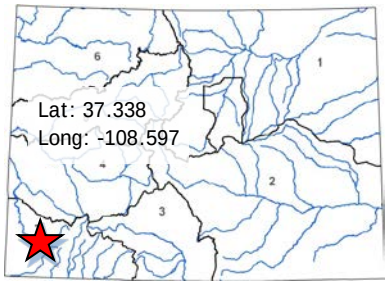
COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Phreatophytes
Montezuma County
July 2020 Board Meeting

Water Plan Grant Application

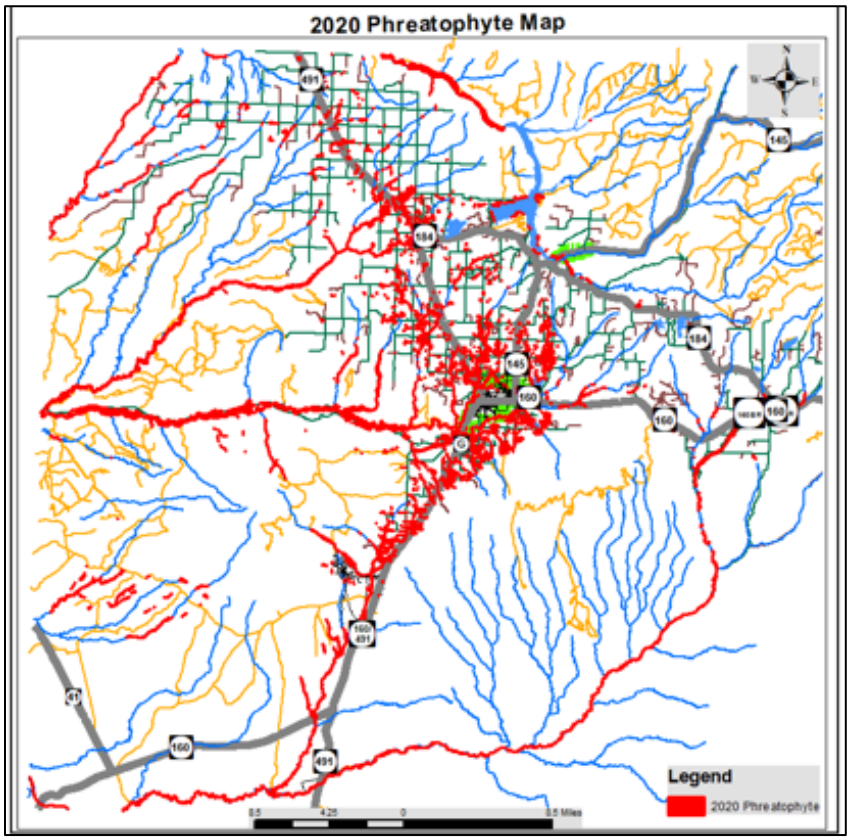


LOCATION	
County/Counties:	Montezuma
Drainage Basin:	San Juan

DETAILS	
Total Project Cost:	$588,100
Water Plan Grant Request:	$125,000
Recommended amount:	$62,500
Other CWCB Funding:	$24,000
Other Funding Amount:	$394,100
Applicant Match:	$45,000
Project Type(s): IPP	
Project Category(Categories): Environment and Recreation	
Measurable Result: 192 acre-ft/year of efficiency savings, 300 acres per year of restored habitat	

Montezuma County, located in Southwest Colorado, has a total area of 2,040 square miles, of which 11 are water. Much of the county is irrigated cropland. The Montezuma County Noxious Weed Department (MCNWD) has developed a map to prioritize phreatophyte removal, namely Russian olive and Salt cedar.

Using the 2020 phreatophyte map that the MCNWD created, a seasonal crew will treat Russian olives and Salt cedars with cut stump treatments. The 2020 map indicates 6,996 acres of Russian olive and 6,775 acres of Salt cedar. 1,696 landowners have been identified who have phreatophytes on one or multiple properties. Landowners that did not have phreatophytes removed in 2019 will be priorities for removal in 2020.



Informative postcards will be sent to the landowners on the project list to promote awareness of the impacts of phreatophytes and to build awareness of the program and removal options.

Properties that have been flagged by MCNWD to have high infestations of phreatophytes along waterways (natural and ditches) will be prioritized and if a landowner is reluctant to remove the phreatophytes from their properties MCNWD will work with them to come up with a solution.

Colorado Water Conservation Board

Water Plan Grant Application

Instructions

To receive funding for a Water Plan Grant, applicant must demonstrate how the project, activity, or process (collectively referred to as "project") funded by the CWCB will help meet the measurable objectives and critical actions in the Water Plan. Grant guidelines are available on the CWCB website.

If you have questions, please contact CWCB at (303) 866-3441 or email the following staff to assist you with applications in the following areas:

Water Storage Projects	Anna.Mauss@state.co.us
Conservation, Land Use Planning	Kevin.Reidy@state.co.us
Engagement & Innovation Activities	Ben.Wade@state.co.us
Agricultural Projects	Alexander.Funk@state.co.us
Environmental & Recreation Projects	Chris.Sturm@state.co.us

FINAL SUBMISSION: Submit all application materials in one email to *waterplan.grants@state.co.us* in the original file formats [Application (word); Statement of Work (word); Budget/Schedule (excel)]. Please do not combine documents. In the subject line, please include the funding category and name of the project.

Water Project Summary

Name of Applicant	**Montezuma County Noxious Weed Department**
Name of Water Project	**Phreatophyte Project**
CWP Grant Requested Amount 5 year project	$125,000
RCPP 5 year project Requested Amount	$250,000
CDA Request are yearly but 5 year request estimates:	$93,500
HPP Funds are yearly but 5 year request estimates:	$23,100 (Have secured $7,100 for 2020)
WSRF Funds 5 year request estimates:	$24,000 (Have been awarded $16,840 for 2020)
Landowners	$27,500
Applicant Funding Contribution	$45,000
Total Project Cost	$588,100

Applicant & Grantee Information
Name of Grantee(s) **Montezuma County**
Mailing Address **109 West Main Rm 260**
FEIN **84-6000-786**
Organization Contact **Shak Powers**
Position/Title **Montezuma County Administrator**
Email **spowers@co.montezuma.co.us**
Phone **970-565-0580**
Grant Management Contact **Bonnie Loving**
Position/Title **Montezuma County Noxious Weed Department Director**
Email **bloving@co.montezuma.co.us**
Phone**970-565-0580**
Name of Applicant (if different than grantee)
Mailing Address
Position/Title
Email
Phone

Description of Grantee/Applicant
Provide a brief description of the grantee's organization (100 words or less).
Montezuma County has a total area of 2,040 square miles (5,300 km^2), of which 2,030 square miles of land and 11 square miles is water. A large county, roughly 1/3 of its area is tribal land, 1/3 is federal land (administered by the National Park Service, the United States Forest Service and the Bureau of Land Management), and 1/3 private or state/county land. The county has the second largest reservoir in Colorado, McPhee Reservoir, many other large reservoirs, and hundreds of private lakes and ponds. Much of the county is irrigated cropland, and it produces fruit, large numbers of cattle and sheep, and beans. It is served by U.S. Highways 160 and 491 (formerly US 666), and by Cortez Municipal Airport.

Type of Eligible Entity (check one)	
X	**Public (Government):** Municipalities, enterprises, counties, and State of Colorado agencies. Federal agencies are encouraged to work with local entities. Federal agencies are eligible, but only if they can make a compelling case for why a local partner cannot be the grant recipient.
	Public (Districts): Authorities, Title 32/special districts (conservancy, conservation, and irrigation districts), and water activity enterprises.
	Private Incorporated: Mutual ditch companies, homeowners associations, corporations.
	Private Individuals, Partnerships, and Sole Proprietors: Private parties may be eligible for funding.
	Non-governmental organizations (NGO): Organization that is not part of the government and is non-profit in nature.
	Covered Entity: As defined in Section 37-60-126 Colorado Revised Statutes.

Type of Water Project (check all that apply)	
	Study
	Construction
X	Identified Projects and Processes (IPP)
	Other

Category of Water Project (check the primary category that applies and include relevant tasks)		
	Water Storage - Projects that facilitate the development of additional storage, artificial aquifer recharge, and dredging existing reservoirs to restore the reservoirs' full decreed capacity and Multi-beneficial projects and those projects identified in basin implementation plans to address the water supply and demand gap.. *Applicable Exhibit A Task(s):*	
	Conservation and Land Use Planning - Activities and projects that implement long-term strategies for conservation, land use, and drought planning. *Applicable Exhibit A Task(s):*	
	Engagement & Innovation - Activities and projects that support water education, outreach, and innovation efforts. Please fill out the Supplemental Application on the website. *Applicable Exhibit A Task(s):*	
	Agricultural - Projects that provide technical assistance and improve agricultural efficiency. *Applicable Exhibit A Task(s):*	
X	Environmental & Recreation - Projects that promote watershed health, environmental health, and recreation. *Applicable Exhibit A Task(s):*	
	Other	Explain:

Location of Water Project	
Please provide the general county and coordinates of the proposed project below in **decimal degrees**. The Applicant shall also provide, in Exhibit C, a site map if applicable.	
County/Counties	**Montezuma County**
Latitude	**37.33839 N**
Longitude	**-108.5968 E**

Water Project Overview
Please provide a summary of the proposed water project (200 words or less). Include a description of the project and what the CWP Grant funding will be used for specifically (e.g., studies, permitting process, construction). Provide a description of the water supply source to be utilized or the water body affected by the project, where applicable. Include details such as acres under irrigation, types of crops irrigated, number of residential and commercial taps, length of ditch improvements, length of pipe installed, and area of habitat improvements, where applicable. If this project addresses multiple purposes or spans multiple basins, please explain. The Applicant shall also provide, in Exhibit A, a detailed Statement of Work, Budget, Other Funding Sources/Amounts and Schedule.
The purpose of this project to control phreatophytes in an effort to conserve water and promote healthy ecosystems. Montezuma County Noxious Weed Department (MCNWD) will hire a two or three-person crew (funding dependent) seasonally, to do cut stump treatments on Salt cedars and Russian olives within Montezuma County, per request of individual landowners and land managers. MCNWD is requesting funding from the Colorado Water Board Conservation to assist in funding crewmember salary and to purchase herbicides. MCNWD has mapped 6,996 acres of Russian olive and 6,775 acres of Salt cedar (Tamarisk) on wetland/waterways within Montezuma County. Total infested acres of these two species comes to 9,371.9 (many areas mapped contain both species). Total miles infested on our major waterways and main canals comes to 221.51 miles. Types of crops being irrigated from our waterways range from grass / alfalfa hay fields, corn, sorghum, wheat, sunflowers, to small organic farms. Non-crop areas being irrigated are typically for ranches raising forage for cattle and other livestock. Estimated water loss from these phreatophytes in Montezuma County comes to 7,377 acre-feet of water each year.

