

EARLY DETECTION AND RAPID RESPONSE

to New Invasive Grasses in North Central Wyoming



EDRR Pilot Project | Contractor's Report



April 2019

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USFWS Project Officer

Lindy Garner

Phone | (406) 727-7400 x213

Fax | (406) 727-7432

Email | Lindy_Garner@fws.gov

USFWS Administrative POC

Susan Lakes

Phone | (406) 727-7400 x21

Fax | (406) 727-7432

Email | Susan_Lakes@fws.gov

Report for the National Invasive Species Council Secretariat
Deliverable for Intra-agency Support Agreement PR# 40316879

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FINAL REPORT

Background

Executive Order 13112 created the National Invasive Species Council (NISC). NISC is co-chaired by the Secretaries of the Interior, Agriculture, and Commerce. NISC provides interdepartmental coordination of invasive species efforts. The US Fish and Wildlife Service has extensive responsibilities concerning the management of invasive species across the nation. Their efforts are vital to the overall work of NISC.

This support agreement (SA) is entered into by and between the National Invasive Species Council (NISC), the buying entity, and the US Fish and Wildlife Service (the Service), the selling entity, for supporting and implementing the NISC 2016-2018 Management Plan (Action Item 2.5.4) and National Framework for Early Detection and Rapid Response Framework in line with the Executive Order 13112, amended 12/5/2016 Sec 6(c).

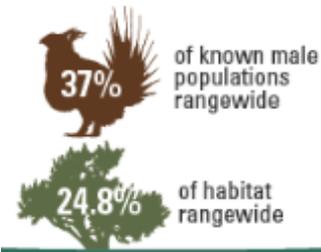
- NISC 2016-2018 National Management Plan, Action Item 2.5.4 – “...to promote pilot projects across a variety of US ecosystems that explore innovative, multi-stakeholder approaches to the early detection of and rapid response to invasive species.”
- EO 13112 Sec 6(c) “...advance national incident response, data collection, and rapid reporting capacities that build on existing frameworks and program and strengthen early detection of and rapid response to invasive species...”
- National Framework for Early Detection and Rapid Response Framework Guiding Principles; Complementarity, Partnerships, Scale, Implementation, Timeliness, Resource Availability, Metrics.

Description of Work

This Scope of Work defines the roles and responsibilities between the NISC and the Service for the development of a pilot project within the sagebrush biome that addresses the early detection and rapid response of invasive grasses with multiple partners. This EDRR project will highlight the guiding principles of the National EDRR Framework, Action Item 2.5.4 NISC Management Plan, and EO 13112 Sec 6 (c). This pilot will provide a process-template of identifying stakeholders, raising awareness, facilitating effective coordination and cost-efficiencies, that remove barriers for stream-lined and timely implementation of management strategies within existing federal and non-federal partnerships and leveraging existing capacities and resources. Performance measures will be developed and collated among all partners for EDRR efficiency and effectiveness and support adaptive management.

Issue

In June 2016, self-sustaining populations of two invasive grasses, medusahead (*Taeniatherum caput-medusae*) and ventenata (*Ventenata dubia*), were documented in northern Wyoming. These were new occurrences of both species for the state of Wyoming and for the larger Great Plains ecoregion. Both species negatively impact rangeland resources for livestock and wildlife, with particularly strong impacts on sagebrush grassland communities. For



example, Wyoming has the most sagebrush of any state at 43 million acres and a stronghold for Greater Sage-grouse. These invasive grasses and their potential for spread and subsequent fire risk require a timely response. Many questions accompanied the initial findings of these invasive species: How widely distributed are they? Where did they come from? What will their impacts be? How do we manage or control them?

This issue was a good fit for working through the Early Detection Rapid Response Pilot process. The US Fish and Wildlife Service then developed a cooperative agreement between our Partners for Fish and Wildlife Program with Sheridan County Weed and Pest to utilize the NISC funding for field project work associated with this EDRR Pilot Project that would address the early detection and rapid response of incipient populations of ventenata and medusahead with Sheridan and surrounding counties and multiple partners.

Actions

Immediately following their discovery, the Wyoming Cheatgrass Task Force met to discuss an Early Detection-Rapid Response (EDRR) program specifically for medusahead and ventenata. Based on recommendations from the Task Force, local partners formed the Northeast Wyoming Invasive Grasses Working Group (NEWIGWG) with a goal of reducing, containing, or eradicating medusahead and ventenata from northeast Wyoming.

