Integrated Roadside Vegetation Management Plan

Buena Vista County

Version Date: APRIL 2024

Table of Contents

Appendices

List of Figures

List of Tables

1. Preface

This Integrated Roadside Management Plan (IRVM) was originally prepared by Greg Johnson, Conservation Board Director, and formally adopted as Buena Vista County's IRVM Plan in May 2017. This Plan focuses on how the vegetation along County-maintained roadways is to be managed. The following information includes the first update to the aforementioned IRVM Plan, and will be submitted to, and be on-file with, the Iowa Department of Transportation (Iowa DOT) as a requirement for Living Roadway Trust Fund (LRTF) grant funding.

Version: Buena Vista County IRVM Plan 2.0

Version Date: April 2024

Adopted April 23rd of 2024

Contributors to the Plan:

Plan Update by Brian Jones – Roadside Manager

Review and Comment from: Conservation Board Director, Conservation Board, County Engineer, and Board of Supervisors

2. Executive Program Elements

Executive Summary

The Buena Vista County IRVM Program recognizes that it is in the general public's welfare that the vegetation of their roadsides be preserved, planted and maintained to be safe, visually interesting, ecologically integrated, and useful for many purposes. The Buena Vista County Conservation Board in cooperation with the Buena Vista County Secondary Roads Department provides a dedicated roadside vegetation management program, which is designed to promote the following:

- Maintenance of a safe travel environment by providing adequate line-of-sight at intersections, minimizing snow drifting, and removing potentially dangerous trees and other obstructions
- Serve a variety of public purposes including drainage, erosion control, wildlife habitat, recreational uses, noxious weed control, scenic qualities, and sustenance of water quality
- Emphasize the establishment of adaptable and long-lived vegetation, often native species, matched to the unique environment found in and adjacent to the roadside
- Be based on a systematic assessment of the conditions existing in roadsides, preservation of valuable vegetation and habitats in the area, and the adoption of a comprehensive plan and strategies for long-term, cost-effective maintenance of roadsides
- Build upon a public education program allowing input from adjacent landowners and the general public
- Incorporate integrated roadside vegetation management with other state/local agency planning and program activities including the recreational trails program, scenic highways, open space, and tourism development efforts

Goals

The formation of this IRVM Plan hopes to successfully establish and maintain a self-sustaining and visually interesting plant community within the county right-of-way that provides for public safety, controls weeds, reduces erosion, preserves and/or increases biodiversity, improves infiltration, maintains drainage patterns, provides pollinator habitat, and provides a reduction in long-term maintenance costs. The following practices represent goals to adopt to achieve success:

- Promote, preserve, establish, and manage native plant materials whenever possible and appropriate
- Survey and maintain an updated inventory of the vegetative community and plant species found within the county right-of-way
- Determine and implement the best IRVM practices for maintaining the right-of-way for public safety and an economically and environmentally sustainable plant community

- Utilize controlled burns to meet management objectives
- Continually evaluate and monitor the effectiveness of implemented IRVM techniques
- Work with adjacent landowners, government officials, community groups and the public to implement and promote the IRVM program and roadside beautification projects
- Adopt and implement emerging trends in planning and management of roadsides
- Maintain safe travel corridors while enhancing the scenic qualities of the roadsides and their value as pollinator habitat
- Make efficient and effective use of the roadside spraying program and promote the reduction of herbicide use whenever possible
- Stabilize road construction projects by seeding and providing adequate erosion control
- Reduce the visibility hazards created by trees and brush on county highways, road intersections, and other areas through selective brush control and stump treatment.
- Provide support and endorse special roadway designations such as the Scenic Byways Program
- Utilize funding and seed sourcing from the Living Roadway Trust Fund and Transportation Alternatives Program (TAP)

Program History

Buena Vista County has operated a spot spray program for weed control for many years. Records indicate that in 1989, the first discussion between the Conservation Board and Board of Supervisors to put the "Weed Department" under the control of the Conservation Board was held. A formal resolution was passed in 2003 to put the "Weed Department" under the control of the Conservation Board. An additional resolution was passed in 2011 stating that the "Weed Department" was to be under the control of the Conservation Board (Exhibit 1).

Conservation Board records indicate that the first IRVM plan was drafted in 1996. It is unclear if the plan had been summited to the Iowa DOT; however, it was signed by the Board of Supervisors (Exhibit 2).

Prior to 2003, it is generally assumed that a form of the program was operated seasonally as part of the Secondary Roads Department. Between 2003 and 2017 the "Weed Department" program was conducted by seasonal staff consisting of a Head Sprayer, Driver, and other seasonals as needed that conducted spot-spraying for noxious weed and limited brush control.

In the fall of 2016 discussions were held between the Conservation Board and Director about hiring a full-time Roadside Manager-Vegetation Specialist. When the Conservation Board's annual report was presented to the Board of Supervisors in the fall of 2016, it included the recommendation to hire a full-time Roadside Manager to conduct an IRVM program. A budget was submitted to the Board of

Supervisors that included wages for a full-time manager and for equipment to increase the capacity of the program, this was approved in the spring of 2017.

The Conservation Board hired current Roadside Manager Brian Jones in June 2017 as Roadside Manager-Vegetation Specialist and to administer the County's IRVM Plan.

IRVM Decision Making Process

Daily activities and priorities of the IRVM Plan are coordinated between the Roadside Manager and the Conservation Board Director. Budget and equipment needs are negotiated annually by the Board of Supervisors and the Conservation Board through the County's budget process. Special projects, equipment needs, and brush removal is coordinated between the County Engineer and the Conservation Director.

Program Type

The IRVM program is in control of the County Conservation Board under the direct supervision of their Conservation Board Director.

Area Map

See Exhibit 3.

3. Jurisdictional Recognition and Approval

Management

The Buena Vista County IRVM program is managed by the Roadside Manager, which is under the control of the Buena Vista County Conservation Board, while the Roadside Manager is under direct supervision of the Conservation Director.

The Roadside Manager is tasked with prioritizing and implementing strategies to meet the goals outlined in this IRVM Plan. Specific examples of tasks include, seeding, erosion control measures, and management of native vegetation after establishment (burning, spraying, etc.). The Roadside Manager administers the roadside management program through each season of the year and adapts practices to changes in available staff, local plant species phenology, herbicide label restrictions, etc. while also incorporating necessary training, and public outreach programs through the year (See Exhibit 4 for full job duties).

The proposed budget for the IRVM program is coordinated between the Roadside Manager and Conservation Director. Final approval is made by the Conservation Board and Board of Supervisors.

Board of Supervisors

The role of the Board of Supervisors is to approve the budget of the Conservation Board, of which the IRVM or "Weed Department" budget is presented in separate line-items from those of the Conservation Department.

Additionally, the Conservation Board hires the County Weed Commissioner with the approval of the Board of Supervisors. Currently, this is the Director of the Conservation Board with the Roadside Manager acting as Deputy Weed Commissioner.

The Weed Commissioner meets monthly during the growing season with the Board of Supervisors to update them on IRVM activities and receive their input. The Weed Commissioner also presents the Board of Supervisors an Annual Report in the fall of each year that details the work activities of the year and addresses issues that may become a priority.

A Statement of Support from the Board of Supervisors can be found in Exhibit 5.

Iowa Code and Administrative Rules – State Laws and Regulations

The following sections of Iowa Code pertain to the IRVM program in Buena Vista County:

Section 314.22 Integrated Roadside Vegetation Management

https://www.legis.iowa.gov/docs/code/314.22.pdf

Section 314.21 Living Roadway Trust Fund

https://www.legis.iowa.gov/docs/code/314.21.pdf

Section 314.17 Mowing Law

https://www.legis.iowa.gov/docs/ico/code/314.17.pdf

Section 314.19 Re-seeding Open Ditches

https://www.legis.iowa.gov/docs/code/314.19.pdf

Section 317.11 Weeds on Roads - Harvesting of Grass

https://www.legis.iowa.gov/docs/code/317.11.pdf

Section 318.3 Obstructions in ROW / Destruction of plants placed in ROW / Crops in ROW

https://www.legis.iowa.gov/docs/code/318.3.pdf

Chapter 317. 1C Iowa Weed Law – Department - Powers and Duties

https://www.legis.iowa.gov/docs/code/317.1C.pdf

Iowa Administration Code, Agriculture and Land Stewardship, Chapter 58 – Noxious Weeds

https://www.legis.iowa.gov/docs/iac/chapter/01-10-2024.21.58.pdf

Local Laws and Regulations

Local laws, regulations, and policies pertaining to IRVM in Buena Vista County reflect that of Iowa Code, as well as any other State and Federal regulations that are specific to management activities that occur within the jurisdiction of the Buena Vista County's IRVM program. Conservation Board employees regularly receive workplace safety training that adhere to Federal OSHA, State, and County laws and policies. The Buena Vista County IRVM program recognizes that herbicide labels and use restrictions contained within them are the law.

Annually in March the Board of Supervisors will pass the Program of Control or "Weed Resolution" that stipulates what species have to be controlled in the County based on the Iowa Department of Agriculture and Land Stewardship (IDALS) priority species for eradication and control and by what date. These species are listed in Iowa Administrative Code IDALS Chapter 58, and may change annually. The Iowa Noxious Weed Law, Chapter 317.1C gives IDALS the authority to prioritize from

the species listed in 317.1A. As described in 317.1C, the Program of Control proposed by the Weed Commissioner and adopted by the Board of Supervisors considers IDALS priority species. This resolution is advertised in the local media as a Public Notice (Exhibit 6).

Permitting

Permits pertaining to construction or utility work in the County right-of-way in Buena Vista County are handled through the County Engineer/Secondary Roads Department and are subject to Board of Supervisor approval.

Local residents have the option to opt-out of spraying on roadsides by the IRVM Program adjacent to their properties, this is obtained annually through the Conservation Board. Landowners are responsible for controlling noxious weeds in their roadside if they choose to sign a "Do Not Spray" permit (Exhibit 7). Signees are given a set of No Spray signs and are informed that the agreement for the "Do Not Spray" permit is only between themselves and the Conservation Board, and does not prohibit utility companies, neighbors, etc. from using herbicides within the roadsides.

Obstructions, Nuisance, and Enforcement

Vegetation that may grow large enough to obstruct traffic safety and sight-lines at intersections is physically removed generally by the Secondary Roads Department as they become aware of such situations. Similarly, nuisance trees that are established within private property, but have grown to encroach into the right-of-way or over the roadway are often physically trimmed with large equipment by the Secondary Roads Department. Often nuisance groves of trees will shade the roadway and prevent snow/ice from melting completely and create hazards for motorists. These areas are often discovered during the winter season by those performing snow removal and addressed in the spring/summer if possible.

The IRVM Program employs brush control strategies through foliar spraying, manual removal, prescribed fire, basal-bark application, chemical side-trimming, etc. within the roadside so that trees and brush do not become large enough to become obstructions or nuisances in the future. It is a goal of the IRVM Program to perform adequate brush control within 25% of the County's right-of-way so that each section of right-of-way is managed for brush approximately every four years.

Buena Vista County does not have ordinances that convey the responsibility of brush/tree control to the landowner within the right-of-way so there are no inspection, notification, or violator policies.

4. Program Organizational Structure

Staff Organization Chart

- Buena Vista County Board of Supervisors (budget)
- Buena Vista County Conservation Board (supervision)
  - Conservation Board Director
    - Roadside Manager
      - Seasonal Spray Truck Driver
    - Roadside Technician
    - Seasonal Staff

Staffing Needs

The IRVM Program since 2017 has consisted of a full-time roadside manager and a seasonal spray truck driver to operate the seasonal spray program, which annually has performed control of noxious weeds required by Chapter 317 to the approximately 2,000 miles of county right-of-way. In addition, in order to meet the 25% annual goal of completing adequate brush control of county right-of-way, a full-time roadside technician was first hired in 2019 (See Exhibit 4 for Technician and Spray Truck Driver job duties). A seasonal staff member has also been employed annually to assist in brush control and is typically shared with the Conservation Department. The IRVM Program has also performed a Special Roadway Maintenance Agreement for the Iowa DOT since 2018 that requires at least three staff members, and typically will utilize one Conservation employee for several days a year.

Succession Plan

When vacancies or additional positions are to be filled, the hiring process will be conducted by the Conservation Board and Director.

5. Public Involvement

Steering Committee

The IRVM Program is within the Conservation Department, which is overseen by the Conservation Board and serves in the capacity of a Steering Committee for the IRVM Program when roadside management is discussed. The five-member Conservation Board is appointed by the Board of Supervisors from County residents when openings occur, and serve 5-year appointments that may be renewed by the Board of Supervisors.

Partners

The IRVM program and Buena Vista County Conservation in general has maintained relationships with the Buena Vista County Soil and Water Conservation District, NRCS, Iowa State Extension, City Governments, Glacial Trail Scenic By-way Committee, The Nature Conservancy, U.S. Fish and Wildlife Service, Little Sioux Watershed Conservation Partnership, Raccoon River Watershed Management Authority, UNI's Tallgrass Prairie Center, Iowa Weed Commissioner's Association, Iowa DOT District 3, Living Roadway Trust Fund, and Other Local Conservation Organizations.

