water Reclamation Facility) where water is cleaned before it is put back in the Truckee River. When it rains, all the water from your rooftops, roads and yards pick up litter, dirt, oil from leaky cars and the stormwater carries this right into the storm drain and right into the river.

What can you do? Pick up your grass clippings, pick up after your dog waste, and put your garbage in the trash/recycle bin.



Stencils can be found around Reno, warning people to not dump, and that the storm drains drain to the Truckee River.

- *Create a car wash campaign to advertise certified car washes and promote keeping water out of storm drains:* In line with understanding the connectedness of storm drains, there are several messages OTR can emphasize to the public. The car wash campaign will work with local certified car washes that recycle their water. OTR can highlight the benefits of using a certified car wash and explaining that if you do need to hand wash your car, wash it on the grass or an impervious surface. OTR has worked with The Wave car wash to create our first PSA. Check out all our PSAs at [onetruckeeriver.org](http://onetruckeeriver.org).
- *Implement free drop-off days and sites for household hazardous waste and work with Waste Management on a Household Hazardous Pick-Up Program:* Educate the public on the importance of properly disposing household hazardous waste. Household hazardous waste routinely enters our storm drains and negatively affects the water quality of the Truckee River. OTR will coordinate with KTMB to establish free drop off days and sites for household hazardous waste. Also, OTR will help KTMB distribute its bilingual recycling guide that has household hazardous waste recycling information.
- *Promote Prescription Drug Roundups to keep medicine out of the water system:* Don't flush your old medicine down the toilet! There is a currently a Prescription Drug Roundup hosted by Join Together Northern Nevada. The Prescription Drug Roundup, held each spring and fall, is a safe place to dispose of expired, unwanted prescription drugs. OTR will help spread the word for this event with TMWA. A U.S. Geological Survey study shows that 80% of U.S. streams contain small amounts of human medicines. Wastewater treatment plants cannot remove all traces of these medicines from water that is released into the Truckee River.
- *Develop strong relationships with Spanish media outlets, including TV, radio, newspapers and magazines to engage the Spanish-speaking community:* According to the U.S. Census Bureau, over 24% percent of Washoe County identifies as Hispanic. The Hispanic population utilizes the river resources and it is vital that OTR shares the proper messaging with them.
- *Work with OTR partners on a succinct, unified message that demonstrates the need for watershed protection:* The watershed needs a unified, powerful, focused message between agencies and nonprofits that demonstrates the need to maintain a pristine Truckee River. The succinct message will emphasize our connection to the river and educate the public that what they do affects the water quality of the Truckee River. OTR will continue to work with our stakeholders and the community to develop this message.
- *Collaborate with upper Truckee River Watershed stakeholders on education in that region of the watershed:* The OTR Management Plan is organized into three geographically defined phases. Phase one focuses on the heavily used section of the Truckee River corridor in the urban portion of Reno and Sparks, stretching from West McCarran Boulevard to the Truckee Meadows Water Reclamation Facility near Vista Boulevard. Phase two extends planning to Pyramid Lake and phase three extends west to the state line.

This education plan identifies some opportunities in the upper watershed, but there are numerous opportunities for education and collaboration once phase three of the plan is implemented. For example, The Nature Conservancy (TNC) uses a Resource Investment Optimization System (RIOS) for upper watershed management. When opportunities arise to educate the public on source water protection and the importance of fire mitigation and restoration projects, OTR will coordinate with TNC on this effort. The Truckee River Watershed Council (TRWC) has several projects in the upper watershed area and OTR will continue to engage with them and coordinate on projects where possible. The Incline Village General Improvement District (IVGID) reaches over 100,000 people with their outreach programs. OTR will work with the district to expand student field lessons and outreach at special events.

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## **Summary**

This plan details the existing educational curriculum and programs that have a direct or indirect link to the Truckee River Watershed, as well as how OTR will coordinate efforts, expand current watershed opportunities, and fill in the gaps to ensure that every citizen is exposed to watershed education.

OTR will continue to coordinate with the agencies currently performing Truckee River Watershed education to leverage limited resources and provide networking opportunities; leverage funds across agencies; reach out to different communities (Spanish-language, Asian, etc.); and find overlap between organizations.

## **Appendix**

- 6.1 Attachment A OTR Community Watershed Knowledge Survey Executive Summary
- 6.2 Attachment B Teacher Resource Guide
- 6.3 Attachment C Schools in the Truckee River Hydrobasin
- 6.4 Attachment D Nonpoint Education for Municipal Officials (NEMO) handout example
- 6.5 Attachment E OTR Pledge: Champion Guide
- 6.6 Attachment F OTR 2016 Pledge
- 6.7 Attachment G NGSS Matrices by Topics and Core Ideas



# Attachment A

## One Truckee River Community Watershed Knowledge Survey

### Executive Summary

From Section 1.0 of UCED Technical Report:

#### 1.1 Summary of Question

1: Do people that spend time by the river have more insight or knowledge about the river?

