A REPORT PREPARED FOR THE MONTANA INVASIVE SPECIES ADVISORY COUNCIL

by Creative Resource Strategies, LLC

Montana Management Assessment of Invasive Species

March 2016

Executive Order 13-2014 established the 21-member, Governor-appointed Montana Invasive Species Advisory Council (MISAC) to advise the Governor on a science-based, comprehensive program to identify, prevent, eliminate, reduce, and mitigate the impacts of invasive species in Montana.

The role of the Montana Invasive Species Advisory Council is to:

- Provide recommendations, direction, and planning for combating infestations of invasive species throughout the state, while preventing the introduction of others;
- Foster cooperation, communication, and coordinated approaches that support international, federal, regional, state, local, and tribal initiatives for the prevention, early detection, and control of invasive species;
- Serve as a nonpartisan forum to achieve a science-based interdisciplinary and comprehensive understanding of the current status, trends, and potential threats of invasive species in Montana;
- Identify priorities for prevention and control of invasive species in Montana;
- Recommend and take measures that will encourage prevention, early detection, and control of harmful invasive species in Montana;
- Champion priority invasive species issues identified by stakeholders to best protect the state; and
- Advise and work with agency personnel, local efforts, and the scientific community to implement program priorities.

Montanans cherish our outdoor recreation and spaces, and those spaces play a crucial role in our state's vibrant economy. It is imperative that we do everything we can to protect Montana from the threat of invasive species that disrupt our land, water, and native species. None of us want another knapweed spreading across Montana. ~ Governor Steve Bullock

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Top photo—US Fish and Wildlife Service; Inset photo—Montana Department of Natural Resources and Conservation; Lower photo—Blaine County, Montana

Foreword The Threat of Invasive Species

Montana's lands and waters are being impacted and threatened by the invasion of an increasing number of harmful, nonnative species that are damaging Montana's natural resources and causing hardships to public, private, natural, and economic resources. The Montana Invasive Species Advisory Council formed in 2015 to advise the Governor on a science-based, comprehensive program to identify, prevent, eliminate, reduce, and mitigate the impacts of invasive species in Montana. To be successful, we are committed to cooperate and collaborate to obtain resources to engage Montanans, implement programs, and efficiently and effectively address the threats posed by invasive species.

We thank everyone who participated in this survey and assessment as we join forces to protect the natural resources all Montanans treasure.

Sincerely,

The Montana Invasive Species Advisory Council

BRYCE CHRISTIAENS, Chair - County Weed Districts; Missoula County Weed District TOM BOOS, Vice Chair - Montana Fish, Wildlife & Parks **STEVEN HERTEL**, Vice Chair - Private Landowners Amy Gannon - Montana Department of Natural Resources and Conservation Chip Weber - U.S. Forest Service Dave Burch - Montana Department of Agriculture Floyd Thompson - Bureau of Land Management Gary Adams - U.S. Department of Agriculture Animal, Plant Health Inspection Service Jane Mangold - Montana State University Extension Jeffrey Baumberger - U.S. Bureau of Reclamation Jim Jacobs - Natural Resources Conservation Service Lindy Garner - U.S. Fish & Wildlife Service Mark Aagenes - Conservation Organizations; The Nature Conservancy Mark Reller - Hydropower Utility; Bonneville Power Administration Mike Miller - Department of Transportation Patricia Gilbert - U.S. Army Corps of Engineers Stephanie Hester, DNRC, Council Liaison Steven Bekedam - U.S. National Park Service Steven Tyrrel - Private Industry; Integrated Ag. Services Inc. Steve Wanderaas - Montana Conservation Districts; McCone Conservation District Thompson Smith - Natural Resource Organizations; Flathead Basin Commission Virgil Dupuis - Salish Kootenai College, Tribal Government

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Executive Summary

Invasive species cause economic and environmental damage to landscapes throughout Montana, in the region, in North America, and throughout the world. Invasive species have greater impacts on livelihood in places such as Montana, where people depend most heavily on agriculture, forestry, and fisheries. The estimated damage from invasive species worldwide totals more than \$1.4 trillion, or five percent of the global economy.¹ The annual U.S. cost from invasives is estimated to be \$120 billion, with more than 100 million acres affected (i.e., about the size of California).² U.S. agriculture loses \$13 billion annually from invasive insects.

The economic impacts of leafy spurge infestations are estimated at \$144 million annually in Montana, North Dakota, South Dakota, and Wyoming. Montana has spent more than \$42 million annually on the direct and indirect costs of diffuse, spotted, and Russian knapweed. A significant amount of prevention work, including watercraft inspection stations, monitoring, and public education occurs in Montana to prevent the introduction and subsequent establishment of dreissenids (quagga and zebra mussels), which are costing other regions of the United States hundreds of millions of dollars annually.

The environmental effects of invasive species are equally devastating. Invasive species decrease biodiversity; put endangered and threatened species at further risk; displace native plants that wildlife and fish depend on for food; increase soil erosion; can cause major damage to streams and other wetland areas that provide habitat for native fish, plants, and animals; increase the frequency and risk of wildfires; and reduce agricultural production and property values.

The Montana Invasive Species Advisory Council (MISAC) was established to advise the Governor on a science-based comprehensive program to identify, prevent, eliminate, reduce, and mitigate the impacts of invasive species in Montana. The three priorities it seeks to address, by January 2017, are to:

- Conduct an assessment and gap analysis of Montana's invasive species programs;
- Host an invasive species summit to develop a shared invasive species strategy for Montana; and
- Develop a comprehensive statewide Montana Invasive Species Strategic Framework, highlighting priority existing and emerging invasive species issues as well as effective, collaborative strategies to address those issues.

In 2015, the Council contracted with Creative Resource Strategies, LLC to conduct an

assessment and gap analysis of Montana's invasive species programs. This report documents the outcomes of that assessment and analysis, and includes an articulation of key gaps as well as a set of recommendations to refine strategies and approaches, and enhance efficiencies, to address invasive species. It is important to recognize that the information from survey respondents represents a snapshot in time—the 2015 fiscal year—for each contributing entity. In addition, the information obtained from survey respondents was, in numerous cases, incomplete, and in some cases, not accurate. Nevertheless, the information obtained is of value to identify gaps and inform a set of recommendations.

Information in this report will serve to inform discussion at an April 12–13, 2016, invasive species summit in Helena, Montana. The summit will engage invasive species managers, county leaders, local governments, tribal sovereign nations, private landowners, lake association members, conservation districts, angling groups, researchers, educators, and others to develop a shared invasive species framework for the state. Creating this shared vision is intended to improve the efficiency and effectiveness of invasive species efforts, which is critical given finite and limited financial and personnel resources. Developing an invasive species strategic framework will position Montana to address the existing and emerging threats invasive species pose to Montana's natural resources, economy, and quality of life.

The following are key gaps and challenges in Montana's invasive species programs:



A. Coordination of Funding - Key Gaps and Challenges

A key challenge federal and state agencies face is coordinating grant programs and disbursements to ensure the highest priority invasive species issues are being addressed.



B. Species Priorities - Key Gaps and Challenges

Invasive species priorities change through time because of emerging pests, establishment of existing pests, new research that leads to biological or other controls, changes in funding or policies, and many other reasons. Assessing and reassessing existing and emerging priorities on an ongoing basis is critical to ensuring Montana is investing its resources in the highest invasive species priorities.



C. Standardized Monitoring Protocols - Key Gaps and Challenges

A patchwork of dedicated people and entities are monitoring Montana for the spread and introductions of invasive species. The number and diversity of organizations working on invasive species efforts requires consistent monitoring protocols and reporting of monitoring results in a shared accessible database for all taxa of invasive species.

Terrestrial invasive plant programs and laws have been established in Montana since the 1930s. In the past several decades, increased awareness of aquatic invasive species has resulted in the creation and implementation of new programs aimed at monitoring for and controlling new aquatic invaders. Opportunities exist to replicate some of the models and processes used to prioritize terrestrial plants to ensure there is identification of the highest priorities and appropriate response to aquatic invasive species infestations.



D. The Framework Moving Forward - Key Gaps and Challenges

The current method of addressing invasive species issues is inefficient, includes gaps in coverage, has redundancies, and doesn't consider an all-taxa approach.



E. Program Effectiveness Key Gaps and Challenges

Respondents reported using a variety of methods to evaluate program effectiveness; some reported using few or no methods.



F. Private Landowners Key Gaps and Challenges

Respondents identified numerous gaps and challenges associated with working with private landowners, from lacking an understanding of the County Weed Control Act and their responsibilities as landowners to the differences in priorities between private landowners and agencies.



G. Regulations

Key Gaps and Challenges

Survey respondents identified numerous gaps and challenges associated with Montana's terrestrial, aquatic, enforcement, management, funding, and authorities regulations.



H. Funding Key Gaps and Challenges

Survey respondents noted significant challenges associated with funding shortfalls for invasive species programs.



I. Information Management Key Gaps and Challenges

There are numerous existing databases that contain information about invasive species in Montana, but there is no single database, or clearinghouse, that contains all of this information that is accessible to the public at some level (while protecting the rights of private landowners). To effectively manage invasive species, managers need acccess to current information, and preferably from a single source in which the information documented undergoes some type of quality control.



J. Information Management Key Gaps and Challenges

Outreach and education efforts are critical to addressing pathways and vectors of invasive species introduction, engaging landowners, and obtaining the political support and will to address existing and emerging invasive species issues.



K. Partnerships and Agreements Key Gaps and Challenges

The number of agreements documented by survey respondents for the 2015 assessment warrant further analysis, consideration, and review for gaps, overlaps, and potential for streamlining.

Methodology

A survey instrument (Appendix A) was used to:

- Obtain information from as many Montana entities as possible that work on invasive species issues;
- Determine the highest priority invasive species taxa entities worked on in 2015;
- Identify the criteria entities use to prioritize their work;
- Understand how entities rank the importance of different types of invasive species programs;
- Characterize the invasive species regulatory environment, including identification of rules and regulations that need to be improved to address existing and emerging invasive species issues;
- Characterize the partnerships that exist relative to invasive species activities;
- Estimate the annual funding expended on invasive species programs, including describing the source of those funds and how they are ultimately expended;
- Describe how entities evaluate their program effectiveness, including self-assessments of strengths and weaknesses; and
- Characterize the key challenges entities face in implementing invasive species actions.

The survey instrument was developed in September 2015 and implemented from September 4, 2015–January 31, 2016. Survey respondents completed the survey using an online tool (www.jotform.com), or via a fillable PDF. Results from respondents who completed the survey via the fillable PDF option were transcribed to the online form so that one online repository of all responses was created.

Each survey response was analyzed, and respondents were contacted if information was missing, unclear, or completed incorrectly. Results from respondents who provided clarifying information were updated using the online response form.

In addition, numerous entities provided background documents and information (Appendix B) to inform understanding of specific invasive species programs within Montana. This information was incorporated into the description of programs and assessment/gap analysis.



Mann Gulch, Helena National Forest, Montana Photo credit: Forest Service Northern Region

Infrastructure

About one-third of Montana lands are administered by federal and state agencies and tribal sovereign nations. The following is a brief description of entities with significant land-management responsibilities:

Federal Agencies

Department of Agriculture

Forest Service (USFS)

Ten national forests comprise about 16.8 million acres in Montana, including 3.3 million acres of wilderness in 12 different locations. National forests are managed for recreation, minerals, timber, grazing, wildlife, water, and wilderness values to achieve the USFS mission to sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations.

Animal and Plant Health Inspection Service (APHIS)

The Animal and Plant Health Inspection Service (APHIS) is a multi-faceted agency with a broad mission that includes safeguarding agriculture and natural resources from the entry, establishment, or spread of economically and environmentally significant plant pests. APHIS also protects and improves the health, quality, and marketability of our nation's animals, animal products, and veterinary biologics by preventing, controlling, and/or eliminating animal diseases, and monitoring and promoting animal health and productivity. The mission of APHIS includes wildlife damage and disease management, regulation of genetically engineered crops, facilitating the safe trade of agricultural products, and protection of public health and safety as well as natural resources vulnerable to invasive pests and pathogens. All of these efforts help protect and promote food, agriculture, and natural resources, and related issues from agricultural pests and diseases.

Natural Resources Conservation Service (NRCS)

Natural Resources Conservation Service (NRCS) conservationists work on grazing land and cropland in close cooperation with conservation districts through field offices that serve every county. The agency emphasizes voluntary, science-based assistance, partnerships, and cooperative problem solving at the community level through the locally-led conservation process.

Department of Defense

US Army Corps of Engineers (USACE)

The USACE's natural resource mission is to manage and conserve natural resources, consistent with ecosystem management principles, while providing quality public outdoor recreation experiences to serve the needs of present and future generations at all civil works projects. The US Army Corps of Engineers, Northwestern Division under the Department of Defense manages two Civil Works Projects in the state of Montana. Fort Peck Dam and Lake Project is part of the Omaha District. Fort Peck Dam and Lake Project is responsible for approximately 390,000 acres of land and water along the Missouri River from River mile 1931–1761.

The Seattle District of the US Army Corps of Engineers manages the Libby Dam Project on the Kootenai River consisting of approximately 30,000 acres of land and water.

Department of Interior

Bureau of Land Management (BLM)

The BLM manages about 8.1 million acres in Montana, the majority of which is rangeland. Management is based on the principles of multiple use and sustained yield, incorporating the long-term needs of future generations for renewable and nonrenewable resources.

Bureau of Reclamation (BOR)

The BOR administers about 200,000 acres of land and 100,000 acres of water in Montana. BOR's mission is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Fish and Wildlife Service (FWS)

The FWS manages about 1.1 million acres of National Wildlife Refuges and waterfowl production areas in Montana to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.

Geological Survey (USGS)

The USGS conducts research on aquatic plants, aquatic invertebrates, fish, and amphibians in the Northwest Region and Intermountain West. Its mission is to provide reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance/protect quality of life.

National Park Service (NPS)

Eight NPS sites in Montana include two national parks, one national battlefield, one

national recreation area, two national historic sites, one national historic trail, one national monument, and one national historical park. The sites welcome a total of more than 4.5 million people annually. The mission of the National Park Service is to preserve unimpaired the natural and cultural resources and values of the NPS system for the enjoyment, education, and inspiration of this and future generations.

Tribal Sovereign Nations

Montana is home to seven Indian reservations and the state-recognized Little Shell Band of Chippewa:

Blackfeet Tribe of the Blackfeet Reservation

The 1,525,712-acre Blackfeet Reservation is located in northwestern Montana along the eastern slopes of the Rocky Mountains. The land is used for ranching, farming, oil and gas development, and harvesting timber. The principal crops are wheat, barley, and hay.

<u>Chippewa Cree Tribe of the Rocky Boy's</u> <u>Reservation</u>

The 122,259-acre Rocky Boy Indian Reservation is in north central Montana and consists primarily of farm and rangelands, minerals, timber, and the Bear Paw mountains.