Measurable Results		
To catalog measurable results achieved with the CWP Grant funds, please provide any of the following values as applicable:		
	New Storage Created (acre-feet)	
	New Annual Water Supplies Developed or Conserved (acre-feet), Consumptive or Nonconsumptive	
	Existing Storage Preserved or Enhanced (acre-feet)	
	Length of Stream Restored or Protected (linear feet)	
192	Efficiency Savings (indicate acre-feet/year OR dollars/year)	
300/year	Area of Restored or Preserved Habitat (acres)	
	Quantity of Water Shared through Alternative Transfer Mechanisms	
	Number of Coloradans Impacted by Incorporating Water-Saving Actions into Land Use Planning	
	Number of Coloradans Impacted by Engagement Activity	
	Other	Explain:

Water Project Justification

Provide a description of how this water project supports the goals of Colorado's Water Plan, the most recent Statewide Water Supply Initiative, and the applicable Roundtable Basin Implementation Plan and Education Action Plan. The Applicant is required to reference specific needs, goals, themes, or Identified Projects and Processes (IPPs), including citations (e.g. document, chapters, sections, or page numbers).

The proposed water project shall be evaluated based upon how well the proposal conforms to Colorado's Water Plan Framework for State of Colorado Support for a Water Project (CWP, Section 9.4, pp. 9-43 to 9-44;)

Colorado Water's Plan

Chapter 7 Highlights the importance of promoting watershed health to ensure Colorado's water future. Montezuma County Noxious Weed Department's project directly supports watershed health by improving water quality (reducing nitrogen level, reducing debris which decreases algae and increases O2), promotes diversity (Russian olives reduce diversity by out-competing native vegetation such as grass forbs and trees), promotes magnitude of water systems (by decreasing debris in return reducing clogging and increasing natural water flow), as well as decreases fire hazard (Russian olives have tremendous natural die-off each year which is a fire hazard, fires effect streambank stability and increase sediment into water).

The Colorado Water's Plan also promotes partnerships for improving watershed health. This project is promoting collaborative management within our entire community.

Lastly, the project supports Colorado Water's Plan by conserving water from non-native invasive species that will help our community during this severe drought.

Statewide Water Supply Initiative

With our growing population, the state needs to be pro-active with supply and demand. This relates to our project because we are reducing unnecessary water loss by invasive species in order to maintain that supply.

Roundtable Basin Implementation Plan

Montezuma County Noxious Weed Department's project fits within the Instream Flow Program because the project is essentially recovering imperiled species (by removing the invasive plants that are out-competing our native species such as non-native carp), enhancing environmental and recreational economic values (by promoting a pristine ecosystem that is in itself aesthetically pleasing), protecting healthy environments, and protecting and restoring critical watersheds. Russian olives and Salt cedars are negatively changing our waterways; they are pushing out native plant and animal species, promoting mosquito's populations, decreasing water quality, and are overall changing the ecosystems completely.

Related Studies

Please provide a list of any related studies, including if the water project is complementary to or assists in the implementation of other CWCB programs.

Russian olive Biology Identification Distribution Control by Robert Wilson and Mark Bernards Extension Weeds Specialists

Saltcedar and Russian olive Control Demonstration Act Science Assessment by the Us. Department of the Interior and U.S. Geological Survey.

Previous CWCB Grants, Loans or Other Funding

List all previous or current CWCB grants (including WSRF) awarded to both the Applicant and Grantee. Include: 1) Applicant name; 2) Water activity name; 3) Approving RT(s); 4) CWCB board meeting date; 5) Contract number or purchase order; 6) Percentage of other CWCB funding for your overall project.

Colorado Water Plan grant for 2019

1) Montezuma County Noxious Weed Department
2) Russian olive and Salt cedar Waterway Management
3) RT?
4) Meeting Date
5) POGGI,PDAA,202000002042
6) 34%

WSRF grant approved for 2020

1) Montezuma County Noxious Weed Department
2) Russian olive and Salt cedar Waterway Management
3) RT?
4) Meeting Date
5) POGGI, PDAA,202000002333
6) 16%

Taxpayer Bill of Rights

The Taxpayer Bill of Rights (TABOR) may limit the amount of grant money an entity can receive. Please describe any relevant TABOR issues that may affect your application.

N/A

Submittal Checklist	
X	I acknowledge the Grantee will be able to contract with CWCB using the Standard Contract.
Exhibit A	
X	Statement of Work(1)
X	Budget & Schedule(1)
	Engineer's statement of probable cost (projects over $100,000)
	Letters of Matching and/or Pending 3rd Party Commitments(1)
Exhibit C	
X	Map (if applicable)(1)
X	Photos/Drawings/Reports
X	Letters of Support (Optional)
	Certificate of Insurance (General, Auto, & Workers' Comp.) (2)
	Certificate of Good Standing with Colorado Secretary of State(2)
	W-9(2)
	Independent Contractor Form(2) (If applicant is individual, not company/organization)
Engagement & Innovation Grant Applicants ONLY	
	Engagement & Innovation Supplemental Application(1)

(1) Required with application.
(2) Required for contracting. While optional at the time of this application, submission can expedite contracting upon CWCB Board approval.

ENGAGEMENT & INNOVATION GRANT FUND SUPPLEMENTAL APPLICATION

Introduction & Purpose

Colorado's Water Plan calls for an outreach, education, public engagement, and innovation grant fund in Chapter 9.5.

The overall goal of the Engagement & Innovation Grant Fund is to enhance Colorado's water communication, outreach, education, and public engagement efforts; advance Colorado's water supply planning process; and support a statewide water innovation ecosystem.

The grant fund aims to engage the public to promote well-informed community discourse regarding balanced water solutions statewide. The grant fund aims to support water innovation in Colorado. The grant fund prioritizes measuring and evaluating the success of programs, projects, and initiatives. The grant fund prioritizes efforts designed using research, data, and best practices. The grant fund prioritizes a commitment to collaboration and community engagement. The grant fund will support local and statewide efforts.

The grant fund is divided into two tracks: engagement and innovation. The Engagement Track supports education, outreach, communication, and public participation efforts related to water. The Innovation Track supports efforts that advance the water innovation ecosystem in Colorado.

Application Questions

*The grant fund request is referred to as "project" in this application.

Overview (answer for both tracks)
In a few sentences, what is the overall goal of this project? How does it achieve the stated purpose of this grant fund (above)?
Over the next five years we hope to treat a total of 1,670 acres of phreatophytes (includes 170 acres treated in 2019). Estimated number of total trees treated by the end of 2024 is 112,055 (including the 12,055 treated in 2019). Estimated total water savings is projected to be 1,078 acre-feet (including the 118-acre feet in 2019. The water savings numbers include water saved from each previous year which ends up adding exponentially. For example 2019 118 acre feet were saved, in 2020 if 192 acre feet are saved total savings are 310 acre feet, in 2021 if 310 were saved total from previous years and another 192 was saved in 2021 the total will become 502 acre feet. We are also planning on releasing Tamarisk Beetles each year on pre-determined locations. Within the five-year period using the biological control we are hoping to have reduced 50% of the Saltcedar populations in Yellow Jacket Canyon, Trail Canyon, Navajo Wash, and McElmo Creek. We are hoping to begin establishment on all of the following waterways by 2024: Cow Canyon, Ruin Canyon, Cross Canyon, Dolores River, Goodman Canyon, Mancos River, Marble Wash, and Mariano Wash.
Who is/are the target audience(s)? How will you reach them? How will you involve the community?
Using the 2020 phreatophyte map MCNWD created we have identified 1,696 landowners who have phreatophytes on one or multiple properties. We have a list of landowners who we did not have time to treat phreatophytes on their property(s) in 2019, and we moved that list to 2020. We will be notifying landowners in those immediate areas about our project, and hopefully we will be able to treat multiple properties in the same immediate area at one time. We will use a similar approach as this as time progresses. Meaning if we have people scheduled in the future we will identify other phreatophyte populations in that immediate area and will notify those properties.

Overview (answer for both tracks)
Outside of this approach we will be sending out informative postcards to the landowners on our list to promote awareness to the impacts of phreatophytes and to make them aware of our project and how we can help. We have noticed a few different types of perspectives folks have on Russian olives and Salt cedars. First, you have the folks who would love to see management done on removing these species because they understand the negative impact they have on our land. They are eager to take care of the problem as long as there is an affordable option. Second, we have seen folks who are indifferent to the situation. They are not interested in investing money to managing these species, but they are not opposed to theme being managed. Third, you have the folks who remember when the U.S. Government was promoting landowners to plant both of these species, and now they are being told they need to remove them. These folks think it should be the government's responsibility to rectify the situation and manage these trees/shrubs. Lastly, you have the folks who believe these species benefit them and the land in some way and that they should remain there. Some of these folks are ranchers who like the trees for sheltering their cattle. In 2020 and future years we want to incorporate more incentives to landowners to manage the phreatophytes, these incentives will unfortunately cost the project more money. One-step we are going to experiment with in 2019 is offer a free day to some of the larger more problematic properties. Problematic meaning they have severe infestations that we want to see managed. We are hoping this free day will provide enough before and after contrast for the landowner to see what a difference it makes. The second stage might be offering multiple free days in an effort to get the work done and the phreatophytes removed. Our process will be determined by how busy our crew is and how much available funds we have. If our incoming phone calls slow down with properties wanting to utilize the program we will make time for some free days.
Describe how the project is collaborative or engages a diverse group of stakeholders. Who are the partners in the project? Do you have other funding partners or sources?
In 2019 we had many partners, we obtained a grant from the Colorado Department of Agriculture to help fund crew salary, we obtained a grant from Southwestern Water Conservation for funds to help with expenses, we obtained the Colorado Water Plan Grant to help fund crew salary, Montezuma County purchased a side by side for the crew and provided a vehicle and a shop for the crew as well, Montezuma County Noxious Weed Department committed administrative time to facilitating the project, and lastly the landowners paid $20/hour. In 2020, we have a grant from the Water Supply Reserve Fund to purchase an excavator mulcher attachment. It cost about $4,000 to rent the attachment alone, and another $4,000 to rent the excavator. By purchasing this attachment head we will save a lot of money in rental fees which will lower the price the landowners need to contribute. We have also received funds from HPP, Parks and Wildlife, to fund a two-person crew for the month of April to get the project going early. Typically, we don't get awarded grants until mid-April so we were not able to start the crew until May 1, 2019. In 2020, MCNWD applied for the Colorado Department of Agriculture Grant to help cover crew salary costs. We applied for the RCPP grant through the farm bill to fund the project for five years to help with crew salary funds. We will be actively looking for other funding opportunities for this project as time goes. We also want to start partnering with conservation districts and implementing a restoration aspect of the project to reintroduce desirable or native species back into the areas treated.