There was no statistical improvement in the understanding of the term nonpoint source pollution as visitation or direct usage of the Truckee River increased. However, there was general improvement in the understanding of where the survey respondent's tap water comes from, where water goes when it is collected by gutters and storm drains, and individual awareness of storm drain stencils in the respondent's community or neighborhood as visitation and direct usage of the Truckee River improved from no use to multiple or daily use of the Truckee River.

#### 1.2 Summary of Question

2: Is there a correlation between length of residency in the area and their knowledge level about the river?

In general, there was no positive correlation between the survey respondent's length of residency or their understanding of where their tap water comes from and where water collected by gutters and storm drains eventually goes. However, regardless of length of residency, survey respondents demonstrated a generally good understanding that between 90 percent and 100 percent of their tap water comes from the Truckee River and an even stronger understanding that water collected in gutters and storm drains eventually drains into the Truckee River.

#### 1.3 Summary of Question

3: How does owning a home compared to renting a home affect cultural practices?

In regards to the frequency in which survey respondents admitted to picking up litter, the frequency in which survey respondents admitted to picking up after their pet when outdoors, the frequency in which survey respondents admitted to washing their car, and whether or not the survey respondent washes their car at a car wash or at home, there was no statistically significant difference in behavior or cultural practices between survey respondents that owned their own home or rented their or home. In regards to the frequency of how often survey respondents admitted to recycling and in regards to the frequency in which survey respondents admitted to disposing of hazardous materials, such as oil, antifreeze, and batteries, at proper collection sites, survey respondents that rented their own home were statistically significantly more likely to engage in these types of behaviors or cultural practices than survey respondents that owned their own home. In regards to the possibility of owning a lawn, the possibility of using fertilizer to fertilize their lawn or garden, and the frequency of how often survey respondents admitted to using fertilizer on their lawn or garden, survey respondents that rented their own homes were statistically significantly more likely to own a lawn, use fertilizer, and use fertilizer more often than survey respondents that owned their own home.

#### 1.4 Summary of Question

4: Does being an owner or a renter affect where residents get their information?

In general, there was only minor statistical variance in regards to how survey respondents get their information between survey respondents that own their own home and survey respondents that rent their own home. Regardless of whether or not the survey respondent indicated that they owned their own home or rented their own home, the most popular sources of information about local water quality or water pollution included the Reno Gazette-Journal, the water district, agency, company or department, the Internet, social media, and television news.

### 1.5 Summary of Question

5: Tie the results of the demographic data collected from survey respondents to the results of the survey respondent's cultural practices as collected from survey respondents.

University Center for Economic Development faculty and staff performed a number of individual factor analyses and multivariate regression analyses between the demographic questions (Question 1 through Question 10) in the 2017 One Truckee River Community Watershed Knowledge Survey and the various behavioral and cultural practices questions (Question 27 through Question 42). The analyses performed by University Center for Economic Development faculty and staff were designed to test the type (positive or negative) and strength of statistical relationship between the various demographic questions (treated as the independent variable) and the various behavioral and cultural practices questions (treated as the dependent variable).

Upon completing the factor analyses and multivariate regression analyses, University Center for Economic Development faculty and staff could find no statistically significant relationship between any of the various demographic questions and the various behavioral and cultural practices questions. Using basic descriptive statistical analysis techniques, University Center for Economic Development faculty and staff were able to develop a series of ten general conclusions and observations regarding the results of the demographic questions (Question 1 through Question 10) and a series of 16 general conclusions and observations regarding the results of the behavioral and cultural practices questions (Question 27 through Question 42). These general conclusions and observations are summarized here.

#### 1.5.1 Summary Statistical Analysis of the Demographic Questions (Question 1 through Question 10)

The ten general conclusions and observations for the demographic questions are:

- First, a survey respondent's geographic location, determined by zip code, did not predict any type of particular pattern about the respondent's various behavioral and cultural practices answers.
- Second, a significant number of survey respondents had generally lived in the Truckee Meadows area for a significant number of years.
- Third, a majority of the survey respondents to the 2017 One Truckee River Community Watershed Knowledge Survey were self-identified owners of their own home.
- Fourth, a majority of the survey respondents indicated that they lived more than one mile from the Truckee River.
- Fifth, a significant number of the survey respondents indicated that they lived more than one mile from a tributary that flows into the Truckee River.

- Sixth, in general, survey respondents who answered Question 6 of the 2017 One Truckee River Community Survey were relatively young.
- Seventh, a significant majority of survey respondents identified themselves as Caucasian or White.
- Eighth, a majority of survey respondents that answered the survey and provided a valid answer to Question 8 identified as female.
- Ninth, in general, survey respondents who answered Question 9 identified as a college graduate.
- Tenth, in general, respondents who provided a valid answer for Question 10 had relatively high total annual household incomes.