Confederated Salish & Kootenai Tribes of the Flathead Reservation

The 1,243,000-acre Flathead Indian Reservation is located in northwestern Montana on the western slope of the Continental Divide. Reservation lands consist of forested land, agricultural lands, prairie habitats, watersheds, pristine mountain lakes, and the lower half of Flathead Lake, the largest freshwater lake west of the Mississippi River.

Crow Tribe of the Crow Reservation

The 3.8-million acre Crow Indian Reservation is located primarily in Bighorn County, in south central Montana. Reservation lands consist of ponderosa pine, grassland, plateaus, and valleys.

Fort Belknap Tribes of the Fort Belknap Reservation

The 645,576-acre Fort Belknap Reservation is located in north central Montana, south of the Milk River, within Phillips and Blaine counties. Most of the northern portion of the reservation consists of glacial plains and alluvial bottomlands, whereas the southern portion drains into the Missouri River and consists of rolling grasslands, river breaks, and two mountain ranges.

Fort Peck Tribes of the Fort Peck Reservation

The 2,093,318-acre Fort Peck Indian Reservation is the second largest reservation in Montana and is located in northeastern Montana in Roosevelt, Valley, Daniels, and Sheridan counties. Agriculture and oil and gas production are significant to the economy.

Northern Cheyenne Tribe of the Northern Cheyenne Reservation

The 444,744.50-acre Northern Cheyenne Reservation is located in southeastern Montana, and consists of open ponderosa-pine plateau and valley country. The reservation has one of the largest coal reserves of any tribe, and about 30 percent of the reservation has timber.

Little Shell Band of Chippewa

The Little Shell Bank of Chippewa is a state-recognized tribe with a small acreage land holding.

State Agencies

Montana Department of Agriculture (MDA)

DOA's mission is to protect producers and consumers, and to enhance and develop agriculture and allied industries. The department administers and enforces plant pest quarantines that affect interstate and international movement of agriculture commodities as well as weed quarantines to prevent the spread of invasive species. The department also administers the Noxious Weed Trust Fund.

Montana Fish, Wildlife & Parks (FWP)

FWP's mission is to provide for stewardship of the state's fish, wildlife, parks, and recreational resources while contributing to the quality of life for present and future generations. FWP manages about 275,265 acres of lands, the majority of which are open to the public as fishing access sites (more than 300), wildlife management areas (84), and state parks. FWP provides access to state and federal lands through land acquisitions, leases, and easements. FWP also administers the Block Management Program, which provides public access to private lands through cooperative management agreements with private landowners. FWP administers Montana's watercraft inspection stations to prevent the introduction and spread of aquatic invasive species in the state.

Montana Department of Natural Resources and Conservation (DNRC)

DNRC's mission is to ensure Montana's land and water resources provide benefits for present and future generations. DNRC administers about 5.2 million acres of School Trust Lands, which are managed to produce income to support public schools and institutions. DNRC offers state-funded grants for the prevention and control of aquatic invasive species, and provides support to the Montana Invasive Species Advisory Council. In DN-RC's Forestry Division, various programs address invasive species. The Urban and Community Forestry Program conducts urban tree inventories and offers grants to manage invasive species. The Forest Pest Management Program focuses on trapping and diagnostics for EDRR.

Montana Department of Transportation (MDT)

The Montana Department of Transportation is responsible for about 25,000 miles of highway in the state. The Maintenance, Construction, and Wetland Programs address invasive species issues. The Maintenance Program focuses on managing noxious weeds statewide. MDT works closely with every county, and uses funding agreements with 53 counties to assist with vegetation management. Construction also has a vegetation management program that addresses both new construction and re-vegetation. The Wetland Program has a Wetland Mitigation Specialist responsible for statewide aquatic resource mitigation bank areas.

Other Entities

Local governments, nonprofit organizations, and institutions of higher learning play a critical role in Montana's fight against invasive species, from on-the-ground management and monitoring, to outreach campaigns and scientific research.





Connecting Rivers and Communities



Clark Fork Coalition volunteers participating in community activities: Photo credits: Clark Fork Coalition

Survey Results Respondents

The results presented in this report are a direct reflection of the respondents who completed the survey, the majority of which are on-the-ground practitioners (i.e., individuals whose responsibility is to detect for, control, and manage invasive species).

A total of 126 individuals representing 85 Montana entities—nine federal agencies, four tribal sovereign nations, four state agencies and one state commission, 45 local/county governments* (cities, weed districts, weed boards, weed departments, weed and mosquito management, and district councils and boards), four institutions of higher learning, 14 nonprofit organizations, four businesses, and one utility—responded to the survey (Figure 1). In addition, the Montana Grain Growers Association responded that they were not involved in any invasive species efforts in 2015; therefore, they did not complete the survey. In several instances, more than one individual from the same entity completed the survey because he/she represented a distinct program within the entity (e.g. Montana Department of Transportation Maintenance and Wetland Mitigation Programs), or had distinct geographic responsibilities from others within the entity (e.g. national forests within Montana).



The geographic representation of survey respondents was statewide, from national forests and counties to regions, valleys, and watersheds.

Figure 1. Total number of respondents to 2015 Montana Statewide Assessment of Invasive Species.

Federal Agencies

Bureau of Land Management Bureau of Reclamation National Park Service US Army Corps of Engineers USDA - Animal Plant Health Inspection Service USDA- Natural Resources Conservation Service US Fish and Wildlife Service US Forest Service US Geological Survey

Local/County Governments

Beaverhead County Weed District Big Horn County Weed District Blaine County Weed Department Broadwater County Weed District Butte Silver Bow Weed District Cascade County Weed and Mosquito Management City of Kalispell Daniels County Conservation District Daniels County Weed District Fergus County Weed District Flathead Conservation District Flathead County Weed District Gallatin County Weed District Garfield County Weed District Hill County Weed District Jefferson County Weed District Lake County Conservation District Lewis and Clark County Weed District McCone Conservation District McCone County Weed District Meagher County Weed District Mineral County Weed District Missoula County Parks and Trails Missoula County Weed District Missouri River Conservation Districts Council Pondera County Weed District Powder River County Noxious Weed District Powell County Weed Board Ravalli County Weed District Richland County Weed District Roosevelt County Rosebud County Weed District Sanders County Weed Control Sheridan County Weed District Sweet Grass County Weed District Teton County Weed District Toole and Liberty County Weed Districts Townsend Tree Board Treasure County Weed District Valley County Weed and Glasgow Mosquito District Wheatland County Whitefish County Water District Yellowstone Conservation District

Tribal Sovereign Nations

Chippewa Cree Tribe Confederated Salish and Kootenai Tribes Fort Belknap Tribes Fort Peck Tribes

State Agencies

Flathead Basin Commission Montana Department of Agriculture Montana Department of Natural Resources and Conservation Montana Department of Transportation Montana Fish, Wildlife and Parks

Institutions of Higher Learning

Fort Peck Community College Montana State University Salish Kootenai College University of Montana

Nonprofit organizations

Blackfoot Challenge Clearwater Resource Council Five Valleys Land Trust Flathead Lakers Indian Nations Conservation Alliance Invasive Species Action Network Montana Organic Association Montana Weed Control Association Musselshell Watershed Coalition Rocky Mountain Elk Foundation Rocky Mountain Front Weed Roundtable The Nature Conservancy The Wilderness Society Whitefish Lake Institute

Businesses

Hanson Environmental Integrated Ag Services, Inc. Mountain Valley Plant Management LLC Weed Management Services



Northwestern Energy

Figure 2. List of entities that responded to the 2015 Statewide Management Assessment of Invasive Species in Montana.

Survey Results Invasive Species Budgets

Survey respondents provided information on personnel and operational expenditures as well as funds they disburse and receive from other entities. In some cases, the information provided by respondents was incomplete. For example, several counties did not report receiving funds from a federal or state agency; however, the agencies responsible for disbursing those funds provided documentation and information in support of these disbursements.

Tribal sovereign nations, which represent a significant percentage of Montana's land base, were underrepresented in this assessment, as was private industry (note: this assessment was not intended to capture private industry investments in invasive species). It was not possible to analyze the budget information from institutions of higher learning because of the lack of completeness in the budget information submitted.

The information received, analyzed, and discussed in this report represents a snapshot in time—the fiscal year 2015 budget for each reporting entity.

Despite the limitations of the budget information provided, there was ample information submitted by government agencies to reflect the financial expenditures and incoming funds of the majority of natural resource federal and state agencies as well as local/county governments. In some cases, there was enough information provided by nonprofit organizations and institutions of higher learning to conduct analyses.

Nine federal agencies reported spending \$8,764,879 (\$4,128,083 on personnel expenses and \$4,636,796 on operational expenses) on invasive species efforts in 2015 (Figure 3). In 2015, federal agencies disbursed \$2,190,822 to other entities to implement invasive species programs; federal agencies received a total of \$192,674. Federal agencies play a key role financially supporting state and local government programs as well as research conducted by institutions of higher learning and other entities.

Four state agencies and one state commission reported spending \$7,547,244 (\$2,297,556 on personnel and \$5,249,688 on operational expenses) in 2015 (Figure 3). In 2015, state agencies disbursed \$3,426,276 to other entities (primarily local governments) to implement invasive species programs. State agencies play a key role financially supporting local government the other invasive species efforts. State agencies reported receiving a total of \$540,885 in 2015, of which 33% came from US-DA-APHIS PPQ and 46% came from the Montana Legislature to implement aquatic invasive species efforts — watercraft inspection stations and prevention efforts focused primarily at preventing an introduction of invasive quagga and zebra mussels and other aquatic invasive species.

A total of 44 local/county governments reported spending \$6,670,319 (\$3,417,463 on personnel and \$3,252,856 on operational expenses) in 2015 (Figure 3). In 2015, local/county governments disbursed

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	Personnel	Operations	Disbursements	Incoming
Federal agencies	\$4,128,083	\$4,636,796	\$2,190,822	\$192,674
Tribal sovereign nations	\$109,000	\$89,000	\$0	\$7,500
State agencies	\$2,297,556	\$5,249,688	\$3,426,276	\$540,885
Local/county governments	\$3,417,463	\$3,252,856	\$467,550	\$1,491,579
Institutions of higher learning	\$769,600	\$286,236	\$6,500	\$485,941
Nonprofit organizations	\$133,000	\$209,400	\$183,180	\$335,372
Businesses	\$360,000	\$250,000	\$0	\$0
TOTALS	\$11,214,702	\$13,973,976	\$6,274,328	\$3,053,951

Table 1. Total dollars survey respondents reported spending on personnel, operations, disbursements to other entities as well as income received for invasive species initiatives in fiscal year 2015.

\$467,550 to other entities (44% of these disbursements were service contracts in the Butte Silver Bow Weed District). Local/county governments reported receiving \$1,491,579; however, we know this number significantly under represents what the counties received from other entities in 2015. The total disbursements to local/county governments in 2015 reported from state and federal agencies is \$2,734,464 (MDT-\$1,062,483 directly to the counties plus an additional \$100,000 in pass-through funds through MDA's Noxious Weed Trust Fund; MDA provided \$1,469,981 through the Noxious Weed Trust Fund; federal agencies reported providing \$102,000).

Four institutions of higher learning and one "campaign" associated with institutions of higher learning reported spending \$769,600 on personnel and \$286,236 on operational expenses in 2015 (Figure 3), primarily for research and outreach purposes. They reported disbursing \$6,500 and receiving \$485,941, the latter of which is underrepresented based on survey responses (several respondents stated they did not have the capacity or it was too labor-intensive to describe all of the grants received in one year).

Although only four businesses responded to the survey (the primary focus of this assessment was on federal, state, local/county government, tribal sovereign nation, nonprofit organization, and institution of higher learning input), two Montana businesses spent over \$0.5 million on invasive species management and control actions in 2015. It is likely additional businesses implemented on-the-ground invasive species actions through contracts with government and nonprofit organizations, thus the number reported likely under represented invasive species business expenditures in 2015.

In summary, Montana entities reported investing about \$28 million in invasive species activities in their fiscal year 2015 (Table 1). This includes the total amount entities reported spending on personnel and operations (\$25,159,678) plus disbursements to other entities (\$6,274,328) minus incoming funds entities reported receiving (\$3,053,951). Incoming funds were deducted from the total because incoming funds were, for the most part, counted initially in the disbursement funds from the source agencies. Although \$28 million seems like a large sum of money, it is important to recognize that the cost of one invasive species to a state can exceed \$100 million.

Of the types of entities that participated in the the survey, federal and state agencies as well as local governments reported spending the most funds on invasive species efforts in Montana in 2015. It is fair to assume that these three types of entities expend more on invasive species than other Montana

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entities on an annual basis. For example, it is reasonable to estimate, given the budget information that was provided, that Montana's institutions of higher learning, or nonprofit organizations, do not expend \$6.5 to \$9 million annually on invasive species research, outreach and education, or other invasive species-related activities (i.e., amounts similar to government agencies). This underscores the role and importance of government agencies to coordinate all aspects of invasive species programs and funding opportunities.

Monitoring, EDRR, and prevention were compiled into one category in the budget analysis because survey respondents occasionally "lumped" these categories, respondents could not clearly differentiate one category from another, or each of the categories were not considered uniquely different. Federal, state, and local/county governments as well as nonprofit organizations expended the majority of their personnel and operational funds on management and control, followed by monitoring/EDRR/Prevention, outreach, and coordination (Figure 4).

It is expected that entities would expend both personnel and operational dollars on management/control (Figure 4), as this activity is both staff and equipment/product-intensive. Outreach and coordination are generally staff-intensive activities (Figure 4).

Federal and state agencies, local/county governments, and nonprofit organizations collectively expend the majority of their resources on management, followed by monitoring/EDRR/ Prevention, outreach, coordination, and research (Figure 5). Effectiveness monitoring, fundraising, policy work, and other activities comprise the remaining 10% of staff and operational expenditures.

Federal, state, and local/county governments, and nonprofit organizations reported expending personnel and operational dollars in a variety of categories, from policy and outreach, to management and monitoring (Figure 4). Figure 4 helps to illustrate the different and overlapping roles Montana entities played in invasive species program implementation in 2015. For example, in the



Figure 3. Information provided by survey respondents for personnel and operational expenditures, disbursements to other entities, and funds received from other entities for invasive species initiatives in fiscal year 2015.



Figure 4. Information provided by survey respondents for personnel (top chart) and operational (bottom chart) expenditures by federal, state, local/county, and nonprofit organizations in fiscal year 2015. Note: Monitoring and surveillance, EDRR, and prevention were compiled because several survey respondents did not differentiate between the three, including those that provided one dollar amount for all three categories total.



Figure 5. Information provided by survey respondents for amount of effort expended in different categories of invasive species based on funds expended in personnel and operational categories by federal, state, local/county, and nonprofit organizations.

top chart, nonprofit organization staff played a more significant role in outreach, coordination, and monitoring/EDRR/Prevention versus management/control or effectiveness monitoring. A significant percentage of state agency staffing and operational dollars was expended on both management and control and monitoring/EDRR/Prevention. Local governments expended the majority of both their staffing and operational resources on management and control.