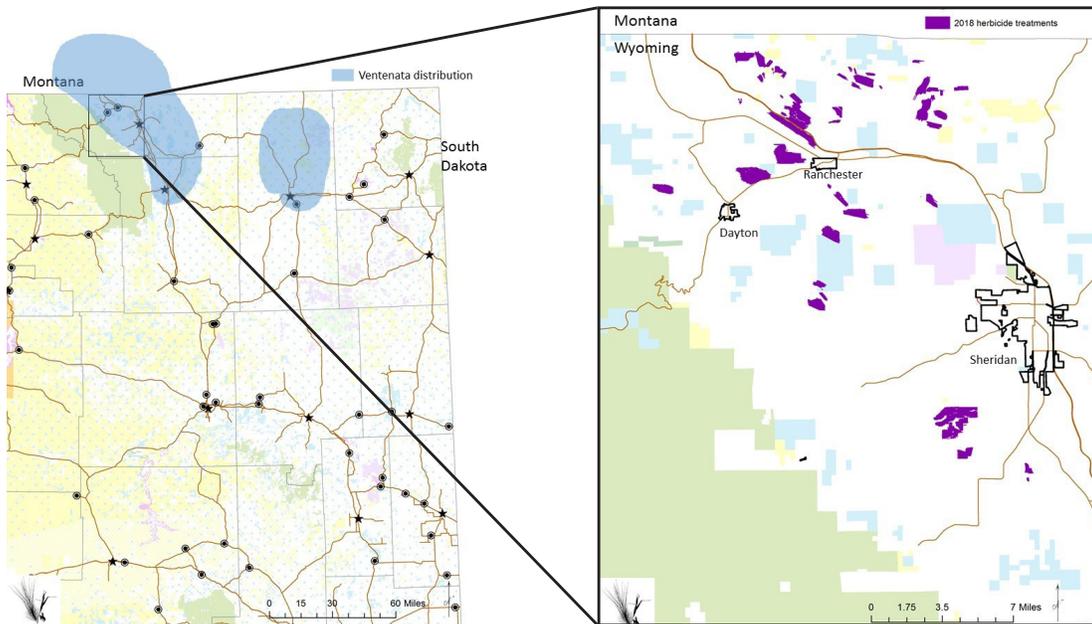


Figure 1. Estimated ventenata distribution (light blue, left) and medusahead distribution (purple, right). Ventenata distribution was determined by survey, partner reports, and citizen science surveys. Medusahead distribution also reflects NEWIGWG herbicide treatments implemented in fall 2018 – all of the known medusahead at that time. Polygons immediately southwest of Sheridan were NRCS partner treatments primarily targeting ventenata.

The National EDRR Framework (USDI 2016) was reviewed initially by the working group to identify the process for implementation of EDRR and highlight what opportunities and system were already in place for this EDRR effort.

I. Preparedness

The working group was a multi-jurisdictional partnership already in place. There were already partners involved in evaluating management approaches for these two invasive grasses, and developing monitoring and research with habitat suitability models.

II. Early Detection

The working group and partners immediately started sharing identification information far and wide. Reported infestations were verified and multiple groups initiated targeted survey efforts. Documentation and reporting avenues were already in place.

III. Rapid Assessment

Both grasses were known to be invasive and found in similar habitat. Identified all known medusahead sites, added information to known perimeter of ventenata infestation, and started evaluating vector management associating with movement of cattle that had grazed in infested areas.

IV. Rapid Response

The working group already had proven ability for rapid response from previous collaboration and identifying the initial medusahead sites. Leadership and coordination were already in place to help with outreach and communications under way.

The Service participated as a member of the NEWIGWG to develop project plan with partners that identified the funding, identification of participants, authorities and capacities necessary for an Early Detection and Rapid Response that addressed the threat of invasive annual grasses, medusahead (*Taeniatherum caput-medusae*) and ventanata (*Ventenata dubia*) in Wyoming (see this agreement's sow).

Primary objectives were developed for the NEWIGWG collaboratively:

1. Clearly understand distribution and potential for spread of the target species,
2. Develop and implement landscape-scale management strategies,
3. Treat and monitor known infestations
4. Facilitate data sharing to enhance management, and
5. Increase awareness around medusahead and ventenata with land managers and communities.