#### 1.5.2 Summary Statistical Analysis of the Behavioral and Cultural Practices Questions (Question 27 through Question 42)

The 16 general conclusions and observations for the behavioral and cultural practices questions are:

- First, when it comes to picking up litter, survey respondents generally indicated that they do pick up litter, either sometimes, more often than not, or always.
- Second, a majority of survey respondents indicated that they always recycle.
- Third, a majority of survey respondents who provided a valid answer for Question 29 indicated that they always dispose of hazardous materials, such as oil, antifreeze, or batteries, at a proper collection site.
- Fourth, if the survey respondent indicated that they had a pet, a significant majority of survey respondents who provided a valid answer to Question 30 indicated that they always pick up after their pet when outdoors.
- Fifth, a majority of survey respondents indicated that they generally wash their car between once a month, every other month, and two to three times a year.
- Sixth, for those survey respondents that indicated that they do wash their car, a significant majority of the respondents that provided a valid answer for Question 32 indicated that they wash their car at a car wash.
- Seventh, a significant majority of survey respondents indicated that they did have a lawn.
- Eighth, a majority of survey respondents that indicated having a lawn further indicated that they do use fertilizer on their lawn.
- Ninth, a significant number of survey respondents indicated that they only fertilize their lawn or garden once a season if they do have a lawn and if they use fertilizer on their lawn.
- Tenth, a majority of survey respondents indicated that they already wash their car at a car wash instead of washing their car at home.
- Eleventh, a majority of survey respondents indicated that they already promptly pick up and dispose of their pet's waste.
- Twelfth, a majority of survey respondents indicated that they are willing to have their septic tank serviced every three to five years. One Truckee River Community Watershed Knowledge Survey Page 6 of 68 August 2017
- Thirteenth, a majority of survey respondents indicated that they already sweep excess fertilizer and grass clippings from pavement onto their lawn or that they throw the excess fertilizer and grass clippings into the garbage or compost.
- Fourteenth, a majority of survey respondents indicated that they already have chosen to landscape their yard with low-water use plants.
- Fifteenth, a majority of survey respondents indicated that they already have chosen to water their lawn less often.

- Sixteenth, a majority of survey respondents indicated that they would be willing to direct rain-gutter runoff away from paved areas and into their lawn.

#### 1.6 Summary of Question

6: Compare people spending a lot of time by the river with their level of stewardship.

Of the 16 possible activity-related answers that survey respondents could select from for Question 45, Walking/Running, Enjoying the Beauty, Festivals/Recreational Events, and Enjoying the Solitude were the most popular activities selected by survey respondents.

#### 1.7 Summary of Question

7: Categorize the information for all 'open ended/write-in' questions and summarize the findings.

Question 20 of the 2017 One Truckee River Community Watershed Knowledge Survey asked survey respondents to indicate what, in their opinion, are the biggest challenges facing the Truckee River Watershed today. Survey respondents generally agreed that pollution, water (generally quality), the river (with answers ranging from accessibility and ease of use), and ongoing drought and potential future drought conditions were the four most common challenges facing the Truckee River Watershed today as identified by survey respondents.

Question 21 of the 2017 One Truckee River Community Watershed Knowledge Survey asked survey respondents to indicate where they thought their tap water comes from. Survey respondents generally agreed that their tap water comes from the Truckee River, other sources of potable water, and the Truckee Meadows Water Authority.

If survey respondents answered 'no' to Question 46, 'Do you feel safe while spending time along the Truckee River?', the survey respondent was encouraged to write-in a reason as to why they did not feel safe while spending time along the Truckee River. Survey respondents generally agreed that the immediate area's homeless population, the general condition and area around the Truckee River within the urban environments of the City of Reno and the City of Sparks, general feelings of being unsafe while being near the Truckee River, and the various characteristics of other people who frequent the Truckee River within the urban environments of the of the City of One Truckee River Community Watershed Knowledge Survey Page 7 of 68 August 2017 Reno and the City of Sparks were the most common contributing factors as to why some survey respondents answered 'no' to Question 46.

#### 1.8 Summary of Question

8: Are the responses provided by survey respondents for the demographic questions statistically significant?

Except for percentage of total population identified as female and percentage of total population with a Bachelor's degree or higher, the results of the 2017 One Truckee River Community Watershed Survey can be considered representative of the population living in each of the 31 valid Nevada-based zip codes. The results of the 2017 One Truckee River Community Watershed Survey, however, cannot be considered representative of either the female population or the population with a Bachelor's degree or higher and living within each of the 31 valid Nevada-based zip codes identified in the survey.