There is some question as to whether adequate resources are being invested in research and effectiveness monitoring. The former enhances our understanding of invasive species biology and controls, and the latter informs an adaptive management framework (i.e., assessing whether management/control actions are effective in the short and long term can inform future management actions and research needs). This issue is addressed in the next section, Invasive Species Priorities.



KEY GAPS/CHALLENGES:

A key challenge federal and state agencies face is coordinating grant programs and disbursements to ensure the highest priority invasive species issues are being addressed. Federal and state agencies disburse significant funding to other entities, i.e., local governments, institutions of higher learning, and nonprofit organizations, however, there are many grants disbursed from federal and state agencies to the same local/county governments, tribal sovereign nations, and others that range in amount from \$1,000-\$10,000. Small and numerous grants to the same entities are relatively inefficient for both the recipient and the disburing entity.

RECOMMENDATIONS:

1. Efficiencies could potentially be achieved by funding agencies working more closely together to define the highest priorities at a variety of scales to align grant programs and inter-agency cooperative agreements. This could result in compiling numerous smaller grant programs and small grant awards (e.g., \$1,000–\$10,000), thus reducing administrative costs, and leaving more funding available for grant programs.

2. Federal and state agency funds can support priorities at a variety of scales and provide capacity to other entities. This type of financial support is critical for a variety of invasive species activities. Improved coordination of all government and tribal sovereign nation invasive species programs could help to ensure the highest priority invasive species issues are addressed.

3. Montanans should ask if the composition of expended funds best represents Montana's priorities, or if new or existing funds should be used to supplement activities in other areas, e.g. outreach, or research.

4. Maintain funding for all programs, particularly those programs that are less wellestablished.

Survey Results Invasive Species Priorities

The most common taxa entities invested resources in during 2015 was terrestrial plants (43%), followed by aquatic plants (21%), aquatic invertebrates (9%), fish (8%), terrestrial invertebrates (7%), micro-organisms (6%), mammals (2%), birds (2%), reptiles (2%), and amphibians (1%) (Table 1, Figure 6). The top 10 species entities invested resources on in 2015 included all taxa (Table 3).

*This list is a reflection of the composition of the survey respondents.

le 2. The most common invasive spec	ies taxa	manag	ied by N	Aontan	a entit	ies in 20)15.	ates		
is list is a reflection of the composition he survey respondents.	biant cinerebates			rial inverteric as organisms						
	Amphi	Acluati	Aduati	Birds	<u>Fi</u> Sh	Terrest	Terrest	Marnin	Micro	Reptile
Federal agencies	1	8	11	1	9	5	25	1	2	0
Tribal sovereign nations	0	0	0	0	1	0	4	0	0	0
State agencies	0	5	6	1	3	4	9	1	5	2
Local/county governments	0	2	18	1	2	2	40	1	2	0
Institutions of higher learning	1	0	5	1	3	5	15	1	2	1
Nonprofit organizations	0	4	5	1	1	2	7	1	2	1
Businesses	0	1	3	0	0	0	2	0	0	0
TOTALS	2	20	48	5	19	18	102	5	13	4



Table 3. Survey respondents identified the top 10 invasive species they spent resources on in 2015 (considering all landscapes and habitat types). They are listed below by taxonomic category. Species with a superscript denote an association to the Montana Noxious Weed List: ^{1A}Priority 1A species; ^{1B}Priority 1B species; ^{2A}Priority 2A species; ^{2B}Priority 2B species; ^{3P}Priority 3 species. The number adjacent to the species name is the number of times the species was referenced as a top 10 species in 2015 statewide assessment survey responses.

Amphibians

American bullfrog (Lithobates catesbeianus) - 1

Aquatic invertebrates

New Zealand mudsnail (*Potamopyrgus antipodarum*) - 3 Asian clams (*Corbicula fluminea*) -2 Crayfish (*Oronectes* spp.) -2 Waterfleas (spiny and fishhook) - 1

Aquatic plants

Eurasian watermilfoil (*Myriophyllum spicatum*)^{2A} - 18 Curlyleaf pondweed (*Potamogeton crispus*)^{2B} - 10 Flowering rush (*Butomus umbellatus*)^{2A} - 9 Yellow flag iris (*Iris pseudacorus*)^{2A} - 7 Hydrilla (*Hydrilla verticillata*)³ - 3 Purple loosestrife (*Lythrum salicaria*)^{1B} - 3 Common reed (*Phragmites* spp.)^{1A} - 2

Fish

Brook trout (*Salvelinus fontinalis*) - 5 Northern pike (*Esox Lucius*) - 5 Lake trout (*Salvelinus namaycush*) - 4 Brown trout (*Salmo trutta*) - 2 Rainbow trout (*Oncorhynchus mykiss*) - 2 Walleye (*Sander vitreus*) - 2 Bass (*Perciformes* spp.) - 1 Brook stickleback (*Culaea inconstans*) - 1 Carp (*Cyprinidae* spp.) - 1 Hybrid cutthroat trout (*Oncorhynchus* spp.) - 1 Perch (*Perca* spp.) - 1

Terrestrial Plants

Knapweeds (Centaurea spp.)^{2B} - 114 Toadflax (dalmation, yellow) (Linaria spp.)²⁸ - 75 Leafy spurge (Euphorbia esula)^{2B} - 68 Canada thistle (Cirsium arvense)^{2B} - 61 Houndstongue (Cynoglossum officinale)^{2B} - 51 Whitetop (Cardaria draba)^{2B} - 40 Field bindweed (Convolvulus arvensis)^{2B} - 28 Hawkweeds (Hieracium spp.)^{2A} - 23 Hoary alyssum (Berteroa incana L.)^{2B}- 22 Salt cedar (tamarisk) (Tamarix spp.)^{2B} - 21 St. John's wort (Hypericum perforatum)^{2B} - 17 Sulphur cinquefoil (Potentilla recta)^{2B} - 16 Cheatgrass (Bromus tectorum)3 - 16 Common tansy (Tanacetum vulgare)^{2B} - 16 Oxeye daisy (Leucanthemum vulgare)^{2B} - 15 Tansy ragwort (Jacobaea vulgaris)^{2A} - 12 Perennial pepperweed (Lepidium latifolium)^{2A} - 11 Musk thistle (Carduus nutans) - 10 Russian olive (Elaeagnus angustifolia)³ - 10

Terrestrial Invertebrates

Emerald ash borer (*Agrilus planipennis*) - 7 Asian long-horned beetle (*Anoplophora glabripennis*) - 5 Gypsy moth (*Lymantria dispar dispar*) - 4 Mollusks (land) (Gastropods) - 4 Bark beetles/wood borers/defoliaters - 3 Cutworms (pale western, army) - 2 Khapra beetle (*Trogoderma granarium*) - 2 Nematodes - 2 Orange wheat blossom midge (*Sitodiplosis mosellana*) - 2 Coddling moth (*Cydia pomonella*) -1 Fire ants (*Solenopsis* spp.) - 1 Japanese beetle (*Popillia japonica*) - 1 Pulse crop pests - 1

Microorganisms

Avian influenza - 1 Didymo (*Didymosphenia geminata*) - 1 Dutch elm disease (*Ascomycota* spp.) - 1 Laurel wilt (*Raffaelea lauricola*) - 1 Plant pathogens - 1 Plum pox virus - 1 Phytophthora spp. - 1 Thousand cankers disease - 1 Viral hemorrhagic septicemia virus - 1 Whirling disease (*Myxobolus cerebralis*) - 1 White pine blister rust (*Cronartium ribicola*) - 1

Reptiles

Red-eared slider (Trachemys scripta elegans) - 1

Rush skeletonweed (Chondrilla juncea)1B - 8 Blueweed (Echium vulgare)^{2A}-6 Kochia (Bassia hyssopifolia) - 6 Black henbane (Hyoscyamus niger) - 5 Dyer's woad (Isatis tinctoria L.)^{1A} - 5 Baby's breath (Gypsophila spp.) - 4 Common mullein (Verbascum thapsus) - 4 Medusahead (Taeniatherum caput-medusae) - 4 Knotweeds (Polygonaceae family)^{1B} - 4 Narrowleaf hawksbeard (Crepis tectorum) - 3 Puncturevine (Tribulus terrestris) - 3 Common burdock (Arctium minus) - 2 Common dandelion (Taraxacum officinale) - 2 Reed canary grass (Phalaris arundinacea) - 2 Ventenata (Ventenata dubia) - 2 Barnyard grass (Echinochloa crusgalli) - 1 Bulbous bluegrass (Poa bulbosa) - 1 Bull thistle (Cirsium vulgare) - 1 Cascara buckthorn (Rhamnus purshiana) - 1

Common bugloss (Anchusa officinalis) - 1 Common buckthorn (Rhamnus cathartica) - 1 Creeping harebell (Campanula rapunculoides) - 1 Green foxtail (Setaria viridis) - 1 Gumweed (Grindelia spp.) - 1 Japanese brome (Bromus japonicas) - 1 Lambs guarters (Chenopodium album) - 1 Poison hemlock (Conium maculatum) - 1 Purslane (Portulaca oleracea) - 1 Quackgrass (Elytrigia repens) - 1 Redroot pigweed (Amaranthus retroflexus) - 1 Redstem filaree (Erodium cicutarium) - 1 Russian thistle (Kali tragus) - 1 Scotch thistle (Onopordum acanthium) - 1 Showy milkweed (Asclepias speciosa) - 1 Shrubby cinquefoil (Dasiphora fruticosa) - 1 Tall buttercup (Ranunculus acris L.)^{2A} - 1 Tumble mustard (Sisymbrium altissimum) - 1 Western wheatgrass (Pascopyrum smithii) - 1 Witchgrass (Panicum capillare) - 1

2015 MONTANA NOXIOUS WEED LIST CATEGORIES



Figure 7. 2015 Montana noxious weed list categories.

There are several groupings or categories of species listed in Table 3 (e.g., bark beetles/wood borers/ defoliators were combined by one survey respondent, and several species of hawkweeds, toadflax and knapweeds were combined within these categories). When species were grouped into categories (e.g., knapweeds), each species was counted separately when compiling the results to ensure the weightings in each category accurately reflected the data submitted.

It is not expected that any of the Priority 1A and Priority 1B weeds (Figure 7) would be identified in Table 3 as species where significant effort is invested because these species either are not present or have a limited presence in Montana. Any effort that is expended would be focused on early detection monitoring. It is expected that Priority 2A, 2B and 3 weeds would have a much higher level of effort expended, as these weeds either are common in isolated areas in Montana (Priority 2A), are abundant and widespread in many counties (Priority 2B), or are regulated and have the potential to have significant impacts (Priority 3) (Figure 7).

MT Statewide Invasive Species Assessment

Species listed in Table 3 represent individual species or groupings of species that were the top tier priority invasive species in Montana in 2015. There is excellent alignment with these species and the priority species on the Montana Noxious Weed List. The only species listed on Montana's Noxious Weed List but not identified as a top 10 priority species by survey respondents included Scotch broom (*Cytisus scoparius*), yellow starthistle (*Centaurea solstitialis*), Brazilian waterweed (*Egeria densa*), and Parrot feather watermilfoil (*Myriophyllum aquaticum* or *M. brasiliense*). This does not mean that effort is not expended on these four species; these four species did not rank among the top 10 priorities relative to resources expended by survey respondents.

The aquatic plant and invertebrate species listed in Table 3 that are receiving the most significant amount of effort expended are the top priority aquatic plant and invertebrate species designated as Montana AIS Grant Program priorities.

The majority of respondents to this assessment invest in invasive species efforts associated with terrestrial plants (Table 3). This underscores the importance of maintaining funding and programs for the small number of entities that address taxa other than terrestrial plants. Many of these lesser known and recognized species have catastrophic economic and environmental consequences in locations where they have become established.

State invasive species priorities may frequently conflict with priorities within counties or weed districts, often for well-founded reasons (i.e., a weed may be well established throughout portions of Montana but may be newly introduced to a specific county or weed district, creating opportunities for that county to eradicate the newly introduced weed). Montana's noxious weed list provides flexibility for counties (e.g., the management of Montana's Priority 2A and 2B weeds is prioritized by local weed districts) to list additional species; however, survey respondents expressed concern that lack of local funding, or the source of local funding, often drives their activities and priorities.

Early Detection Rapid Response, Prevention, and Management/Control received the most number of 1, 2 and 3 rankings (Figure 5).

It is well established that EDRR and prevention efforts are the most cost-effective way of managing invasive species – for every dollar spent on prevention, there are \$17 dollars in cost savings over the long-term.³ Therefore, the fact that respondents ranked EDRR and prevention as most important is indicative of the general shared understanding that exists in the state to monitor for incoming invaders and then to respond rapidly (i.e., manage/control – the third highest ranking) to prevent their establishment.

The overall lower rankings of coordination, research, and policy do not indicate that these categories of programs are neither important nor significant; it simply means that there is a recognition that priorities must be established, and because of the cost-effectiveness of prevention and EDRR, other categories rank lower. In fact, several respondents attempted to rank the eight categories the same, or in tiers, versus using the forced ranking of 1–8 because of the significance of all of these categories to a comprehensive, all-taxa approach to invasive species management.

Respondents included predominantly invasive terrestrial plant experts and practitioners. Yet EDRR efforts are focused on a variety of terrestrial and aquatic species because of the detrimental effects any one of these species can have to Montana's economy and natural resources. Given the known economic and environmental damages the species in Table 3 have proven to cause, the importance of an all-taxa approach to managing invasive species in Montana is critical. Survey respondents were asked to rank, from 1-8, with one being the most important and 8 being the least important, types of invasive species programs in Montana (Figure 8). The forced ranking included the categories of Policy, Coordination, Research, Outreach and Education, Management/ Control, Prevention, Early Detection Rapid Response, and Monitoring."Early Detection" was defined as surveying for new populations of invasive species whereas "Monitoring" was defined as surveillance of existing populations.



Figure 8. Ranking of invasive species programs by their importance to Montana in 2015 (N=106).



KEY GAPS/CHALLENGES:

Invasive species priorities change through time because of emerging pests, establishment of existing pests, new research that leads to biological or other controls, changes in funding or policies, and many other reasons. Assessing and reassessing existing and emerging priorities on an ongoing basis is critical to ensuring Montana is investing its resources in the highest invasive species priorities.

RECOMMENDATIONS:

1. One method to improve consistent buy-in at the landscape-level scale and across geo-political boundaries in the state relative to where investments are made in invasive species efforts is to conduct a biannual summit that includes representatives from federal agencies, tribal sovereign nations, state agencies, local and county governments, institutions of higher learning, nonprofit organizations, industry, private landowners, and other stakeholders. Institutionalizing this event could be instrumental in achieving consensus on key strategies, improving collaboration and cooperation, streamlining funding programs, and developing a shared understanding of statewide priorities, needs, and gaps so that the limited resources that exist to fund invasive species programs are directed at the state's highest priorities. This is particularly important because of priorities that may emerge as a result of an introduction of an invasive species within the state or near state boundaries. Such detections often require marshaling resources to control or eradicate the introduction, followed by long-term monitoring to detect recurrence.