Overview (answer for both tracks)
Describe how you plan to measure and evaluate the success and impact of the project?
The two or three person crew will be mapping their treatments a well as taking photo points so we can monitor the site in the future. On the documentation, paperwork the crew is required to fill out has a section which will track how many trees were treated as well as their size. This is enable us to estimate a more accurate water savings. Every year after treatment was done the crew will revisit treatment areas to do a foliar treatment on any sprouts coming up. We will also do an evaluation on the treatment site on whether there needs to be noxious weed treatments of Russian knapweed or other noxious weed species, or whether the site needs to be re-seeded.
What research, evidence, and data support your project?
Russian olive Biology Identification Distribution Control by Robert Wilson and Mark Bernards Extension Weeds Specialists Saltcedar and Russian olive Control Demonstration Act Science Assessment by the Us. Department of the Interior and U.S. Geological Survey.
Describe potential short- and long-term challenges with this project.
We do not foresee any significant challenges. Our proposed project plan has solid framework and we are confident it will be successful.

Please fill out the applicable questions for either the Engagement Track or Innovation Track, unless your project contains elements in both tracks. If a question does not relate to your project, just leave it blank. Please answer each question that relates to your project. Please reference the relevant documents and use chapters and page numbers (Colorado's Water Plan, Basin Implementation Plan, PEPO Education Action Plan, etc.).

Engagement Track
Describe how the project achieves the education, outreach, and public engagement measurable objective set forth in Colorado's Water Plan to "significantly improve the level of public awareness and engagement regarding water issues statewide by 2020, as determined by water awareness surveys."
Water is a very scarce resource that we all need and therefore causes a lot of tension among farmers, ranchers, and landowners that rely on that water. It is very important that we all do our part in conserving water and being very efficient with our water use. Montezuma County is supporting our community by creating this project to assist our landowners and community by conserving our water and not letting invasive species displace what we could be using to grow our crops. If landowners were aware at how much water these species were using and how much water we could potentially be saving I'm sure we would see a shift in these Russian olive and Salt cedar populations. One way to achieve this is to do as much public outreach as we can to educate the public.

Montezuma County Noxious Weed Program will be writing articles to local newspapers about the project and the benefits of managing Russian olives. We are also directly reaching out to the 1,696 landowners who have these species on their properties, and providing education about their impacts on the land, and how we can effectively mitigate that.

Describe how the project achieves the other measurable objectives and critical goals and actions laid out in Colorado's Water Plan around the supply and demand gap; conservation; land use; agriculture; storage; watershed health, environment, and recreation; funding; and additional.

Supply and Demand gap: This purpose of this project is to reduce unnecessary water loss in result of the drought and our high demand of water.

Conservation and Land Use: This project is long term to reduce the amount of water uptake from Russian olive and Salt cedar in an effort to conserve what little water we have. The drought situation is what spurred this project into action. We must do what we can to help conserve water, and 4,800 acre feet of water being taken up by invasive species is a significant problem.

Agriculture: This project will improve water quality as well as will reduce clogs due to Russian olive and Salt cedar debris which will increase what system efficiency.

Storage: The more water we save up river the more potential the water has to make it downriver. Reducing clogs resulting in flooding is also an aspect of saving water for down waterway usage.

Watershed and Environmental Health: Russian olives and Salt cedars are listed as noxious weed species by the Colorado Department of Agriculture, deeming them to be injurious to agricultural or horticultural crops, natural habitats or ecosystems, or humans or livestock. Removing Russian olives will improve water quality by decreasing nitrogen levels caused by Russian olives, or salt caused by Salt cedars. Mosquito populations will decrease with the removal of their preferred habitat (Russian olives) which will decrease the probability of diseases spread via mosquitoes. Where fish populations are present in waterways, removing Russian olives will remove Carp's preferred habitat which will hopefully give native fish more habitat, instead of being chased off by the Carp.

Recreation: Along waterways where fishing is allowed, access will be improved by the removal of Russian olives and Salt cedars. It will also improve native fish habitat as mentioned earlier which will benefit recreationalists.

Funding: We are an eligible applicant since we are a county. We will match at least 50% of the project cost through both cash match and in-kind match.

Describe how the project achieves the education, outreach, and public engagement goals set forth in the applicable Basin Implementation Plan(s).

The goals I found in the Southwest Basin Roundtable Public Education, Outreach, and Participation Education Action Plan are specific for the needs of the roundtable.

- Develop a fact booklet which describes the different organizations in southwest Colorado involved with water and the different uses of water, both consumptive and non-consumptive.
- Develop and present three workshops on the subjects of developing stream management plans, agricultural efficiencies, and land use planning and water.
- Provide copies of the CO water plan and southwest Basin Implementation Plan to interested entities and public libraries within the Southwest Basin.
- Provide educational material as necessary to support the Roundtable.

These honestly are not applicable to any project working on conservation of water; these goals are specifically goals for the roundtable. I would assume their overall goal is to educate landowners and water users on being responsible with how they are using water, as well as educate them on efficient methods of using water. In response to that assumed educational goal, I would think this project fits because we are educating the public and landowners on how much water uptake Russian olive and Salt cedars have as well as their effect on water quality and the ecosystem health.

Describe how the project achieves the basin roundtable's PEPO Education Action Plans.

The strategies in the Southwest Basin Roundtable's PEPO talk about how they will develop the booklet, getting different printing quotes, how it will be advertised and distributed. It then goes into their workshops, they will do a Developing Stream Management Plan workshop, Agricultural Efficiencies workshop, and a Land Use Planning and Water Workshop. They just discuss broad summary of what each workshop will encompass. They then talk about distributing the Colorado Water Plan and the Basin Implementation Plan to local libraries.

As mentioned earlier the Southwest Basin's plan is specific to things what their roundtable wants to accomplish not really what the roundtable wants to promote. I see a goal being they want to promote public awareness on conserving water and efficient methods of water usage. How I see my project achieving this goal is by educating the public of one way we can all work together to conserve water, by removing invasive Russian olives and Salt cedars. There are many different aspects to water conservation and this is one of those pieces that needs to be addressed.

Innovation Track

Describe how the project enhances water innovation efforts and supports a water innovation ecosystem in Colorado.

These tree species were introduced into the Untied States as windbreaks, wildlife habitat, as well as for streambank restoration in the late 1800's. Like many things we have done in the past we did not fully study possible affects or outcomes from introducing exotic species. We have learned now that it was a mistake to introduce these species they are causing more harm than good.

In 1996 the Colorado Noxious Weed Act came into place in 1990. I'm not sure if Russian olive was put onto Colorado Department of Agriculture weed list, but I know it was on the 2002 noxious weed list. By 2002 Russian olives and Salt cedars were well established along waterways throughout the United States.

Currently Russian olives are on the Noxious Weed List B, designating it for control and suppression. Other counties / states have made tremendous efforts for the eradication of this species, however Montezuma County has been prioritizing different species for control and suppression / eradication.

Due to the increased calls about Russian olive, received from the Montezuma County Noxious Weed Department, new Montezuma County Noxious Weed Department Director, as well as the impact of the drought, Russian olives were assessed and researched. It was decided that a Russian olive management plan needed to be developed for Montezuma County in an attempt to control and suppress the populations in an effort to conserve water and promote healthy ecosystems.

So to answer this question, the management of Russian olives is innovative in Montezuma County. Management techniques have been fully studied by Montezuma County Noxious Weed Department and the most efficient and least damaging techniques will be used as described earlier in this application.

Describe how the project engages/leverages Colorado's innovation community to help solve our state's water challenges.

Innovation Track
They key to truly conserving water is to educate all landowners and water users on different ways to be efficient water users. This project understands we will not be successful unless we get the entire community involved with phreatophyte management. The only way to do that is to take the first step, and this project is that first step. This project is providing the first feasible option there has been in this area to manage their phreatophytes. This project is also the first public outreach project in this area to educate landowners and land managers of the effects phreatophytes have on the water and water systems.
Describe how the project helps advance or develop a solution to a water need identified through TAP-IN and other water innovation challenges. What is the problem/need/challenge?
The mission of TAP-IN (to convene Coloradans around water challenges to bring fresh voices and new approaches to the conversation and build a collaborative network across communities) fits beautifully with the project. The key to successful invasive weed management and water conservation is collaboration across the communities. This project is a creative approach to promoting management of these species for the greater good of our land and our people's water usage needs.
Describe how this project impacts current or emerging trends; technologies; clusters, sectors, or groups in water innovation.
When people start managing their land for conservation it motivates neighbors to do the same. I feel like we will be able to use the good neighbor policy on our side. The more properties that make an effort to manage these phreatophytes the more likely neighbors will do the same. Hopefully we will start this trend.

Last Updated: July 2019

Colorado Water Conservation Board
Water Plan Grant - Exhibit A

Statement Of Work	
Date:	**12-11-2019**
Name of Grantee:	**Montezuma County Noxious Weed Department**
Name of Water Project:	**Phreatophyte Project**
Funding Source:	**Montezuma County / Landowners / HPP / CDA? / RCPP? /**

Water Project Overview:

MCNWD will hire a seasonal two to three-person crew that will work 40-hour weeks from April 1 to November 31 from 2020 through 2024 for the five-year project we are requesting funds for. The duration of the project will more than likely extend for several more years past 2024.