## Attachment B

### One Truckee River

# Educator Resource Guide



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**One Truckee River works to ensure a healthy, thriving, sustainable river connected to the hearts and minds of its community.**

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We all live in the Truckee River Watershed. One Truckee River wants to create an aware and engaged community that protects and cares for the Truckee River – this starts with your students! This Educator Resource Guide highlights outside organizations and opportunities to get your students familiarized with their home, the Truckee River Watershed. See below for an outline of education programs specific to our watershed. For a more detailed plan and to see how Truckee River Watershed education fits into every grade's NGSS standards, please visit [www.onetruckeeriver.org](http://www.onetruckeeriver.org) and see the One Truckee River Watershed Education Plan.

**Core Learning Outcomes:** Have your students identify where they live in the watershed and understand that we are all connected (Lake Tahoe, Truckee River, Pyramid Lake, several creeks and ditches all make up the Truckee River Watershed). Why does our connectedness matter? Regardless of where you live, stormwater (litter, dog waste, lawn pollutants, and more) enters storm drains and then the river. The Truckee River is our lifeline (80% of our drinking water comes from it. Students should understand the multiple water user issues and what they can do to keep it clean). Have the students pledge to be a Truckee River steward.

#### **Boys & Girls Club**

[www.bgctm.org](http://www.bgctm.org)

Several after school and break programming opportunities centered around and about the Truckee River. (Ages: 0-18)

#### **Bureau of Land Management (BLM)**

[www.handsontheland.org/teachers/data/Wetlands\\_Field\\_Activity\\_Stations\\_Guide\\_HotL.pdf](http://www.handsontheland.org/teachers/data/Wetlands_Field_Activity_Stations_Guide_HotL.pdf)

85% of Nevada is in public ownership. Guest speakers can explain the benefits of public lands on water resources. [Downloadable] Wetlands and Riparian Habitat "Hands on the Land" curriculum for qualitative and quantitative field labs (Grades: 6-12)

#### **Desert Research Institute: ScienceAlive (DRI)**

[www.sciencealive.dri.edu](http://www.sciencealive.dri.edu)

Inquiry based STEM curriculum through Green Boxes (reserve a Green Box today that focuses on the Truckee's unique trait of being a terminal watershed), teacher trainings, speakers, and field trips. (Grades: pre-K-12)

#### **Envirolution: Project ReCharge**

[www.envirolution.org/project-recharge-curriculum-info/](http://www.envirolution.org/project-recharge-curriculum-info/)

Empowers students to drive the growth of a sustainable economy with [downloadable] curriculum (topics include water efficiency and usage), career development, school break sustainability tours. (Grades: 7-12)

#### **Great Basin Institute – Galena (GBI)**

[www.galenacreekvisitorcenter.org/education-programs.html](http://www.galenacreekvisitorcenter.org/education-programs.html)

Take your class to the Galena Creek Visitor Center. GBI enhances student connection to the environment through field studies for classes, and school break day and residential field camps. (Grades: K-12)

#### **Great Basin Outdoor School (GBOS)**

[www.greatbasin-os.org/at-a-glance](http://www.greatbasin-os.org/at-a-glance)

Day field trips and multi-day overnight ecology camps (during breaks) on Lake Tahoe and other local sites. Students learn with hands-on standards-based activities, and conservation projects. Project WET teacher trainings are available. (Ages: 6-12)

#### **Keep Truckee Meadows Beautiful (KTMB)**

<https://www.ktmb.org/warriorsyoutheducation/>

Watershed Warriors presentation and curriculum introduces students to the Truckee River Watershed and opportunities for your classroom to "Adopt-A-River." (Grades: K-12)

#### **Lynell Garfield - Lorelai the Mayfly**

[www.thesecretlifeofstreams.com/](http://www.thesecretlifeofstreams.com/)

The Secret Life of Streams is a children's story/field guide about the underwater life of a talking mayfly. Mayflies are indicators of aquatic ecosystem health. Lorelai is available for school assemblies, class presentations, and STEM Trainings. (Grades: K-5)

#### **Nevada Department of Wildlife (NDOW)**

[www.ndow.org/Education/Wildlife\\_Ed/Education\\_Sites/](http://www.ndow.org/Education/Wildlife_Ed/Education_Sites/)

Connects people to Truckee River wildlife through the Oxbow Nature Study Area, Verdi Wildlife Education Center, and Trout in the Classroom program. Guest speakers can come to you or take your class on a field trip! (All ages)

#### **Pyramid Lake Paiute Tribe Museum and Visitors Center**

[www.pyramidlake.us/pyramid-lake-visitor-center.html](http://www.pyramidlake.us/pyramid-lake-visitor-center.html)