In 2018 NEWIGWG partners:

- Continued to identify priority survey areas based on risk, vector and pathway considerations relative to cattle grazing and cattle movements and wildlife recreation access points.
- Prioritization for which sites to survey had to occur based on available resources, collaborative communication and leadership among all partners to partition effort.
- Continued a tiered-priority survey of an additional >20,000 acres and informally surveyed approximately 8,000 acres for medusahead and Ventenata.
- Adaptively adjusted distributional limits for both species as new reports were confirmed.
- Provided written fact sheets and identification guides to more than 3000 contacts; included yearly in all BLM and State Lands correspondence contacts.
- Held additional local landowner informative meetings to share information about medusahead and ventenata and over 100 educational presentations across the Western US since 2017.
- Hosted the 2nd annual field tour, consisting of well over 100 participants from around the nation including heads of the Department of Interior; media coverage included.
- Developed a central source for information and reporting. (<https://www.scweeds.com/invasive-annual-grasses>)



- Constructed and provided boot brush signs for and additional 15+ locations and increased distribution of the Wyoming Invasive Grass Quick Reference Guide.
- Chemically treated all currently-known medusahead acres with surrounding *ventenata* matrix in August and September of 2018 (see Figure A.).

Outcomes

As more knowledge was gained regarding species distribution, NEWIGWG members discussed possible approaches to their management. Total gross acres of *ventenata* distribution (as determined by connecting all confirmed locations as an outer boundary) has exceeded 2 million acres, although net infested acreage is estimated to be dramatically less than this. Known medusahead infested acreage was far less, so NEWIGWG decided to target its eradication from the region. This approach may change if additional populations are reported that significantly increase infested acreage. Incoming questions, sighting reports, and requests for information steadily increased throughout 2017 & 2018 – providing a clear indication that outreach and awareness is greatly increasing.

Accomplishments over the Agreement Period (17-18) by Objective:

- 1) *Identify scope and extent of current threat of medusahead and ventenata in Wyoming, starting with Sheridan County as ground zero; FY17. Subsequently identify gaps of tools, capacity or resources for EDRR coverage; FY18.*
 - Implemented intensive, tiered survey methodology across 50,000 acres in the region currently known to harbor medusahead populations. These intensive on-the-ground surveys were coupled with flights, citizen-science reports, and additional verification of landowner-reported populations in surrounding areas. The intensive surveys suggest that approximately 10% of the surveyed area could be blocked together for effective aerial herbicide treatment of medusahead, often within a matrix of *ventenata*. Actual medusahead point locations indicate that its occurrence across the surveyed landscape is closer to 5%. Medusahead patches are difficult to locate from a distance, so NEWIGWG partners ‘quality checked’ survey crews and found some patches that had been missed. This difficulty of finding a cryptic species within a large landscape is one of the primary challenges to ensuring effective eradication of this species. Continual funding for survey of new areas and efficacy monitoring of treated locations is crucial to a data-driven approach that is needed for successful rapid response for medusahead.
 - *Ventenata* reports continued to arrive from external sources over the grant period. Our perception of this species went from a relatively restricted population to two primary areas of distribution in Wyoming (Figure A.), one of which extends into MT. Some of the participants from our educational field tour that work in MT were responsible for documenting *ventenata*’s presence in 9 new counties in MT in 2018. This has led to an increased coordination with a newly-forming group in MT with similar goals as NEWIGWG. Although it is more widespread than initially thought, *ventenata* is still an EDRR priority because its distribution is relatively restricted from a regional standpoint, and its ability to cause dramatic impacts in our region has been clearly demonstrated.
 - Gaps in our existing system include the need to prioritize between treatment and survey for expenditures of limited resources. We are moving forward with several remote sensing projects and with coarse-scale habitat suitability analysis for medusahead (see below).
- 2) *Assist multi-stakeholder Task Force working collaboratively, across jurisdictions, to identify EDRR priorities that leverage existing capacities and additional resources to reduce an invasive annual grass threat within the sagebrush biome; FY17*
 - NEWIGWG came together with a broad array of partners quickly. The engagement continues to be strong and to attract more partners over time. The working group was partially responsible for bringing the target species to the forefront of awareness on many levels.