Education and Outreach

Being highly visible on public roadways, IRVM staff regularly interact with the public while performing job duties associated with roadside management. Often times concerns or curiosities are expressed by the public while performing the work. It is understood that those who are employed by County Government are to serve the public's interest. Therefore, it is encouraged within the IRVM Program to take opportunities to engage with the public to address any concerns, and to provide requested information regarding work within the roadsides. This includes utilizing pamphlets developed by the UNI's Tallgrass Prairie Center that discuss various topics on roadside management.

The roadside manager participates in training sessions with partner organizations to facilitate education within the local public and private conservation community. Examples include presenting prescribed fire training through the Little Sioux Watershed Conservation Partnership, and conducting a tree disease program with the local Iowa State Extension.

Communication Mechanisms

Annually the Board of Supervisors passes a “Weed Resolution” that is prepared by the IRVM Program/Weed Commissioner that includes species of control, applicable dates for control, a description of herbicides commonly used by the IRVM Program, instructions for being included in the “Do Not Spray” Program, and other pertinent information. This resolution is published in each of the County’s official published media outlets.

The Conservation Department maintains a social media Facebook page and website to promote events and to showcase activities conducted by staff. This media outlet can be used more to communicate IRVM activities with the public.

6. Inventory and Analysis

Natural Resources

- Tools
  - The IRVM Program utilizes a spray mapping software package called SprayLogger from AgTerra Technologies that generates geo-referenced polygons when specific boom sections are turned on during chemical application; and no-spray lines when the truck is moving, but not spraying chemical (Figure 1). The SprayLogger software also generates a chemical application record daily log as required that entails chemical name, applicator name, chemical amount, hourly weather, and other necessary information (Figure 2). The Spraylogger system is currently utilized to record and document spray applications in both spray trucks and the UTV used for roadside application.

  - A companion software Program called MapitFast also by AgTerra is used as a GIS mapping tool on a mounted tablet inside the cab of the truck to quickly mark locations of weed populations, disturbed areas for future seeding, and remnant vegetation locations on several available aerial images, and other basemaps such as topographical (Figure 3). The tablet can be dismounted from the truck and be used to take geo-referenced photos in the field as well. Both SprayLogger and MapitFast have been used by the IRVM Program since 2018 and the generated mapping and spray reports are stored digitally in cloud-based storage by Ag-Terra for an annual subscription.

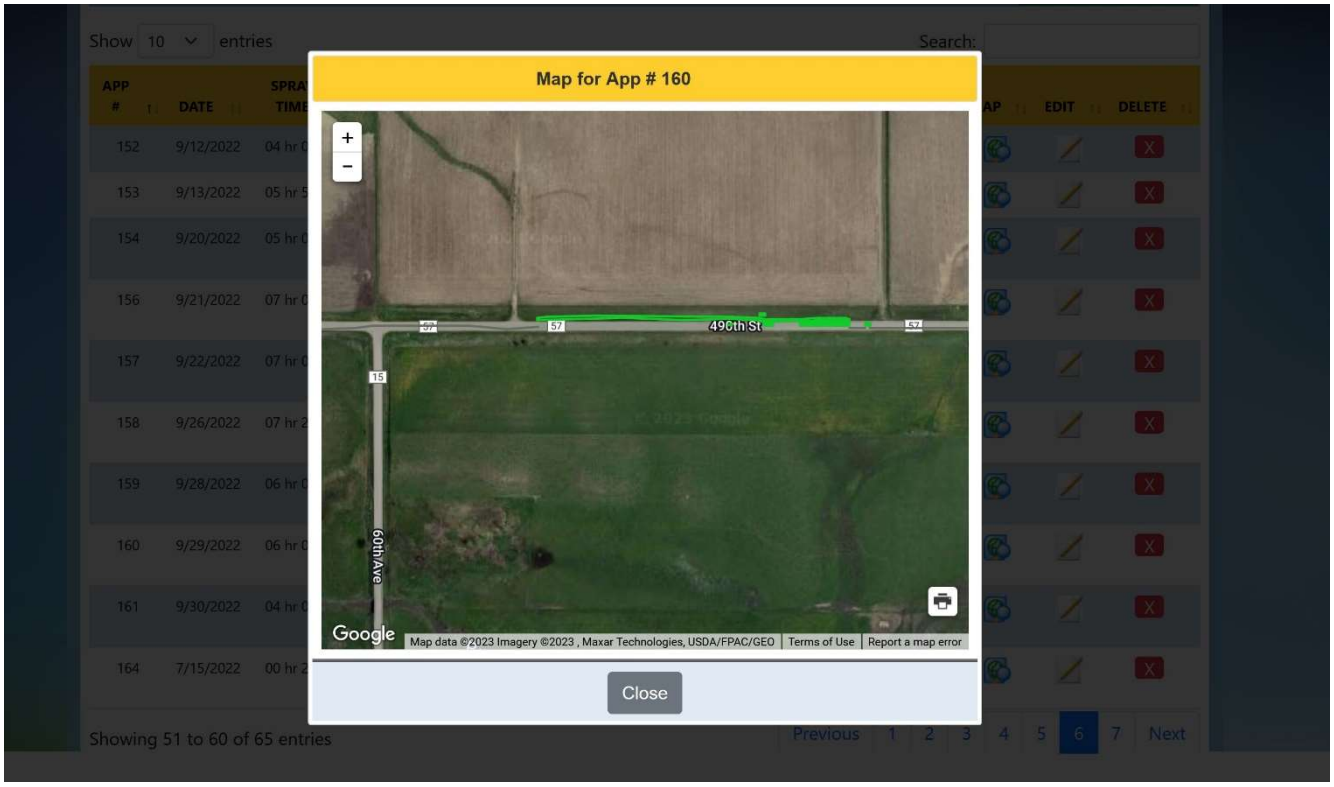


Figure 1. Spray Polygons (green) and No-spray lines (gray) shown on aerial photography generated by Ag-Terra mapping software.

Application

Application #:	126	**Gallons Applied:**	82.940	**Calibrated GPA:**	20.00	**Acres Treated:**	4.147
SprayLogger Serial:	E3B183059	**Rig Name:**	Spray Truck			**Rig Capacity:**	N/A
Rig Billing Basis:		**Rig Billing Units:**	1.00	**Rig Billing Rate:**	$ 1.00	**Rig Total Cost:**	$ 1.00
Tank Mix Description:	Thistle Spray Truck						
Miles Logged:	69.287	**Miles Treated:**	4.105	**Application Comment:**			

Chemicals

Chemical	EPA#	Chem Rate	Chem Used	Unit Cost	Est. Cost
Milestone	62719-519	7.00 fl oz / Acre	29.03 fl oz	$ 312.50 / gal	$ 70.87
Premier 90	exempt	6.00 fl oz / Acre	24.88 fl oz	$ 20.08 / gal	$ 3.90
Guardian	exempt	12.00 fl oz / Acre	49.76 fl oz	$ 18.01 / gal	$ 7.00
				TOTAL:	$ 81.77

Applicators

Applicator Name	Address	Contact	License	Rate	Units	Total
Brian Jones			50561	$0.00	1.00	$ 0.00
					TOTAL	$ 0.00

Application Work Days

Day	Start Time	Stop Time	Hours:Minutes
1	7/27/2018, 7:17:01 AM	7/27/2018, 2:53:30 PM	07:36

Weather Information

Time	Temperature	Precipitation	Humidity	Wind Speed	Direction	T. Inversion
7/27/2018 7:04:14 AM	54 F	0	94 %	7 mph	NW	NO
7/27/2018 8:04:01 AM	57 F	0	88 %	6 mph	W-NW	NO
7/27/2018 9:04:03 AM	63 F	0	77 %	6 mph	N-NW	NO
7/27/2018 10:04:03 AM	66 F	0	73 %	7 mph	NW	NO
7/27/2018 11:04:03 AM	68 F	0	60 %	8 mph	NW	NO
7/27/2018 12:04:01 PM	70 F	0	57 %	9 mph	NW	NO
7/27/2018 1:04:01 PM	72 F	0	53 %	6 mph	NW	NO
7/27/2018 2:05:01 PM	70 F	0	57 %	6 mph	N	NO

Figure 2. SprayLogger daily chemical application log.

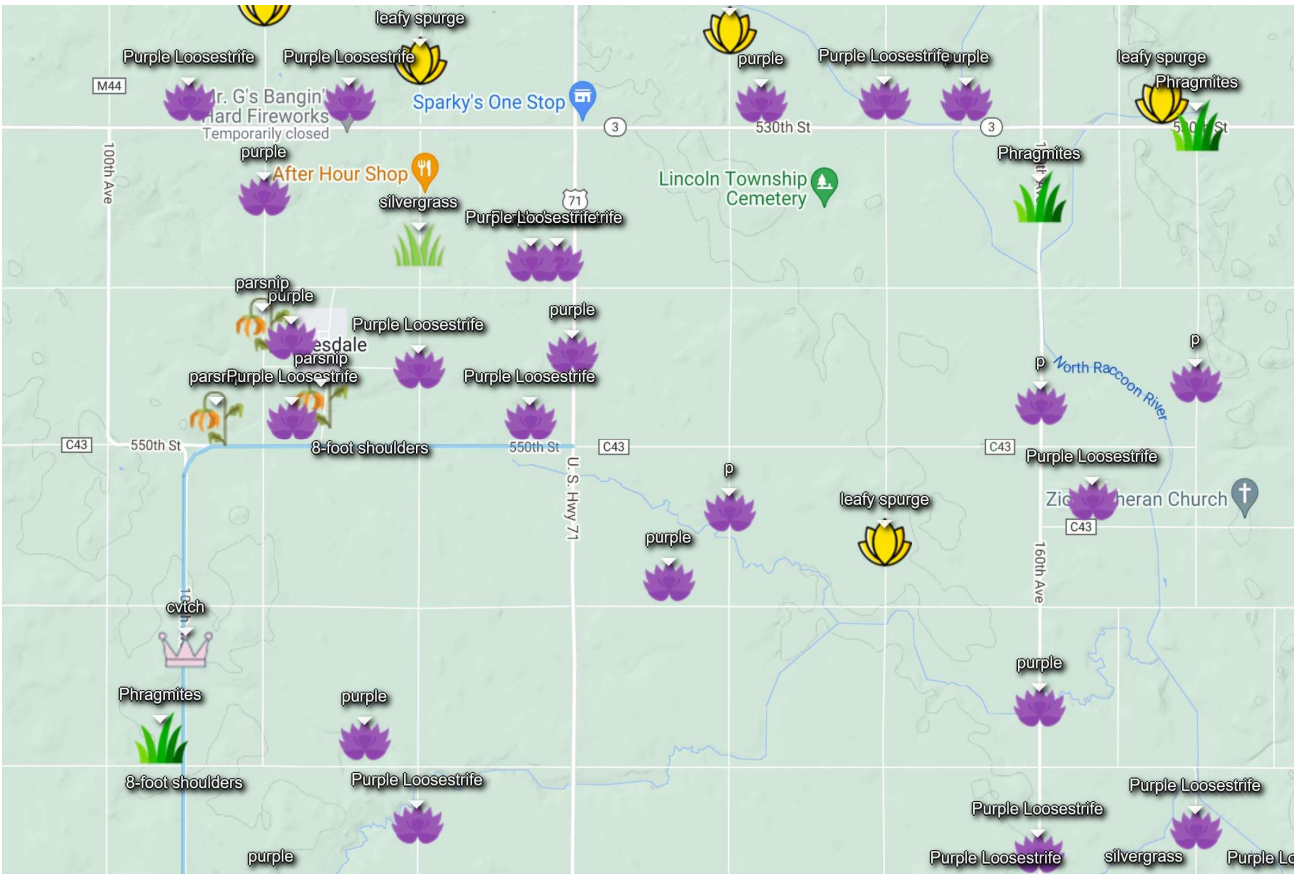


Figure 3. MapitFast software showing mapped weed locations within the County.