Multi-purpose museum open 5 days/week features the natural history of Pyramid Lake and why the Paiute people hold it in high esteem. Coloring books available by contacting Pyramid Lake Environmental Department Water Quality Program (775) 574-0101. (All ages)

#### **Sierra Nevada Journeys (SNJ)**

[www.sierranevadajourneys.org/](http://www.sierranevadajourneys.org/)

Delivers outdoor, science-based education programs (Classrooms Unleashed, Overnight Outdoor Learning, Parent Engagement, Teacher Professional Development, summer camp) to develop critical thinking skills and inspire natural resource stewardship. (Grades: K-6)

### **Terry Lee Wells Nevada Discovery Museum**

[www.nvdm.org/exhibitions-and-events/permanent-exhibitions/truckee-connects](http://www.nvdm.org/exhibitions-and-events/permanent-exhibitions/truckee-connects)

Our community science center provides field trips, transportation scholarships, and temporary and permanent Truckee River exhibits contribute to an understanding of clouds (the water cycle) and multiple water users in our watershed. (All ages)

### **The Nature Conservancy: McCarran Ranch Preserve (TNC)**

[www.nature.org/ourinitiatives/regions/northamerica/unitedstates/nevada/placesweprotect/mccarran-ranch-preserve.xml](http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/nevada/placesweprotect/mccarran-ranch-preserve.xml)

Outdoor education destination. Truckee River Environmental Education Program guides 4th grade students through watershed activities (USFWS, BLM, and NDOW partnership). (All ages can visit the preserve)

### **Truckee Meadows Parks Foundation (TMPF)**

[www.tmparksfoundation.org/programs](http://www.tmparksfoundation.org/programs)

Park-based programs (Student Stewards Program, Junior Naturalist Program, Mini Bio Blitz, spring and summer camp) raise awareness of vital public spaces. Several of these parks

.....  
Citizen Science opportunities provide your students ways they can each help protect our environmental resources. Citizen science uses beloved technology to get the public involved in science. Below is a list of citizen science opportunities in the region.

### **Community Collaborative Rain, Hail, and Snow Network (CoCoRaHS)**

Volunteers of all ages work together to measure and map precipitation (rain, hail and snow) using low-cost measurement tools, training and education, and an interactive website. CoCoRaHS provides quality data for natural resource, education and research applications. [www.cocorahs.org/Application.aspx](http://www.cocorahs.org/Application.aspx)

### **Desert Research Institute: Stories in the Snow (DRI)**

Students engage in real data collection and research throughout the Lake Tahoe/Truckee Basin. Students can tell the story of a snowflake from just a picture. [www.dri.edu/education-and-outreach/stem-stream-at-dri/2017-01-05-18-54-14/stories-in-the-snow](http://www.dri.edu/education-and-outreach/stem-stream-at-dri/2017-01-05-18-54-14/stories-in-the-snow)

### **iSeeChange**

Connects students with national media & scientists to understand how weather and climate affect their daily lives. [www.iseechange.org/about](http://www.iseechange.org/about)

### **Tahoe Environmental Research Center (TERC)**

TERC has several citizen science projects based in Lake Tahoe (the Truckee River is the ONLY river that flows out of Tahoe). The "Citizen Science LakeTahoe" app allows students to be involved in the source of their drinking water. [www.terc.org](http://www.terc.org)

Additional tools to increase watershed education are available to print at [www.onetruckeeriver.org/education/](http://www.onetruckeeriver.org/education/). Tools include a watershed map to display in your classroom, macroinvertebrate, plant, and wildlife identification guides specific to the Truckee River, and a searchable map with the distance from your classroom to the nearest waterbody so students can be outside learning!

Don't forget to celebrate our river, May is One Truckee River Month. One Truckee River will have many student contests and watershed education opportunities with our stakeholders. Make sure to stay in the loop!

are along the Truckee River and programs include several watershed lessons. (Grades: K-8)

### **Truckee Meadows Water Authority (TMWA)**

[www.tmwaacademy.com/teachers/lessons/index.shtml](http://www.tmwaacademy.com/teachers/lessons/index.shtml)

TMWA Academy short animated videos and downloadable curricula, presentations and speakers are available to cover a variety of topics: smart water planning, responsible water use, water supply, our water system, and water quality. (Ages all)

### **Urban Roots**

[www.urgc.org/lesson-plans](http://www.urgc.org/lesson-plans)

Dedicated to growing healthy minds, bodies, and communities through education and service. They have camps, farm school, garden programs for schools, and downloadable curricula that address the watershed and water use on the Truckee. (All ages)

### **U.S. Fish and Wildlife Service (USFWS)**

[www.fws.gov/lahontannfhc/outreach.html](http://www.fws.gov/lahontannfhc/outreach.html)

Tour the Lahontan National Fish Hatchery (open all year) and Marble Bluff Fish Passage and Research Station (open during spawning season, March-June), and create an outdoor classroom with the School Yard Habitat program. (All ages)