The purpose of the project is to promote management of phreatophytes across the county. How we will achieve that is offering a low cost management option to the landowners with the incentives of land stewardship and water conservation.

Project Objectives:

- Reduce Russian olive and Salt cedar populations in an effort to:
  - Conserve water.
  - Reduce nitrogen levels in water.
  - Reduce maintenance costs caused by debris of Russian olive and Salt cedar.

Last Updated: July 2019

Tasks
Task 1 – Promoting Public Awareness / Obtaining Jobs
Description of Task:
Using the 2020 phreatophyte map MCNWD created we have identified 1,696 landowners who have phreatophytes on one or multiple properties. We have a list of landowners who we did not have time to treat phreatophytes on their property(s) in 2019, and we moved that list to 2020. We will be notifying landowners in those immediate areas about our project, and hopefully we will be able to treat multiple properties in the same immediate area at one time. We will use a similar approach as this as time progresses. Meaning if we have people scheduled in the future we will identify other phreatophyte populations in that immediate area and will notify those properties. Outside of this approach we will be sending out informative postcards to the landowners on our list to promote awareness to the impacts of phreatophytes and to make them aware of our project and how we can help. Properties that have been flagged by MCNWD to have high infestations of phreatophytes along waterways (natural and ditches), will be made a priority to collaborate with the landowner. If landowner is reluctant to remove the phreatophytes from their properties either because of cost or because the trees benefit the landowner in some way we will first offer a free day, where our crew will do a days work for treating the phreatophytes in hopes the landowner will see the difference and will then be sold on the idea. Next, if it is a shelter issue for cattle we will work with the landowner to come up with a plan to remove portions of the phreatophytes, while leaving some shelter areas. Once portions are removed we can work on a plan to establish more desirable shade trees. If it is a cost issue we will work with the landowner to come up with a plan to help the landowner financially.
Method/Procedure:
Initially an informative letter will be sent out to each landowner. Secondly, postcards will be sent out as a reminder of the program if the landowner received an informative letter the previous year. High priority properties that we discussed above will most likely be contacted by phone or in person. There will be other outreaches such as newspaper articles, flyers, and social media.
Deliverable:

Last Updated: July 2019

Tasks
- Postage records for landowner notifications. - Excel sheet of notified landowners. - Maps of high priority properties - Excel sheet of landowners who contacted us - Treated Property Reports

Tasks
Task 2 – Phreatophyte Crew
Description of Task:
Crew will conduct treatments on properties who have reached out to MCNWD requesting management of phreatophytes.
Method/Procedure:
The crew will be doing cut stump treatments on all shrubs/trees with a root collar diameter (RCD) greater than one inch. This work entails either using snippers or a chainsaw to cut the shrub/tree down, and within five minutes of cutting the stem they will apply a mixture of Garlon 4, Impel, and Rodeo to the stump with a paintbrush or with a backpack sprayer. Shrubs/trees smaller than 1" RCD will be foliar sprayed with the same herbicides with a backpack sprayer. Areas that have a high density of smaller diameter trees we will rent an excavator and use our mulcher attachment to more efficiently treat these areas. One crewmember will operate the equipment and the other crew member(s) will apply the herbicide to the stumps. Each day the crew will document how many trees were treated divided into different Root Collar Diameter (RCD) sizes and by species. By recording this data we can then use those numbers to calculate the water savings. It was determined that calculating water saved per acre was less accurate than keeping track of individual trees treated relative to their RCD size. The golden rule is landscape trees need 10 gallons per inch in diameter each week to be healthy. These phreatophytes work differently because they grow in riparian areas and are known to transpire higher rates of water than native trees. There are not studies that give us a direct

Tasks
number of how many gallons each diameter class of these two species takes up per week. Using an educated guess, on the reserved side, we are estimating these trees are taking up 20 gallons per inch in diameter each week, so twice of that of which an ornamental tree would take up. Once the trees are cut and treated the crew will then pile the slash into slash piles on the properties to be burned or hauled off by the landowner / land manager. Larger tree stems will be cut into sections intended for the landowner / land manager to utilize as firewood. Trees are not felled into waterways, in some cases equipment such as side by sides or tractors were used to pull the tree away from the waterway as it was being felled. Another procedure that the crew is tasked with is to take before and after photos on each treatment property. After pictures will also be taken following years when the property is re-visited.
Deliverable:
- Field Tickets - Before and After Photos - Maps

Tasks
Task 3 – Final Reports
Description of Task:
Field tickets, maps, and photos will be given to MCNWD after each job. MCNWD will then calculate water savings based on trees treated within each diameter class. A report will be written for each landowner including an invoice. Landowner payments will be made to MCNWD to contribute expenses to the project.
Method/Procedure:

Last Updated: July 2019

Tasks

MCNWD uses the “golden rule” X2 for calculating water savings of phreatophytes. The golden rule is each tree needs 10 gallons of water per inch in diameter each week during the growing season. Because phreatophytes are growing along waterways and are using the water table as a water source they are using at least 20 gallons of water per inch in diameter each week for a 39-week growing season. Do take note that these trees are still up taking water through the winter.

Final reports will be made for each landowner outlining with dates the phreatophyte crew worked on their property, how many trees were treated, and the calculated water savings.

Deliverable:

- Individual property final reports
- Excel spreadsheet of all treated properties including water savings

Budget and Schedule

This Statement of Work shall be accompanied by a combined Budget and Schedule that reflects the Tasks identified in the Statement of Work and shall be submitted to CWCB in excel format.

Reporting Requirements

Progress Reports: The applicant shall provide the CWCB a progress report every 6 months, beginning from the date of issuance of a purchase order, or the execution of a contract. The progress report shall describe the status of the tasks identified in the statement of work, including a description of any major issues that have occurred and any corrective action taken to address these issues.

Last Updated: July 2019

Reporting Requirements

Final Report: At completion of the project, the applicant shall provide the CWCB a Final Report on the applicant's letterhead that:

- Summarizes the project and how the project was completed.
- Describes any obstacles encountered, and how these obstacles were overcome.
- Confirms that all matching commitments have been fulfilled.
- Includes photographs, summaries of meetings and engineering reports/designs.

The CWCB will pay out the last 10% of the budget when the Final Report is completed to the satisfaction of CWCB staff. Once the Final Report has been accepted, and final payment has been issued, the purchase order or grant will be closed without any further payment.

Payment

Payment will be made based on actual expenditures and must include invoices for all work completed. The request for payment must include a description of the work accomplished by task, an estimate of the percent completion for individual tasks and the entire Project in relation to the percentage of budget spent, identification of any major issues, and proposed or implemented corrective actions.

Costs incurred prior to the effective date of this contract are not reimbursable. The last 10% of the entire grant will be paid out when the final deliverable has been received. All products, data and information developed as a result of this contract must be provided to CWCB in hard copy and electronic format as part of the project documentation.

Performance Measures

Performance measures for this contract shall include the following:

(a) Performance standards and evaluation: Grantee will produce detailed deliverables for each task as specified. Grantee shall maintain receipts for all project expenses and documentation of the minimum in-kind contributions (if applicable) per the budget in Exhibit B. Per Water Plan Grant Guidelines, the CWCB will pay out the last 10% of the budget when the Final Report is completed to the satisfaction of CWCB staff. Once the Final Report has been accepted, and final payment has been issued, the purchase order or grant will be closed without any further payment.

(b) Accountability: Per Water Plan Grant Guidelines full documentation of project progress must be submitted with each invoice for reimbursement. Grantee must confirm that all grant conditions have been complied with on each invoice. In addition, per Water Plan Grant Guidelines, Progress Reports must be submitted at least once every 6 months. A Final Report must be submitted and approved before final project payment.

(c) Monitoring Requirements: Grantee is responsible for ongoing monitoring of project progress per Exhibit A. Progress shall be detailed in each invoice and in each Progress Report, as detailed above. Additional inspections or field consultations will be arranged as may be necessary.

Last Updated: July 2019

Performance Measures
(d) Noncompliance Resolution: Payment will be withheld if grantee is not current on all grant conditions. Flagrant disregard for grant conditions will result in a stop work order and cancellation of the Grant Agreement.

PROJECT EXPENSES					
Year	2020	2021	2022	2023	2024
3-Person Crew Salary	$ 80,257.00	$ 82,342.00	$ 84,428.00	$ 86,514.00	$ 88,600.00
Cost of Herbicide	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00
Fuel	$ 3,000.00	$ 3,000.00	$ 3,000.00	$ 3,000.00	$ 3,000.00
Excavator Rental	$ 9,000.00	$ 9,000.00	$ 9,000.00	$ 9,000.00	$ 9,000.00
Chainsaw / PPE / Misc	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00
Phone	$ 560.00	$ 560.00	$ 560.00	$ 560.00	$ 560.00
Admin Time (300 Hours)	$ 9,000.00	$ 9,000.00	$ 9,000.00	$ 9,000.00	$ 9,000.00
Total Cost	$ 111,817.00	$ 113,902.00	$ 115,988.00	$ 118,074.00	$ 120,160.00

PROJECT FUNDING						
Contributers	Requested amount for 2020	Requested Amount for 2021	Requested Amount for 2022	Requested Amount for 2023	Requested Amount for 2024	5 Year Project Estimates
Funding Party						
Regional ConservationPartnership Program	$ 50,000.00	$ 50,000.00	$ 50,000.00	$ 50,000.00	$ 50,000.00	$ 250,000.00
Colorado Department of Agriculture	$ 20,000.00	$ 15,000.00	$ 17,000.00	$ 19,500.00	$ 22,000.00	$ 93,500.00
Colorado Water Plan Grant	$ 25,000.00	$ 25,000.00	$ 25,000.00	$ 25,000.00	$ 25,000.00	$ 125,000.00
Habitat Partnership Program	$7,100	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 23,100.00
Landowners	$ 7,500.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 27,500.00
Montezuma County Noxious Weed Department Admin (300 hours)	$ 9,000.00	$ 9,000.00	$ 9,000.00	$ 9,000.00	$ 9,000.00	$ 45,000.00
Water Supply Reserve Fund	16840 (mulcher	$ 6,000.00	$ 6,000.00	$ 6,000.00	$ 6,000.00	$ 24,000.00
Total:	$118,600	$ 114,000.00	$ 116,000.00	$ 118,500.00	$ 121,000.00	$ 588,100.00