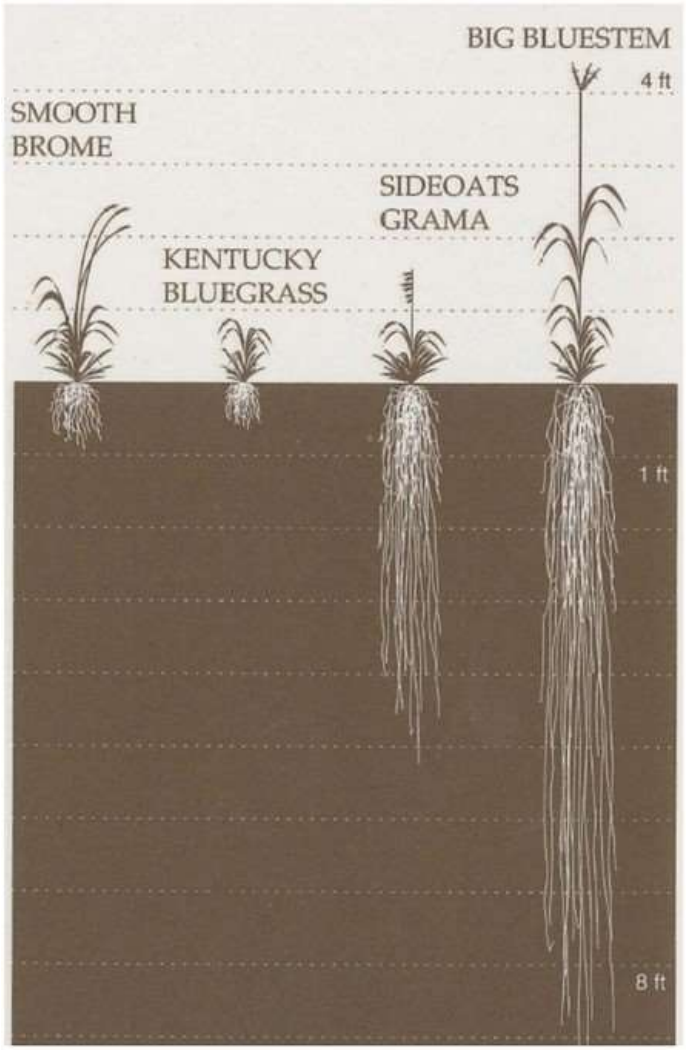
- Vegetation
  - Most roadsides within Buena Vista County and across Iowa are dominated by smooth brome, which was likely seeded after the construction and maintenance of the roadway's dimensions. While other smaller areas, where roadway dimensions may have required little to no additional grading to construct the road, pockets and slopes of historical remnant prairie vegetation still remains today. In the northern part of the County, which generally has more topography and along the Little Sioux River there are many prairie remnants within the roadside.

  - The only official roadside inventory that was conducted in Buena Vista County occurred in 1997. This document is in paper format and is difficult to interpret and understand. It would be beneficial for the County to have a new inventory conducted that would include digitized maps and geo-referenced locations to intergrade with our GIS mapping software.

    However, the IRVM Program has assembled data while spraying using MapifFast software to map locations of remnant prairies and potential areas for seed collection sites. This

effort was not comprehensive, but is a beginning to locate these important plant communities.

- Seeding of new construction activities and areas of bare ground within the roadside by the IRVM Program has entailed a diverse mix of native vegetation to hold the dimensions of roadway construction and prevent erosion. Also, a diverse mix of native vegetation is adapted to withstand drought having a formidable root system, and providing wildlife benefits is preferable to any single species seeding that may not withstand all future pests/conditions (Figure 4). The elimination of green ash trees by the emerald ash borer is one recent example of possibly relying too heavily on a single species.



Drawing courtesy of the Minnesota Department of Transportation

Figure 4. Plant profiles of common roadside grass species.

- Watersheds
  - Two major watersheds exist in Buena Vista County that are separated by the edge of the Des Moines Lobe of the Wisconsin Glacier. The Little Sioux River Watershed incorporates the northwestern parts of the County that flows to the Missouri River. Buena Vista County Conservation regularly participates in the Little Sioux Watershed Cooperative Partnership that brings together many partners to collectively address watershed conservation issues.

  - The remainder of the County flows into the Raccoon River Watershed that ultimately flows into the Mississippi River. The North Raccoon River Watershed Management Coalition (NRRWMC) has been created in the watershed that includes 28E agreements that have been signed by 40 city, soil and water conservation, and county government entities. The NRRWMC acts as a Watershed Management Authority (WMA) under Iowa Code to improve the watershed's water quality and reduce flooding through collaboration and planning with the governments involved.

- Special Road Designations
  - Buena Vista County contains approximately 13 miles of the Glacial Trail Scenic Byway (formerly Old O'Brien Glacial Trail Byway). This unique 36-mile byway takes in a four-county area (O'Brien, Clay, Cherokee and Buena Vista) of "rolling plains of glacial drift" in northwest Iowa. Currently the Conservation Director sits on the Glacial Trail Byway Committee.

Equipment

An Equipment Inventory for pieces of equipment used by the IRVM Program is included in Exhibit 8. Equipment listed that is dedicated to the IRVM Program is noted to be housed in the IRVM Program. Alternatively, equipment that is available to the IRVM Program, but is shared with the Conservation Department is noted as being housed in the Conservation Department. The majority of equipment is physically stored at the Conservation Department's main headquarters at Buena Vista County Conservation Park near Peterson, IA. Some of the equipment and the hydromulch used for seeding is stored at a County-owned building in Truesdale, IA that is in poor repair and is anticipated to be abandoned due to costs associated with extensive repair needed to the roof of the building. Seasonally, our newer spray truck is over-wintered at a Secondary Roads building in Storm Lake, IA.

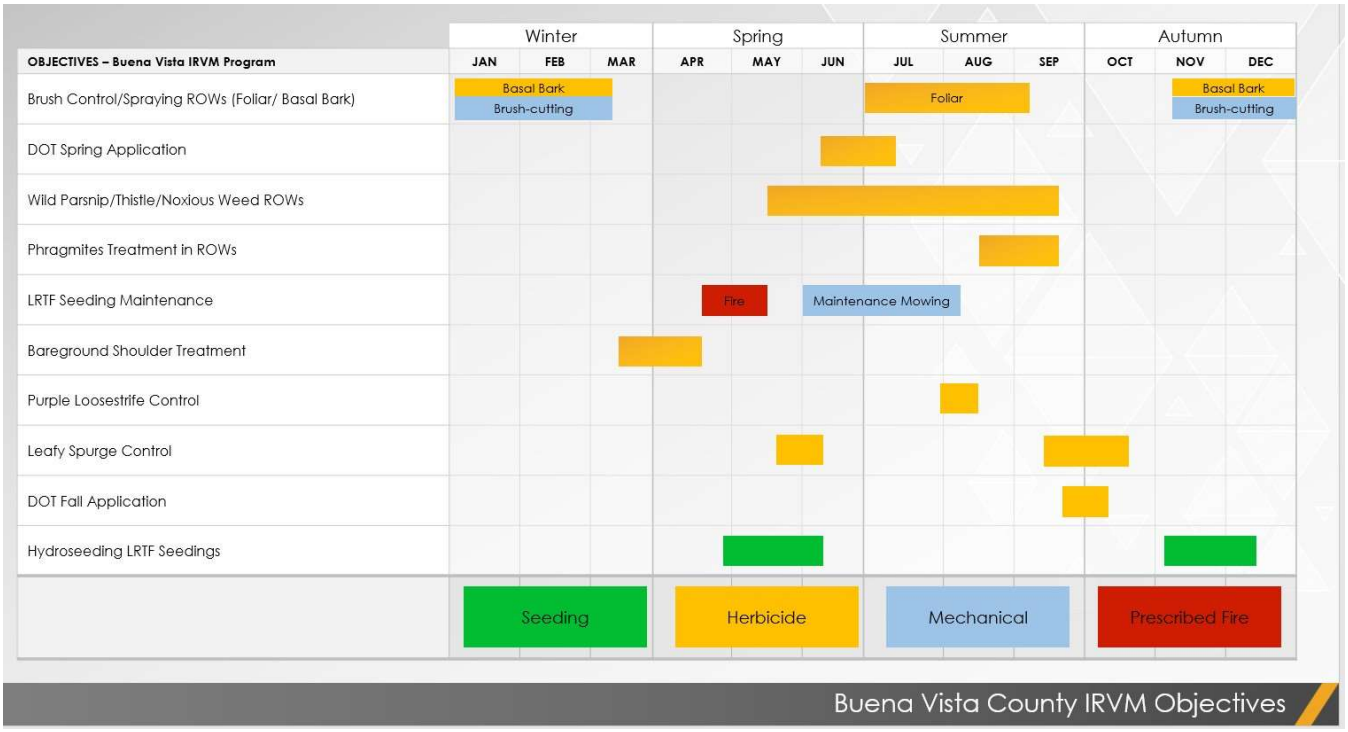
There is a need for the IRVM to run more effectively to have equipment stored at a centralized location, especially with the unknown availability of the Truesdale location for future equipment storage. Future equipment/space for seed storage is needed where LRTF is presently stored in the basement of the Conservation Board Office. Also, a small seed processing/cleaning space and equipment would facilitate expanded seed collection efforts to compliment the seed already provided through LRTF.

7. Program Operations

Annual Operations

Roadside management activities that annually are similar each year and are conducted by the IRVM Program are shown in Table 1. The Roadside Manager, Roadside Technician and/or IRVM seasonals may be assigned to assist on other Conservation Board projects or programs throughout the year.

Table 1. Buena Vista IRVM Program Annual Operations Calendar



Work Area Types

- Rural

The large majority of the IRVM program's fieldwork is conducted within rural settings. The County maintains approximately 2,000 right-of-way miles of roadsides along gravel roads and blacktops. Streets within the rural communities in the County are under the jurisdiction of the town and the roadsides are under their local ordinance to be mowed lawn. Therefore, IRVM management is generally not conducted within a town or to an area maintained as lawn.

- Urban

Very little work is done within the urban interface; occasionally spot spraying, or a seeding is conducted within roadsides within the City of Storm Lake.

Vegetation Types for Specific Users

The vegetation types that are managed under the IRVM Program are dependent on the adjacent land use. Table 2 lists the typical land use types and generally how the vegetation may be managed in terms of seed type, spot spraying, establishment mowing, and prescribed burning.

Table 2. IRVM Management for Adjacent Land Use

Land Use Type	Seed Type	Spot Spray	Establishment Mowing[1]	Burn[2]
Rural adjacent agriculture	Native-forb mix	Yes	Yes	Yes
Rural adjacent non-agriculture	Native-forb mix	Yes	Yes	Yes
Rural adjacent homestead	Cool-season lawn mix	Yes	Yes	No

1-Mowing may be conducted if the dimensions of the roadside are accessible with UTV and pull-behind mower.

2-Burning may be conducted if the burn can be managed safely.

Special Projects

Since 2018 the IRVM Program has maintained an annual Special Roadway Maintenance Agreement with the Iowa Department of Transportation (Iowa DOT) to conduct weed abatement on State Maintained Highways under the jurisdiction of the Storm Lake Garage. This agreement is renewed annually with the Iowa DOT District 3 Engineer and entails approximately 200 right-of-way miles in mainly Buena Vista County, but also includes portions of highways in Sac and Cherokee Counties. The maintenance agreement entails a spring and fall application that generated $45,000 in revenue by the Weed Department in 2023. Each application is completed in a two-week period and utilizes the IRVM Program's Spray Truck and UTV, IRVM staff, and typically an additional Conservation staff member.

The IRVM Program has used biocontrol insects to address two invasive species, purple loosestrife and leafy spurge; where herbicide application may be not as effective as the insects at controlling these weed species. Integrated Weed Control, Inc. of Bozeman, MT reared and supplied the insects for release under permitting guidelines for the State of Iowa. Both insects are capable of spreading throughout the weed population outside of the right-of-way and controlling plant populations on adjacent lands. Once an insectary is established, insects may be collected and moved to other problem areas. Establishment may be slow and may take several years to achieve, currently monitoring populations are on-going. Purple loosestrife beetles (*Galerculla sp*. and *Nanophyes sp*.) were released in May 2019 and May 2022. Leafy spurge flea beetles (*Aphthona sp*.) were released in July 2020 and July 2021.

Training

Training associated with the Roadside Manager and Conservation Director that pertain to Weed Commissioner duties include Iowa Pesticide License Category 1A (Agricultural Weed) at a minimum.

The IRVM Program for herbicide application within the right-of-way that would include the Roadside Manager and the Roadside Technician job duties include Iowa Pesticide License Categories 6 (Right-of-Way) and Category 5 (Aquatic). Completion of the Iowa DOT Special Roadway Maintenance agreement also requires Categories 6 and 5. Annual continuing education for these licenses are coordinated with Iowa State Extension and are administered by IDALS.

Prescribed Fire participation for the Roadside Manager and Roadside Technician include S130/S190 fire training at a minimum to conduct any roadside burning. An annual fire refresher is conducted and coordinated through District 3 of the Association of Iowa County Conservation Boards.

Transportation of equipment by the Roadside Manager and Roadside Technician throughout Buena Vista County requires a Class A Commercial Driver's License (CDL) for truck and trailer combinations that are over 26,000 pounds gross vehicle weight (GVW). Utilizing the IRVM program's hydroseeder also entails a tanker endorsement to the CDL.

In addition, further support for training includes the Annual Iowa Invasive Species Conference, Little Sioux Watershed Conservation Partnership events, Annual Roadside Conference, and other events showing importance to the IRVM Program.