2. The state Noxious Weed List and other lists identify invasive species priorities, primarily by taxa. Even if a species is established in some areas of the state, it can, and in many cases, should be considered a priority in specific areas where it is not well established and where a risk assessment indicates it would become established given environmental and other conditions. This same concept should apply to aquatic as well as terrestrial invasive species.

3. There is no systematic approach to prioritizing aquatic invasives in Montana. Opportunities exist to replicate some of the models and processes used to prioritize terrestrial plants to ensure there is identification of the highest priorities and appropriate response to aquatic invasive species infestations.

4. Consideration should be given to developing categories of aquatic invasive species priorities for other taxa similar to the Noxious Weed List categories so that there is shared understanding of the different priorities across all taxa.

C. Standardized Monitoring Protocols

KEY GAPS/CHALLENGES:

A patchwork of dedicated people and entities are monitoring Montana for the spread and introductions of invasive species. The number and diversity of organizations working on invasive species efforts requires consistent monitoring protocols and reporting of monitoring results in a shared accessible database for all taxa of invasive species.

RECOMMENDATION:

1. Monitoring protocols for all invasive species should be reviewed for adequacy and efficacy to ensure the protocols are effective, widely distributed, used, and reported. In addition, results of all types of monitoring efforts should be incorporated into a shared database that is readily accessible to land managers and others (recognizing there are password-protected levels of access to protect private landowner interests).

Terrestrial invasive plant programs and laws have been established in Montana since the 1930s. In the past several decades, increased awareness of aquatic invasive species has resulted in the creation and implementation of new programs aimed at monitoring for and controlling new aquatic invaders. Opportunities exist to replicate some of the models and processes used to prioritize terrestrial plants to ensure there is identification of the highest priorities and appropriate response to aquatic invasive species infestations.

RECOMMENDATION:

2. Consideration should be given to developing categories of aquatic invasive species priorities for other taxa similar to the Montana Noxious Weed List categories so that there is shared understanding of the different priorities across all taxa.



Aquatic invasive species are destroying the environment, damaging fisheries, and costing American taxpayers billions of dollars annually. ~ John M. McHugh, American politican

"

Table 4. List of Early Detection Rapid Response focal species in Montana in 2015.

Amphibians

American bullfrog (Lithobates catesbeianus)

Aquatic invertebrates

Zebra/quagga mussels (Dreissenid spp.) New Zealand mudsnail (Potamopyrgus antipodarum)

Aquatic plants

Curlyleaf pondweed (*Potamogeton crispus*) Eurasian watermilfoil (*Myriophyllum spicatum*) Flowering rush (*Butomus umbellatus*) Purple loosestrife (*Lythrum salicaria, L. virgatum*) Yellowflag iris (*Iris pseudacorus*)

<u>Fish</u>

Brook trout (Salvilinus fontalis)

Terrestrial invertebrates

Amber snails (*Succinea* spp.) Asian long-horned beetle (Anoplophora glabripennis) Bark beetles (*Ips sexdentatus*) Black spruce long-horn beetle (*Tetropium castaneum*) Cereal cyst nematode (Heterodera latipons, Heterodera filipjevi) Cotton leafworm (Spodoptera littoralis (Boisduval)) Cowpea cyst nematode (*Heterodera cajani*) Cucurbit beetle (*Diabrotica speciosa Germar*) Emerald ash borer (Agrilus planipennis) European spruce bark beetle (*Ips typographus*) Gypsy moth (Lymantria dispar dispar) Heath snail (Xerolenta obvia (Menke) Hygromiid snails (Monacha spp.) Invasive slugs (*Veronicella* spp.) Japanese pine sawyer (Monochamus alternatus Hope, *M. saltuarius*) Orange wheat blossom midge (Sitodiplosis mosellana) Pine caterpillar (Dendrolimus punctatus (Walker) Pine sawfly (*Diprion pini* L.) Pine sawyer (Monochamus sutor L.) Pine shoot beetle (Tomicus piniperda) Rosy gypsy moth (Lymantria mathura Moore) Sirex woodwasp (Sirex noctilio) Slender-banded pinecone longhorn beetle (Chlorophorus strobilicola) Stem nematode (Ditylenchus dipsaci) Vineyard snail (Cernuella virgata daCosta) Wheat bug (Nysius huttoni White) White garden snail (Theba pisana Müller)

Terrestrial plants

Baby's breath (Gypsophila spp.) Blueweed (*Echium vulgare*) Bohemian knotweed (Fallopia japonicus x bohemica) Cheatgrass (Bromus tectorum) Common bugloss (Anchusa officinalis) Common reed (Phragmites spp.) Common tansy (*Tanacetum vulgare L.*) Dalmatian toadflax (Linaria dalmatica) Dame's rocket (Hesperis matronalis) Dyer's woad (Isatis tinctoria) Hawkweeds (Hieracium spp.) Hoary alyssum (Berteroa incana) Houndstongue (*Cynoglossum officinale*) Jointed goatgrass (Aegilops cylindrica) Leafy spurge (Euphorbia esula) Medusahead (Taeniatherum caput-medusae) Narrowleaf hawksbeard (Crepis tectorum) Orange hawkweed (*Pilosella aurantiaca*) Oxeye daisy (Leucanthemum vulgare) Perennial pepperweed (*Lepidium latifolium*) Reed canary grass (Phalaris arundinacea) Rush skeletonweed (Chondrilla juncea) Russian knapweed (*Rhaponticum repens*) Russian olive (*Elaeagnus angustifolia*) Salt cedar (*Tamarix* spp.) Spotted knapweed (Centaurea maculosa) Tansy ragwort (Senecio jacobaea) Ventenata (Ventenata dubia) Whitetop (*Cardaria draba*) Yellow toadflax (Linaria vulgaris) Yellow starthistle (Centaurea solstitialis)

<u>Mammals</u>

Nutria (Myocastor coypus)

Micro-organisms

Avian influenza Brown needle blight of pine (*Mycosphaerella gibsonii*) Root rot (*Phytophthora alni*) Scots pine blister rust (*Cronartium flaccidum*)

Survey Results Criteria Used to Prioritize Efforts

A suite of factors drove where Montanans made investments in invasive species activities in 2015:

Land management priorities and plans

- Noxious Weed List (priorities with the list)
- Federal/tribal laws, priorities and guidance
- Project goals
- Cooperative agreements and contracts
- Regional, federal, state, local and site plans
- Farmer and rancher priorities
- FERC license
- Likelihood of control
- Ability to respond
- Integrated pest management

Ecosystem/Species Health

- Ecosystem health and management
- Protection of native fish genetics
- Areas of special concern (e.g., wilderness and big game winter ranges, aquatic/riparian areas)
- Predictor for animal disease
- Human health threats (e.g., mosquitoes)

Economics

- Funding availability
- Direct and indirect costs of noxious weeds
- Trade implications
- Producer interests and contributions

Risk Assessment

- Vector pathways areas of high traffic, sources of infestation, potential to spread, firewood
- Perceived/predicted threat establishment potential
- Potential to eradicate newly introduced species (EDRR)
- Future habitat suitability models (based on climate change scenarios

Site Characteristics

- Areas that will be disturbed by land management projects
- Accessibility to site
- Highly invasive and small versus established and widely distributed
- Local familiarity of area versus statewide or agency priorities

- Current distribution of invasives
- Time of year ability to capitalize on treatment windows
- Quantity and quality of native ecosystems threatened by invasive species
- Recreational use

Cooperation

- Cross-jurisdictional/boundary issues and opportunities
- Regional efforts
- Stakeholder input
- Communication with neighboring states re: what species are showing invasive characteristics

Research

- Need for developing and refining tools (e.g., biological controls, application of herbicides)
- Key questions driving the causes and consequences of biological invasions
- Funded projects and grants

A total of 70% of the respondents stated their organization has a management plan or guidance document that includes invasive species strategies/action items, followed by 18% that responded the question was not applicable, and 12% that responded "no." All weed districts that responded to the survey stated they have a weed management plan in place.

Respondents cited numerous examples of plans that establish priorities for geographic areas of the state, or invasive species taxa, or species. These included:

- Environmental impact statements
- Aquatic invasive species plans
- State noxious weed plan
- County weed management plans
- Federal forest and land management plans
- Project-level plans
- Ecosystem-watershed analyses
- Watershed plans
- Vegetation management plans
- Multi-park invasive plant management plans (NPS)
- Integrated pest management plans
- Pesticide use proposals and protocols
- Invasive plant species control plans
- State and national strategies
- State and federal strategic plans
- DEQ Wetland Mitigation Plan
- DNRC State Water Plan

No respondents referenced Montana's 2015 State Wildlife Action Plan, despite the fact that the statewide plan:

- Is intended to guide conservation throughout Montana;
- References invasive species in 30 places in the document;
- Details specific actions relative to aquatic nuisance species, noxious weeds, disease outbreaks, insect infestations, and conifer encroachment;

- Identifies community types, focal areas, and species in Montana with significant issues that warrant conservation attention;
- Identifies 128 Species of Greatest Conservation Need and their associated habitats;
- Describes current impacts, future threats, and conservation actions to ensure resources are spent efficiently and effectively;
- Was developed as a requirement by federal agencies to receive federal funding; and
- Articulates the need for adequate monitoring and an adaptive management framework.

Other models and approaches

Numerous peer-reviewed publications document different prioritization criteria that should be used to address invasive species strategies; almost all of them emphasize the importance of prioritization because of limited resources, and most describe the need to optimize benefits by "gaining as much ecological and economic benefit for each dollar as possible."⁴

Sheley and Smith (2012) describe a systematic approach to landscape-scale invasive species management that includes mapping and inventory, followed by prevention (with a focus on weed-free areas—because every dollar spent on prevention saves 17 dollars in future costs), control on partially intact ecosystems, and finally, restoration, with a focus on repairing ecological processes.

Some states, such as Washington, use an assessment grid approach to prioritize invasive species. The grid includes the following four quadrants:

- Lower impact, higher prevention ability (management actions include promoting awareness and encouraging citizen action).
- Lower impact, lower prevention ability (management actions include focusing control on species in high-value sites).
- Higher impact, higher prevention ability (management actions include supporting detection and control efforts and preparing response plans).
- Higher impact, lower prevention ability (management actions include preparing response plans, identifying regulatory gaps, and enhancing prevention strategies through policy, education, and funding).

Implementing an All-Taxa Approach to Invasive Species Efforts in Montana

Montana's approach to invasive species prevention, control, management, research, and outreach and education efforts is largely a result of individual programs, policies, and statutory authorities that were created over time to address emerging concerns.

The results of this assessment will be used to evaluate how Montana structures and implements invasive species programs to maximize efficiencies, reduce redundancies, address gaps, refine legislation, improve awareness and education, and collaborate to ensure that adequate resources are dedicated to address tiered priorities (i.e., statewide, regional, and local) and emerging threats.

All entities in Montana have a role to play in invasive species prevention and control efforts. The majority of invasive species programs are implemented at the local level, whether through counties, watershed councils, weed districts, or other entities. Given the emerging trends associated with aquatic invasive species and the recognition that the majority of prevention, monitoring, and control happens at the local level, Montana is poised to rethink and restructure how it implements invasive species programs.

Numerous models exist to implement invasive species programs within defined geographic areas, including Cooperative Weed Management Areas (CWMA), Cooperative Invasive Species Management Areas (CISMA), Partnerships for Regional Invasive Species Management (PRISM), and numerous others. The name of the entity is not as important as the basic tenets upon which the partnership functions.⁵ These partnerships of federal, state, and local governments, tribal sovereign nations, nonprofit organizations, businesses, and private landowners:

- Operate within a defined geographic area, distinguished by a common geography, invasive species problem, community, climate, political boundary, or land use.
- Involve a broad cross-section of landowners and natural resource managers within its defined boundaries.
- Are governed by a steering committee.
- Have staying power—They generally make a long-term commitment to cooperation, usually through a formal agreement among partners.
- Have a comprehensive plan that addresses the management or prevention of invasive species within its boundaries.
- Facilitate cooperation and coordination across jurisdictional boundaries.

Some of these partnerships address only one type of taxa, e.g. plants, such as the Blue Ridge PRISM in Virginia, whereas others focus their efforts and resources on a comprehensive all-taxa approach.

One of the most effective networks of partnerships in the United States is implemented by the State of New York, in which eight regional partnerships address invasive species using an all-taxa approach. New York PRISMs plan regional invasive species management, develop early detection and rapid response capacity, implement eradication projects, educate and inform, coordinate partners, recruit and train volunteers, and provide support for research through citizen science.

This type of approach, or elements of this approach, could work well for Montana, using the existing designated Montana watershed basins as the footprint for the creation of a network of partnerships. Montana could take a step-wise approach to creating watershed basin-based partnerships, focusing initially on watershed basins in which there currently exists collaborative efforts. For example, the Clark Fork Coalition in western Montana, which has been in existence for 30 years, works to protect and restore the Clark Fork River basin by engaging diverse stakeholders and through participation from public and private partners to restore and sustain the Clark Fork and its tributaries. The coalition takes a science-based and community-driven approach to support continued funding to prevent, monitor, and manage the spread of harmful aquatic invasive species, a key strategy in their strategic plan.

The creation of these types of partnerships throughout Montana could help streamline how federal and state agencies disburse funds. Disbursing funds though a single basin sponsor eliminates the processing of hundreds of small grants and will help ensure consensus exists for the highest state-wide and regional priorities at the basin level.



D. The Framework Moving Forward

KEY GAPS/OPPORTUNITIES:

Individual land management agencies and entities within Montana have their own systems and protocols for prioritizing invasive species, which have been developed throughout time to address emerging invasive species threats. The current method of addressing invasive species issues is inefficient, includes gaps in coverage, has redundancies, and doesn't consider an all-taxa approach.

Montana has an opportunity to consider restructuring how it funds and implements invasive species programs, considering a watershed basin-based approach and an all-taxa model as foundational to efforts. A comprehensive all-taxa approach based on, for example, Montana's designated watershed basins, could streamline invasive species programs, enhance efficiencies, build on existing "regional" collaboratives, reduce overlap and redundancies, and better prepare Montana for future emerging invasive species threats.

