YAMPA RIVER LEAFY SPURGE PROJECT

A REGIONAL PARTNERSHIP TO CONTROL AND MANAGE

LEAFY SPURGE ALONG THE YAMPA RIVER

PROJECT DESCRIPTION

December 14, 2015

Updated August 4, 2016

PROBLEM

Leafy spurge is a Colorado designated List "B" noxious weed. List B species fall under a statewide management plan designed to stop the continued spread of the species. Leafy spurge reproduces both by roots, which can spread 15 feet per year and reach nearly 30 feet in length. It also spreads by seeds which in riparian habitats, can spread downstream when the seeds are broadcast. Leafy spurge is an extremely aggressive invasive weed that can out-compete native vegetation, which may result in a monoculture. Over 2 million acres of ranch land in Montana and North Dakota have become agriculturally unproductive due to leafy spurge.

Leafy spurge is having enormous economic impact on western states. Montana, North and South Dakota, and Wyoming together spend approximately $144 million per year on leafy spurge control. In these states once prime agricultural land is now difficult to sell. Land that has been invaded with leafy spurge has a decreased market value because of the plants detrimental ecological effects, as well as, the costs associated with control.

In Northwestern Colorado, the primary riparian infestation is concentrated in a 15 mile reach of the Yampa River. This infestation is present in an almost continuous state on both banks of the Yampa River in western Routt County and eastern Moffat County. However it is evident that this invasive weed is spreading throughout the watershed. Leafy spurge infestations are being observed as far upstream as above Stagecoach Reservoir and State Park and downstream in Dinosaur National Monument due to river born seeds approximately 100 river miles from the primary infestation. In 2016, during a leafy spurge exploration river trip through the Little Upper Yampa Canyon, 32 river-miles downstream from Craig, CO, leafy spurge was observed in an almost continuous infestation along this reach of the Yampa River.

While County Weed Supervisors and agricultural producers have had success eradicating and controlling infestations on upland sites using the herbicide Tordon, invasions along the riparian corridor are more difficult to manage due to restrictions on the use of chemicals. If the

infestation of leafy spurge is not controlled, agricultural lands will be devalued, wildlife and native plant communities will be displaced and public lands will be degraded. The effects of leafy spurge could have devastating impacts, not only on the riparian environment but also the agricultural economy of the region.

HISTORY

About 40 years ago leafy spurge was introduced into the Yampa River watershed just west of Hayden, Colorado. Whether the original source of contamination was hay equipment brought into the area from Utah or road building equipment working on US 40 is unknown, but both occurred at approximately the time that leafy spurge was first observed.

This outbreak once concentrated in the riparian areas of the Yampa River in western Routt County and eastern Moffat County for approximately 15 miles has now spread along the Yampa River as far a Dinosaur National Monument and is being observed in irrigation ditches and tributaries of the Yampa River

In 2015 partners in Routt and Moffat Counties have come together to form the Yampa River Leafy Spurge Project (YRLSP) to combat a growing leafy spurge infestation in the Yampa River Watershed.

PREVIOUS EFFORTS

After the initial infestation spread from private land, Colorado Parks and Wildlife (CPW) which owns an adjacent wildlife area and the Routt County Weed Program (RCWP) began treatment in the area West of Hayden around 1986. The infestation in this area has been designated a containment area by RCWP.

Colorado Parks and Wildlife, formerly Colorado Division of Wildlife, has attempted control of leafy spurge through all possible control methods (chemical, biological, and mechanical) on the Yampa River State Wildlife Area. CPW has sprayed chemicals in-house (spring/summer application of Tordon and fall application of Plateau), has contracted spraying through RCWP, and incorporates herbicide spraying through the agricultural lease by the lessee. Sheep grazing has been utilized in the past but with limited success due to the significant presence of mosquitoes. Mechanical cutting of leafy spurge with weed eaters and waders was used early on but with limited success as well. Leafy spurge beetles have also been released on the State Wildlife Area and did show signs of success but it is believed they were washed away or drowned during high runoff years. During the summer of 2015 herbicides were sprayed and beetles were released on the Yampa River State Wildlife Area.