ESTIMATED PROJECT OUTCOMES					
	2020	**2021**	**2022**	**2023**	**2024**
Estimated Trees Treated	20,000	20,000	20,000	20,000	20,000
Estimated Acres Treated	300	300	300	300	300
Previous Acres Treated	170	470	770	1070	1370
Total Estimated Accumulative Acres Treated	470	770	1070	1370	**1670**
Water Savings / Estimated (acre feet)	192	192	192	192	192
Previous Estimated Water Savings (acre feet)	118	310	502	694	886
Total Yearly Estimated Water Savings (acre feet)	310	502	694	886	**1078**

COLORADO
Department of Agriculture
Conservation Services Division

December 18, 2019

Mr. Chris Sturm
Colorado Water Conservation Board
Department of Natural Resources
1313 Sherman Street, Room 721
Denver, CO 80203
waterplan.grants@state.co.us

Dear Mr. Sturm,

Please accept this letter of support for Montezuma County's application to the Colorado Water Plan Grant. Colorado Department of Agriculture views this project important for a number of reasons. We applaud the interagency approach Montezuma County takes as demonstrated by past funding they received from CDA, Colorado Parks and Wildlife, Southwestern Basin Water Conservation District Grant, Empire Electric and Colorado Water Conservation Board.

We understand that landowners have a difficult time understanding why in the past federal and state agencies encouraged phreatophyte planting and now we require removal. Montezuma County makes diligent efforts to educate landowners and elected officials about the impact phreatophytes have not only on our state's water supply, but also on riparian soil stability, chemistry, native flora and fauna. With Montezuma County's persistence, landowners contributed about $12,000 towards chainsaw operations and equipment for this on-going project this past field season.

The phreatophyte surveys Montezuma County reported into EDDMapS, CDA's invasive plant spatial database, allows them to commicate with landowners and partners on this multi-year project and demonstrates their commitment towards interagency coordination and phreatophyte removal. Since CDA awards funds on a competitive, annual basis, and cannot make multi-year funding commitments, we consider carefully these types of efforts when making our funding decisions.

The severe drought of 2018 was an alarm to Montezuma County managers that the area is highly susceptible to climatic changes. Since water is the number one scare resource in the Southwest Basin, and the US Global Change Research Program documents significant climatic change projections for this area, it is imperative we focus our statewide priorities on projects that advance the Colorado Water Plan, Colorado State Wildlife Action Plan, Colorado Climate Plan and noxious weed management.

The past and future proposed activities associated with this project work toward achieving Action 6.3.4.4 by removing invasive phreatophytes, 7.1.1 by surveying and reporting georeferenced phreatophyte occurrences that degrade watershed condition, 7.1.10 monitoring projects, and 7.1.10 interagency projects, monitoring and adaptive management identified in the Colorado Water Plan. For these reasons, we recommend continued support for this project.

Sincerely,

Lara Duran
List B Noxious Weed Specialist

December 2, 2019

Montezuma County Noxious Weed Program
Bonnie Loving
103 North Chestnut
Cortez, CO 81321
970-565-0580

Re: Russian olive/Salt cedar Project

Dear Ms. Loving,

This letter is in response to your request for formal comment regarding the proposed Montezuma County Russian Olive/Salt Cedar Project. The Habitat Partnership Program was created to help resolve wildlife conflicts, particularly those associated with fence and forage issues; and to assist CPW in achieving game management objectives. The Montelores HPP Committee met on November 5th, 2019 and, after careful consideration, the committee strongly supported this project and committed $7,100.00 towards it.

The project area comprises important habitat for deer and elk, particularly during migration events and winter. Infestations of Russian olive and salt cedar reduce forage production in these areas, which limits big game utilization of winter range and increases the potential for game damage to nearby agricultural operations. Reducing the presence and spread of these noxious species will improve the quality and quantity of forage that is available for big game. Additionally, this area of Montezuma County has been the location of a number of recent conservation easements and habitat improvement projects by multiple agencies, including CPW and HPP. Continuing to protect and enhance habitat with integrated projects on both public and private lands helps CPW to achieve big game management and harvest objectives.

Thank you for the opportunity to become involved in this valuable project.

Sincerely,

Eldon Simmons

Eldon Simmons
Sportsman Representative
Chairman - Montelores HPP Committee

Phreatophyte Project

Five-Year Project Plan 2020-2024

Before and After

Satellite View of Russian olive along waterways

Montezuma County Noxious Weed Department

Prepared by: Bonnie Loving

Plan updated 1-22-2020

Index

Introduction……...Page 3

History of Russian olives and Salt cedars……Page 3

Phreatophyte Impacts……Page 3-6

Phreatophyte Extent and Drought / Water Impacts:……Page 3-4

Nitrogen Impacts of Russian olives:……Page 4

Salinity Impacts of Saltcedar:……Page 5

Wildlife Habitat Impacts:……Page 5

Economic Impact of Phreatophytes:……Page 5-6

2019 Phreatophyte Project……Page 6-7

Five-Year Management Plan……Page 7-

Biological Plan……Page 7

Mechanical / Herbicide Plan……Page 7-8

Monitoring……Page 8

Outreach……Page 8

Expected Five-Year Plan Results……Page 8-9

Appendix A: 2020 Phreatophyte Map……Page 10

Appendix B: Detailed main canals and waterways infested distance……Page 11

Appendix C: Field documentation……Page 12

Appendix D: Map of 2019 Treatments……Page 13

Appendix E: Photos of Treatments in 2019……Page 14-17

Appendix F: 2020 Bio control Release Points……Page 18

Introduction:

This project was designed to control Russian olives and Salt cedars (phreatophytes) in an effort to conserve water and promote healthy ecosystems. Taking the low economy of Montezuma County into account as well as the extent of the phreatophyte populations we have created a plan to effectively manage them.

History of Russian olives and Salt cedars:

Salt cedars was brought to the United States in the early 1800's. As early as the 1820s Saltcedar was advertised in U.S. horticultural catalogues, and by 1856 it was sold and promoted in California nurseries. In the early 1900s, Saltcedar was widely planted in the Southwestern United States for windbreaks and protection from streambank erosion, being promoted by both government and private land agencies.

Russian olives have a similar story, they were brought into the United States in the early 1900s, and was cultivated in several Western States. Russian olive has widely been promoted for being planted in windbreaks and horticultural settings, often with the encouragement of state and Federal subsidies.

The Colorado Noxious Weed Act was established in 1990, recognizing the severe impacts that non-native invasive species are having on our native ecosystems. Salt cedar and Russian olives were put on the B-List designating them to be controlled and suppressed on all lands within Colorado.

Phreatophyte Impacts

Phreatophyte Extent and Drought / Water Impacts:

MCNWD has mapped 6,996 acres of Russian olive and 6,775 acres of Salt cedar (Tamarisk) on wetland/waterways within Montezuma County (see Appendix A). Total infested acres of these two species comes to 9,371.9 (many areas mapped contain both species). Total miles infested on our major waterways and main canals comes to 221.51 miles (see appendix B for breakdown).

Researchers studying water consumption by classes of riparian vegetation in the Middle Rio Grande Region of New Mexico estimated that one acre infested with Russian olives or Salt cedars would consume 4.5, 4.2, or 3.8-acre feet of water per year. Using our data from treated phreatophytes in 2019 we estimated one acre infested with these phreatophytes would consume about .8 acre feet of water per year. Density is definitely a factor in these water calculations, and it was not clearly defined in this article. We determined the more accurate way to determine evapotranspiration amounts would be to calculate per tree treated as our crew did in 2019.

Using our calculations from 2019 we estimate Montezuma County is losing about 7,377 acre-feet/year. This number does not take into account water loss occurring from flooding as a direct result of phreatophyte debris clogging ditches/waterways. Therefore, the total amount of water loss from these two phreatophyte species is estimated to be much higher.

Using the United States Drought Monitor map archive we can see that Montezuma County has been in the D4 Intensity category documenting exceptional drought in 2002 and 2018. We have been in the D3 Intensity category documenting extreme drought in 2003, 2012, and 2013. We have been in the D2 Intensity category documenting severe drought in 2014. We have been in the D1 Intensity category documenting moderate drought in 2004, 2006, 2007, and 2019. Lastly, the D0 Intensity category documenting abnormally dry was recorded in 2010, 2011, and 2017. In conclusion to this data we can see that since 2002 we have had 13 years of reported drought and only 5 years reporting no drought. The most recent U.S. drought monitor map puts us in the severe drought category, intensity D2.

In Montezuma County, water is a scarce resource. The heart of our county is in agriculture, if we continue to lose water, people will start losing their farms and way of life. It therefore is our duty to do whatever we can to conserve what little water we have.

Nitrogen Impacts of Russian olives:

One study, Russian olive, Elaeagnus angustifolia, alters patterns in soil nitrogen pools along the Rio Grande River, New Mexico, USA, compared nitrogen and debris accumulation between Cottonwoods and Russian olives. The study reported a 55% increase in total nitrogen due to Russian olives. They also saw 73% more debris accumulation under subcanopy Russian olive compared with cottonwood trees alone.

The increased nitrogen in soil does not affect microbial productivity, but it does overall enhance soil nitrogen resources in semi-arid riparian environments, which could be a good thing. One thing the study talked about is how increasing the nitrogen in the soil will make Cottonwoods healthier in these areas; however it also makes Russian olives more competitive which will compete with cottonwoods for other resources, ultimately suppressing the cottonwoods.

John O'Connell / Capital Press Idaho State University stream ecologist Colden Baxter has done research on nitrogen levels directly increased by Russian olives and the impacts those nitrogen levels have. Russian olives accumulate nitrogen in their leaves, Russian olives also have a high die off rate, and therefore they are continuously dropping leaves with this deposited nitrogen. When the trees are along a waterway these nitrogen rich leaves fall into the water, which increases the nitrogen levels in the water itself. Colden Baxter found that these elevated nitrogen levels help increase carp populations. He has seen a 20-fold increase in carp density compared with estimates from the early 1970s in one stream he's studied, in which the primary change has been Russian olive numbers. The problem is that Carp are non-native fish that will out-compete and chase off our native / desirable fish species.