RECOMMENDATIONS:

1.Montana should consider implementing a systematic, comprehensive, tiered, all-taxa approach and framework to prioritizing and implementing invasive species strategies to make the best use of available and limited resources and ensure the state maximizes limited resources efficiently and effectively. Coordination and communication are integral to success in prioritizing invasive species efforts statewide. A comprehensive framework will allow the state to:

The framework should:

- Describe agency responsibilities, resolving contradictory/conflicting procedures/authorities;
- Describe coordination among all agencies and entities at the statewide level and through designated geographic areas of the state;
- Recommend long-term sustainable approaches to funding invasive species;
- Articulate a "regional" approach to prevention and early detection and rapid response;
- Establish a statewide invasive species database clearinghouse;
- Establish a mechanism to review, and establish, on an ongoing basis, the highest priorities for invasive species research;
- Identify opportunities for control and restoration, including research needs;
- Describe a coordinated and comprehensive effective outreach and education program;
- Include recommendations for legislation needed to address existing deficiencies;
- Identify those species that represent the greatest risks to Montana's economy and natural resources;
- Identify the current distribution of invasive species and locations where new introductions are likely to occur and ensure a platform exists to readily share that information

while protecting private landowner interests;

- Target prevention efforts where invasive species do not exist, or populations are minimal (or not well established);
- Create efficiencies by focusing on entire ecosystems and habitats versus individual species, or taxa;
- Manage partially intact systems; and
- Restore habitats to their full ecological function.

Numerous plans and guiding documents articulate priorities for addressing and investing resources in invasive species issues in Montana.

RECOMMENDATIONS:

2. Montana would benefit from a review and analysis of all plans relating to invasive species and land management as a key first step in understanding where overlap and key gaps exist in invasive species program implementation. This step would inform the development of a comprehensive all-taxa strategic framework.

3. Establishing consistency among federal and state agencies for the criteria used to assess grant fund requests (e.g., risk assessment, species on Noxious Weed List, etc.) will help ensure statewide priorities and taxa-specific priorities are met.

Survey Results Evaluating Program Effectiveness

A total of 116 survey respondents described how their programs evaluate the effectiveness of their actions. Among all entities, "effectiveness monitoring," which was defined as "evaluating the success in meeting objectives," was the most commonly used tool, followed by "met the requirements of a contract/agreement," "outcome-based performance objectives," and "compliance monitoring." The majority of survey respondents use three or more methods to evaluate program effectiveness, which suggests a suite of tools is important in comprehensively evaluating elements of Montana's invasive species programs.

The number of respondents from businesses and tribal sovereign nations was too small to draw any conclusions about the extent to which program effectiveness tools are used.

The three most common methods federal agencies use to monitor program effectiveness are effectiveness monitoring, compliance monitoring, and meeting the requirements of a contract/ agreement (N=28) (Figure 9).

Institutions of higher learning most commonly use effectiveness monitoring, followed by outcome-based performance objectives, and opinion surveys (N=15) (Figure 9).

Local/county governments most often use both effectiveness monitoring, meeting the requirements of a contract/agreement, and outcome-based performance objectives (N=41) (Figure 9).

Both state agencies and nonprofits most often use meeting the requirements of a contract/ agreement to measure program effectiveness, followed by effectiveness monitoring, and outcome-based performance objectives (N=13 - state agencies; N=12 - nonprofits) (Figure 9).

Of the 14 entities that do not evaluate program effectiveness, two were federal agencies, two were institutions of higher learning, six were local/county governments, two were nonprofit organizations, and two were state agencies.

In addition to these forced-ranked categories, respondents were given an opportunity to describe additional ways they evaluate program effectiveness. Responses included:

- The number of acres treated with greater than 90% mortality of the target species.
- Respondents from institutions of higher learning stated, "success at obtaining additional funding for continuing research" and "monitor analytics associated with social media platforms."

- Local/county government respondents described "performance-based budgeting" and "data collection as well as visual inspections."
- State agency respondents noted "noxious weeds have less than 5% total aerial coverage within a site," "prevention is working," and "evaluations of presentations."
- One federal agency respondent uses field office spot checks to assess program effectiveness.



Figure 9. How entities evaluate the effectiveness of their invasive species programs.



KEY GAPS/CHALLENGES:

Respondents stated they used a variety of methods to evaluate program effectiveness; some used few or no methods.

RECOMMENDATIONS:

1. Entities that are the source of funding for invasive species programs in Montana should require monitoring as a mandatory part of their agreements and grant programs. These funding sources could collectively agree on a set of best management practices to implement monitoring as well as use of a shared database that facilitates learning, cooperation, and use of an adaptive management framework.

2. Entities that do not currently evaluate program effectiveness, particularly government entities, should assess the reasons why evaluation does not occur, address the challenges, and institutionalize monitoring as a key element of program implementation.

3. Evaluating the effectiveness of individual invasive species programs is important, but Montana also needs a statewide biannual assessment of its program effectiveness to determine how successful it is in preventing/eradicating new introductions and controlling, or preventing the spread, of existing populations.

4. Montana would benefit from a review and analysis of all plans relating to invasive species and land management as a key first step in understanding where overlap and key gaps exist in invasive species program implementation. This step would inform the development of a comprehensive all-taxa strategic framework.

5. Establishing consistency among federal and state agencies for the criteria used to assess grant fund requests (e.g., risk assessment, species on Noxious Weed List, etc.) will help ensure statewide priorities and taxa-specific priorities are met.

Invasive alien species have devastating impacts on native biota, causing decline or even extinctions of native species, and negatively affecting ecosystems. Invasive alien species are animals, plants, fungi and micro-organisms entered and established in the environment from outside of their natural habitat. They reproduce rapidly, out-compete native species for food, water and space, and are one of the main causes of global biodiversity loss. Species are often introduced deliberately, through, for example, fish farming, pet trade, horticulture, biocontrol; or unintentionally, through such means as land and water transportation, travel, and scientific research. ~ United Nations Decade on Biodiversity

"

F. Private Landowners

Strategies to improve engagement and compliance

orking with private landowners is critical to the success of preventing both new introductions and the spread of established populations of invasive species. Survey respondents articulated key challenges that landowners and state and federal land management agencies face as they work collaboratively to address this important issue. The following are several key recommendations and strategies to address outreach, incentives, evaluation, and enforcement:

KEY GAPS/CHALLENGES:

- Private landowners may be willing to control and may be aware of the need to control invasives, but their priorities may be different than management agencies (e.g., they are concerned with inventories versus treatment, or established invaders versus new invaders).
- Many private landowners lack an understanding of the County Weed Law and their responsibilities as landowners.
- On federal lands, the goal is often to protect the least infested areas first, but this frequently requires collaboration with adjoining private landowners, some of whom have different priorities.
- Some private landowners and, in particular, small and absentee landowners have challenges addressing priority invasives.
- There is neither a consistent nor comprehensive approach to assessing whether invasive species efforts are improving land health for private landowners.
- Landowners who own land in multiple counties can be confused about the rules and regulations for each county.

RECOMMENDATIONS:

1. Increase targeted outreach to landowners through local government and conservation districts to help landowners understand the benefits of early detection and control and how working with adjacent landowners benefits everyone.

2. Properly vet priority lists for all invasive species taxa, and ensure adequate notifications occur for rule changes to promote stakeholder engagement and buy-in.

3. Create new incentives that specifically address the needs of private landowners as well as priority invasives.

4. Increase efforts to share case studies of private landowners willing to communicate the benefits of control to motivate reluctant landowners.

5. Enforce noncompliance of county weed laws to make it easier and more straightforward for landowners that own property in multiple counties.

Survey Results Laws and Regulations

Survey respondents rated the effectiveness of the laws and regulations that govern their invasive species work/programs in Montana. Of the survey respondents, 107 rated Montana's laws and regulations. Five rated Montana's invasive species laws and regulations "excellent," 54 rated them "good," 36 rated them "fair," and 13 rated them "poor" (Figure 10). A total of 16 respondents did not provide a ranking (many of the respondents who did not rank were involved primarily in research or outreach and education initiatives). Although 48% of those who provided a ranking rated invasive species laws and regulations as good or excellent, a total of 39% ranked these laws and regulations as fair or poor. The majority of those who ranked laws and regulations as fair or poor provided specific recommendations to address perceived deficiencies.

These recommendations are described in five categories: Terrestrial, Aquatic, Authorities, Funding, and Enforcement and Management.

In a few instances, there is crossover among the categories (e.g., a recommendation was focused on enforcement of aquatic invasive species). In those instances, a determination was made to place the recommendation in the category that best reflected the emphasis of the recommendation.



Figure 10. Effectiveness ranking of Montana invasive species laws and regulations (N=108).

Survey respondents described numerous gaps and challenges associated with specific elements of Montana's invasive species legislation, from lack of regulations to gaps in regulations:



G. Regulations Recommendations



1. Terrestrial Regulation Recommendations

- a. Create firewood transport regulations.
- b. Provide clarity to the County Weed Control Act
- c. Amend county weed laws to include state- and federal-owned lands.



2. Enforcement and Management Recommendations

- a. Consistently enforce and implement the Weed Law with law enforcement officers; use weed personnel as experts in weed verification.
- b. Enhance authorities and funding for enforcement and management, particularly for counties.
- c. Provide authority to state agencies to enforce aquatic plant regulations.
- d. Improve enforcement of local noxious weed laws and assess noncompliance tactics.
- e. Enforce weed- and seed-free gravel.
- f. Require commercial applicators to carry insurance.



3. Funding Recommendations

- a. Establish a watercraft user fee to supplement revenue for watercraft inspection programs and outreach and education.
- b. Allocate sufficient funding in both the Governor's budget and the Legislature to capitalize the Aquatic Invasive Species Trust Fund.
- c. Implement the Water Resources Reform and Development Act (2014). [Note: This would provide additional funding and capacity to implement watercraft inspection stations.]
- d. Adequately fund the Montana Invasive Species Advisory Council (MISAC), state Weed Coordinator, and weed control positions.



4. Aquatic Regulation Recommendations

- a. Refine permits for dredging, harvesting and treatment of aquatic plants to enhance public understanding and compliance.
- b. Enhance the aquatic invasive species statute to include:
 - 1. Require inspection of watercraft entering the state prior to launch;
 - 2. Establish quarantine authorities for mussel-fouled boats;
 - 3. Provide counties with authority to adopt aquatic invasive species regulations;
 - 4. Direct Fish, Wildlife, and Parks to partner with Montana Department of Transportation at ports of entry, or adjacent Department of Transportation facilities;
 - 5. Establish decontamination protocols relating to holds after decontamination;
 - 6. Ban felt-soled waders;
 - 7. Require a detailed early detection rapid response plan.
- c. Legislate aquatic plants as equal to terrestrial weeds.
- d. Mandate "pull the plug" for watercraft leaving waterbodies.
- e. Prohibit the use of live bait for fishing statewide.
- f. Enforce and increase penalties for individuals that transport live fish.
- g. Work with the Western Regional Panel, 100th Meridian Initiative, other regional entities and states to collaborate and coordinate efforts associated with species of regional importance.
- h. Identify appropriate agencies and entities to implement aquatic plant regulations.

5. Authorities Recommendations

a. Institutionalize the existence of MISAC beyond its current December 2016 expiration date. b.Improve laws pertaining to transportation and sale of non-native invasive species.

- c. Create authorities to quarantine potentially infested wood products.
- d. Establish clear state authorities for which agencies are responsible for aquatic plant management, enforcement, etc.
- e. Create authorities to inspect and manage invasive species infestations on private land.

Enhancing the Efficacy of Montana's Invasive Species Laws and Regulations

In addition to the specific recommendations to improve Montana's laws and regulations on the previous page, survey respondents also provided recommendations to improve the overall efficiency and effectiveness of invasive species program implementation:

- Improve consistency between county weed lists and state priority lists.
- Follow the Aquatic Invasive Species statute in both letter and spirit, particularly relative to agency-to-agency partnerships.
- Improve expectations relative to the Noxious Weed Law and counties to foster an ecologically-based weed/vegetation management system.
- Improve coordination and consistency among counties.
- Evaluate the ability to enforce both Montana state law and specific county laws relative to weeds.
- Enforce noncompliance of weed laws in every Montana county to address landowners that own land in multiple counties.
- Address invasive species found in urban areas.
- Provide incentives to encourage compliance.
- Improve coordination among landowners to more effectively treat terrestrial weeds.
- Conduct an assessment to determine if Montana's noxious weed list is achieving desired objectives.
- Protect Montana from terrestrial invasive species at the border (e.g., clean ATVs, clean construction equipment).
- Educate the public on emerging invasive species issues, problems caused by non-native sport fish, and the suite of tools available for invasive species control.
- Improve understanding of authorities by sharing information with Montana stakeholders relative to roles and responsibilities for Montana's invasive species programs.

Survey Results Program Challenges

Respondents were asked to rank from 1–10, with one being the most important and 10 being the least important, the obstacles they face in being able to effectively implement their invasive species program. A total of 111 respondents providing rankings.

Funding

The most significant obstacle Montana entities face relative to invasive species program implementation is funding (Figure 11). Resources to fully implement appropriate and effective monitoring, prevention, control, outreach and education, and research to prevent new introductions and the spread of existing introductions of invasive species is lacking in Montana.

Despite the fact that a reported \$28 million was spent on invasive species programs and efforts in 2015, survey respondents overwhelmingly and emphatically noted not enough resources existed to handle the invasive species threat that exists.

When asked if one thing could be done to improve how Montana addresses invasive species, respondents made comments, such as, "More funding at all levels," "stable funding," "Have a



Figure 11. The most significant obstacle Montana entities face relative to invasive species program implementation.

long-term funding source to deal with invasive species on a statewide scale," "Get more money to on-the-ground work," "Increase the importance of funding aquatic invasive species prevention and EDRR," "Fund collaborative efforts for new invaders," "Secure long-term, obligated funding for multi-year projects across larger landscapes," and "FUND IT."

When the 10 force-ranked obstacles are charted, three tiers of priorities emerge (Figure 12). The most significant obstacle is funding. The second tier of obtacles, ranked 2nd through 5th, include, in order of priority, political will, public awareness, coordination, and landowner involvement. The third tier, which includes the remaining categories, include laws and regulations, economic impacts, scientific understanding, technical expertise, and effective databases.

Political Will, Public Awareness, Coordination, and Landowner Involvement

Second tier challenges, including political will, public awareness, and coordination, can be addressed through the development of an invasive species framework for Montana. Legislative gaps can be filled by working closely with legislators; public awareness can be increased through coordinated public campaigns, such as Clean, Drain, Dry; and coordination can be addressed by forming a series of partnerships across the state that focus their efforts within a certain geographic area and across all taxa.

Note: Ranking of 1 = highest



Figure 12. The top five obstacles Montana entities face relative to invasive species program implementation.

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Landowner involvement ranked as the second highest challenge. The recommendations on page 40 of this report address some of the gaps and challenges in working with landowners as well as recommendations to improve engagement.

Effective Databases

Numerous comments were made about the lack of "Effective databases" to manage invasive species information in Montana, yet this topic was ranked the least significant obstacle Montana entities face relative to program implementation (Figure 12), likely because most entities have some sort of database to manage their information. However, when reviewing the information from survey respondents, although many entities have databases, one respondent summarized a common concern: "Montana lacks an adequate mapping database that works across all jurisdictional boundaries."