- Local NRCS resource planning committee prioritized degraded vegetation condition due to annual grasses as its top funding priority
 - Wyoming Game and Fish clearly stated that medusahead and ventenata present one of the most pressing resources issues in the state
 - New Wyoming Governor Mark Gordon, in both his inaugural address and first state of the state address specifically called out medusahead and other invasive species as a top priority for the state.
 - A shared goal and willingness for people to devote time to the effort has made this one of the most productive cooperative groups we have worked with.
- 3) *Explore innovative techniques to monitor and collate performance measures to evaluate efficiency and effectiveness; FY18*
- NEWIGWG continues to discuss ways to effectively and efficiently evaluate our programs. A PhD student at the University of Wyoming initiated a project in 2018 to evaluate the effects of ventenata and medusahead, and their control, on ecosystem goods and services in the region. This broad-reaching study will contribute to, and build on, data collection from treated areas in previous years. This moves the discussion around ‘effectiveness monitoring’ to a deeper question, but still accomplishes the base level needs of triggering retreatment and understanding effectiveness of treatments. Some of the 2017 treatments appeared to have had limited efficacy on medusahead. We learned of this in early 2018 thanks to our vegetation monitoring program. Medusahead was stunted and not very productive in treated areas, but still produced seed. A seed viability screening compared seed from treated areas to adjacent non-treated areas and found that the germinability of medusahead seed in the treatments was roughly 80% less than in non-treated areas. These sites were re-treated with a new herbicide in fall of 2018 with the intent to further deplete the already diminished seedbank.
 - Data from our intensive surveys are being evaluated this winter to determine whether it is as effective as it should be. We may shift toward a reconnaissance approach for initial population detection followed by intensive site-specific surveys once medusahead is found. This should increase the amount of time spent in searching areas, but will maximize information about confirmed populations.
- 4) *Identify needs and opportunities to predict areas at risk of invasion based on EDRR spatial data, pathways and vectors; FY18*
- We finished a vector-pathway analysis for medusahead in FY18. This analysis combined cattle movement data from ranchers with known medusahead infestations and identified areas where cattle had been moved from known infestations to areas that had not yet been searched. We prioritized intensive surveys in some of these areas in an attempt to ‘get ahead of the spread.’ There was no strong evidence that cattle movement had served as a vector into the new areas, but this is not conclusive to the relatively small sample size. We will continue to use this approach to inform our prioritization of search locations. Additionally, sufficient spatial data are currently available to being to evaluate remote sensing and habitat suitability modeling for medusahead. These two methods, if implemented successfully, will make a meaningful difference in prioritizing locations for futures search.

Lessons Learned

This Early Detection and Rapid Response project was designed in concert with the National Framework for Early Detection and Rapid Response Framework, and fit the need of the National Invasive Species Council National Management Plan, Action Item 2.5.4 “...to promote pilot projects across a variety of US ecosystems that explore innovative, multi-stakeholder approaches to the early detection of and rapid response to invasive species.

The project was conceptualized on the local level with many county, state and university partners in conjunction with local landowners as a response to the recent identification and verification of both species in the north central

area of the state. Several opportunities and challenges were presented with the administration, logistics, partners and terrain.

Opportunities:

- Multiple landowners actively engaged in the process
- Agreement for inventory with a tiered-priority approach
- No gap between state and federal, common priorities
- Big group of collaborating experts so plenty of knowledge and latest information and technology available
- Raised awareness for surrounding counties and states
- Right information to a few key landowners dramatically changed scope of impact for independent survey work
- Leadership of federal funding prompted seriousness of EDRR and other federal partner engagement resulted

Challenges:

- Federal financial agreements timeliness was significantly inhibited from waiting on allocations and process constraints to get funding to the working group
- How to make decisions of where to survey first was overwhelming and difficult to determine which areas should get limited resources
- Detectability was reduced with such a high spring production of vegetation
- Remote and rough terrain slowed survey efforts
- Identification of vectors of spread required one-on-one conversations and significant time to identify linked properties with grazing association's movement of cattle, but this may be a valuable tool moving forward
- Long-term funding need but funding tied to current year and treatment only when significantly needed more survey work
- Management lesson was that the use of herbicide picloram released ventenata and will need to be considered for weed succession issues
- Slow response for timeliness of Sect 18 exemption for use of indaziflam, but this appears to be the best tool for long-term control of our target species (currently)

Next Steps

NEWIGWG partners are currently implementing innovative methods to predict areas with high likelihood of invasion by coupling vector-pathway analysis with estimated habitat suitability to improve efficiency and effectiveness of survey efforts on the ground and potentially with unmanned aerial systems (drones). The current treatment strategy is to use herbicides over multiple years (as indicated by vegetation monitoring) to deplete the seedbank in an attempt to eradicate medusahead. Ventenata efforts will largely focus on defining its distribution boundaries, then prioritizing areas for treatment once its distribution is better documented. Local priorities for treatment will be considered based on local needs, impacts to livestock forage, and risk of fire to migration corridors, infrastructure and wildlife habitat.