Colden Baxter also discussed that these elevated nitrogen levels may increase algae growth and choke out dissolved oxygen. This creates water-quality problems in reservoirs when combined with olives and leaves that are slow to decompose.

Salinity Impacts of Saltcedar:

Salt glands on the leaves of Salt cedars exude salts and may create saline soil environments. Excessive quantities of soluble salts can be harmful to plants by interfering with water uptake. For native plants competing to establish in the same habitat as Saltcedar, saline soil reduces their survival.

Wildlife Habitat Impacts:

The Saltcedar and Russian olive Control and Demonstration Act Science Assessment written by Heather Bateman and Eben Paxton discusses impacts of these phreatophytes on arthropods and birds. As far as arthropod diversity, it appears to be greater in native vegetation compared to Salt cedar and Russian olive habitats, but they did say that more studies are needed to understand how Saltcedar and Russian olives affect particular specific species and entire communities of arhropods.

As far as birds studies have shown Saltcedar to be suitable for a number of generalist avian species, however Saltcedar is not suitable habitat for all native riparian birds, and bird abundance and diversity is seen to be lower in Saltcedar than in native-dominated riparian vegetation. With regards to Russian olives, a study of birds nesting in Russian olive in New Mexico found that a little more than half of riparian breeding species did not nest in this species. Russian olive does produce abundant fruit that is eaten by a large number of bird species and can provide important structural habitat for birds. However, diversity of birds is lower in Russian olives compared to native species.

A species of concern is the Southwestern Willow Flycatcher, it has been listed as a federally endangered species. This assessment said nearly half of the Flycather's territories are found in riparian patches consisting primarily of native trees such as willows, 6% of known breeding territories are in monotypic salt cedar, 22% are in habitats dominated by Saltcedar, and another 28% are in native habitats where Salt cedar and other exotics provide 10-50 percent of the habitat structure.

The assessment went on to say much of the Saltcedar along riparian systems is not used by flycatchers and is presumably unsuitable; for example, flycatchers are absent today from some areas where they historically bred and where Saltcedar is now dominant and widespread. Furthermore, fire is considered one of the greatest threats to flycatcher breeding sites, and the presence of Saltcedar may increase the likelihood of large fires due to its flammability.

Economic Impact of Phreatophytes:

It has been estimated that the cost incurred by salt cedar infestations in the southwest USA with respect to water supply, flood control, and wildlife to the benefits of eradicating this weed would be a net total benefit between $3.8 billion to $11.2 billion over a 55 year period (Zavaleta 2000, pp. 261-300 in Mooney & Hobbs, Invasive Species in a Changing World).

The cost of irrigation water definitely varies, a median cost is probably $390 per acre-foot. If you take our 6,775 acre-feet of water lost each year it equates to $2,642,250 per year. Now we need to estimate crop loss or forage loss from losing that acre of production, and this price will vary significantly. In this area we raise a lot of timothy grass hay, alfalfa hay, beans, sorghum, and wheat. We are going to use an overall estimate of $600/acre. Therefore if you lose one acre foot of water you lose $600. The total production loss would equate to $4,065,000, that is to say all of this water the phreatophytes are consuming could be used for irrigation. Therefore, we can estimate that in Montezuma County these phreatophytes are causing an economic loss of $4,065,000 each year. This estimate is not including ditch maintenance costs due to phreatophyte debris.

2019 Phreatophyte Project

MCNWD hired a seasonal two-person crew that worked 40-hour weeks from May 1, 2019 to November 31, 2019. The crew was trained as spraying technicians in order to safely and effectively treat Russian olives and Salt cedars with herbicides to kill root systems and hopefully prevent the species from sprouting. The crew was also trained for chainsaw safety.

The crew conducted cut stump treatments on all shrubs/trees with a root collar diameter (RCD) greater than one inch. This work entailed either using snippers or a chainsaw to cut the shrub/tree down, and within five minutes of cutting the stem, they would apply a mixture of Garlon 4, Impel, and Rodeo to the stump with a paintbrush or with a backpack sprayer. Shrubs/trees smaller than 1" RCD were foliar sprayed with the same herbicides with a backpack sprayer.

Areas down McElmo Canyon we ended up renting an excavator and a mulcher attachment to more efficiently treat dense areas of Salt cedar. For every hour using the excavator it would save the crew six hours using chainsaws.

Each day the crew documented how many trees were treated divided into different RCD sizes and by species (see appendix C). By recording this data we could then use those numbers to calculate the water savings. It was determined that calculating water saved per acre was less accurate than keeping track of individual trees treated relative to their RCD size. The golden rule is landscape trees need 10 gallons per inch in diameter each week to be healthy. These phreatophytes work differently because they grow in riparian areas and are known to transpire higher rates of water than native trees. There are not studies that give us a direct number of how many gallons each diameter class of these two species takes up per week. Using an educated guess, on the reserved side, we are estimating these trees are taking up 20 gallons per inch in diameter each week, so twice of that of which an ornamental tree would take up.

Once the trees were cut and treated the crew then piled the slash into slash piles on the properties to be burned or hauled off by the landowner / land manager. Larger tree stems were cut into sections intended for the landowner / land manager to utilize as firewood. Trees were not felled into waterways, in some cases equipment such as side by sides or tractors were used to pull the tree away from the waterway as it was being felled.

The crew has treated Russian olives and Salt cedars on a total of 30 properties and some areas of county roadsides. Waterways that were treated include: private ditches off Lone Pine Canal, private ditches off Upper Arickaree, private ditches south of Trail Canyon, Ritter Draw, McElmo Creek, a drainage off Upper Arickaree and Hermana Canal, drainage off of Rocky Ford Ditch, drainage off Yellow Jacket Canyon, some irrigated pastures off pipelines, Mancos River, private ditch off of Towaoc / Highline Canal, Mud Springs, and Simon Draw.

To sum up this project the crew has treated 8,175 Russian olives and 4,975 Salt cedars. We kept track of the diameter range of each tree treated from >2", 2-4", and <4". We then calculated the amount of water each diameter class of tree used in a 39-week period. Total water savings from treating these 13,150 treated trees comes to be 38,693,750 gallons of water, or 118.7 acre feet. We don't think acreage of treated trees is as important as individual trees treated, however the gross acreage of treated trees comes to be about 150. The goal was 200 acres, however some properties we treated had high density of trees, so acreage isn't the important take home note, individual trees treated is, including diameter class.

A map of treated areas can be found in Appendix D, and photos of the project from 2019 can be found in Appendix E.

Five-Year Management Plan:

Biological Plan:

MCNWD plans to release the Northern Tamarisk Beetle in Yellow Jacket Canyon, Cow Canyon, Ruin Canyon, Cross Canyon, Dolores River, Trail Canyon, Goodman Canyon, Navajo Wash, Mancos River, Marble Wash, McElmo Creek, and Mariano Wash. These are all remote waterways that mainly have Saltcedar infestations. MCNWD is working with the Palisade Insectary on obtaining 5 releases, each containing about 500 beetles, for the next five years.

MCNWD has pre-determined five locations to release beetles at in 2020 (see appendix F). Two releases will be in Yellow Jacket Canyon, one release will be in Trail Canyon, one release will be on Navajo Wash, and the fifth release will be on McElmo Creek. Sites will be monitored yearly, photo points will be taken at release point. Satellite images will also be recorded before release and after release.

Mechanical / Herbicide Plan:

MCNWD intends on keeping a crew of two to three people, funding dependent, to continue working at a low cost to be an affordable option for private landowners to get their phreatophytes removed. As was done in 2019, we will continue to do cut stump treatments on all shrubs/trees with a root collar diameter (RCD) greater than one inch. This work will entail either using snippers or a chainsaw to cut the shrub/tree down, and within five minutes of cutting the stem, the crew will apply a mixture of herbicide to the stump with a paintbrush or with a

backpack sprayer. Shrubs/trees smaller than 1" RCD were foliar sprayed with the same herbicides with a backpack sprayer. In 2019 Garlon, Rodeo, and Impel was used for the herbicide treatments. We will be evaluating the results from this mixture in 2020 to decide if we need to change herbicides.

Areas that have high densities of phreatophytes with low root collar diameters the crew will utilize an excavator with a mulcher attachment head. One crewmember will operate the equipment, the other member, or two members, will follow treating the stumps with the herbicide, as well as documenting the number of trees treated within different root collar diameter ranges. Each day the crew will document treatments and take photo points.

Monitoring:

Each property that was treated the previous year will be re-visited the following year. Any sprouts that have come up will be treated by a foliar application with herbicide. After photos will be taken, preferably in the same location as the before photos.

Crew will meet with the landowner and discuss any management needs such as helping the landowner develop a noxious weed plan, or and reclamation plans. MCNWD is hoping to partner with local organizations/businesses to get discounted native/desirable species to re-introduce into areas that were once dense thickets of phreatophytes. These species might include shade trees, native/desirable grasses, or pollinator species.

Outreach:

Using the 2020 phreatophyte map MCNWD created we have identified 1,696 landowners who have phreatophytes on one or multiple properties. We have a list of landowners who we did not have time to treat phreatophytes on their property(s) in 2019, and we moved that list to 2020. We will be notifying landowners in those immediate areas about our project, and hopefully we will be able to treat multiple properties in the same immediate area at one time.

We will use a similar approach as this as time progresses. Meaning if we have people scheduled in the future we will identify other phreatophyte populations in that immediate area and will notify those properties. Outside of this approach we will be sending out informative postcards to the landowners on our list to promote awareness to the impacts of phreatophytes and to make them aware of our project and how we can help.