Safety

Typically, IRVM and Conservation full-time staff receives safety training with the Secondary Roads Department. The training is coordinated and provided by the County's Safety Coordinator and includes topics such as hazardous materials, blood-borne pathogens, winter driving, CPR, chainsaw safety, fall protection, ladder safety, PPE, and traffic control. In addition, Buena Vista County has a safety manual that outlines work procedures regarding safety. In the case of a workplace accident, the County utilizes the Company Nurse phone number for assistance in managing an injury as a result of the accident.

8. Methods

Vegetation Establishment

Establishment of roadside vegetation by the IRVM Program adheres closely with the IRVM Technical Manual published by the Tallgrass Prairie Center and found on-line at:

https://tallgrassprairiecenter.org/sites/default/files/irvm-technical-manual-2015-2_0_0.pdf

Collection and mapping of seeding sites are continually updated throughout the year. MapitFast software is used to mark locations that are either observed by IRVM staff as requiring seeding, or the locations are forwarded through the Secondary Roads Department after a construction project. Once the seeding is conducted, an electronic seeding form is attached to that location that details how the seeding was conducted that includes drop down menus for seeding date, equipment used, cover crops used, seeding and hydromulch rates, etc. The form includes a status selection that indicates what stage of seeding each location is recorded as it's current condition. Selections are Open (bare soil), Burndown (weed control prior to seeding conducted), Seeded, and Weed Control (weed control post seeding conducted). As the form is updated electronically, icons on the map will automatically change to reflect the status of each seeding location, an example is shown in Figure 5.

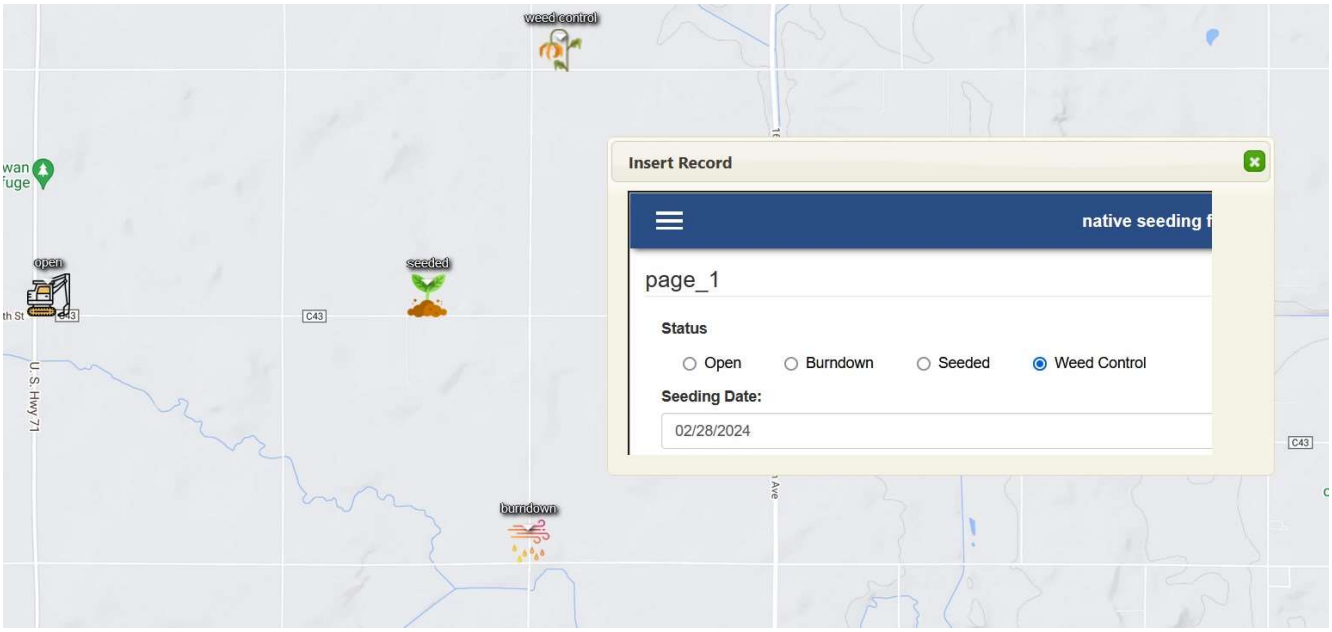


Figure 5. Example of mapping seeding locations and their status.

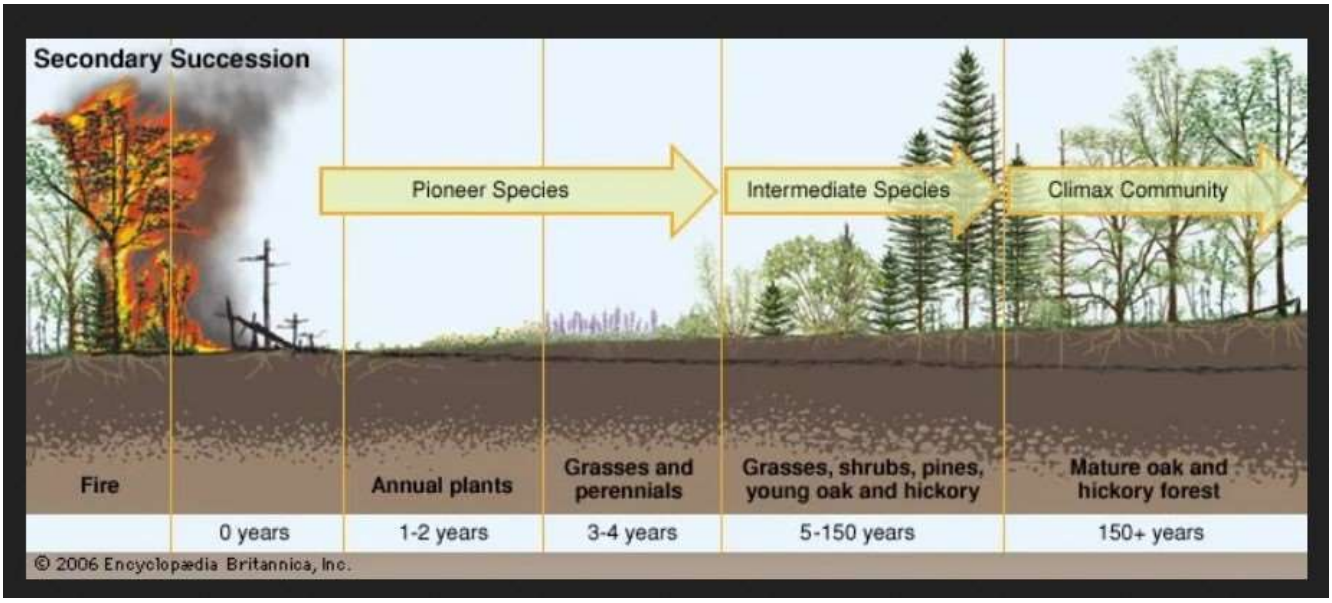
The majority of seedings conducted by the IRVM department are conducted in late fall with the hydroseeder after the soil temperature has fallen below 50 degrees F to prevent native seed from germinating just before going into winter and are considered as dormant seedings. Most often site preparation is limited by access with any equipment in narrow roadsides. Dormant seedings are preferable in these situations as anticipated snow compaction will likely improve seed-to-soil contact.

Forb species that most often require a period of stratification are able to germinate in a shorter period of time as opposed to a spring or summer seeding. The freeze-thaw cycle associated with dormant seedings also helps to work small prairie species into the ground. Nurse crops of winter triticale are used with dormant seedings to quickly establish in either the remaining days of fall, or the spring, but will germinate in low soil temperatures. Hydromulch rates in dormant seedings are generally light (~600 lbs/ac), primarily used as a color indicator to produce an even distribution of seed, and are conducted in one-pass of the hydroseeder. Alternatively, a spring seeding may be conducted with the main differences being oats are substituted as the nurse crop species and it includes a second pass of just hydromulch (additional ~600 lbs/ac). Additional hydromulch is used in spring seedings because the young seedlings will shortly be entering a period of drier growing conditions and the extra hydromulch helps to retain moisture. Cultipacking after seeding is advantageous more so in the spring, if possible, since the seed-to-soil contact will not be improved through either freeze-thaw or snow compaction as opposed to a late fall seeding.

Seed species and mix composition are selected by the Tallgrass Prairie Center's Iowa Roadside Management Program (IRM), which are available in 10-acre increments and are received free of charge. The species mix is composed of Iowa ecotype native seed that generally contains between 10-12 grasses and sedges, and approximately 40 forb species for the Diversity Mix. The Diversity Mix species selection changes periodically based on price and seed availability. The Diversity Mix that was offered in 2022 is shown in Exhibit 9 that had a value of $367.50 per acre.

During the first growing season it is important to manage for expected annual weed species, such as giant ragweed, pigweed species, marestail, etc. in new seedings. These are common agricultural annual weeds and are often sprayed by adjacent landowners. IRVM staff tries to make it a priority to mow a new seeding promptly before these plant species are sprayed with broadleaf herbicides that also negatively impacts the seeding, particularly the forb diversity. However, the dimensions of some roadsides are not always accessible with mowing equipment. If more persistent, noxious weeds become established, such as Canada thistle, then spot spraying of problem areas is conducted.

Figure 6 depicts the natural succession of plant communities through time starting with bare ground, after significant disturbance such as construction activity, or herbicide drift. The IRVM Program recognizes the short duration of annual weeds (1-2 years) in a roadside planting and prefers to let succession naturally promote toward perennial vegetation. While knowing that liberal herbicide applications in these plantings to control annual weeds not only impacts the establishment of the seeding, but also continuously sets the succession clock back to year zero shown in Figure 6.



Drawing courtesy of Encyclopedia Britannica

Figure 6. Natural progression of plant communities through time.

Ongoing Maintenance

Vegetation management of established, perennial vegetation within the roadside eventually entails brush management. The IRVM Program strives to maintains an approximately 4-year rotation of performing brush control through the year while working to provide adequate brush control in approximately 25% of the County each year. This maintains most of the roadsides in a state of perennial grass and forbs (prairie) that would otherwise naturally succeed to shrubs and trees; while becoming safety concerns for vehicles leaving the roadway. Brush control is performed by foliar herbicide, basal-bark herbicide application, physical removal (brush-cutting/chainsaws), and prescribed fire.

Prescribed fire is also used to enhance the diversity and integrity of prairie remnants and IRM Diversity Mix seedings. The objectives of prescribed fire, in addition to controlling woody encroachment, is typically to set back exotic cool-season grasses. Table 1 shows that this timeframe generally is from late April to Early May. There is a tight window in the calendar for both meeting the objective of reducing cool-season grasses, while ensuring to not impact adjacent crops that may already be emerging adjacent to the roadside. It is preferrable to burn adjacent to disked fields or soybean stubble when available, and it may be several growing seasons after a seeding that enough grass fuel is present to successfully carry the fire through the roadside planting.

Urban vs Rural Implications

Buena Vista County is largely a rural county and the IRVM Program has only, in a few instances, established vegetation in an urban area, such as within the City of Storm Lake. It is not anticipated that vegetation would likely be managed differently between either urban or rural environments in the future.

9. Material Procurement

Sourcing

Native seed is sourced through the Tallgrass Prairie Center's IRM Program, which is funded through the Living Roadway Trust Fund, and can be obtained annually. Seed is available free-of-charge for Roadside Programs, but they must adhere to cost-share agreements to seed and maintenance the planting through establishment. Seed also must be seeded within a two-year period after receiving it to ensure the viability of the seed. There are no limits to the amount of seed that can be ordered, but staff time for seeding and maintenance to ensure the seed requested is consumed in the two-year period is often a limiting factor. Also, seeding areas are often cleanouts conducted by the Secondary Roads Department, which are conducted based on available time for the crews to perform and seasonal constraints. These projects are not usually foreseeable two-years in advance so there is a balancing act of having enough seed on-hand for projects, and having too much seed that additional site prep work is required to ensure a successful seeding is conducted before the two-year period ends.

Cover crop and nurse crop seed are used to quickly establish vegetation offering erosion and sediment control, and competition with annual agricultural weeds. These seed resources have been acquired from Millborn Seeds (formerly Siouxland Grass & Forage) in the past, but new local options now also exist. Hydromulch has also been acquired from Millborn Seeds and has been used in a half wood and half recycled paper combination. Hydromulch and cover/nurse crop seed is ordered as needed to complete the anticipated seeding season.

Material Handling and Storage

Native seed acquired through the Tallgrass Prairie Center is picked up in May or June at their facility in Cedar Falls. The seed comes in 10-acre allotments and each seed species is individually bagged in either clear plastic bags or white woven grass seed bags that includes the seed origin tag directly from the prairie seed producer. The seed is stored in the basement of the Conservation headquarters in Peterson, which is not specifically designed for seed storage, but is generally accommodating for seed storage being cool, around 50% relative humidity and rodent-free. Usually, as time allows the seed will be mixed into grass and forb components and bagged into 1/3-acre sizes. The grass species being placed in 2-gallon zip-lock bags and the forb species in quart zip-lock bags that are then stored in large utility tubs until seeded. Large seeding projects of 10 acres or more at one time may skip the 1/3-acre zip-lock bagging process.