2017 ANNUAL REPORT

Background

Executive Order 13112 created the National Invasive Species Council (NISC). NISC is co-chaired by the Secretaries of the Interior, Agriculture, and Commerce. NISC provides interdepartmental coordination of invasive species efforts. The US Fish and Wildlife Service has extensive responsibilities concerning the management of invasive species across the nation. Their efforts are vital to the overall work of NISC.

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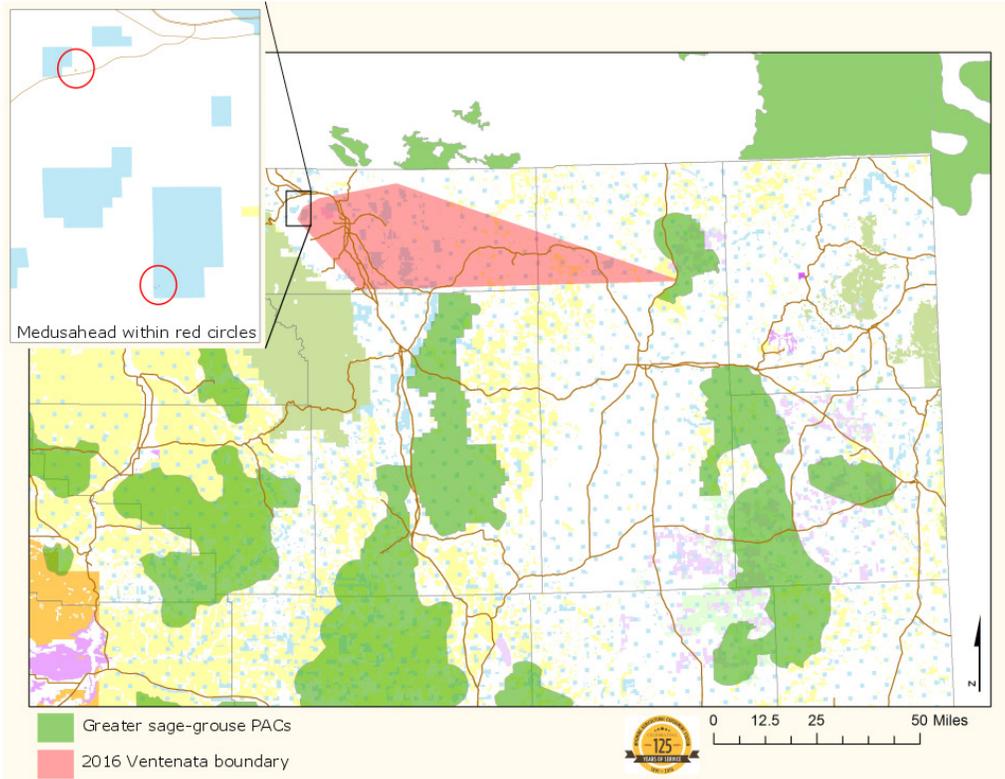
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Issue

In June 2016, self-sustaining populations of two invasive grasses, medusahead (*Taeniatherum caput-medusae*) and ventenata (*Ventenata dubia*), were documented in northern Wyoming. These were new occurrences of both species for the state of Wyoming and for the larger Great Plains ecoregion. Both species negatively impact rangeland resources for livestock and wildlife, with particularly strong impacts on sagebrush grassland communities. For example,

Wyoming has the most sagebrush of any state at 43 million acres and a stronghold for Greater Sage-grouse. These invasive grasses and their potential for spread and subsequent fire risk require a timely response. Many questions accompanied the initial findings of these invasive species: How widely distributed are they? Where did they come from? What will their impacts be? How do we manage or control them?

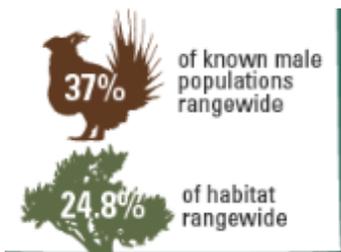


This issue was a good fit for working through the Early Detection Rapid Response Pilot process. The US Fish and Wildlife Service then developed a cooperative agreement between our partners for Fish and Wildlife Program with Sheridan County Weed and Pest to utilize the NISC funding for field project work associated with this EDRR Pilot Project that would address the early detection and rapid response of incipient populations of ventenata and medusahead with Sheridan and surrounding counties and multiple partners.