The Routt County Weed Program (RCWP) has cooperated with CPW over several years to control leafy spurge near the site of the original infestation and CPW has now taken over the treatment at that site. RCWP had a program in place for several years to provide weed control services to private landowners which included leafy spurge treatment. When sufficient private contractors began doing business in the county these private land contracts ended.

This effort has had limited success for various reasons: the riparian nature of the area, insufficient staff and funding, flea beetle mortality, and herbicide label restrictions for the most effective herbicides for leafy spurge. The continued use of certain chemicals in some areas has even destroyed much of the native vegetation and grasses.

The RCWP has treated leafy spurge infestations from Toponas to the Wyoming border and at isolated locations between with success. RCWP treats any leafy spurge infestation outside of the West Routt containment area as a target for eradication at the earliest possible date. It has been the specific policy of the RCWP since 2009 to act immediately on leafy spurge infestations outside the containment area.

Moffat County Pest and Weed Management (MCPWM) has over the years worked in partnership with private land owners to spray the leafy spurge infestations from the Routt County line to the mouth of Duffy Canyon the beginning of the Little Yampa Canyon which is located south of Craig, CO . MCPWM also has cooperative weed agreements to address leafy spurge with Colorado Board of Land Commissioners, CDOT and BLM

In 1995 the Yampa River Weed Management Area Plan was created by Routt and Moffat Counties "…because of concern about spreading populations of leafy spurge and other noxious weeds in the area." This Plan attempted to address "jurisdictional boundaries that are barriers to weed management programs… ". The Plan recognized that "to be successful in controlling these weeds, all landowners must be in agreement and sign off on the Weed Management Plan". The project area was along the Yampa River "just west of the Town of Hayden to the south of the city of Craig." After some initial efforts this Plan faltered due to lack of interest and effective organization

Under NRCS leadership several landowners in Routt County have participated in Farm Bill programs to address leafy spurge infestations on private lands. A combination of chemical techniques, as well as, biological control methods have been used with mixed success. Site specific combinations of pest prevention, pest avoidance, pest monitoring and finally pest suppression strategies are taken into account with each Integrated Pest Management Plan aimed at addressing leafy spurge.

CHALLENGES

Routt and Moffat Counties, private landowners, and Colorado Parks and Wildlife have known and understood for at least 30 years the environmental implications of this infestation of leafy spurge on both agricultural and public lands; wildlife; and riparian habitats of the Yampa River. The following are the main challenges faced by the Yampa River Leafy Spurge Project (YRLSP):

1. The Yampa River is unique in the Western United States; it has no major dams and flows with a nearly natural hydrograph for its entire length from the Flat Tops to the confluence with the Green River in Dinosaur National Monument. The natural processes of a free-flowing river have preserved increasingly rare stands of native vegetation. The Yampa River has ideal natural habitats for listed Endangered fish species including the razorback sucker and the Colorado River pikeminnow. Also, along the Yampa River corridor from the Carpenter Ranch (above Hayden) to South Beach (below Craig) there is critical habitat for the recently listed (Threatened) yellow-billed cuckoo. The Yampa River's high-quality riparian habitat supports a diverse array of numerous native bird and mammal species. With the present extent of the leafy spurge infestation and the recent observations that this infestation is spreading along the Yampa River including into the Little Yampa Canyon, and the increasing presence of leafy spurge on multiple sandbars in Dinosaur National Monument provide ample evidence that opportunities to address the threat to the Yampa River will diminish with each passing year, unless immediate and coordinated action is taken.

In order to access and treat the infestation along the Yampa Rive and its tributaries, a river-mobile spray system will have to be devised and outfitted.

2. This infestation of leafy spurge is mainly in the tributaries, back waters, irrigation ditches, and riparian areas of the Yampa River. The riparian nature poses special challenges because of seasonal inundation, proximity to water, and mixed jurisdiction along the Yampa River floodplain. Some of the chemicals used to treat leafy spurge are not effective in wet areas, and others are restricted for use around water bodies. Other chemicals not only destroy woody vegetation like the native cottonwood forests which are prevalent in the area but also native grasses that might compete with leafy spurge.

Any new project will have to rely on research to identify the appropriate chemicals to use in the different habitats that are located within the project area; the most effective timing of treatments; and opportunities for use of integrated methods (e.g., Rx grazing).