Shipments of cover/nurse crop seed and hydromulch are stored at the Truesdale building managed by the Secondary Roads Department. Hydromulch and seed is delivered on several pallets from the supplier and entails the use of a skid steer loader to unload the trailer.

10. Research Opportunities

In February 2024, Iowa State University Extension and Outreach's Field Agronomist Meaghan Anderson reported that Corteva discovered a suspected 2,4-D resistant waterhemp population in Wright County that was sampled in 2022. A copy of the news article is included in Exhibit 10.

The article details that Corteva sampled the Wright County location for resistant waterhemp in the agricultural field and in the ditch adjacent to the field. After testing, it was discovered that the waterhemp population within the field was not confirmed to be resistant, while the population that was sampled from the ditch is suspected to be resistant. The report also stated "that the ditch had a multi-year history of 2,4-D application to manage broadleaf weeds."

It is assumed that waterhemp, an annual agricultural weed that is the nemesis of farmers of annual cropping systems, but which is easily out-competed by many other plant species, was annually sprayed with 2,4-D to attempt to control it. Figure 6 shows that annual weeds, will in a short time, naturally succeed to perennial vegetation via the seedbank in field edges and roadsides when formerly perennial vegetation existed. Unfortunately, in this case waterhemp plants were apparently targeted repeatedly with an important agricultural herbicide for several years leading to the suspected resistant population that now threatens future soybean production in north-central Iowa.

The research need that would be beneficial to address for IRVM Programs is to conduct research that identifies the best strategy to address promoting vegetation in roadsides/ field edges when discovered at the annual weed stage. Exhibiting patience may very well be the best strategy, but it is also less pro-active, and not viewed by the public as addressing the immediate concern for annual weeds that may represent a source of weed seeds to adjacent crop fields.

11. Budget

Annual Budget Process

The Conservation Director annually prepares the Weed Department budget that is included in the overall Conservation Department budget. For a future fiscal year (FY) that begins on July 1, the budget planning would have begun the December prior, would have been updated as insurance and cost-of-living adjustments became available, and typically finalized in the March-April timeframe. The Conservation Board would also approve the proposed line-item costs, and then the Board of Supervisors would need to approve the allocation of funds to support the proposed budget.

Current Year

The current year expense budget for FY 2023-2024 (July 1 -June 30) and the proposed FY 2024-2025 expense budget is shown in Table 3. The revenue budget for FY 2023-2024 includes $45,000 for noxious weed control through the special roadway maintenance agreement with the Iowa DOT. Other revenue sources such as Iowa DNR grants, Living Roadway Trust Fund awards, and charges for habitat work performed are accounted through the County budget amendment process as revenue becomes available.

Table 3. Weed Department Budget

Line Item	FY 2023-2024	FY 2024-2025[1]
Wages-Roadside/ Nat Res Manager	$ 58,950.00	$ 62,483.20
Wages- Roadside/ Nat Res Tech	$ 49,920.00	$ 54,080.00
Salary- Weed Commissioner	$ 1,500.00	$ 1,500.00
Salary- Deputy Weed Commissioner	$ 1,200.00	$ 1,200.00
Wages- Seasonal Driver	$ 10,000.00	$ 13,000.00
Wages- Seasonal Tech	$ 10,000.00	$ 13,000.00
Longevity	$ 360.00	$ 360.00
FICA 7.65%	$ 10,065.00	$ 11,112.63
IPERS 9.44%	$ 12,420.00	$ 13,712.85
EMC Group Insurance	$ 39,075.00	$ 47,286.00
Chemicals/Herbicides	$ 20,000.00	$ 20,000.00
Biocontrol	$ 4,000.00	$ 4,000.00
Fuels	$ 8,000.00	$ 8,000.00
Stationery & forms	$ 100.00	$ 100.00
Magazines, Books	$ 100.00	$ 100.00
Safety & Protective Supplies	$ 1,000.00	$ 1,500.00
Uniforms-NRM	$ 300.00	$ 300.00
Uniforms-NRT	$ 300.00	$ 300.00
Publication & legal notices	$ 500.00	$ 500.00
Postage/Mailing	$ 50.00	$ 50.00
Employee Mileage & Subsistence	$ 1,500.00	$ 1,500.00
Telephone	$ 1,600.00	$ 1,600.00
Education/Training	$ 2,000.00	$ 2,500.00
Medical & Health Services	$ 200.00	$ 200.00
Motor Vehicle Repair	$ 6,000.00	$ 6,000.00
Office & Data Proc Equip Maintenance	$ 1,500.00	$ 1,500.00
Dues/Memberships	$ 200.00	$ 200.00
Custom Work	$ 10,000.00	$ 5,000.00
Office Equipment & Furniture	$ 1,500.00	$ 1,500.00
Other Equipment	$ 15,000.00	$ 15,000.00
Miscellaneous	$ 1,000.00	$ 1,000.00
	$ **268,340.00**	$ **288,584.68**

1-FY 2024-2025 is proposed and subject to change.

Appendices

Exhibit 1.

This is the resolution adopted by the Board of Supervisors July 1, 2003, showing transfer of jurisdiction of the weed department to the Conservation Board:

Resolution 2003-07-01-C

WHEREAS, the Buena Vista County Board of Supervisors is permitted by Chapter 317 of the 2003 Code of Iowa to appoint a county weed commissioner to supervise the control and destruction of all noxious weeds in the county; and

WHEREAS, pursuant to Iowa Administrative Code (571) 33.30 (5)"a"(3) the cost of the county's weed control program may be included as a county conservation purpose for qualifying under the state's competitive REAP grants program provided the Board of Supervisors appoint either the county conservation director or a member of the county conservation board staff as the county weed commissioner; and

NOW THEREFORE, BE IT RESOLVED, that the Buena Vista County Board of Supervisors will continue to annually appoint the County Weed Commissioner to supervise its program for the control and destruction of all noxious weeds, and, effective July 1, 2003, does hereby transfer the weed department employees, to the governance of the Buena Vista County Conservation Board; and

BE IT FURTHER RESOLVED, effective July 1, 2003, as follows:

1. that Norm Lund, as an employee of the Buena Vista County Conservation Board, hereby shall continue in his appointment by the Buena Vista County Board of Supervisors as the Buena Vista County Weed Commissioner for the remainder of 2003;

2. that the Board of Supervisors will continue its responsibilities, pursuant to Chapters 317.3 and 371.4 of the 2003 Code of Iowa, with respect to directing the weed program, and, in cooperation with the Conservation Board, will set the wages for the Weed Commissioner and Deputy Weed Commissioner;

3. that the Buena Vista County Weed Commissioner is thereby given full authority to plan and accomplish an environmentally sound vegetative management program (see IAC (571) 33.50(5)"a"(3);

4. that weed spray certificates for Norm Lund and Dave Wiley will be transferred from Buena Vista County's license (#260) to the Buena Vista County Conservation license (#561), effective July 1, 2003;

5. that the Buena Vista County Conservation Board shall prepare the budget for the weed destruction program in consultation with the Board of Supervisors.

PASSED AND APPROVED, July 1, 2003.

Resolution No. 2011-06-21-A

Whereas, the Buena Vista County Board of Supervisors is authorized and empowered to exercise any power and perform any function it deems appropriate to protect and preserve the rights, privileges, and property of the County or its residents and to preserve and improve the peace, safety, health, welfare, comfort, and convenience of its residents;

And whereas the Board has determined that it's in the best interest of the County and its administration to combine the weed department and the conservation department;

And whereas the Board at its April 12, 2011 authorized the merger of those two departments under the direction of conservation director, currently Nate Young

Therefore be it resolved:

1. The Weed Department be combined with the Conservation Department;

2. The Weed Commissioner and all other Weed Department employees shall and hereby are employees of the Conservation Department;

3. The Weed Commissioner shall be hired by the Conservation Board or its director, as determined by the Conservation Board, subject to approval of the Board of Supervisors;

4. The direct supervision of day-to-day activities of the Weed Commissioner and sprayers will be the director of the Conservation Board;

5. The wage or salary of the Weed Commissioner shall be set by the Board of Supervisors;

6. Duties of the Weed Commissioner shall include an obligation to report monthly to the Board of Supervisors during each season where activities of the Weed Commissioner occur; and,

7. The Conservation Department shall continue to submit yearly budgets to the Board of Supervisors for approval.

Approved this 21st day of June, 2011.

Dale Arends

Dale Arends, Chair, Board of Supervisors

Attest: Susan K Lloyd

Susan K. Lloyd, Auditor

Exhibit 2.

BUENA VISTA COUNTY INTEGRATED ROADSIDE VEGETATION MANAGEMENT (IRVM) PLAN

Statement of Purpose:

To promote the safety, beauty, and conservation of the roadways of Buena Vista County through the development and implementation of a program of Integrated Roadside Vegetation Management.

IRVM Plan:

Buena Vista County Integrated Roadside Vegetation Management (IRVM) is committed to a long term plan that:

1. Locates existing areas of desirable vegetation.
2. Evaluates areas to be managed.
3. Determines plant communities best fitted to the area.
4. Develops procedures that will encourage, enhance, re-establish or establish desirable plant communities.
5. Provides self-sustaining, diversified, visually interesting vegetation.
6. Promotes responsible weed control.
7. Keeps safety of public and an improved environment as priorities.
8. Recognizes disturbances to roadside vegetation and utilizes the most beneficial methods to prevent or correct undesirable situations.
9. Provides a forum for public education on IRVM.
10. Establishes an IRVM Community Advisory Committee of professional and lay people to assist in the facilitation of the public education program and to provide input for those in local government responsible for implementing the plan.

IRVM Goals:

1. Preserve and provide safe, functional corridors of travel throughout the county.
2. Utilize a long-term integrated management program that promotes desirable self-sustaining plant communities.
3. Encourage those plant communities that are native to the area through preservation and re-establishment whenever practical.
4. Recommend responsible, environmentally sound, and economically feasible weed control

Exhibit 3.

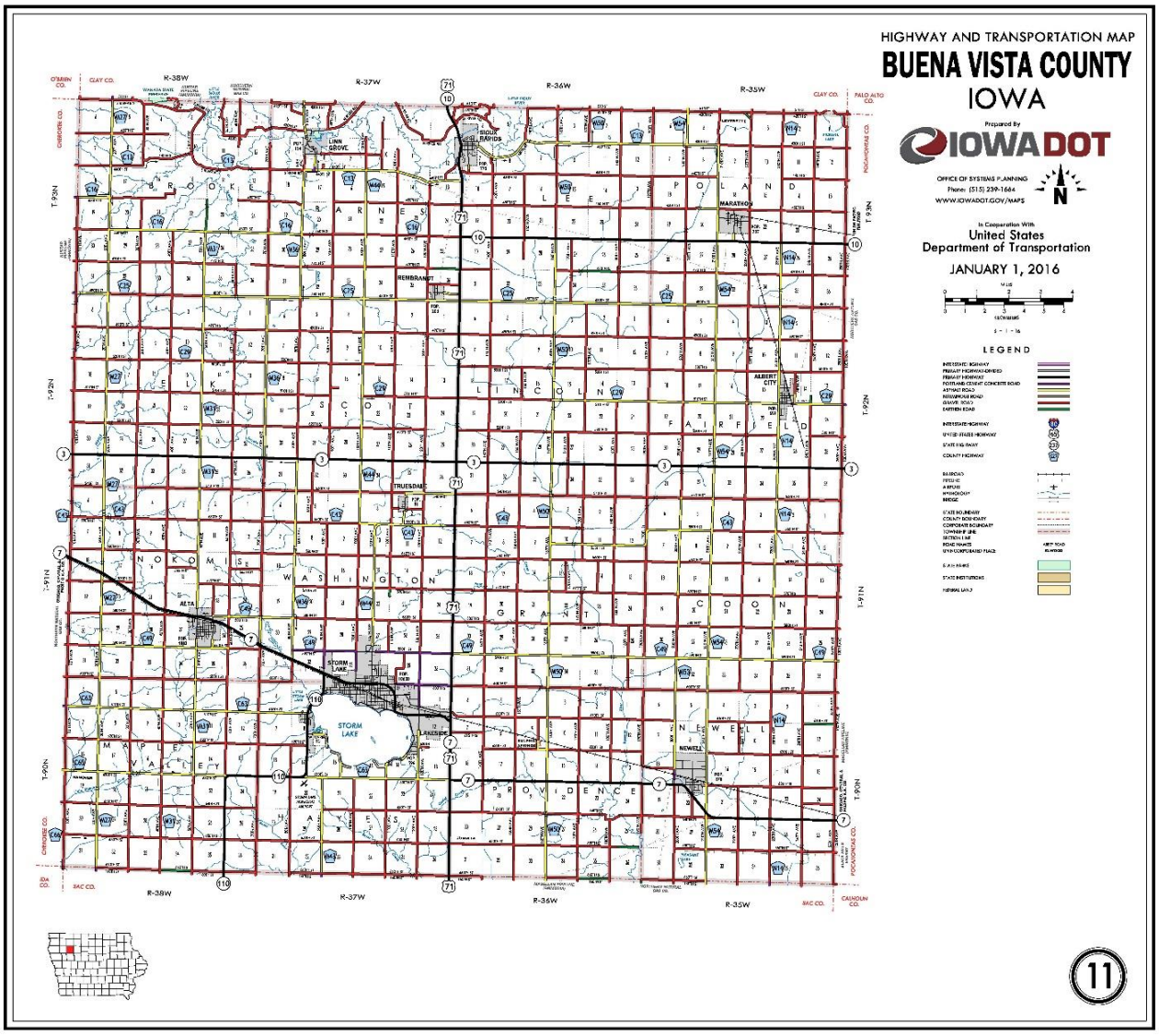

HIGHWAY AND TRANSPORTATION MAP
BUENA VISTA COUNTY
IOWA
Prepared By
IOWA DOT
OFFICE OF SYSTEMS PLANNING
Phone: (515) 239-1664
WWW.IOWADOT.GOV/MAPS
In Cooperation With
United States
Department of Transportation
JANUARY 1, 2016
LEGEND
BROOKE
BARNES
POLAND
LINCOLN
SCOTT
FAIRFIELD
ELK
WASHINGTON
GRANT
CORON
MAPLE VALLEY
PROVIDENCE
NEWELL
STORM LAKE
LINN GROVE
SIOUX RAPIDS
REMBRANDT
TRUESDALE
MARATHON
ALBERT CITY
ALTA
LAKESIDE
R-38W
R-37W
R-36W
R-35W
T-93N
T-92N
T-91N
T-90N
11

Exhibit 4.