Expected Five-Year Plan Results:

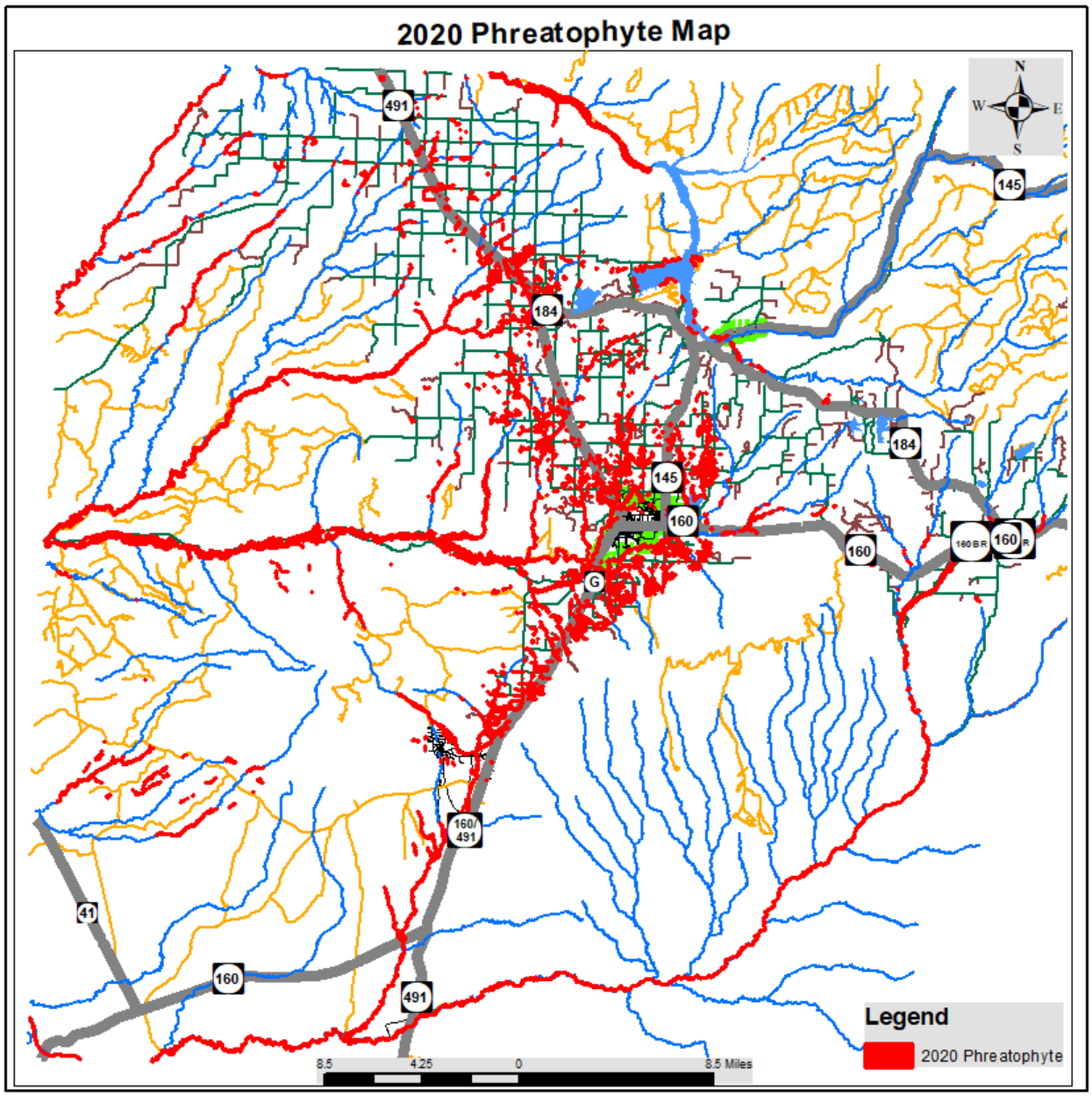
In 2019, with a two person crew, we were able to treat 12,055 trees or 170 acres. This led to the estimated water savings of 118 acre-feet. In 2020, we are purchasing a mulcher attachment through the Southwest Water Reserve Fund to help lower the cost to the landonwers. In 2019 we used the excavator for one month, and in 2020 we are anticipating using the excavator for 3 months. Utilizing this equipment will increase productivity, increasing trees treated and acres treated. We are anticipating treating 20,000 trees in 2020, on 300 acres. Water savings is estimated at about 192 acre-feet. For our next four years

we are estimating these same numbers.

By the end of 2020, including results of 2019, we estimate to have saved 310 acre-feet of water, and estimate to have treated 32,055 trees covering 470 acres. Holding the numbers constant, by the time 2021 season is complete we are estimating to have treated a total of 52,055 trees, covering 770 acres. At the end of the 2022 season we are estimating to have treated 72,055 trees, covering 1070 acres, estimating water savings of 694 acre feet since the project began in 2019. Skipping to year five in 2024 we are estimating total number of trees treated to be 112,055, covering 1,670 acres, with an estimated water savings of 1,078 acre feet since 2019.

Within the five-year period using the biological control we are hoping to have reduced 50% of the Saltcedar populations in Yellow Jacket Canyon, Trail Canyon, Navajo Wash, and McElmo Creek. We are hoping to begin establishment on all of the following waterways by 2024: Cow Canyon, Ruin Canyon, Cross Canyon, Dolores River, Goodman Canyon, Mancos River, Marble Wash, and Mariano Wash.

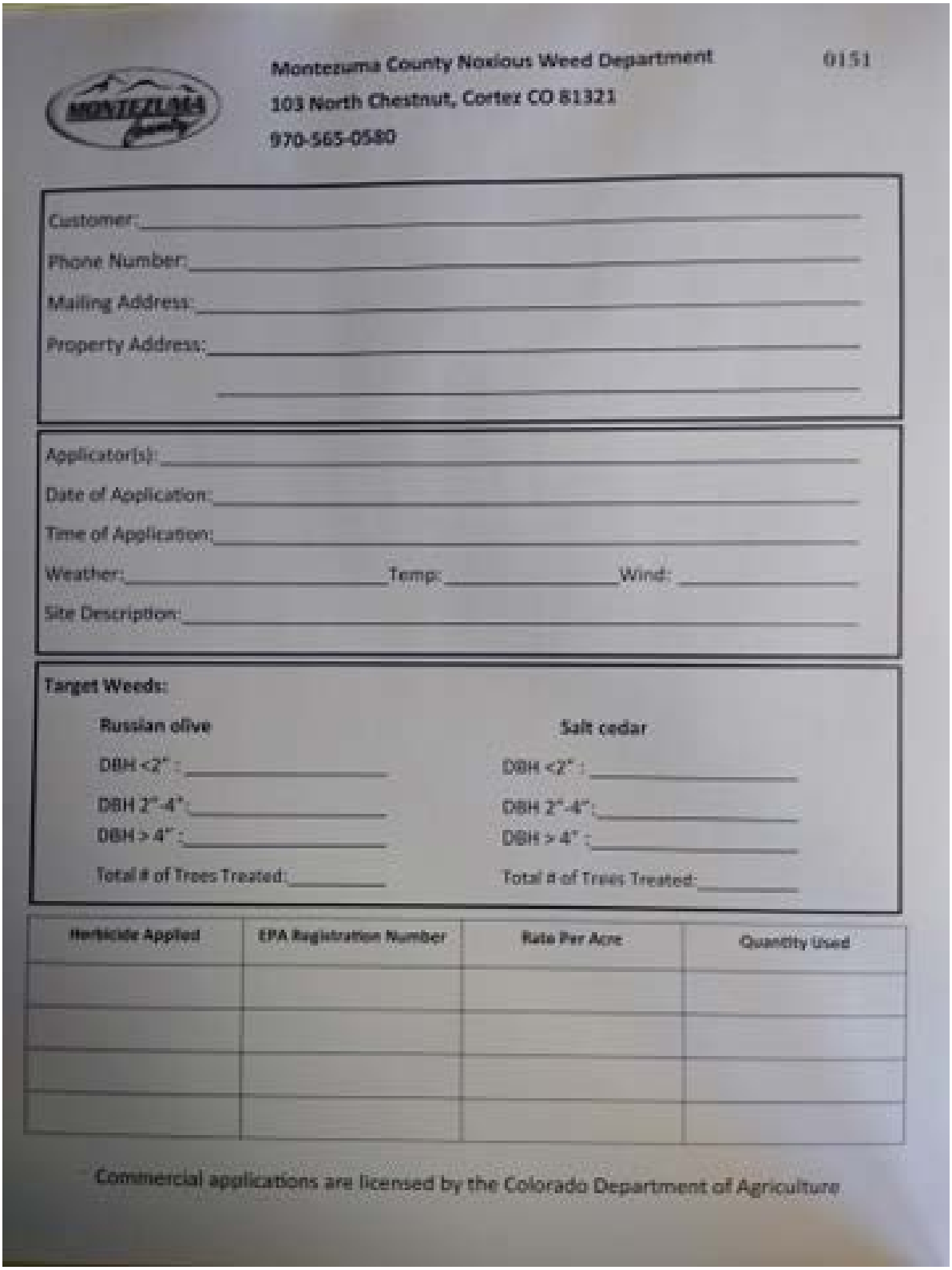
Appendix A:


2020 Phreatophyte Map
N
W
E
S
491
145
184
184
145
160
160
160 BR
160
G
160/
491
41
160
491
Legend
2020 Phreatophyte
8.5
4.25
0
8.5 Miles

Appendix B: Detailed main canals and waterways infested distance.