An example would be WIN-PST, which is a science based pesticide environmental risk screening tool, which can be used to evaluate the potential for pesticides to move with water and eroded soil/organic matter and affect non-targeted organisms. NRCS partners have access to this tool

for considering environmental risks and making recommendations. Long term human and fish toxicity data and ratings are included in WIN-PST reports, as well as, other mitigation tools.

In order to manage leafy spurge in riparian habitats there needs to be extensive research performed by our federal and state agencies and cooperating academic entities.

3. Biocontrol has been tried in the past. The Black-dot flea beetle (Apthona) was released and seemed to have some affect before they were flooded out in the spring runoff and disappeared.

The project will have to establish its own nursery for flea beetles to be used in the various environments. The copper spurge flea beetle has been recommended by Dr. George Beck as perhaps the best insect bio control for leafy spurge in areas with wet soils.

In the summer of 2016 flea beetles were released on two sites on the CPW State Wildlife Area west of Hayden, CO by Colorado Department Insectary staff from Grand Junction in cooperation with CPW, RCWP, MCWPM, and Routt County Colorado Extension Program. It is planned that these beetles will be able to be harvested and moved to other sites in two years.

4. In the past, sheep have been tried but during the wet season the mosquitoes were so bad that the sheep and herders were driven off.

In order to choose the correct integrated treatment program available, current research will need to be reviewed. Also, mosquito control will have to be part of any targeted grazing component of an integrated weed management plan for leafy spurge in the riparian corridor.

5. Most of the land in the project area is privately owned. Due to the high number of different landowners, it has been difficult in the past to notify, coordinate and maintain interest over a long period of time. Most of the affected lands are in agricultural production, including ranching and hay production.

An example of the difficulty of obtaining the participation of private landowners was The Colorado Headwaters Invasives Partnership of the Yampa and Green Rivers of 2008 (CHIP). The CHIP, with its long-term primary objective to control tamarisk and Russian olive along the Yampa and Green Rivers, had limited success outside of Dinosaur National Monument due to the fact that private landowners could not be persuaded that tamarisk and Russian olive were a real problem. Even with total funding from the project sponsors landowner interest was limited.

The Routt and Moffat County Weed Programs have had success in the past working with landowners on leafy spurge because there is a tangible impact from infestations. However, it

will be necessary to create an outreach program to all private land owners along the more than 100 miles of project area.

The Yampa River Leafy Spurge Project has the opportunity to bring together a diverse group of partners, and to find a coordinated treatment that would work in these riparian areas which could be used as a model in similar riparian environments.

6. The leafy spurge infestation is migrating up the tributaries and irrigation ditches from the Yampa River. The infestation has been observed 4 to 5 miles up Elkhead Creek and in the Fortification Creek drainage in Moffat County. This migration into upland areas could eventually impact sage grouse habitat. This migration along waterways, along with the natural transport of leafy spurge seeds by wildlife, livestock, and humans could negatively impact efforts for sage grouse recovery. If not addressed and controlled leafy spurge could impact the sagebrush understory which is vital to the Colorado Sage Grouse Recovery Plan and derail efforts to stop the US Fish and Wildlife Service from listing sage grouse as an Endangered Species.

The Yampa River Leafy Spurge Project has the opportunity not only to control leafy spurge in the primary infestation area but also to treat outlying infestations before there is an impact to sage grouse habitat.

THE YAMPA RIVER LEAFY SPURGE PROJECT AREA

The primary project area is the lands adjacent to the Yampa River from the Town of Hayden, Colorado to the confluence of the Yampa River with the Green River in Dinosaur National Monument. This has been designated the leafy spurge Focus Area by the YRLSP.

In order to address this leafy spurge infestation and eradicate leafy spurge from Northwest Colorado, RCWP and MCPWM and designated all of Routt and Moffat Counties as the leafy spurge Management Plan Area.

There are also secondary areas that the YRLSP will need to address :

1. In 2015 a 25-acre leafy spurge infestation was discovered on private lands ¼ mile off the Yampa River upstream of Stagecoach Reservoir and State Park. The location of this infestation, along with other infestations in the area, could cause a downstream problem in this stretch of the Yampa River.

2. The major tributaries and creeks of the Yampa River and connecting waterways from upstream of Stagecoach Reservoir to its confluence with the Green River i.e. Elkhead Creek, Fortification Creek, and Anderson Hole and Tepee Draw in Dinosaur National Monument.