Buena Vista County Conservation Board

~Natural Resource/Roadside Manager ~

POSITION: Permanent Full-Time Roadside Manager-Vegetation Specialist position, under the direct supervision of the Director of Buena Vista County Conservation Board, Peterson, IA.

SUMMARY: The Roadside Manager-Vegetation Specialist shall administer, develop, plan, and conduct a program of vegetative management that seeks to control unwanted vegetation and promote desirable vegetation within Buena Vista County Rights-Of-Ways (ROW's) and Buena Vista County Conservation Board (BVCCB) managed areas, address Section 317 of the Code of Iowa the "Noxious Weed Law", the Integrated Roadside Vegetation Management (IRVM) Manual, and address the provisions of Section 314 of the Code of Iowa.

DUTIES AND RESPONSIBILITIES: Performs a wide variety of professional, technical, and field duties.

These duties include all aspects of managing roadside vegetation and BVCCB vegetation/wildlife programs, including but not limited to:

1. Noxious and non-noxious herbaceous vegetation control (Chemical, Mechanical, Biological)
2. Management of woody vegetation in ROW's and BVCCB Area's (Chemical and Mechanical)
3. Seeding of ROW's and BVCCB area's (Hydroseeding, Drill, Broadcast)
4. Mowing of ROW's and BVCCB Wildlife area's
5. Habitat restoration and management (Prairies, ROW's, Woodlands, Wetlands)
6. On-going maintenance of existing and future plantings.
7. Operation, maintenance, and repairs of all agency equipment (tractor, vehicles, utv's, chainsaws)
8. Maintaining records (Chemical, daily work logs, equipment, etc.)
9. Writing IRVM and other grants
10. Assist in the investigation and addressing noxious weed complaints
11. Assist in the planning and conducting of prescribed burns on ROW and BVCCB area's
12. Effective communication with the County Engineer's office, Conservation Board, and the Public.
13. Compile monthly and annual work activity reports for tasks completed
14. Assist to the best of your ability the enforcement of all local, state, and federal laws pertaining to the operation of roadside vegetation management within Buena Vista County.
15. Assist with development and presentation of educational materials related to Roadside and BVCCB programs
16. Assist with inventory and data collection for prairie remnants, noxious weed areas and woody vegetation encroachment sites.
17. Organize and create management maps using GIS software.

18. Assist with production, harvest and processing of native prairie plant seeds for use in Roadsides and BVCCB areas.
19. Train and supervise seasonal and temporary employees
20. Attend and engages in state and regional conferences relating to the field as directed
21. Aside from roadside duties this individual may be assigned to work on other conservation properties and projects.
22. The position may be appointed the County Weed Commissioner.

SKILLS AND ABILITIES:

1. Ability to identify native trees, prairie plants, introduced and weed species.
2. Thorough working knowledge of prairie grass, forb, cover crop and cool season seed planting and care
3. Knowledge of prescribed fire and using fire to meet habitat management goals and objectives.
4. Thorough working knowledge of chemicals and their application rates.
5. Knowledge of erosion control techniques.
6. Ability to read, analyze, and interpret general business periodicals, professional journals, technical procedures or governmental regulations.
7. Ability to plan and prioritize work in an efficient manner.
8. Ability to work with minimal direct supervision
9. Ability to routinely work at remote/satellite work stations and locations
10. Ability to communicate effectively both orally and in writing.
11. Ability to plan work, think conceptually, analyze data, observe and evaluate, and make sound decisions and recommendations
12. Ability to apply knowledge and common sense to achieve work objectives.
13. Ability to adapt to a variety of job situations involving non-standard work hours and occasional weekends.
14. Knowledge of personal computer programs including Word and Excel for word processing and data management.
15. Ability to safely operate any equipment owned by BVCCB and ability to operate non-agency owned, job specific equipment, to achieve work objectives.
16. Ability to be insurable for driving under county insurance company policies

EDUCATION REQUIREMENTS: Graduate from a accredited college or university with a Bachelor's Degree in wildlife biology, ecology, forestry, agriculture or closely related subjects and at least one (1) years of experience in roadside management, natural resource management, wildlife, forestry, prescribed fire, agriculture, fisheries, or a related field of study or an Associate's Degree from an accredited 2-year college with major course work related to the natural resource field plus a minimum of 2-years' experience in an natural resource field or related field, or an equivalent combination of education and experience.

Must possess or the ability to obtain within 6 months an Iowa Commercial Pesticide License, S130/S190 Wildland Firefighting Certification, CPR/First Aid, and a Class A CDL with combination and air-brake endorsement.

PHYSICAL DEMANDS/WORK ENVIRONMENT: The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions. Ability to routinely talk, hear; use hands to finger,

grasp, handle or feel; push or pull and reach with hands and arms; stand, walk, reach, sit, kneel, stoop, balance, climb, and routinely lift, carry, push and pull objects weighing 50-100 pounds for extended periods of time. Ability to operate various types of vehicles, tools, machinery and equipment including but not limited to; tractors, mowers, chainsaws, pickups, straight trucks, trailers, skid loaders, tree planters, prescribed fire equipment, hand tools, seeders, and chemical spray equipment. Ability to work outdoors in extreme hot, cold, rainy, snowy, and windy weather conditions and be exposed to chemicals, allergens, insects, dust, fumes, smoke, and loud noises. Normal hours of operation Mon. - Fri., 8:00 A.M. – 4:30 P.M. but is subject to change routinely based on weather conditions needed to accomplish work objectives.

Wage and Benefits: Starting wage is $22.00 Standard county benefits include paid single health insurance, competitive family insurance, vision, dental, IPERS, sick leave, and paid holidays.

Applicant will be subject to post offer, pre-employment drug and physical testing.

TO APPLY: Resume, cover letter, and standard county application are required.

Applications and full job description is available online at www.bvcountyiowa.com or at the BVCCB Office.

SUBMIT APPLICATION PACKET TO:

Director
Buena Vista County Conservation
377 440th Street
Peterson, Iowa 51047

Or email to office@bvcountyparks.com

DEADLINE: Must be received by April 21st, 2017 at 4:30 p.m.

Buena Vista County is an equal opportunity employer.

Job description reviewed and approved by the Buena Vista County Conservation Board on 02/17/17

Buena Vista County Conservation Board

~Natural Resource Technician~

POSITION: Permanent Full-Time, Natural Resource Technician position, under the supervision of the Director and Natural Resource/Roadside Manager of Buena Vista County Conservation Board (BVCCB), Peterson, IA.

SUMMARY: The Natural Resource Technician will work with the Natural Resource/Roadside Manager to administer, develop, plan, and conduct a program of vegetative management that seeks to control unwanted vegetation and promote desirable vegetation within Buena Vista County roadsides and Buena Vista County Conservation Board (BVCCB) managed areas.

Essential Functions and Responsibilities:

The following duties are typical for this position. These are not to be construed as exclusive or all inclusive.

Other duties may be required and assigned.

Performs a wide variety of professional, technical, and field duties.

These duties include all aspects of managing roadside vegetation and BVCCB natural resource management programs, including but not limited to:

23. Performing chemical, mechanical, and biological control of unwanted species consistent with Buena Vista County's adopted Integrated Roadside Management (IRVM) Plan.
24. Providing management of woody vegetation in County Roadsides in conjunction with the Secondary Roads Department and BVCCB managed areas to promote native prairie and savanna species populations and public safety.
25. Operating BVCCB seeding equipment, including hydroseeder, no-till drills and broadcast seeders.
26. Facilitating continual maintenance of food plot, cover crop, and/or native plantings.
27. Operation, maintenance, and repairs of all BVCCB equipment (tractor, vehicles, UTV, chainsaws, etc.)
28. Maintaining written and digital records (chemical application, daily work, equipment maintenance, etc.)
29. Assisting in the investigation and addressing of noxious weed complaints.
30. Assisting in the planning and conducting of prescribed fire.
31. Providing effective communication with the County Engineer's office, Conservation Board, and the public.
32. Assisting with development and presentation of educational materials related to roadside and BVCCB programs.
33. Assisting with inventory and data collection for prairie remnants, noxious weed areas and woody vegetation encroachment areas.
34. Contributing and executing management plans and illustrating visual plans using GIS software.
35. Assisting with production, harvest and processing of native prairie seeds for use in roadsides and BVCCB natural areas.
36. Training and leading seasonal/temporary employees.
37. Attending and engaging in state and regional conferences relating to the field as directed.

38. Aside from natural resource management activities this individual may be assigned to work on other conservation properties, and assisting with general park maintenance and other BVCCB capital projects when needed.

SKILLS AND ABILITIES:

17. Ability to identify native trees, prairie plants, introduced and weed species.
18. Thorough working knowledge of prairie grass, forb, cover crop and cool season seed planting and care.
19. Knowledge of prescribed fire and using fire to meet habitat management goals and objectives.
20. Thorough working knowledge of chemicals and their label requirements.
21. Knowledge of erosion control techniques.
22. Ability to read, analyze, and interpret general business periodicals, professional journals, technical procedures or governmental regulations.
23. Ability to plan and prioritize work in an efficient manner.
24. Ability to work with minimal direct supervision.
25. Ability to routinely work at remote locations.
26. Ability to communicate effectively both orally and in writing.
27. Ability to plan work, think conceptually, analyze data, observe and evaluate, and make sound decisions and recommendations.
28. Ability to apply knowledge and common sense to achieve work objectives.
29. Ability to adapt to a variety of job situations involving non-standard work hours and occasional weekends.
30. Knowledge of personal computer programs including Word and Excel for word processing and data management.
31. Ability to safely operate any equipment owned by BVCCB and ability to operate non-agency owned, job specific equipment, to achieve work objectives.
32. Ability to be insurable for driving under county insurance company policies.

EDUCATION REQUIREMENTS: Graduate from a accredited college or university with a Bachelor's Degree in wildlife biology, ecology, forestry, agriculture or closely related subjects and at least one (1) years of experience in roadside management, natural resource management, wildlife, forestry, prescribed fire, agriculture, fisheries, or a related field of study or an Associate's Degree from an accredited 2-year college with major course work related to the natural resource field plus a minimum of 2-years' experience in an natural resource field or related field, or an equivalent combination of education and experience.

Must possess or the ability to obtain within 6 months an Iowa Commercial Pesticide License, S130/S190 Wildland Firefighting Certification, CPR/First Aid, and a Class A CDL with combination and air-brake endorsement.

PHYSICAL DEMANDS/WORK ENVIRONMENT: The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions. Ability to routinely talk, hear; use hands to finger, grasp, handle or feel; push or pull and reach with hands and arms; stand, walk, reach, sit, kneel, stoop, balance, climb, and routinely lift, carry, push and pull objects weighing 50-100 pounds for extended periods of time. Ability to operate various types of vehicles, tools, machinery and equipment including but not limited to; tractors, mowers, chainsaws, pickups, straight trucks,

trailers, skid loaders, tree planters, prescribed fire equipment, hand tools, seeders, and chemical spray equipment. Ability to work outdoors in extreme hot, cold, rainy, snowy, and windy weather conditions and be exposed to chemicals, allergens, insects, dust, fumes, smoke, and loud noises. Normal hours of operation Mon. - Fri., 8:00 A.M. – 4:30 P.M. but is subject to change routinely based on weather conditions needed to accomplish work objectives.