Actions

Immediately following their discovery, the Wyoming Cheatgrass Task Force met to discuss an Early Detection-Rapid Response (EDRR) program specifically for medusahead and ventenata. Based on recommendations from the Task Force, local partners formed the Northeast Wyoming Invasive Grasses Working Group (NEWIGWG) with a goal of reducing, containing, or eradicating medusahead and ventenata from northeast Wyoming.

The National EDRR Framework (USDI 2016) was reviewed initially by the working group to identify the process for implementation of EDRR and highlight what opportunities and systems were already in place for this EDRR effort.



- I. Preparedness
The working group was a multi-jurisdictional partnership already in place. There were already partners involved in evaluating management approaches for these two invasive grasses, and developing monitoring and research with habitat suitability models.
- II. Early Detection
The working group and partners immediately started sharing identification information far and wide. Reported infestations were verified and multiple groups initiated targeted survey efforts. Documentation and reporting avenues were already in place.
- III. Rapid Assessment
Both grasses were known to be invasive and found in similar habitat. Identified all known medusahead sites, added information to known perimeter of ventenata infestation, and started evaluating vector management associating with movement of cattle that had grazed in infested areas.
- IV. Rapid Response
The working group already had proven ability for rapid response from previous collaboration and identifying the initial medusahead sites. Leadership and coordination were already in place to help with outreach and communications under way.

The Service participated as a member of the NEWIGWG to develop project plan with partners that identified the funding, identification of participants, authorities and capacities necessary for an Early Detection and Rapid Response that addressed the threat of invasive annual grasses, medusahead (*Taeniatherum caput-medusae*) and ventanata (*Ventenata dubia*) in Wyoming (see this agreement's SOW).

Primary objectives were developed for the NEWIGWG collaboratively:

1. Clearly understand distribution and potential for spread of the target species,
2. Develop and implement landscape-scale management strategies,
3. Treat and monitor known infestations
4. Facilitate data sharing to enhance management, and
5. Increase awareness around medusahead and ventenata with land managers and communities.

In its first year of existence, NEWIGWG partners:

- Identified areas to survey based on risk, vector and pathway considerations relative to cattle grazing and cattle movements and wildlife recreation access points.
- Prioritization for which sites to survey

The Northeast Wyoming Invasive Grass Working Group consists of multiple partners from local, state, and national organizations working together to reduce the impacts of these emerging threats to rangeland ecosystems and is supported from various sources.

- Sheridan County Weed & Pest
- Johnson County Weed & Pest
- Campbell County Weed & Pest
- Sheridan County Conservation District
- Clear Creek Conservation District
- Campbell County Conservation District
- US Fish and Wildlife Service
- US Forest Service
- Natural Resource Conservation Service
- US Bureau Land Management
- Wyoming Military Department
- The Nature Conservancy
- American Bird Conservancy
- University of Wyoming Agricultural Experiment Station
- University of Wyoming Extension
- Sheridan College
- Wyoming Office of State Lands and Investments
- Multiple private landowners

had to occur based on available resources and collaborative communication and leadership among all partners to partition effort.

- Developed and implemented a tiered-priority survey >22,000 acres and informally surveyed approximately 5,000 acres for medusahead and ventenata
- Adaptively adjusted distributional limits for both species as new reports confirmed
- Develop and provided written fact sheets and identification guides to more than 3000 contacts; included in all BLM and State Lands correspondence contacts
- Held local landowner ‘town hall’ meetings to share information about medusahead and ventenata and over 15 educational presentations ranging from Weed and Pest Fall Conference to Wyoming Mining Natural Resources Foundation to neighboring states weed meetings to Western Weed Coordinating Committee to name a few.
- Hosts an annual field tour for over 100 participants from 6 different states; media coverage included
- Provided boot brush signs at eight locations and developed and distributed the Wyoming Invasive Grass Quick Reference Guide.
- Chemically treated all currently-known medusahead acres with surrounding vetenata matrix in September-October 2017.