To effectively manage all invasive species, managers need access to current information, preferably from a single source in which the information documented undergoes some type of quality control. Reliable information about the distribution and management of invasive species throughout Montana as well as in bordering states, provinces, and the region will best help Montana address both existing and emerging invasive species.

A centralized database can house location information for invasive species and be displayed in a geographic information system (GIS) format to allow for easy visualization of the data. Landowner protections are integral to the database through levels of password protection.

The database could serve to advance communication among resource managers, who could contact each other directly and thus share information first-hand. The database could also serve as the foundation for developing statewide, regional, and local lists, rank threats, and propose management options.

In 2010, the Montana Natural Heritage Program implemented and produced a report titled, *Statewide Invasive Species Mapping and Data Management: A Needs Assessment*. The report concluded there is a need in Montana for a "standardized invasive species data collection, storage, and retrieval system" to improve risk assessment analysis on federal and state lands as well as enhance storage and retrieval of spatial data for county weed managers. At the time, based on 2010 costs, it was estimated the development and upfront costs would be \$156,325, and the annual operating budget would be \$186,960.



KEY GAPS/CHALLENGES:

Long-term sustainable funding needs to be identified to ensure Montana entities have adequate resources for all aspects of invasive species prevention.

RECOMMENDATION:

1. Long-term sustainable funding needs to be identified for all of Montana's invasive species programs but, in particular, for the aquatic invasive species program, which currently is funded with one-time-only funds to DNRC and FWP.



I. Information Management

KEY GAPS/CHALLENGES:

There are numerous existing databases that contain information about invasive species in Montana, but there is no single database, or clearinghouse, that contains all of this information that is accessible to the public at some level (while protecting the rights of private landowners).

RECOMMENDATION:

1. Montana should reassess the recommendations made in the 2010 report, *Statewide Invasive Species Mapping and Data Management: A Needs Assessment*, and determine if database systems, such as EDDMaps, *i*MapInvasives, or the Montana Geographic Information Clearinghouse, are currently providing the recommended level of database infrastructure needed to meet Montana's all-taxa invasive species needs, or if these products need to replaced or supplemented with additional funding to address specific statewide needs. Montana needs a statewide database clearinghouse for all taxa of invasive species that incorporates existing data from agencies and organizations in the state, as well as from nearby states, provinces, Canada, tribes and the federal government.



KEY GAPS/CHALLENGES:

Landowner involvement was ranked second, and political will was ranked third, of the top four obstacles Montana entities face relative to invasive species program implementation (Figure 12). Outreach and education efforts are critical to addressing pathways and vectors of invasive species introduction, engaging landowners, and obtaining the political support and will to address existing and emerging invasive species issues.

RECOMMENDATION:

1. Outreach and education programs, core messages, and modes of delivery should be evaluated to ensure the messaging is effectively contributing to behavioral and attitudinal changes, and is providing policy makers with the information and tools to understand key priorities and take action to address those priorities. The content of Montana's messages should be evaluated within a regional and national context as well, especially given that some of the most significant vectors and pathways of introduction come from neighboring states or other parts of the United States.

Survey Results Partnerships and Agreements

Respondents described the nature of their invasive species partnership agreements with other entities in Montana relative to monitoring/surveillance, early detection rapid response, prevention, management/control, outreach/education, research, coordination, fundraising, policy work, and other activities. The most common types of partnerships were between local governments and all other entities (N=1,001), followed by partnerships between state governments and all other entities (N=459), federal agencies and all other entities (N=314), nonprofit organizations and all other entities (N=167), institutions of higher learning and all other entities (N=144), and tribes and all other entities (N=61) (Table 5). Businesses were not included in this list because of the small number of businesses that responded to the survey. In addition, tribal sovereign nations are under represented in this survey; therefore the number of agreements provided by tribes (N=61) is significantly lower than the number reported by other entities that have agreements with tribes (N=198).

Federal agencies have the most agreements for monitoring, early detection rapid response activities, management, and outreach and education, followed by state agencies and local/county governments (Figure 13). The majority of all agreements signed by all three of these types of government organizations is with local/county governments.

Local and county governments are the workhorses for Montana's invasive species prevention efforts, followed by state agencies and then nonprofit organizations (Figure 13). Federal, state agencies, and local governments comprise the majority of agreements signed by local and county gov-

	Federal	Tribal	State	Local	Institution	Nonprofit	TOTAL
					of		
					higher		
					learning		
Federal	127	10	69	63	20	25	314
Tribal	14	28	8	8	3	0	61
State	134	94	79	76	43	33	459
Local/county government	338	34	316	272	41	0	1001
Institution of higher learning	37	21	43	24	19	0	144
Nonprofit	66	11	30	32	5	23	167
TOTAL	716	198	545	475	131	81	2,146

Table 5. Agreements among Montana entities for invasive species implementation strategies in Montana in 2015.

ernments. This emphasizes the critically important role federal and state agencies play in defining priorities and deliverables associated with prevention efforts.

Numerous counties received a variety of grants from federal and state agencies; many of these grants are important but nominal. For example, one weed district received a total of \$14,585 from a variety of grazing districts for weed control, plus and additional \$82,785 from seven different sources. Of the \$82,785, \$1,000 was from DNRC and \$1,785 was from MDA.

Local/county governments reported the most research-related agreements, followed by federal agencies, state agencies, and then institutions of higher learning (Figure 13); however, numerous university respondents did not provide the details of their research agreements because of the sheer number, or lack of time; therefore, universities are underrepresented in this data. The number of agreements that exist across these different entities underscore the importance of Montana having a prioritized list of research needs to ensure the limited resources that exist for research are dedicated to the state's highest priorities.

State agencies play a key role coordinating invasive species in Montana, signing more than 200 agreements with other entities to coordinate invasive species activities (Table 5). The majority of agreements state agencies sign are with other state agencies. Federal agencies also play a significant role, followed by local/county governments and tribes. Given the land base owned and managed by tribes in Montana and their underrepresentation as respondents to this assessment, it is likely tribes have more agreements and play a more significant role relative to coordinating invasive species activities on lands they manage and with adjacent land managers and land management agencies.

Fundraising represents a small portion of the agreements survey respondents described (Figure 13). It is expected that local/county governments would invest more resources than other entities in this area because a significant portion of their funding comes from federal and state agencies, which require written agreements/grants. Local/county governments have available to them a number of programs and grant funds for which they can seek funding to work with private landowners and others on invasive species issues.

Federal, state, and local governments work more in the policy arena. Survey results demonstrate that federal, state, and local governments have the greatest number of agreements relating to policy work. Local governments have the most agreements of all—these agreements are with other local governments.

Respondents reported a significant number of agreements with entities other than the federal, tribal, state, local/county, and nonprofit organizations listed in the survey instrument. These included private landowners, cities, water and sewer entities, and irrigators, to name a few.

K. Partnerships and Agreements

KEY GAPS/CHALLENGES:

The number of agreements documented by survey respondents for the 2015 assessment warrant further analysis, consideration, and review for gaps, overlaps, and potential for streamlining.

RECOMMENDATION:

1. Evaluate the nature of the invasive species agreements that exist among state agencies and assess whether or not reorganization, program, or fund shifts could enhance efficiencies and reduce the cost of managing state agency agreements.





Figure 13. Distribution of agreements made between entities for invasive species program implementation in 2015.

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Summary of Findings and Recommendations

The results of this assessment will be used to evaluate how Montana structures and implements invasive species programs to maximize efficiencies, reduce redundancies, address gaps, refine legislation, improve awareness and education, and collaborate to ensure that adequate resources are dedicated to address tiered priorities (i.e., statewide, regional, and local) and emerging threats.

A total of 126 individuals representing 85 entities in Montana (federal and state agencies, tribal sovereign nations, local and county governments, institutions for higher learning, nonprofit organizations, and others) completed a survey to provide information about fiscal year 2015 efforts associated with invasive species biology, prevention, control, management, research, and outreach and education in Montana. The information in this report is a snapshot in time describing fiscal year 2015 information. This information is a baseline to inform future invasive species efforts.

Montana entities that participated in the survey invested about \$27 million in invasive species activities. State agencies invested about \$11 million, followed by about \$10.7 million from federal agencies, about \$4.4 million from local/county governments, about \$1 million from nonprofit organizations, and about \$0.5 million from institutions of higher learning. Tribal sovereign nation and private industry participation in this survey was underrepresented, particularly in reference to budget information.

Respondents invested the most resources in terrestrial plants, followed by aquatic plants, aquatic invertebrates, fish, terrestrial invertebrates, micro-organisms, mammals, birds, reptiles, and amphibians. The top 10 invasive species entities worked on in 2015 represented all taxa, and aligned well with the priority species on the Montana Noxious Weed List as well as the top priority aquatic plant and invertebrate species designated as Montana AIS Grant Program priorities.

Early detection/ rapid response and coordination ranked as the most important invasive species activity, followed by prevention, management/control, outreach and education, monitoring, coordination, research, and policy.

More than 30 different criteria informed prioritization of invasive species efforts, from availability of funding and legal authorities, to management plans, risk assessments, and focused efforts on vectors and pathways.

Effectiveness monitoring was the most commonly used tool to evaluate program effectiveness, followed by "met the requirements of a contract/agreement," outcome-based performance objectives, and compliance monitoring. The majority of respondents identified three or more methods used to evaluate program effectiveness.

Many respondents described the importance of working with private landowners, and the need to improve efforts associated with outreach, evaluation, incentives, and enforcement.

A total of 55% of respondents rated the effectiveness of the laws and regulations that govern their invasive species work/programs in Montana as excellent or good; a total of 45% rated them as fair or poor. The majority of those who ranked laws and regulations as fair or poor provided specific recommendations to address perceived deficiencies in programs, authorities, funding, enforcement, and management. Respondents also provided recommendations to improve the overall efficiency and effectiveness of invasive species program implementation.

Funding was the most significant obstacle Montana entities faced relative to invasive species program implementation. Resources were lacking to fully implement appropriate and effective monitoring, prevention, control, outreach and education, and research to prevent new introductions and the spread of existing introductions. Political will, public awarenwess, coordiantion, and landowner involvement, respectively, were the next four obstacles Montanan's face relative to implementing invasive species activities.

The following recommendations are intended to advance Montana's ability to address existing and emerging invasive species issues. The majority of these recommendations originated from assessment respondents;p others were derived from an analysis of survey respondent results.



A. Coordination of Funding Recommendations

1. Efficiencies could potentially be achieved by having funding agencies work more collaboratively to define the highest priorities at a variety of scales to align grant programs and inter-agency cooperative agreements. This could result in compiling numerous smaller grant programs and small grant awards (e.g., \$1,000-\$10,000), thus reducing administrative costs, and leaving more funding available for grant programs.

2. Federal and state agency funds can support priorities at a variety of scales and provide capacity to other entities. This type of support is critical for a variety of invasive species activities. Improved coordination of all government and tribal sovereign nation invasive species programs could help to ensure the highest priority invasive species issues are addressed.

3. Montanans should ask if the composition of expended funds best represents Montana's priorities, or if new or existing funds should be used to supplement activities in other areas, e.g. outreach, or research.

4. Maintain funding for all programs, particularly those programs that are less well-established; consider merging less established programs to enhance efficiencies.



1. Conduct a biannual summit that includes representatives from federal agencies, tribal sovereign nations, state agencies, local and county governments, institutions of higher learning, nonprofit organizations, industry, private landowners, and other stakeholders. Institutionalizing this event could be instrumental in achieving consensus on key strategies, improving collaboration and cooperation, streamlining funding programs, and developing a shared understanding of statewide priorities, needs, and gaps so that the limited resources that exist to fund invasive species programs are directed at the state's highest priorities. This is particularly important because of priorities that may emerge as a result of an introduction of an invasive species within the state or near state boundaries. Such detections often require marshaling resources to control or eradicate the introduction, followed by long-term monitoring to detect recurrence.

2. The state Noxious Weed List and other lists identify invasive species priorities, primarily by taxa. Even if a species

is established in some areas of the state, it can, and in many cases, should be considered a priority in specific areas where it is not well established and where a risk assessment indicates it would become established given environmental and other conditions. This same concept should apply to aquatic as well as terrestrial invasive species.

3. There is no systematic approach to prioritizing aquatic invasives in Montana. Opportunities exist to replicate some of the models and processes used to prioritize terrestrial plants to ensure there is identification of the highest priorities and appropriate response to aquatic invasive species infestations.

4. Consideration should be given to developing categories of aquatic invasive species priorities for other taxa similar to the Noxious Weed List categories so that there is shared understanding of the different priorities across all taxa.

C. Standardized Monitoring Protocols Recommendations

1. Monitoring protocols for all invasive species should be reviewed for adequacy and efficacy to ensure the protocols are effective, widely distributed, used, and reported. In addition, results of all types of monitoring efforts should be incorporated into a shared database that is readily accessible to land managers and others (recognizing there are password-protected levels of access to protect private landowner interests).

2. Consideration should be given to developing categories of aquatic invasive species priorities for other taxa similar to the Montana Noxious Weed List categories so that there is shared understanding of the different priorities across all taxa.



D. The Framework Moving Forward Recommendations

1. Montana should consider implementing a systematic, comprehensive, tiered, all-taxa approach and framework to prioritizing and implementing invasive species strategies to make the best use of available and limited resources and ensure the state maximizes limited resources efficiently and effectively. Such an approach could streamline invasive species programs, enhance efficiencies, build on existing "regional" collaboratives, reduce overlap and redundancies, and better prepare Montana for future emerging invasive species threats. The framework should:

- Describe agency responsibilities, resolving contradictory/conflicting procedures/authorities;
- Describe coordination among all agencies and entities at the statewide level and through designated geographic areas of the state;
- Recommend long-term sustainable approaches to funding invasive species;
- Articulate a "regional" approach to prevention and early detection and rapid response;
- Establish a statewide invasive species database clearinghouse;
- Establish a mechanism to review, and establish, on an ongoing basis, the highest priorities for invasive species research;
- Identify opportunities for control and restoration, including research needs;
- Describe a coordinated and comprehensive effective outreach and education program;
- Include recommendations for legislation needed to address existing deficiencies;
- Identify those species that represent the greatest risks to Montana's economy and natural resources;
- Identify the current distribution of invasive species and locations where new introductions are likely to occur and ensure a platform exists to readily share that information while protecting private landowner interests;
- Target prevention efforts where invasive species do not exist, or populations are minimal (or not well established);
- Create efficiencies by focusing on entire ecosystems and habitats versus individual species, or taxa;
- Manage partially intact systems; and
- Restore habitats to their full ecological function.



2. Montana would benefit from a review and analysis of all plans relating to invasive species and land management as a key first step in understanding where overlap and key gaps exist in invasive species program implementation. This step would inform the development of a comprehensive all-taxa strategic framework.