Wage and Benefits: Starting wage is $20.00/hour. Standard county benefits include paid single health insurance, competitive family insurance, vision, dental, IPERS, sick leave, and paid holidays.

Applicant will be subject to post offer, pre-employment drug and physical testing.

TO APPLY: Resume, cover letter, and standard county application are required.

Applications and full job description is available online at www.bvcountyiowa.com or at the BVCCB Office.

SUBMIT APPLICATION PACKET TO:

Director
Buena Vista County Conservation
377 440th Street
Peterson, Iowa 51047

Or email to office@bvcountyparks.com

DEADLINE: Must be received by April 2nd, 2021 at 4:30 p.m.

Buena Vista County is an equal opportunity employer.

Job description reviewed and approved by the Buena Vista County Conservation Board on 02/09/21

Buena Vista County Conservation Board

~Seasonal Spray Truck Driver~

POSITION: Seasonal Spray Truck Driver, under the direct supervision of the Director and/or the Roadside Manager of the Buena Vista County Conservation Board (BVCCB), Peterson and/or Storm Lake, IA.

SUMMARY: The Seasonal Spray Truck Driver will assist the Roadside Manager with aspects of managing roadside vegetation. This will include, but is not limited to: management of noxious weeds, managing roadside trees and brush, maintenance of seedings, and routine maintenance of the County's spray application equipment.

DUTIES AND RESPONSIBILITIES: Primarily, the Seasonal Spray Truck Driver assists with operation of all Spray vehicles applying herbicides to County Roadsides; however, may also perform a wide variety of duties related to Buena Vista County's Integrated Roadside Vegetation Management (IRVM) Plan.

These duties include aspects of managing roadside and BVCCB vegetation, including, but not limited to:

1. Noxious vegetation control (chemical, mechanical, biological)
2. Management of woody vegetation in Roadsides and BVCCB areas
3. Seeding and management of vegetation in Roadsides and BVCCB areas
4. Operation, maintenance, and repairs of all BVCCB equipment
5. Maintaining records (chemical, daily work logs, equipment, etc.)
6. Assist with inventory and data collection

SKILLS AND ABILITIES:

1. Possess safe and defensive driving skills and ability to operate vehicles on gravel roads at a slow speed
2. Ability to communicate effectively both orally and in writing
3. Ability to read and interpret documents such as safety rules, operating and maintenance instructions, and procedure manuals
4. Ability to apply knowledge and common sense to achieve work objectives
5. Ability to adapt to a variety of job situations involving non-standard work hours and occasional weekends
6. Ability to safely operate any equipment owned by BVCCB and ability to operate non-agency owned, job specific equipment, to achieve work objectives
7. Ability to be insurable for driving under county insurance company policies

EDUCATION REQUIREMENTS: High school diploma or general education degree (GED). Must possess a valid Iowa Class C Driver's License. Preferred candidates will possess or willingness to obtain an Iowa Commercial Pesticide License in Category 6 or 1A, and an Iowa Class A Commercial Driver's License (CDL).

PHYSICAL REQUIREMENTS: Ability to routinely stand, walk, sit, kneel, stoop, balance, climb and operate all hand and power tools for extended periods of time. Ability to routinely lift up to 50lbs. Ability to follow written and oral instructions. Ability to work outdoors in extreme hot, cold, rainy and windy weather conditions and be exposed to dust, fumes, smoke, and loud noises.

WAGE AND BENEFITS: Seasonal Spray Truck Driver will be scheduled for 40 hours per week from approximately June through mid-September with start and finish dates being flexible. Hours worked per week may change based on weather conditions suitable for spraying. Starting wage is $12-13/hour. Uniform Shirts provided. Normal hours of operation Monday - Friday. 7:00 A.M. – 3:30 P.M. but is subject to change routinely based on weather conditions needed to accomplish work objectives.

TO APPLY: Standard County application is required.

Applications are available online at https://buenavista.county.iowa.gov or at the BVCCB Office.

SUBMIT APPLICATION PACKET TO:

Director

Buena Vista County Conservation

377 440th Street

Peterson, Iowa 51047

Or email to office@bvcountyparks.com

DEADLINE: Open until Filled

Buena Vista County is an equal opportunity employer.

Job description reviewed and approved by the Buena Vista County Conservation Board on 9/11/18

Exhibit 5.

Buena Vista County IRVM Statement of Support

The Buena Vista County Board of Supervisors, the Buena Vista County Conservation Board, and the Buena Vista County Engineer come together in cooperation, common goals and shared interest to manage roadsides in Buena Vista County by and through integrated roadside principals.

Consistent with Iowa Code Chapter 314.22, it is declared to be in the general public welfare of Iowa and Buena Vista County for the vegetation of its roadsides to be preserved, planted, and maintained to be safe, visually interesting, ecologically integrated, and useful for many purposes.

We realize that IRVM will be beneficial to our roadside management goals, while being economically and environmentally beneficial.

We understand that working in unison towards improving roadside vegetation is the most efficient way to accomplish the goals of improved, safe, and weed free roadsides. This integrated approach will add to the ecologically sound habitat and natural beauty of Buena Vista County.

We hereby agree to manage Buena Vista County roadsides according to the provisions described within this management plan.

However, this is a flexible plan that requires common sense interpretations with changes as necessary to fit the ever-changing complex circumstances realized in roadside vegetation management.

Rhonda Ruggenberg — 4-23-24

Chairperson: Buena Vista County Board of Supervisors — Date

4-23-24

Conservation Director: Buena Vista County — Date

Bret R Wilkinson — 4-23-24

County Engineer: Buena Vista County — Date

Exhibit 6.

RESOLUTION #2024-04-09-A

A PUBLIC NOTICE: DESTRUCTION OF NOXIOUS WEEDS & FINES ASSESSED

TO ALL PROPERTY OWNERS:
Be it resolved, by action of the Board of Supervisors of Buena Vista County, Iowa, that pursuant to the provisions of Chapter 317.13 and 317.14, 2024 Code of Iowa, it is hereby ordered:

1-That each owner and each person in the possession or control of any land in Buena Vista County shall cut, burn, spray, or otherwise destroy all noxious weeds thereon, at such times in each year and in such manner as shall prevent said weeds from blooming or coming to maturity, and shall keep said lands free from such growth of any other weeds as shall render the streets or highways adjoining said land unsafe for public travel. Noxious weeds shall be cut, burned, sprayed, or otherwise destroyed on or before the following dates and as often thereafter as is necessary to prevent seed production:

Group 1. June 1, 2024, for Leafy Spurge and Musk Thistle.

Group 2. July 1, 2024, for Canada Thistle, Teasel and Field Bindweed.

Group 3. August 1, 2024, for Palmer Amaranth, Multiflora Rose, Bull and Plumeless Thistles.

2-That each owner and each person in possession or control of any lands in Buena Vista County infested with any noxious weeds listed for eradication or control by the Agriculture and Land Stewardship Department Administrative Rules Chapter 58.4 shall adopt a program of weed destruction described by the Weed Commissioner to destroy and will immediately keep under control such infestations of said noxious weeds.

3-That if the owners or persons in possession or control of any land in Buena Vista County fail to comply with the foregoing orders, the Weed Commissioner shall cause this to be done and the expense of said work, including costs of serving notice and other costs, if any, to be assessed against the real estate upon which the noxious weeds are destroyed.

4-That the County Weed Commissioner be and is hereby directed to cause notice of making and entering of the foregoing order by one publication each of the Official Newspapers of the County.

5-Anyone wishing not to have noxious weeds sprayed within the right-of-way adjacent to dwellings or property by Buena Vista County, he or she shall sign an annual agreement by June 1st at the County Conservation Board Office and receive official signs to be posted on each side of the area designated and shall be responsible to destroy such weeds, all season.

6-Buena Vista County primarily uses Milestone and TerraVue herbicide for noxious weed control within the road right-of-way. For individuals who harvest hay from the County's right-of-way consult the Milestone and TerraVue labels for possible haying and grazing restrictions. Any additional concerns may be directed to the County Weed Commissioner.

7-The Weed Commissioner, Greg Johnson or Deputy Weed Commissioner, Brian Jones are located at the Buena Vista County Conservation Board office. 377 440th Street, Peterson, Iowa 51047. Telephone-712-295-7985.

PENALTY

Be it further Resolved, that upon failure to comply by the date prescribed in an order, pursuant to Chapter 317, for destruction of weeds, the weed commissioner, following notice, may enter upon the land without consent and have the weeds destroyed with the costs of such action taxed against the real estate on which the weeds were destroyed, or may impose a penalty of $10.00 per day for each day, up to ten days, that the owner or person in possession or control of the land fails to comply, after which, the weed commissioner, following notice, may enter upon the land without consent and have the weeds destroyed with the costs of such action taxed against the real estate on which the weeds were destroyed.

Passed and approved this 9th day of April, 2024. ATTEST:

_____ _____ _____

Chair-Buena Vista County Board of Supervisors County Auditor

Exhibit 7.

"Do Not Spray" Permit

Date _____

2024–

Permit #_____

# of Signs _____

Fee for Signs _____

* Do Not

* Resume

I, _____, request permission to erect "Do Not Spray" signs along a Buena Vista County Secondary road at the following location. Please include your address or at a minimum the township and section number with the location.

_____

_____

I agree to abide by the resolution for destruction of noxious weeds by order of the Buena Vista County Board of Supervisors pursuant to the provisions of Chapter 317.13 and 317.14 2011 Code of Iowa. (These conditions are outlined on the reverse of this permit application.) I also understand that sensitive garden plants, such as tomatoes, melons and grapes shall be planted in areas as far removed from the road as possible, especially where destruction of noxious weeds may be done on the opposite side of the road. Signs will be posted at the beginning and end of the "DO NOT SPRAY" area at the above listed location and shall be visible in the normal direction of travel. There is no charge for the permit and one set of signs will be furnished with each permit. Other suitable signs that have been approved by the county weed commissioner can also be used. (Additional signs can be purchased at the County Conservation Office for a cost of $2.00 per set.) ***I further understand that this permit is only valid for one season and must be renewed each year.***

Signed_____

Address_____

_____

Phone _____

Buena Vista County Weed Commissioner

Approved: _____

Date: _____

Approved Signs: _____

Exhibit 8.

Category	Year	Manufacturer	Model Number	Description	GVW	Funding Source	Housed in Department
Vehicles	2018	Chevrolet	Silverado 3500	1-ton Flatbed	13,200	2018 LRTF Award $10,000	IRVM
	2020	GMC	Sierra 2500	3/4-ton Truck	10,450		IRVM
	2022	Chevrolet	Silverado 2500HD	3/4-ton Truck (Fire)	11,550		Conservation
	2003	Chevrolet	C300	Custom Spray Truck	19,500		IRVM
Loaders	2006	New Holland	T60	Tractor Loader			Conservation
	2023	Bobcat	SJC T66 T4	Skid Steer Loader			Conservation
UTVs	2011	John Deere	Gator 825i	UTV			Conservation
	2019	John Deere	Gator XUV835E	UTV		2019 LRTF Award $10,000	IRVM
	2022	Bobcat	UV34	UTV			Conservation
Trailers	2010	PJ Trailer MFG	D2122	Dump trailer	9,900		Conservation
	2023	Load trail	TRA/REM Carhauler	24-foot car trailer	14,000		IRVM
	2024	Aluma	7817TA ESA	17-foot utility trailer	7,000		Conservation
Mowers	2020	Bobcat	Brushcat	72-inch Brush mower		2021 LRTF Award $4,086.97	IRVM
		Hydra Clip	HC16	Tree Shear			Conservation
	2017	Bush Hog		3-point rotary mower			Conservation
	2022	Kunz	MR55BE	55-inch pull-behind mower			IRVM
Seeding	1992	Truax	FLX-88	No-till Drill			Conservation
		Vicon		3-point Pendulum Seeder		2018 BV Soil & Water $3,319	Conservation
		Little Sioux Prairie Co.		DewDrop seeder		2018 BV Soil & Water $7,500	Conservation
		Truax		ATV broadcast seeder		2018 BV Soil & Water $714	Conservation
		Truax		manual broadcast seeder		2018 BV Soil & Water $506	Conservation
	2017	Bowie	1100	Hydroseeder	16,000	2018 LRTF Award $24,000	IRVM
Spray Units	2018	F/S Manufacturing	FS100	100-gallon UTV Sprayer		2019 LRTF Award $1,795.20	IRVM
	2020	C & R Supply	Custom	400-gallon Skid Sprayer		2020 LRTF Award $15,000	IRVM
			Custom	5-gallon Basal-bark Sprayer		2022 LRTF Award $703.79	IRVM
				5-gallon backpack Sprayer (2)			IRVM
		Bomgaars		20-gallon ATV Sprayer			Conservation
Fire	2020	CET/ Feld Fire	Custom	225-gallon Skid Fire Unit			Conservation
	2019	QTAC	85EMS-C	85-gallon Skid Fire Unit			Conservation
				150-gallon Skid Fire Unit			Conservation
				Drip Torch (4)			Conservation
				Nomex Fire PPE/Handtools		2018/2021 LRTF Awards $1,172.72	IRVM/Conservation
Power							
Equipment		Stihl	MS 271	16-inch Chainsaw (2)			IRVM (1)/Conservation (1)
		Stihl	MS 193T	12-inch Chainsaw (2)			IRVM (1)/Conservation (1)
		Stihl	MS 391	28-inch Chainsaw			Conservation
		Stihl	MS 310	20-inch Chainsaw (2)			Conservation
		Stihl	FS 460	Brushcutter (2)		2018 DNR WDG Award $2,015.90	Conservation
		Stihl	BR 600	Backpack Blower			Conservation
		Stihl	BR 800C	Backpack Blower			IRVM
		Stihl	HT 131	Pole Saw			Conservation
		Stihl	FS 240	Weedeaters (2)			Conservation
		Honda		Trash pump 3-inch dia			Conservation
Electronics		Motorola	HT1250	Two-way Radios (6)			Conservation
		HP	Elitebook	Laptop Computer			IRVM
		Samsung	Galaxy	Tablet (2)			IRVM
		Kyocera	E7110	Cell Phone			IRVM
		Ag-Terra	E3B	SprayLogger -Truck (2)			IRVM
		Ag-Terra	E3A	Spraylogger - UTV		2022 LRTF Award $2,520.00	IRVM
Software		Ag-Terra		MapitFast (2 licenses)			IRVM
Other	1988	Vermeer	1250BSHCHPR	Wood Chipper			Conservation
	2023	PackerMaxx		4-foot Cultipacker (water)			IRVM
				5-foot Cultipacker (steel)			Conservation
				4-foot Cultipacker (steel)			Conservation
				3-point 6-foot landscape rake			Conservation
	2015	Bobcat		Grapple Attachment			Conservation
	2019	Bobcat	SG60	Stump Grinder Attachment			Conservation
	2023	Dewalt	DXST10000	Chemical Storage Shelves (4)		2023 LRTF Award $1,087.97	IRVM