Outcomes

As more knowledge was gained regarding species distribution, NEWIGWG members discussed possible approaches to their management. Total gross acres of ventenata distribution (as determined by connecting all confirmed locations as an outer boundary) approached 2 million acres in December 2017, although net infested acreage is estimated to be dramatically less than this. Known medusahead infested acreage is less than 500 acres, so NEWIGWG decided to target its eradication from the region. This approach may change if additional populations are reported that significantly increase infested acreage. Incoming questions, sighting reports, and requests for information steadily increased throughout 2017 – providing a clear indication that outreach and awareness are increasing.

Monitoring

Sheridan County Weed & Pest contracted initial survey efforts to Rocky Mountain Energy Solutions. They were able to survey 20,000 acres of State, Private, and Forest land in high detail. The University of Wyoming, in conjunction with Sheridan County Weed & Pest and NRCS, continue to monitor all treatment sites to determine effectiveness of herbicide. Comparative analysis of treated vs non treated areas along with several different rates of multiple chemical combinations were performed post treatment. Information collected includes percent control, forage quality & quantity, and seed viability. Continually surveying around the risk vector pathway to monitor growth/reduction of the distribution of these grasses is one of the primary objectives and is essential to the success of this program.

Lessons Learned

This Early Detection and Rapid Response project was designed in concert with the National Framework for Early Detection and Rapid Response Framework, and fit the need of the National Invasive Species Council National Management Plan, Action Item 2.5.4 “...to promote pilot projects across a variety of US ecosystems that explore innovative, multi-stakeholder approaches to the early detection of and rapid response to invasive species.

The project was conceptualized on the local level with many county, state and university partners as a response to the recent identification and verification of both species in the north central area of the state. Several opportunities and challenges were presented with the administration, logistics, partners and terrain.

Opportunities:

- Several partners and landowners willingness to get on board with the collaborative approach
- Agreement for inventory with a tiered-priority approach
- No gap between state and federal, common priorities
- Big group of collaborating experts so plenty of knowledge and latest information and technology available
- Raised awareness for surrounding counties and states
- Right information to a few key landowners dramatically changed scope of impact for independent survey work
- Leadership of federal funding prompted seriousness of EDRR and other federal partner engagement resulted

Challenges:

- Federal financial agreements timeliness was significantly inhibited from waiting on allocations and process constraints to get funding to the working group
- How to make decisions of where to survey first was overwhelming and difficult to determine which areas should get limited resources
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- Long-term funding need but funding tied to current year and treatment only when significantly needed more survey work
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For FY18, NEWIGWG partners plan to survey another 20,000+ acres around the buffer zone of the infestations. Sheridan County Weed & Pest aims to treat 4,250 acres of medusahead/ventenata matrix, while NRCS is preparing for 2,000 acres of Ventenata treatments with participating landowners. The remaining NISC funds will be applied to Medusahead infestations using the herbicide Esplanade. Research shows that this treatment program will be more effective for a longer period of time than other chemicals know currently.

Budget

Below is a breakdown of funding sources for 2017 and expected 2018. This program was kick-started with the NISC funding, and has since gathered a lot of attention and funding from other sources.

Landowners are becoming much more involved after education efforts to help them identify Medusahead and Ventenata. A very large portion of our mapping and survey efforts are due to the landowner involvement. Their in-kind services have saved thousands of dollars in survey and mapping efforts. The biggest expense of the program is actual treatments of these grasses. The volume of area, as well as terrain, are such that effective treatments need to be performed by aircraft.

2017			2018		
Source	Amount	Agency Status	Source	Amount	Notes
Fish & Wildlife (NISC) Grant	\$30,000	Federal	Fish & Wildlife (NISC) Grant	\$30,000	Federal
Forest Service	\$10,000	Federal	Forest Service	\$15,000	Federal
State Lands	\$7,000	State	State Lands	\$40,000	State
BLM	\$10,000	Federal	BLM	\$5,000	Federal
Pesticide Registration (SAC)	\$14,000	State	Pesticide Registration (SAC)	\$25,000	State
State & Private Forestry (SAC)	\$4,320	Federal	State & Private Forestry (SAC)	\$30,533	Federal
USFS Sage Grouse Grant	\$20,000	Federal	NRCS Grouse / Pheasants Forever	\$25,000	Federal
Game & Fish	\$20,000	State	Game & Fish	\$10,500	State
			Wyoming Wildlife and Natural Resource Trust	\$95,400	State
			USFS Sage Grouse	\$75,000	Federal