[citizensciencetahoe.org/](http://citizensciencetahoe.org/)

### **Truckee River Guide**

Interactive field guide and participatory mapping project to help local people learn about the species that live in and along the Truckee River; and to create a community-produced public record of wildlife and plant distribution along the Truckee River as it exists today. [www.truckeeriverguide.org](http://www.truckeeriverguide.org)

### **Truckee River Snapshot Day**

Annual picture of one moment in time of our watershed. Sign your class up to gain hands-on experience (perform a stream walk, collect field data, grab samples and take photos) and interact with water resource professionals. Sites are assigned to a sampling site near your school and buses can be provided. Data collected may be used for restoration projects and the to protect our watershed from further degradation. [www.tahoetruckeesnapshotday.org](http://www.tahoetruckeesnapshotday.org)

### **Truckee River Watershed Council (TRWC)**

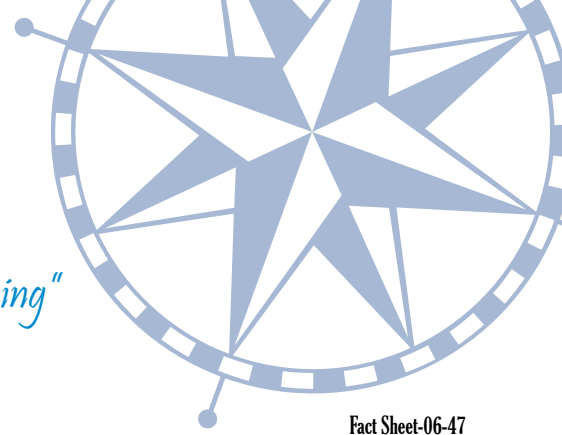
Aquatic Monitoring Lab gives you the skills and equipment you need to participate in important biology and chemistry monitoring through TRWC's Adopt-A-Stream program. [www.truckeeriverwc.org/get-involved/adopt-a-stream/](http://www.truckeeriverwc.org/get-involved/adopt-a-stream/)

## **Attachment C**

To see the map of Schools in the Truckee River Hydrobasin, please visit <http://onetruckeeriver.org/educator-guides/>



*"Protecting water quality through community planning"*



Nonpoint Education for Municipal Officials

Fact Sheet-06-47

POW: Protecting Our Water ACTION GUIDE SERIES  
ACTION GUIDE #6

# What to Do About Pet Wastes

*By Susan Donaldson, Water Quality Education Specialist, and Melody Hefner, NEMO Nevada Program Assistant, University of Nevada Cooperative Extension*

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et waste and hobby farm livestock waste contains nutrients and pathogens that can contaminate surface waters. If ingested, many pathogens found in animal wastes can harm humans. Organisms such as *Cryptosporidium*, *Giardia lamblia*, *Salmonella*, and *E. coli* can cause symptoms ranging from skin sores, to diarrhea and gas, to chest pain. Symptoms are more severe in the very young, the elderly and those individuals who are immunosuppressed. Some strains of *E. coli* can cause serious illnesses and fatalities. *Cryptosporidium* is also of particular concern because it is highly resistant to disinfection with chlorine.

*"The easiest way to avoid health and aesthetic problems is to clean up pet or livestock waste and dispose of it properly."*

Animal wastes can also contain parasites such as roundworms, pin worms and other parasitic nematodes. Infection by a few worms is usually not a problem, but severe

infections may cause fever, bronchitis, asthma, or vision problems.

Many people feel that the waste from their pet doesn't make much of a contribution to nonpoint

source pollution. When you combine all the waste from all the pets in the neighborhood, however, the impact becomes significant. The easiest way to avoid health and aesthetic problems is to clean up pet or livestock waste and dispose of it properly.



Photo by S. Donaldson

Many parks provide pet waste bags for your convenience. If bags are not available, be sure to bring several with you.

*Some strains of E. coli can cause serious illnesses and fatalities. Cryptosporidium is also of particular concern because it is highly resistant to disinfection with chlorine.*



University of Nevada Cooperative Extension



## Here's what you can do about pet wastes:

- ➔ When taking your pet for walks, remember to bring several plastic bags to clean up after her. Bag the waste and place it in the trash.
- ➔ Many parks and other recreational areas have doggie doo drop boxes or doggie loos disposal units installed in the ground. These units aid in prompt disposal of bags of pet waste, so you won't have to carry the filled bags for the remainder of the walk.
- ➔ Many parks are now designing special areas for dogs called poochie patches, which are sandy areas specifically designed for dogs to do their business.
- ➔ Avoid letting your pet do his business within 200 feet of a water body.
- ➔ Never dump pet waste directly in or near a ditch, catch basin, storm drain or water body.
- ➔ For dogs, cats, and other meat eaters, dispose of the waste in the garbage or down the toilet. Avoid adding kitty litter to the toilet, however. Wastes from meat eaters should not be placed in compost piles. The parasites, bacteria and/or viruses present in their feces are not readily destroyed during the composting process and can be passed on to humans.