3. In Maybell, CO an extensive agricultural area in Moffit County, the Maybell Ditch is increasingly an area of leafy spurge infestation due to the Yampa River.

YAMPA RIVER LEAFY SPURGE PROJECT PARTNERS

Executive Committee
Routt County Commissioners
RC Weed Supervisor
Moffat County Commissioners
Moffat County Weed and Pest Manager
Colorado First Conservation District
Routt County Landowner
Moffat County Landowner
Little Snake BLM
Dinosaur National Monument
Colorado Parks and Wildlife
Yampa River System Legacy Partnership
Northwest Colorado Citizen Representative

Advisory Committee
CSU RC Extension
RC Weed Board
Natural Resources Conservation Service
CO Dept of AG/Weed Coordinator
CO State Board of Land Commissioners
Yampa Valley Land Trust
Yampa Valley Community Ag Alliance
The Nature Conservancy
Friends of the Yampa
Rocky Mt. Youth Corps
The Tamarisk Coalition

Need to Outreach to the following:
RC Conservation District
CSU MC Extension
CO Dept of Transportation

CSU
CO Dept of Natural Resources
Colorado Water Conservation Board
Yampa/White/Green Roundtable
City of Steamboat Springs
City of Craig
Town of Hayden
Representative of Maybell
Union Pacific Railroad

YAMPA RIVER LEAFY SPURGE PROJECT GOALS

The primary goal of the project is to manage this leafy spurge infestation and reduce its area to a manageable threshold level.

The long-term goal is to contribute knowledge necessary to effectively manage leafy spurge in riparian habitats associated with the Yampa River and its tributaries and to develop and implement a long-term monitoring and management strategy that will remove the leafy spurge threat to the agricultural and ecological health of the Yampa Valley in Moffat and Routt Counties.

A corollary goal of the YRLSP project will be to create a model for the long-term control of leafy spurge in riparian areas incorporating an integrated multi-agency weed management strategy that could be replicated elsewhere in Colorado or in other riparian areas in the Western United States.

YAMPA RIVER LEAFY SPURGE PROJECT TIMELINE

Organizational Phase 2015

A. Obtain commitments for the Executive Committee for this regional multi-agency partnership.

B. Outreach to all appropriate organizations for commitments to be on the Advisory Board.

C. Find an organization or 501C3 that will be responsible for the management of all project funding. In 2016 Colorado First Conservation District agreed to be the fiscal agent for the YRLSP grant application to the Colorado Department of Agricultural Weed Program.

2016 Project Objectives

A. Mapping of leafy spurge in project area

1. Gather existing mapping from all partners into one location and use compatible mapping technology. Need to coordinate with Cecily Mui, CDA who has said there is a possibility of CDA hosting and administrating the YRLSP mapping.

2. Fly the project area and map leafy spurge infestation during bloom with aerial technology and coordinate with existing mapping.

3. Ground truth aerial mapping using GPS technology in order to pick up infestations not visible from air or where small sparse populations of leafy spurge occurs.

4. Continue inventory mapping using GPS technology for project inventory.

5. Dinosaur National Monument will complete a leafy spurge map for infestations along the Yampa River and tributary drainages in Dinosaur National Monument and provide data to project partners.

B. Research of treatment strategies in riparian areas and creation of Project Management Plan

1. Investigate through Colorado State University and other sources appropriate leafy spurge treatment methodologies for riparian areas.

2. Fund a CSU graduate student to collate this research and advise the YRLSP in creating a multi-year integrated weed management treatment plan for the project area. Need to talk to Scott Nissen, CSU Dept. of Bioagricultural Sciences and Pest Management.

3. YRLSP Partners will complete a 10-year leafy spurge treatment Project Management Plan by end of 2016

C. Outreach program for project area private property landowners

1. Hire a part-time Private Property Coordinator who will direct the private property Outreach Program

2. Put together a project area landowner list using Routt and Moffat County GIS and other property search resources.

3. Create a mailing list and mail out project information to all landowners and necessary follow-up, at least two mailings.

4. The Private Property Coordinator will schedule and coordinate community meetings with landowners and attend local county meetings where agricultural operators can be approached.