3. Establishing consistency among federal and state agencies for the criteria used to assess grant fund requests (e.g., risk assessment, species on Noxious Weed List, etc.) will help ensure statewide priorities and taxa-specific priorities are met.

E. Program Effectiveness Recommendations

1. Entities that are the source of funding for invasive species programs in Montana should require monitoring as a mandatory part of their agreements and grant programs. These funding sources could collectively agree on a set of best management practices to implement monitoring as well as use of a shared database that facilitates learning, cooperation, and use of an adaptive management framework.

2. Entities that do not currently evaluate program effectiveness, particularly government entities, should assess the reasons why evaluation does not occur, address the challenges, and institutionalize monitoring as a key element of program implementation.

3. Evaluating the effectiveness of individual invasive species programs is important, but Montana also needs a statewide annual assessment of its program effectiveness to determine how successful it is in preventing/eradicating new introductions and controlling, or preventing the spread, of existing populations.

4. Montana would benefit from a review and analysis of all plans relating to invasive species and land management as a key first step in understanding where overlap and key gaps exist in invasive species program implementation. This step would inform the development of a comprehensive all-taxa strategic framework.

5. Establishing consistency among federal and state agencies for the criteria used to assess grant fund requests (e.g., risk assessment, species on Noxious Weed List, etc.) will help ensure statewide priorities and taxa-specific priorities are met.

F. Private Landowners Recommendations

1. Increase targeted outreach to landowners through local government and conservation districts to help landowners understand the benefits of early detection and control and how working with adjacent landowners benefits everyone.

2. Properly vet priority lists for all invasive species taxa, and ensure adequate notifications occur for rule changes to promote stakeholder engagement and buy-in.

3. Create new incentives that specifically address the needs of private landowners as well as priority invasives.

4. Increase efforts to share case studies of private landowners willing to communicate the benefits of control to motivate reluctant landowners.

5. Enforce noncompliance of county weed laws to make it easier and more straightforward for landowners that own property in multiple counties.



G. Regulations Recommendations

1. Terrestrial:

- a. Create firewood transport regulations.
- b. Provide clarity to the County Weed Control Act
- c. Amend county weed laws to include state- and federal-owned lands.
- 2. Enforcement and Management:
 - a. Consistently enforce and implement the
 - Weed Law with law enforcement officers; use weed personnel as experts in weed verification.
 - b. Enhance authorities and funding for enforcement and management, particularly for counties.
 - c. Provide authority to state agencies to enforce aquatic plant regulations.
 - d. Improve enforcement of local noxious weed laws and assess noncompliance tactics.
 - e. Enforce weed- and seed-free gravel.
 - f. Require commercial applicators to carry insurance.

3. Funding

- a. Establish a watercraft user fee to supplement revenue for watercraft inspection programs and outreach and education.
- b. Allocate sufficient funding in both the Governor's budget and the Legislature to capitalize the Aquatic Invasive Species Trust Fund.
- c. Implement the Water Resources Reform and Development Act (2014). [Note: This would provide additional funding and capacity to implement watercraft inspection stations.]
- d. Adequately fund the Montana Invasive Species Advisory Council (MISAC), state Weed Coordinator, and weed control positions.

4. Aquatic

- a. Refine permits for dredging, harvesting and treatment of aquatic plants to enhance public understanding and compliance.
- b. Enhance the aquatic invasive species statute to include:
 - 1. Require inspection of watercraft entering the state prior to launch;
 - 2. Establish quarantine authorities for mussel-fouled boats;
 - 3. Provide counties with authority to adopt aquatic invasive species regulations;
 - 4. Direct Fish, Wildlife, and Parks to partner with Montana Department of Transportation at ports of entry, or adjacent Department of Transportation facilities;
 - 5. Establish decontamination protocols relating to holds after decontamination;
 - 6. Ban felt-soled waders;
 - 7. Require a detailed early detection rapid response plan.
- c. Legislate aquatic plants as equal to terrestrial weeds.
- d. Mandate "pull the plug" for watercraft leaving waterbodies.
- e. Prohibit the use of live bait for fishing statewide.
- f. Enforce and increase penalties for individuals that transport live fish.
- g. Work with the Western Regional Panel, 100th Meridian Initiative, other regional entities and states to collaborate and coordinate efforts associated with species of regional importance.
- h. Identify appropriate agencies and entities to implement aquatic plant regulations.

5. Authorities

- a. Institutionalize the existence of MISAC beyond its current December 2016 expiration date.
- b.Improve laws pertaining to transportation and sale of non-native invasive species.
- c. Create authorities to quarantine potentially infested wood products.
- d. Establish clear state authorities for which agencies are responsible for aquatic plant management, enforcement, etc.
- e. Create authorities to inspect and manage invasive species infestations on private land.



H. Funding Recommendation

1. Long-term sustainable funding needs to be identified for all of Montana's invasive species programs, but in particular, for the aquatic invasive species program, which currently is funded with one-time-only funds to DNRC and FWP.



I. Information Management Recommendation

1. Montana needs a statewide database clearinghouse for all taxa of invasive species.



J. Outreach Recommendation

1. Outreach and education programs, core messages, and modes of delivery should be evaluated to ensure the messaging is effectively contributing to behavioral and attitudinal changes, and is providing policy makers with the information and tools to understand key priorities and take action to address those priorities. The content of Montana's messages should be evaluated within a regional and national context as well, especially given that some of the most significant vectors and pathways of introduction come from neighboring states or other parts of the United States.



K. Partnerships and Agreements Recommendation

1. Evaluate the nature of the invasive species agreements that exist among state agencies and assess whether reorganization, program, or fund shifts could enhance efficiencies and reduce the cost of managing state agency agreements.

References

1. Pimentel, D., McNair, S., Janecka, J., Wightman, J., Simmonds, C., O'Connell, C., Wong, E., Russel, L., Zern, J., Aquino, T. and Tsomondo, T. 2001. Economic and environmental threats of alien plant, animal, and microbe invasions. *Agriculture, Ecosystems and Environment* 84: 1–20.

2. Pimentel, D., Zuniga, R., and Morrison, D. 2005. Update on the environmental and economic costs associated with alien-invasive species in the United States. *Ecological Economics* 52: 273–288.

3. Office of Technology Assessment, U.S. Congress, Harmful Non-Indigenous Species in the United States (Washington, D.C.: U.S. Government Printing Office, 1993) (available online at www.wws. princeton.edu/~ota/disk1/1993/9325).

4. Sheley, R.L., and B.S. Smith. 2012. Prioritizing Invasive Plant Management Strategies. *Society for Range Management*. #756, pp. 11–14.

5. CWMA Cookbook: Recipe for Success. 2011. Midwest Invasive Plant Network.

Appendices

Appendix A. Montana Statewide Assessment of Invasive Species Survey Instrument

Montana Statewide Assessment of Invasive Species

The Montana Invasive Species Advisory Council, established in 2014, was created to advise the Governor on a science-based, comprehensive program to identify, prevent, eliminate, reduce and mitigate the impacts of invasive species in Montana. The 21-member Council, appointed by the Governor, identified three priorities to achieve in the next two years, including an assessment of Montana's invasive species programs. We invite you to complete this survey because you/your organization was involved in invasive species prevention, management, monitoring or other efforts in 2015. Your input is critical to further understanding about how to improve Montana's invasive species programs. Thank you for your participation.

Contact Information

Full Name

Organization

What best describes the entity you represent? (Federal agency, tribal sovereign nation, state agency, local/county government, nonprofit organization, institution of higher learning, business, private landowner, other) If you selected "other" in the question above, please explain.

Title

Address

Email

Office phone number; mobile phone number

Please describe the geographic scope of the program for which you are completing this form. Please describe your organization's fiscal year.

Priorities

If you conducted invasive species work in your fiscal year 2015, please select the taxa associated with your activities: Check all that apply. (Aquatic invertebrates, aquatic plants, birds, fish, land invertebrates, land plants, mammals, micro-organisms, reptiles, other)

How do you prioritize your invasive species work (i.e., what criteria do you use to prioritize)?

Considering all landscapes and habitat types, what were the top 10 species you spent time and money on in your fiscal year 2015?

If the species listed in the question above are not, from your perspective, priority species, list your top 10 priority species.

In fiscal year 2015, if there is a difference between the top 10 species you spent time and money on and your top 10 priority species, explain why that difference exists.

Please rank, from 1-8, with 1 being the most important and 8 being the least important, the following types of invasive species programs by their importance to the state of Montana. Note: "Early Detection" is surveying for new populations of invasive species. "Monitoring" involves surveillance of existing populations. (Monitoring or surveillance, Early Detection Rapid Response (EDRR), Prevention activities, Management or control activities, Outreach and education, Research, Coordination, Policy work)

If you participated in EDRR in your fiscal year 2015, please list the species that were the focus of these EDRR efforts (you can separate species with a comma)

If there is anything else you wish to add about the species you work on, or invasive species priorities, please do so here.

Regulations and Policies

List the federal, tribal sovereign nation, state, county, city, or local laws/policies that give you authority to engage in or guide your invasive species activities. Separate each with a comma.

Rate the effectiveness of the laws and regulations that govern your invasive species work/program in Montana (Excellent, Good, Fair, Poor, Not applicable)

Please describe any existing regulations pertaining to invasive species in Montana that need to be improved. Does your organization have a management plan(s) or guiding document(s) that includes invasive species strategies/ action items? (Yes, No, Not applicable)

If you answered yes to the previous question, what is the name of the plan(s), and when was it last updated? Is there anything else you would like to add relative to Montana's regulations and policies associated with invasive species?

Partnerships

This section includes a large table with organizations listed in this order: Federal governments, Tribal sovereign nations, State governments, Local governments, academia, and nonprofit organizations. If your organization had a formal partnership/cooperative agreement with any of these organizations in your fiscal year 2015, place one or more check marks in the row for that organization to indicate the types of activities that best pertain to the activities associated with that agreement. (Activities listed on X axis included Monitoring or surveillance, EDRR, Prevention activities, Management or control activities, Outreach and education, Research, Coordination, Fundraising, Policy work, Other). If you checked the "Other" box above, please describe the "other activities."

If your organization had a partnership/agreement with any other entities for invasive species activities in Montana in fiscal year 2015 that are not listed in any of the matrices above, please list the organization and indicate what types of activities most closely relate to the partnership/agreement.

If you believe any deficiencies exist relative to communication or cross-program invasive species coordination in Montana, please describe.

If there is anything else you would like to add relative to invasive species partnerships, please do so here.

Funding

This section is intended to capture that portion of your budget that was received and used only for invasive species. You need your program budget for invasive species in your fiscal year 2015 to complete this section. If you do not have actual figures, provide your best estimates. Fiscal years vary by organization. Use your organization's fiscal year. Use whole dollar amounts only, rounded to the nearest \$100. Include any administrative overhead costs as well as benefit costs (for personnel). The budget portion of the survey is divided into two sections - personnel costs and operational costs. We recognize that most entities do not budget according to the categories that may be listed below, therefore, please provide your best estimates. And remember, we are asking for the amount you spent and received for invasive species work only.

How would you describe the geographic scope of your budget? Please be as specific as possible.

Personnel

Please estimate the total dollar amount of staff salaries (and benefits) for full and part-time staff that conducted invasive species work of any kind in fiscal year 2015. If staff worked only a portion of the time on invasive species, include that percentage of their salary and benefits.

If you entered a dollar amount in the previous question, please enter the estimated total percent of staff time dedicated to specific invasive species activities. The total should add up to 100. (Monitoring or surveillance, EDRR, Prevention activities, Management or control activities, Research, Effectiveness monitoring, Coordination, Fundraising, Policy work, Other)

Operational Expenditures

Estimate the total dollar amount for operational expenditures by category for invasive species during your fiscal year 2015. Note: This includes your entire budget for invasive species, excluding staff salaries and benefits. (Monitoring or surveillance, EDRR, Prevention activities, Management or control activities, Research, Effectiveness monitoring, Coordination, Fundraising, Policy work, Other)

Organizations receive funding from a variety of sources. Please list any funding you received in your fiscal year 2015 from any organization for the purpose of conducting invasive species activities. Please list the organization and the total dollar amount. If you received funding from more than one source in your fiscal year 2015, please separate the sources and dollar amounts with a semi-colon.

Did your fiscal 2015 program budget include any funding that was disbursed to another organization, such as a grant program? If so, please list the recipients of these fiscal 2015 budget funds and the total dollar amount.

If you would like to upload a file or spreadsheet to help explain your budget, please upload your file here.

If your program uses volunteers to implement invasive species activities, please estimate the total number of volunteer hours contributed in your fiscal year 2015 and the source of those volunteer hours.

If there is anything else you would like to add relative to your program budget for invasive species, please do so here.

Evaluating Program Effectiveness

How do you evaluate the effectiveness of your invasive species efforts? Check all that apply. (Compliance monitoring, Conduct cost-benefit analysis, Conduct opinion surveys, Do not evaluate program effectiveness, Effectiveness monitoring (evaluating the success in meeting objectives), Met the requirements of a contract/agreement, Outcome-based performance objectives, Other)

Please describe up to three strengths relative to your organization and its invasive species activities.

Please describe up to three weaknesses relative to your organization and its invasive species activities.

If you would like to add any additional comments relative to evaluating your program effectiveness, please do so here.

Challenges

Please rank from 1-10, with 1 being the most important and 10 being the least important, the obstacles you face in being able to effectively implement your invasive species program. Please ensure you place a different number in each of the 10 boxes below. (Coordination, Economic impacts, Effective databases, Funding, Landowner involvement, Laws and regulations, Political will, Public awareness, Scientific understanding, Technical expertise) Are there other obstacles not include in the list above that you believe are important? If so, please describe. If you could do one thing to improve how Montana addresses invasive species or an individual invasive species program, what would it be?

Thank you for taking the time and making the effort to complete this survey. The Montana Invasive Species Advisory Council sincerely appreciates your commitment to the health of Montana's natural resources by preventing introductions and the spread of invasive species.

Appendix B. Additional documents provided by survey respondents to inform assessment outcomes.