*Don't let manure accumulate in fields or along ditches where the water will carry nutrients and pathogens downstream. Instead, construct a manure pile or donate the excess to gardeners.*

## Livestock manure also requires proper disposal. Follow these suggestions:

- ➔ For horses and other livestock, including sheep, goats, rabbits, poultry, beef, llamas, etc., compost the manure and add it to your garden, give it to gardeners, or take it to a recycling facility. The average horse produces about 45 pounds of waste a day. It is important to have a plan in mind to properly dispose of that amount of daily waste.
- ➔ Protect manure storage areas or compost piles from rain and surface runoff.
- ➔ Locate barns, corrals and other heavily used areas on high ground. Ensure drainage and surface runoff from these areas does not head for the nearest storm drain, creek, stream or other water body.
- ➔ Surround corrals, stables and barns with pasture or other vegetative cover to act as a natural filtering system.
- ➔ Don't allow animals to have direct uncontrolled access to creeks, streams or ditches. Fill troughs or construct water gaps to meet livestock water needs. This will aid in pollution control and reduce the degradation of the bed and banks of the water body.



Photos by S. Donaldson

## For more information:

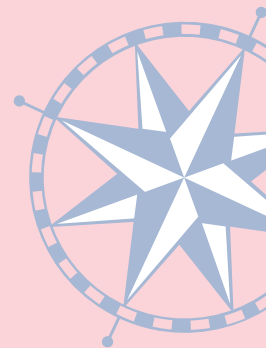
Contact the NEMO Project,  
c/o Susan Donaldson, Ph.D.  
University of Nevada  
Cooperative Extension  
5305 Mill St.  
Reno, NV 89502

Tel: (775) 784-4848  
Fax: (775) 784-4881

Internet:  
[www.unce.unr.edu/NEMO](http://www.unce.unr.edu/NEMO)

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## Champion Guide: What Can You Do?

### **(one) visit the river**

Embrace the river: Hike, bike, bird watch, kayak, walk, and more along the river corridor; find out where you live in the watershed

### **(two) take care of the river:**

Protect the river: Pick up litter and dog waste; don't dump paint or toxic materials in storm drains; conserve water

### **(three) love the river:**

Share your passion for the river: Bring a friend on a walk along the Truckee River; help that friend develop his or her own connection with the river; vote for the river

be river informed:  
[www.onetruckeeriver.org](http://www.onetruckeeriver.org)



One Truckee River



@onetruckeeriver



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## Attachment F

*I pledge to make a difference in my watershed, the Truckee River Watershed! We all live in a watershed; a watershed is an area of land that water flows across as it moves toward a common body of water (the Truckee River or Pyramid Lake). What you do matters. Making simple changes helps prevent water pollution and keeps the Truckee River healthy. Pledge to commit to protecting the Truckee River.*

Taking the pledge is simple:

I pledge to...

- Put only water in the storm drain. Did you know that everything enters a storm drain goes directly to local waters without treatment?
  - » Pick up my pet waste and throw it out in the trash or a toilet!
  - » Recycle toxic materials such as motor oil and paint, never dump them down drains or on the ground.
- Make water conservation a habit.
  - » Water use calculator – learn how much water you can save
  - » Fix leaks (EPA estimates the average household's leaks can account for more than 10,000 gallons of water wasted every year. Common types of leaks found in the home are worn toilet flappers, dripping faucets, and other leaking valves)
  - » Use water efficient landscaping
  - » Turn off the faucet while brushing teeth (it makes a difference)
- Embrace the river
  - » Set an example for healthy watershed by hiking and biking along the river corridor
  - » Find out where you live in the watershed
  - » Bring a friend on a walk along the river and encourage them to take the watershed pledge.