5. Encourage private landowners to treat infestations through NRCS Farm Bill Programs such as EQIP.

D. Continue funding weed control in designated containment area at existing funding levels

1. Routt and Moffat County Weed Programs will continue leafy spurge treatments in the containment area, the area along the Yampa River from west of the Town of Hayden to south of the City of Craig

2. Colorado Parks and Wildlife will continue funding leafy spurge treatments at the Yampa River State Wildlife Area, the Yampa River State Park, and other CPW river access points.

3. The YRLSP will apply for funding for leafy spurge treatments by private property owners in the containment area and to address other areas with infestations.

4. The Colorado State Board of Land Commissioners (SLB) will continue to contribute to Moffat County Pest and Weed Management to control leafy spurge on SLB lands.

5. Dinosaur National Monument will continue containment actions (hand-pulling by volunteers and river staff along the river corridor as new incipient infestations are encountered) and additional strategies will be considered as research results become available. Containment actions will continue in Anderson Hole and Tepee Draw (tributaries).

6. Dinosaur National Monument and BLM will continue their existing leafy spurge treatments on lands adjacent to the Yampa River.

E. Establish a flea beetle nursery with volunteer help. The CDA Insectary staff is eager to help us establish a leafy spurge flea beetle nursery this year. Colorado Parks and Wildlife would be very interested in starting a beetle nursery on the Yampa River State Wildlife Are

F. Apply for funding through the Colorado Department Agriculture Weed Fund. Application due January 11, 2016. The YRLSP applied for a $101,000 grant to the CDA Weed Fund to address: 1. Aerial Mapping from Hayden, CO to Dinosaur National Monument ; 2. Funding for a CSU Graduate Student for riparian area leafy spurge research; and 3.Funding for a Project Manager/Private Land Coordinator. The YRLSP's application was approved but for only $30,000 due to lack of funds and the numerous applications to CDA Weed Fund. In order to accomplish the project goals of 2016 with limited funds the YRLSP will: 1. Attempt to complete an area leafy spurge map with help from the YRLSP partners using existing satellite imagery and GPS ground work; 2. RCWP and MCWPM will perform a limited amount of leafy

spurge treatment within the leafy spurge Focus Area and on adjacent lands within the Management Plan Area; and 3. The YRLSP will hire a part-time Data/Private Landowner Coordinator.

G. YRLSP Partners will research funding sources for 2017

H. The YRLSP Partners will creat a 10-year Leady Spurge Management Plan.

2017 Project Objectives

A. Fund and hire a Project Coordinator

Project Coordinator will be responsible in carrying out the YRLSP Leafy Spurge Management Plan

B. As per Management Plan begin to treat leafy spurge in the Fucus Area and continue treatment in the Management Plan Area with the objective of reducing the area of infestation and eliminating any new outbreaks.

C. Purchase and outfit a river-mobile craft that will be able to treat the leafy spurge present along the banks of the Yampa River

D. Maintain the leafy spurge nursery established on the CPW State Wildlife Area for leafy spurge beetles.

E. Apply for funds from various sources as per Management Plan to include: treatments of private and public lands; and necessary organizational expenses.

Years Three through Ten 2018-2025

A. As per Leafy Spurge Management Plan developed by the YRLSP Partners

FUNDING SOURCES FOR THE YAMPA RIVER LEAFY SPURGE PROJECT

1. HPP: Colorado Parks and Wildlife (Jim Haskins)
2. Taylor Grazing Act:
   Routt County Weed Board (Tim Corrigan and Greg Brown)
   Moffat County
3. RCPP, EQIP Funds, private landowner sign-up: NRCS (Christine Shook

4. Water Resources Grant Funding, Colorado River District, invasive weed programs are eligible. Application due in January
5. Pursue a CAP (114) for Integrated Pest Management (NRCS, Christine Shook)
6. Yampa/Green/White Basin Roundtable funds from Colorado Water Conservation Board
7. Colorado Department of Agriculture, Invasive Weed Grant due in January
8. Colorado Parks and Wildlife - Wetland Wildlife Program - http://cpw.state.co.us/aboutus/Pages/Wetlands.aspx - funding announcements usually come out in March.
9. Colorado State Forest Service http://csfs.colostate.edu/media/sites/22/2014/02/Landowner-CommunityFinancialAssistancePrograms-rev4-21-14.pdf
10. From the CDA Noxious Weed Program site:

There are several dedicated funds that annually solicit funding proposals related to weed management. Please check the pertinent websites for additional information.