- Rocky Ford Ditch: 4.76 miles
- Highline Ditch / Towaoc Canal: 1.04 miles
- Dove Creek Canal: .145 miles
- Lone Pine Canal: 1.68 miles
- U Lateral: 2.04 miles
- Garret Ridge Lateral: .12 miles
- Upper Hermana Lateral: .1 miles
- May Lateral: .24 miles
- Marble Wash: 2.13
- Alkali Canyon: 4.62 miles
- Tributary to Little Cahone Canyon: .19 miles
- Tributary to Cow Canyon: .42 miles
- Bowdish Canyon: .18 miles
- Brumley Draw: 1.36 miles
- Cahone Canyon: .7 miles
- Chicken Creek: 2.3 miles
- Cottonwood Wash: 2.02 miles
- Cow Canyon: 1.04 miles
- Cross Canyon: 2.8 miles
- Crow Canyon: 2.79 miles
- Dawson Draw: 1.83 miles
- East Fork Mud Creek: .66 miles
- Tributary to Sandstone Canyon: .87 miles
- Ferris Canyon: .2 miles
- Fisher Creek: 1.03 miles
- Goodman Canyon: 2.62 miles
- Hartman Draw: 9.23 miles
- Head Draw: .2 miles
- Hovenweep Canyon: 4.45 miles
- Tributarys to McElmo Creek: 4.23 miles
- Kernan Creek: 1.57 miles
- Little Cahone Canyon: .11 miles
- Littlewater Canyon: .11 miles
- Lost Canyon: 1.02 miles
- Mancos River: 25.51 miles
- Dolores River: 8 miles
- Rock Canyon: .8 miles
- Mud Creek: .14 miles
- Narraguinnep Canyon: 2.1 miles
- Negro Canyon: .14 miles
- Pine Creek: 2.08 miles
- Rincon Canyon: .52 miles
- Ruin Canyon: 1.61 miles
- Ryman Draw: .08 miles
- Salter Canyon: .16 miles
- San Juan River: .71 miles
- Sandstone Canyon: 1.13 miles
- Simon Draw: .4 miles
- Stinking Springs Canyon: .36 miles
- West Fork Mud Creek: .46 miles
- West Mancos River: .27 miles
- Woods Canyon: .38 miles
- Yellow Jacket Canyon: 36.44 miles
- Navajo Wash: 13.54 miles
- Weber Canyon: 12.4 miles
- Tributary to Yellow Jacket: 1.33 miles

Appendix C: Field Documentation



Montezuma County Noxious Weed Department 0151
103 North Chestnut, Cortez CO 81321
970-565-0580

Customer: _____
Phone Number: _____
Mailing Address: _____
Property Address: _____
_____

Applicator(s): _____
Date of Application: _____
Time of Application: _____
Weather: _____ Temp: _____ Wind: _____
Site Description: _____

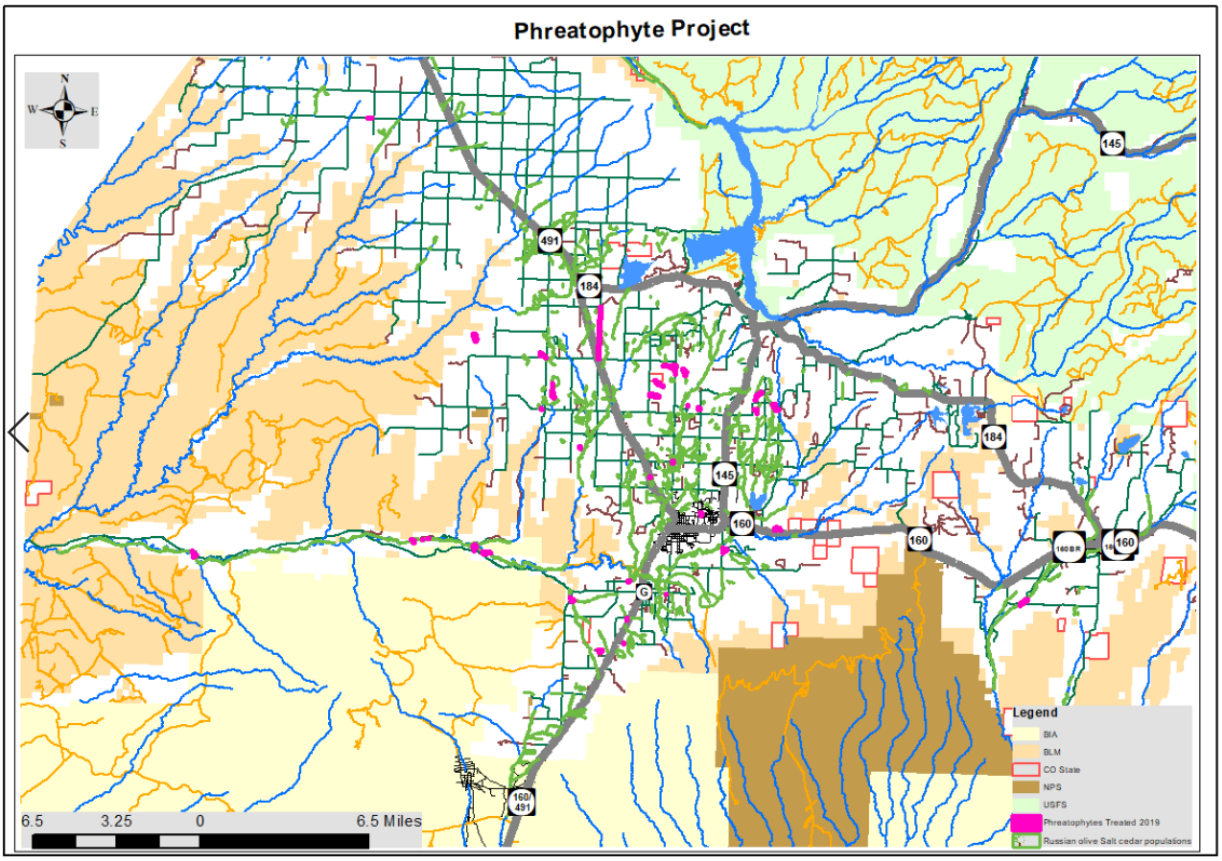
Target Weeds:

Russian olive	Salt cedar
DBH <2" : _____	DBH <2" : _____
DBH 2"-4": _____	DBH 2"-4": _____
DBH > 4" : _____	DBH > 4" : _____
Total # of Trees Treated: _____	Total # of Trees Treated: _____

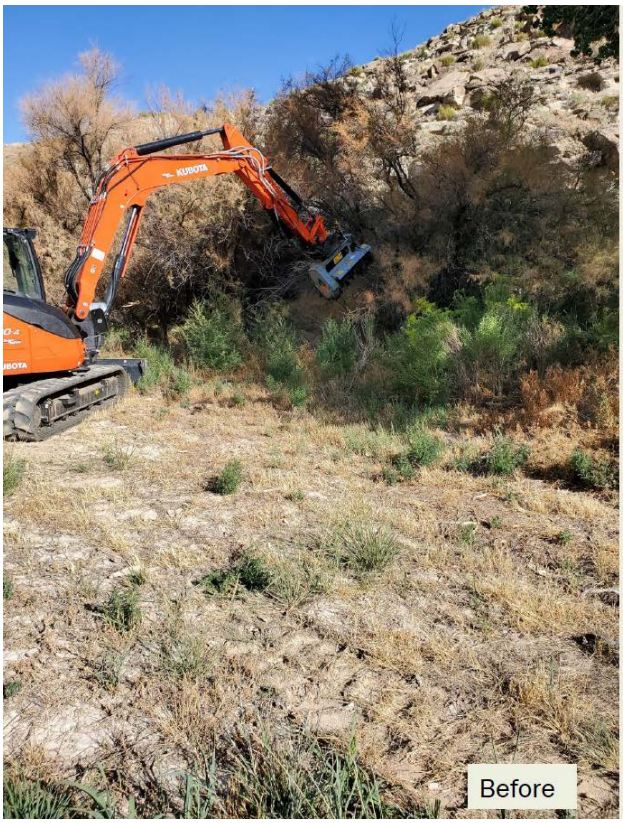
Herbicide Applied	EPA Registration Number	Rate Per Acre	Quantity Used

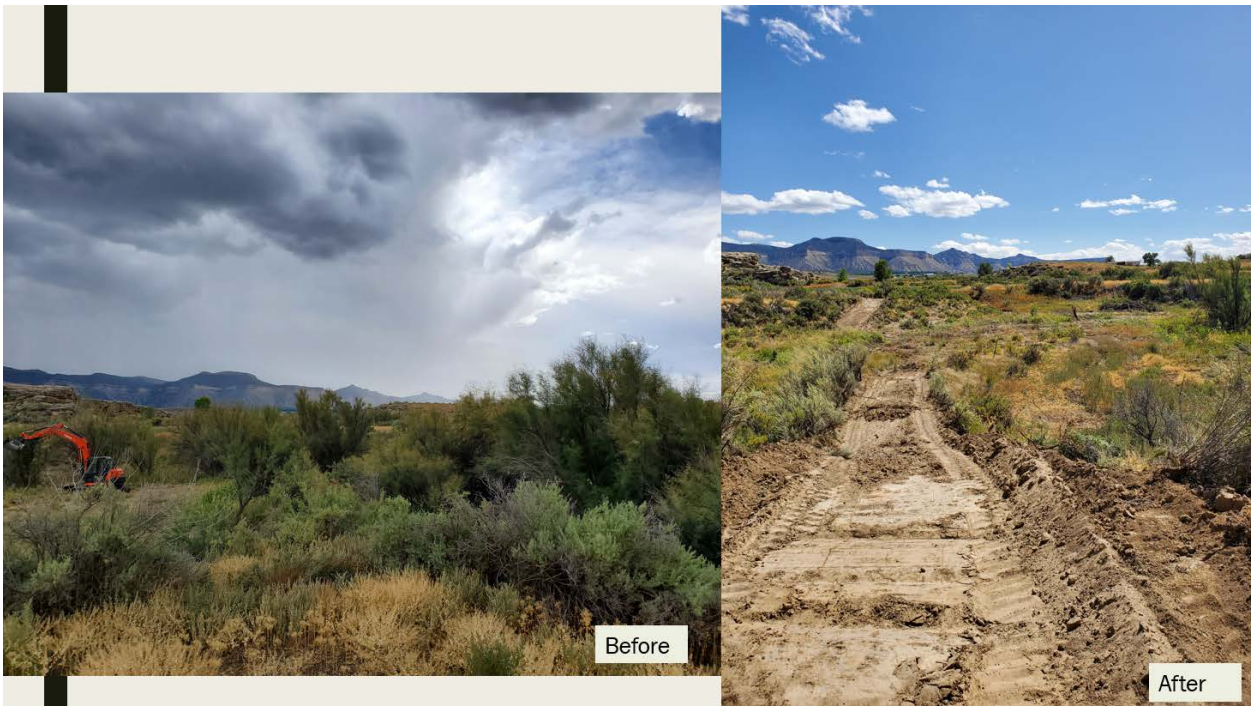
Commercial applications are licensed by the Colorado Department of Agriculture

Appendix D: Map of 2019 treatments.



Appendix F: Photos of treatments in 2019.




Before
After


Before
After


Before
After


Before
After


Before
After


Before
After

<u>Appendix F:</u> 2020 Bio control release points