Exhibit 9.

2022 Diversity Mix, 10 Acres

Group I – Grasses and grass-like plants		Bags	PLS lbs/bag	Seeds/ft^2	Habitat
_____Sideoats grama	*Bouteloua curtipendula*	1	20	4.41	Dry
_____Indiangrass	*Sorghastrum nutans*	1	15	6.61	Mesic to Dry
_____Little bluestem	*Schizachyrium scoparium*	1	20	11.02	Mesic
_____Canada wildrye	*Elymus canadensis*	1	20	3.82	Mesic to Dry
_____ Big bluestem	*Andropogon gerardii*	1	20	7.35	Mesic
_____Prairie cordgrass	*Spartina pectianta*	1	2.2	0.53	Mesic
_____Switchgrass	*Panicum virgatum*	1	7.5	3.86	Mesic
_____Rough dropseed	*Sporobolus asper*	1	5	5.14	Dry
__*___Plains oval sedge	*Carex brevior*	1	0.45	0.48	Mesic
__*___Field oval sedge	*Carex molesta*	1	0.22	0.20	Mesic
__*___Bebb's sedge	*Carex bebbii*	1	0.8	3.65	Mesic
***These are in the forb bags.**					
Total grass and grass-like plant seeds per square foot				**47.07**	

1 Black bag, Grey Tie

Group II – Forbs		Bags	PLS lbs/bag	PLS oz/bag	Seeds/ft^2
Alumroot	*Heuchera richardsonii*	1	0.023	0.37	0.30
Black-eyed susan	*Rudbeckia hirta*	1	0.375	6	1.27
Blue vervain	*Verbena hastata*	1	0.75	12	2.56
Butterfly milkweed	*Asclepias tuberosa*	1	0.75	12	0.12
Canada anemone	*Anemone canadensis*	1	0.31	5	0.09
Canada milkvetch	*Astragalus canadensis*	1	1.25	20	0.78
Compass plant	*Silphium laciniatum*	1	0.875	14	0.02
Foxglove beardtongue	*Penstemon digitalis*	1	0.5	8	2.39 (small seed)
Golden alexanders	*Zizia aurea*	1	1.875	30	0.76
Gray-headed coneflower	*Ratibida pinnata*	1	1.25	20	1.38
Great blue lobelia	*Lobelia siphilitica*	1	0.282	4.5	5.17
Hoary vervain	*Verbena stricta*	1	0.625	10	0.64
Ironweed	*Vernonia fasciculata*	1	0.562	9	0.50
Large-flowered beardtongue	*Penstemon grandifloris*	1	0.5	8	0.24
Lead plant	*Amorpha canascens*	1	0.5	8	0.29
Mountain mint	*Pycanthemum virginianum*	1	0.282	4.5	2.27
New England aster	*Symphyotrichum novae-angliae*	1	0.438	7	1.06
Obedient plant	*Physostegia virginiana*	1	0.438	7	0.24
Ox-eye sunflower	*Heliopsis helianthoides*	1	0.687	11	0.12
Pale purple coneflower	*Echinacea pallida*	1	1.25	20	0.24
Partridge pea	*Chamaecrista fasciculata*	1	2.813	45	0.27
Prairie blazingstar	*Liatris pycnostachya*	1	0.69	11	0.28
Purple prairie clover	*Dalea purpurea*	1	2.675	42.8	1.47
Rattlesnake master	*Eryngium yuccifolium*	1	0.625	10	0.17
Roundheaded bushclover	*Lespedeza capitata*	1	0.406	6.5	0.12
Sky blue aster	*Symphyotrichum oolentangiense*	1	0.5	8	1.47
Showy tick trefoil	*Desmodium canadense*	1	1.25	20	0.25
Smooth blue aster	*Symphyotrichum laeve*	1	0.5	8	1.47
Spotted Joe pye weed	*Eutrochium maculatum*	1	0.688	11	2.02
Stiff goldenrod	*Oligoneuron rigidum*	1	0.438	7	0.66
Sweet black-eyed susan	*Rudbeckia subtomentosa*	1	0.937	15	1.48
Thimbleweed	*Anemone cylindrica*	1	0.088	1.41	0.08
White prairie clover	*Dalea candida*	1	2.675	42.8	1.87
White sage	*Artemisia ludoviciana*	1	0.25	4	2.53
White wild indigo	*Baptisia alba*	1	0.50	8	0.03
Wild bergamot	*Monarda fistulosa*	1	0.437	7	1.12
Winged loosestrife	*Lythrum alatum*	1	0.188	3	20.66
Total forb seeds per square foot					**56.39**

Wet species		**Bags**	**PLS lbs/bag**	**PLS oz/bag**	**Seeds/ft²**
Fox sedge	*Carex vulpinoidea* (Allendan)	1	1	16	3.67 (small seed)
Sneezeweed	*Helenium autumnale*	1	0.187	3	0.90 (small seed)
Swamp milkweed	*Asclepias incarnata*	1	0.875	14	0.15
Total wet species seeds per square foot				**4.72**	

Note: The last species will grow best in a wetter habitat, a location with more soil moisture such as the ditch bottom. The 3 species labeled as having small seeds won't grow if they get buried. One way to plant them would be to mix the seed in a bucket of sand and scatter it by hand on the soil surface towards the bottom of the ditch.

Exhibit 10.

Suspected 2,4-D Resistant Waterhemp Population Discovered

February 13, 2024
ICM News

We know the evolution of resistance in waterhemp populations happens faster than new herbicides are discovered, so the recent report of dicamba resistant waterhemp in Iowa by Bayer was not unexpected. Corteva has now reported the discovery of a suspected 2,4-D resistant waterhemp population in Iowa. These reports emphasize the need to use herbicides wisely and diversify weed management tactics beyond herbicides, especially as more farmers rely on herbicide group (HG) 4-based postemergence weed control in both corn and soybean.

The particulars

In late January 2024, Corteva reported the discovery of a suspected 2,4-D resistant waterhemp population in 2022 in Wright County, Iowa. A Corteva employee collected two samples of waterhemp seed, one from plants in the field and one from plants growing in the ditch adjacent to the field. While greenhouse testing with seed collected from plants in the field did not confirm resistance, plants grown from the ditch population are suspected to be 2,4-D resistant. The communication reported that the ditch had a multi-year history of 2,4-D application to manage broadleaf weeds. Corteva will continue evaluation of the populations in the greenhouse and the field. If resistance is confirmed in this population, it will become at least the fourth report of 2,4-D resistance in waterhemp, joining prior reports from Nebraska in 2009 (Bernards et al. 2012), Illinois in 2016 (Evans et al. 2019), and Missouri in 2018 (Shergill et al. 2018).

Iowa State University screened populations of waterhemp against several herbicides in 2019 at their 1X rates (Table 1). On average, waterhemp exhibited 17% survival to 2,4-D, 5% survival to dicamba, and 4% survival to glufosinate (Hamberg et al. 2023). We are rapidly losing herbicide options for postemergence control of waterhemp.

Table 1. 1X rates used for 2019 waterhemp screening. (Hamberg et al. 2023)

Herbicide active ingredient	Herbicide trade name	Application rate	Postemergence label use rate[1]
2,4-D	Enlist One	1.5 pt.	2.0 pt.
Dicamba	Xtendimax	22 fl. oz.	22 fl. oz.
Glufosinate	Liberty	29 fl. oz.	32-43 fl. oz.
[1]For labeled applications in herbicide tolerant soybean			

Best management practices to slow resistance development

Now is the time to evaluate how to improve weed management in fields. While herbicides will remain the primary tactic to manage weeds, farmers can implement several best management practices to slow herbicide resistance evolution and improve control of weeds like waterhemp.

1. Choose an effective herbicide program for the weed spectrum present on a field-by-field basis.
    1. Use full rates of effective residual herbicides and plant into a weed-free seedbed.
    2. Include overlapping residual herbicides and multiple effective herbicide groups in postemergence applications to provide longer waterhemp control. Consult manufacturers for specific tank-mix recommendations.
    3. Make timely applications and choose appropriate adjuvants, nozzles, application volume, etc.
    4. Scout fields 7-10 days after postemergence herbicide applications to evaluate weed control.
2. Use a diversity of weed management tactics, including chemical, mechanical, and cultural options. Narrow row spacing, cover crops, more diverse crop rotations, and tillage are effective tactics to suppress waterhemp.
3. Control weed escapes prior to seed production to reduce future weed populations and prevent resistance from spreading.
4. Reduce influx of weed seed into crop fields by managing weeds in field edges and cleaning equipment between movement from problematic fields to clean fields. The detection reported here indicates the threat of weeds in field edges.

Reporting suspected herbicide-resistant populations

Please report incidences of non-performance of products to the chemical manufacturer. This scenario is an example of the effective coordination and response that can occur when performance concerns are quickly addressed.

While Iowa State University does not currently have the capability to test suspected herbicide-resistant populations, please report suspected HG 4-, HG 10-, or HG 15-resistant waterhemp populations to Meaghan Anderson, field agronomist with Iowa State University Extension and Outreach. She can be reached at mjanders@iastate.edu or 319-331-0058.

Reference:

Bernards M.L., Crespo R.J., Kruger G.R., Gaussoin R., Tranel P.J. A Waterhemp (Amaranthus tuberculatus) Population Resistant to 2,4-D. *Weed Science*. 2012;60(3):379-384. doi:10.1614/WS-D-11-00170.1

Evans C.M., Strom S.A., Riechers D.E., Davis A.S., Tranel P.J., Hager A.G. (2019) Characterization of a waterhemp (Amaranthus tuberculatus) population from Illinois resistant to

herbicides from five site-of-action groups. Weed Technol 33: 400–410. doi: 10.1017/wet.2019.19

Hamberg, R.C., Yadav, R., Owen, M.D.K., and Licht, M.A. 2023. Differential susceptibility of Iowa waterhemp (*Amaranthus tuberculatus*) populations to 2,4-D, dicamba, and glufosinate. Can. J. Plant Sci. 103: 595-599. doi:10.1139/cjps-2023-0081

Shergill L.S., Barlow B.R., Bish M.D., and Bradley K.W. (2018) Investigations of 2,4-D and Multiple Herbicide Resistance in a Missouri Waterhemp (Amaranthus tuberculatus) Population. Weed Sci. doi: 10.1017/wsc.2017.82

Category:
Crop Production
Weeds
Herbicide Resistance

Authors:

Meaghan Anderson ***Field Agronomist in Central Iowa***

Meaghan Anderson is a field agronomist in central Iowa and an extension field specialist at Iowa State University Extension and Outreach. Educational programming is available for farmers, agribusinesses, pesticide applicators, certified crop advisors, and other individuals interested in...

Micheal D.K. Owen