# NGSS Matrix Organized by Topics

		Life Science	Earth & Space Science	Physical Science	Engineering
Elementary School	<b>K</b>	K.Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment	K.Weather and Climate	K.Forces and Interactions: Pushes and Pulls	K-2.Engineering Design
	<b>1</b>	1.Structure and Function	1.Space Systems: Patterns and Cycles	1.Waves: Light and Sound	
	<b>2</b>	2.Interdependent Relationships in Ecosystems	2.Earth's Systems: Processes that Shape the Earth	2.Structure and Properties of Matter	3-5.Engineering Design
	<b>3</b>	3.Interdependent Relationships in Ecosystems 3.Inheritance and Variation of Traits: Life Cycles and Traits	3.Weather and Climate	3.Forces and Interactions	
	<b>4</b>	4.Structure and Function	4.Earth's Systems: Processes that Shape the Earth	4.Energy 4.Waves: Waves and Information	
	<b>5</b>	5.Matter and Energy in Organisms and Ecosystems	5.Earth's Systems 5.Space Systems: Stars and the Solar System	5.Structure and Properties of Matter	
Middle School		MS.Structure and Function MS.Matter and Energy in Organisms and Ecosystems MS.Interdependent Relationships in Ecosystems MS.Natural Selection and Adaptations MS.Growth, Development, and Reproduction of Organisms	MS.Space Systems MS.History of Earth MS.Earth's Systems MS.Weather and Climate MS.Human Impacts	MS.Structure and Properties of Matter MS.Chemical Reactions MS.Forces and Interactions MS.Energy MS.Waves and Electromagnetic Radiation	MS.Engineering Design
High School		HS.Structure and Function HS.Inheritance and Variation of Traits HS.Matter and Energy in Organisms and Ecosystems HS.Interdependent Relationships in Ecosystems HS.Natural Selection and Evolution	HS.Space Systems HS.History of Earth HS.Earth's Systems HS.Weather and Climate HS.Human Impacts	HS.Structure and Properties of Matter HS.Chemical Reactions HS.Forces and Interactions HS.Energy HS.Waves and Electromagnetic Radiation	HS.Engineering Design

This matrix was prepared by NSTA based on the release of the Next Generation Science Standards in April 2013

# NGSS Matrix Organized by Disciplinary Core Ideas

		Life Science	Earth & Space Science	Physical Science	Engineering
Elementary School	K	K-LS1 From Molecules to Organisms: Structures and Processes	K-ESS2 Earth's Systems K-ESS3 Earth and Human Activity	K-PS2 Motion and Stability: Forces and Interactions K-PS3 Energy	K-2-ETS1 Engineering Design
	1	1-LS1 From Molecules to Organisms: Structures and Processes 1-LS3 Heredity: Inheritance and Variation of Traits	1-ESS1 Earth's Place in the Universe	1-PS4 Waves and Their Applications in Technologies for Information Transfer	
	2	2-LS2 Ecosystems: Interactions, Energy, and Dynamics 2-LS4 Biological Evolution: Unity and Diversity	2-ESS1 Earth's Place in the Universe 2-ESS2 Earth's Systems	2-PS1 Matter and Its Interactions	
	3	3-LS1 From Molecules to Organisms: Structures and Processes 3-LS2 Ecosystems: Interactions, Energy, and Dynamics 3-LS3 Heredity: Inheritance and Variation of Traits 3-LS4 Biological Evolution: Unity and Diversity	3-ESS2 Earth's Systems 3-ESS3 Earth and Human Activity	3-PS2 Motion and Stability: Forces and Interactions	3-5-ETS1 Engineering Design
	4	4-LS1 From Molecules to Organisms: Structures and Processes	4-ESS1 Earth's Place in the Universe 4-ESS2 Earth's Systems 4-ESS3 Earth and Human Activity	4-PS3 Energy 4-PS4 Waves and Their Applications in Technologies for Information Transfer	
	5	5-LS1 From Molecules to Organisms: Structures and Processes 5-LS2 Ecosystems: Interactions, Energy, and Dynamics	5-ESS1 Earth's Place in the Universe 5-ESS2 Earth's Systems 5-ESS3 Earth and Human Activity	5-PS1 Matter and Its Interactions 5-PS2 Motion and Stability: Forces and Interactions 5-PS3 Energy	
Middle		MS-LS1 From Molecules to Organisms: Structures and Processes MS-LS2 Ecosystems: Interactions, Energy, and Dynamics MS-LS3 Heredity: Inheritance and Variation of Traits MS-LS4 Biological Evolution: Unity and Diversity	MS-ESS1 Earth's Place in the Universe MS-ESS2 Earth's Systems MS-ESS3 Earth and Human Activity	MS-PS1 Matter and Its Interactions MS-PS2 Motion and Stability: Forces and Interactions MS-PS3 Energy HS-PS4 Waves and Their Applications in Technologies for Information Transfer	MS-ETS1 Engineering Design
High School		HS-LS1 From Molecules to Organisms: Structures and Processes HS-LS2 Ecosystems: Interactions, Energy, and Dynamics HS-LS3 Heredity: Inheritance and Variation of Traits HS-LS4 Biological Evolution: Unity and Diversity	HS-ESS1 Earth's Place in the Universe HS-ESS2 Earth's Systems HS-ESS3 Earth and Human Activity	HS-PS1 Matter and Its Interactions HS-PS2 Motion and Stability: Forces and Interactions HS-PS3 Energy HS-PS4 Waves and Their Applications in Technologies for Information Transfer	HS-ETS1 Engineering Design