- Colorado Water Conservation Board
- Colorado State Conservation Board
- Natural Resources Conservation Service
- The National Fish and Wildlife Foundation - Pulling Together Initiative
- Colorado Parks and Wildlife Habitat Partnership Program (HPP) offers grants for large scale habitat improvement
- Colorado Parks and Wildlife Wetlands Project Funding offers grants to restore enhance and create wetlands and riparian areas in Colorado.

Sage Grouse Initiative webinar, January 20th, Possible funding due to federal and state sage grouse efforts: Full announcement and webinar instructions: http://www.conservationwebinars.net/webinars/grazing-strategies-for-riparian-and-wet-meadow-improvement-in-the-sagebrush-steppe

APPENDIX OF POSSIBLE TREATMENS FOR LEAFY SPURGE

The Yampa River Leafy Spurge Project is an integrated multi-faceted project. Many of the treatments outlined below will be used in combination with other treatments in order to maximize the effect on the target infestation of leafy spurge.

1. Chemical Control Treatments

A. Herbicides (upland):

2,4-D: in spring or fall
Vanquish/Clarity (dicamba): in spring or fall; not near woody plants
Tordon 22K (picloram): in spring or fall; not near woody plants
Aminocyclopyrachlor: Similar to Tordon
Roundup (glyphosate)
Plateau (imazapic): for non-crop areas; can be used around trees
Paramount: Recommended for away from water by K. George Beck, Professor of weed Science, CSU

B. Herbicides (Wetlands):

Habitat: Recommended for adjacent to water by K. George Beck, Professor of Weed Science, CSU

2. Biocontrol Treatments

A. Beetles (Flea Beetle Types)

1. Black-dot flea beetle (*Apthona nigriscutis*): open dry sites; sandy loams and open sites

2. Brown-dot Spurge flea beetle (*A cyparissiae*): soils higher in moisture

3. Black Spurge flea beetle (*A czwalinae*): larva feed on roots and adults on foliage; moist clay soils **Recommended for their tolerance to soil moisture by K. George Beck, Professor of weed Science, CSU**

4. Copper Spurge flea beetle (*A flava*): larva feed on roots and adults on foliage; In coarse soils with high water tables **Recommended for their tolerance to soil moisture by K. George Beck, Professor of weed Science, CSU**

B. Grazing (Animal Types)

1. Angora Goats Need to contact Pat Evangelatos, GreenGoatPatrol.com, 970-879-4524

2. Sheep: **From K. George Beck, Professor of Weed Science, CSU**, Grazing with sheep or goats represents yet another option. Years ago, we tested sheep grazing with the flea beetles on a creek in eastern Colorado (just east of Aurora) and 8 sheep grazing for 10 days or 6 sheep for 20 days with flea beetles controlled 90-100% of leafy spurge in 5 years. We allowed the animals to graze in July and because leafy spurge wasn't as palatable as earlier in the year, these lighter stocking intensities provided the greatest control because they left a lot of standing spurge with axial meristems intact. This turned out to be important because the axial

meristems in leaves and shoots control the “germination” of adventitious root buds. We also examined much higher stocking intensities (2, 4, 6, or 8 sheep per acre grazing for 10, 20, or 30 days in July – the timing was very important). The highest stocking intensity (8 sheep for 30 days) mowed the spurge down to 2-4 inches tall and each spring, it was a forest of new spurge shoots. So, this is another thought albeit a bigger hassle tending grazing animals and the last thing one wants to see is a moonscape after grazing because that will just exacerbate the problem … similar results if not worse than 8 sheep for 30 days.

3. Cattle may be appropriate in some situations.

C. Ground Cover

Canary Grass (NRCS does not recommend seeding Canary Grass, especially in wet environments. It may be better than leafy spurge but it could potentially dominate this area and form a monoculture. It is considered invasive and in certain situations also necessitates costly control measures.)

Other Grasses: It would be an appropriate element of this project to research and evaluate more appropriate native grass species for the reclamation of leafy spurge infestations in riparian sites.

Revegetation/Reseed