Montana Aquatic Invasive Species Program 2014 Report

- Montana Departments of Agriculture, Fish, Wildlife & Parks, Natural Resources and Conservation, Transportation
- Montana Aquatic Nuisance Species (ANS) Management Plan 2002

DNRC Aquatic Invasive Plant Management Grant Program 2015 Biennium

 Conservation and Resource Development Division, Department of Natural Resources and Conservation

Fish, Wildlife & Parks Noxious Weed Management FY14 Report

• Montana Fish, Wildlife & Parks

The Montana Weed Management Plan – 2008

Montana Noxious Weed Summit Advisory Council – Weed Management Task Force

Status of Invasive Northern Pike in the Pend Oreille River – September 2015

Washington Department of Fish and Wildlife, Kallispel Natural Resources

Retail Firewood Can Transport Live Tree Pests - Entomological Society of America

Jacobi, W. R., J. G. Hardin, B. A. Goodrich, and C. M. Cleaver. 2012. Retail Firewood Can Transport Live Tree Pests. Entomological Society of America. 105(5): 1645–1658

Statewide Invasive Species Mapping and Data Management: A Needs Assessment

- Report submitted to the Montana Weed Control Association from the Montana Natural Heritage Program, 2010
- 2005-2012 FWP AIS Program Monitoring Data
- Montana Fish, Wildlife and Parks 2012 Report on Aquatic Invasive Species Monitoring 2013
- Montana Fish, Wildlife and Parks 2013 Report on Aquatic Invasive Species Monitoring 2013
- Montana Fish, Wildlife and Parks 2014 Report on Aquatic Invasive Species Monitoring 2015
- Montana Fish, Wildlife and Parks 2012 Report on Watercraft Inspection Stations 2013
- Montana Fish, Wildlife and Parks 2013 Report on Watercraft Inspection Stations 2015
- Montana Fish, Wildlife and Parks 2014 Watercraft Inspection Station Annual Report
- Montana Fish, Wildlife and Parks Progress Report for the FWP Aquatic Invasive Species Program – 2013

Appendix C. Montana Administrative Code and Statutes

Montana Administrative Code and Statutes

Montana Code Annotated - State Laws

Local Government (Title 7)

General Provisions (Chapter 1)

Creation of New Boards (7-1-202)

Weed and Pest Control (Chapter 22)

Part 21 – County Weed Control

- 7-22-2102 established weed management districts in every county in Montana, providing latitude to include more than one county the agreement of affect county commissioners.
- 7-22-2013 gives authority to commissioners to appoint a weed board and, with a recommendation from the weed board, the commissioners can appoint a weed coordinator. A weed management plan can be approved or rejected pursuant to 7-22-2121.
- 7-22-2109 gives authority to the weed board to administer a district's noxious week management program, establish management criteria for noxious weeds on all lands in the district, and make efforts to develop and implement a noxious weed management program on all lands within the district owned or administered by a federal agency. The board may supervise a coordinator and other employees, purchase items to implement a noxious weed management program using noxious weed funds, determine chemicals that can be used by people controlling weeds on their own land, enter into agreements with the department for control or eradication of any new exotic plant species, enter into cost-share agreements for noxious weed management, entire into agreements with commercial applicators (pursuant to 80-8-102) for control of noxious weeds, and request legal advice and services from the county attorney.
- 7-22-2116 makes it unlawful for any person to permit any noxious weed to propagate or go to seed on the person's land, except for those who adhere to the district noxious weed program or people who have land in compliance with a noxious weed management agreement.
- 7-22-2117 provides for civil penalties for people who interfere with the board or its authorized agent equal to the actual cost to the board or the estimated cost of removing noxious weeds from the impacted property. Funds are paid to the county treasurer and placed into the noxious weed fund.
- 7-22-2133 provides for noncompliance actions for landowners.
- 7-22-2134 provides for noncompliance actions by the board.
- 7-22-2141 creates a noxious weed fund by the commissions to be maintained by the county treasurer pursuant to 7-6-2111.

Part 23 – County Control of Insect Pests

- 7-22-2301 authorizes the board of commissioners and its agents to exterminate insect pests that destroys grain, hay, range, and horticultural crops within the county.
- 7-22-2304 authorizes any person pursuant to 7-22-2301 to control and exterminate insect pests.

Part 25 – County Vertebrate Pest Management

- 7-22-2502 authorizes a governing body to establish a program to manage and suppress vertebrate pests, cooperating with the department, and able to enter into cooperative agreements with state and federal agencies, counties, and other entities.
- 7-22-2511 states that a governing body that establishes a program to manage and suppress vertebrate pests must establish a county vertebrate pest management fund.

Part 41 – Municipal Weed Control

 7-22-4101 authorizes cities or towns to declare nuisance weeds, provide the manner of extermination, require landowners to exterminate or remove nuisance weeds, levy the cost of extermination as a tax against the property if the owner neglects to remove nuisance weed, and notes that a noxious weed, as defined in 7-22-2101 may not be declared a nuisance weed.

Land Resources and Use (Title 76)

Timber Resources (Chapter 13)

Control of Forest Diseases and Insect Pests (Part 3)

- 76-13-303 authorizes the creation of a zone of infestation that the department annually designates and includes a list of areas where there exists an infestation of forest insect pests or diseases injurious to forest lands.
- 76-13-304 authorizes the department to enter land with a zone of infestation to suppress, eradicate or control the pest in a manner approved by the department. This section authorizes the department to enter into cooperative agreements.

Agriculture (Title 80)

Disease, Pest, and Weed Control (Chapter 7)

Weed Control (Part 7)

- 80-7-701 gives the department authority to regulate or prohibit the importation or sale of materials containing noxious weed seed or plants harmful to Montana.
- 80-7-702 gives the department of agriculture the authority to adopt rules to regulate the importation or sale of materials provided in 80-7-701 as well as adopt rules for the establishment of inspection stations, appointment of inspectors, inspection fees, certificate issuances, methods of transporting and packaging, regulation of nursery stock commerce, and other rules necessary to carry out 80-7-701 through 80-7-704.
- 80-7-703 makes it a misdemeanor for any person who refuses to obey the order of an appointed inspector or willfully disobeys 80-7-701 through 80-7-704.
- 80-7-705 authorizes the department to distribute equally among Montana's counties that have established a noxious weed fun, the funds in the noxious weed state special revenue account, provided for in 80-7-816, collected pursuant to 80-7-823 and deposited in the noxious weed fund as provided for in 7-22-2141. The weed districts shall use the funds at the county level to enhance noxious weed management programs.
- 80-7-711 authorizes the department to provide technical assistance on the management and control of noxious plants.
- 80-7-712 gives the department authority to obtain federal funds to manage noxious plants on federal lands in cooperation with the agencies responsible for said

management. The funds shall be disbursed to local governments authorized to conduct noxious plant management programs. The department shall request 3% of the total federal funds receives to cover overhead and administration costs.

- 80-7-714 authorizes the department to adopt rules and policies to implement 80-7-711 through 80-7-713.
- 80-7-720 authorizes the department to expend funds for the collection and distribution of biocontrol agent to control leafy spurge and spotted knapweed. The Department of Natural Resources is given authority to transfer funds to the Department of Agriculture for said purpose.

Noxious Weed Management Funding (Part 8)

- 80-7-802 authorizes the department to adopt rules to implement this part.
- 80-7-805 authorizes the director of the department to appoint an 11-member noxious weed management advisory council to provide advice to the department on noxious weed management funding.
- 80-7-811 authorizes the department to administer the \$10 million noxious weed management trust fund.
- 80-7-814 describe the elements of the noxious weed management program.
- 80-7-815 authorizes the governor to declare a noxious weed emergency.
- 80-7-823 mandates the transfer of \$100,000 annually from the highway non-restricted account to the noxious weed state special revenue account.

Noxious Weed Seed Free Forage Act (Part 9)

- 80-7-904 authorizes the director of the department to appoint a 10-voting/2-ex-officio member advisory council to administer the Act.
- 80-7-905 gives powers and duties to the department to administer and enforce the Act.
- 80-7-907 gives authority to the department (with the advice of the advisory council) to establish fees to support the cost of administering the noxious weed seed free forage program.
- 80-7-908 authorizes deposit of all funds received from the department for fees or penalties collected or received under 80-7-905 through 80-7-907, 80-7-921 and 80-7-922 in the state noxious weed forage account.
- 80-7-910 authorizes the department or its agents, upon reasonable cause, to enter private or public premises, property, or vehicle, with a warrant or the consent of the inhabitant to inspect, sample or investigate forage subject to certification or sale as certified forage or as free of noxious weed seeds.
- 80-7-911 authorizes the department to issue a written stop sale, use, or removal order to anyone suspected of selling, distributing, storing, transporting, or using forage in violation of the provisions of the Act.
- 80-7-912 prohibits anyone from certifying or selling as certified noxious weed seed free any forage as free of noxious weed seed within Montana unless the forage is identified as "Montana certified" and the forage meets all of the requirements of this part.
- 80-7-922 provides for penalties for violation of this part.

Aquatic Invasive Species (Part 10)

- 80-7-1004 authorizes the department of fish, wildlife and parks to administer an invasive species account in the state special revenue fund.
- 80-7-1005 authorizes the departments to enter into cooperative agreements with each other or any entity or person to carry out the agreement.
- 80-7-1006 require the departments prepare a list of invasive species and identify the departments and public agencies with jurisdiction over each species on the list. Invasive species that are under the jurisdiction of more than one department will clarify and coordinate their responsibilities. The departments shall develop and adopt an invasive species strategic plan or plans, which will identify and prioritize threats and determine appropriate actions.
- 80-7-1007 authorize the departments to adopt rules for the prevention, early detection, and control of invasive species.
- 80-7-1015 authorizes a department with jurisdiction over an invasive species to designate and administer an invasive species management areas for a specific area of land or for a body or bodies of water for a specific or indeterminate amount of time to prevent and control the infestation or spread of the invasive species.
- 80-7-1010 mandates that owners, operators, or people in possession of vehicles or equipment authorized for use in an invasive species management area comply with 80-7-1008(3)(b) and that this equipment must be drained (such that it does not impact waters of the state) prior to being transported on land or public highway (defined in 61-1-101), except where allowed by department of fish, wildlife and parks.
- 80-7-1011 authorizes the department to establish check stations within or adjacent to invasive species management areas for the purposes of examining the vessels and equipment for invasive species. Owners, operators, or possessors of vessels or equipment are required to stop at check stations unless there is a medical emergency in which death or serious injury is likely to occur. If invasive species are detected, the vessel or equipment cannot leave the check station until it is cleaned and decontaminated.
- 80-7-1012 prohibits a person from importing, purchasing, selling, bartering, distributing, propagating, transporting, introducing or possessing invasive species (with exceptions).
- 80-7-1013 authorizes the governor to declare an invasive species emergency if the introduction or spread of an invasive species has occurred or is imminent.
- 80-7-1014 provides for penalties in violation of the Act.
- 80-7-1015 provides for signage, inspection stations, and other activities associated with statewide invasive species management areas.

Fish and Wildlife (Title 87)

Wildlife Protection (Chapter 5)

Importation, Introduction, and Transplantation of Wildlife (Part 7)

- 87-5-704 authorizes the commission to adopt rules for this title and chapter.
- 87-5-705 prohibits a person from importing, possessing, or selling exotic wildlife it is allowed by law or commission rule, they have obtained authorization from the department for livestock, or they have a department-issued permit.

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- 87-5-706 authorizes the possession or sale (but not the release or transplant) of noncontrolled exotic wildlife without a permit.
- 87-5-707 authorizes the commission, upon recommendation from a classification review committee, to adopt a list of controlled exotic wildlife that may be imported, possessed, or sold pursuant to commission and department rules and authorization.
- 87-5-708 authorizes the director to appoint a classification review committee to advise the commission on the importation, possession, and sale of exotic wildlife, including those animals that shall be placed on noncontrolled, controlled, or prohibited exotic wildlife lists.
- 87-5-709 provides exceptions and exemptions to possession and sale of exotic wildlife.
- 87-5-711 prohibits the importation for introduction or the transplantation or introduction of any wildlife unless the commission determines the species poses no threat of harm to native wildlife and plants or to agricultural production, and that the introduction has significant public benefits.
- 87-5-712 authorizes the commission to list, by administrative rule, wildlife species or exotic wildlife that may not be imported, possessed, or sold as pets for captive breeding for research or commercial purposes, for the commercial pet trade, or for any other reason.
- 87-5-713 subjects any wildlife species listed in 87-5-714 and approved by the commission for introduction or transplantation to have a plan developed by the department to ensure that the population can be controlled if harm should occur.
- 87-5-714 authorizes wildlife species that may be introduced or transplanted based on scientific investigation and approval of the commission.
- 87-5-715 authorizes the department to control or exterminate any wildlife or feral species transplanted or introduced in the say if the commission determines the species poses harm to native wildlife or plants or agricultural production.
- 87-5-721 provides for penalties of this part.
- 87-5-725 mandates the department provide public notice when the decision is made to introduce or transplant a wolf, bear, or mountain lion, and requires landowner permission before any animal is transplanted onto private property.

Administrative Rules of Montana - State Regulations

Agriculture (Title 4)

Noxious Weed Management (Chapter 4.5) Agricultural Sciences Division (Chapter 4.12) Quarantines and Pest Management Standards (Subchapter 13)

Fish, Wildlife, and Parks (Title 12)

Enforcement Division (Chapter 12.6) Exotic Wildlife (Subchapter 22) Recreational Water Use (Chapter 12.11) Aquatic Invasive Species Inspection Stations (12.11.341) Natural Resources and Conservation (Title 36) Forest Management (Chapter 11) Weed Management (36.11.445)

Other State Legal Resources

Montana Department of Agriculture

Montana Noxious Weed List – Invasive Species Executive Order 13112

- 34 species
 - Priority 1A not present or very limited presence in Montana. Management criteria will require prevention, education, and eradication, if detected.
 - Priority 1B Limited presence in Montana. Management criteria will require eradication or containment, where present, and prevention and education elsewhere.
 - Priority 2A Common in isolated areas of Montana. Management criteria will require containment and suppression where common; and eradication, prevention, and education where less abundant. Management shall be prioritized by local weed districts.
 - Priority 2B Abundant in Montana and widespread in many counties. Management criteria will require containment and suppression where abundant and widespread; and eradication, prevention and education where less abundant. Management shall be prioritized by local weed districts.
 - Priority 3 Not noxious weeds, but regulated plants that have the potential to have significant negative economic and ecological impacts. Intentional spread or sale of regulated plants other than as a containment in agricultural products is prohibited. Research, education, prevention, and control programs, where appropriate, are recommended to minimize the spread of these weeds. Control of Priority 3 weeds is not mandated.

Montana Fish, Wildlife and Parks

Exotic Species: Importation, Introduction, and Transplantation of Wildlife Any importation, transplantation, possession, sale, or introduction permitted must be conducted in a manner to ensure that wildlife or exotic wildlife can be controlled if harm arises from unforeseen effects. Prohibited species, unless authorized by Montana Fish, Wildlife & Parks may not be imported, possessed, sold, purchased, exchanged, or transported in Montana, the same applies for any species not classified. Controlled species may be imported into the state however, specific control measures for each species must be adhered to.

- Controlled species: A live, exotic wildlife species, subspecies, or hybrid of species that may not be imported, possessed, sold, purchased or exchanged in Montana unless a person obtains written authorization from the department.
- Noncontrolled Species: A live, exotic wildlife species, subspecies, or hybrid of that species that may be possessed, sold, purchased or exchanged in the state without a permit, except as provided in this subchapter or in Montana statutes or federal statutes. An uncontrolled species may not be released into the wild unless authorized in writing by the department. This definition does not authorize the sale possession, transportation, importation or exportation of a noncontrolled species in violation of any applicable federal or state statute or regulation or county or city ordinance.
- Prohibited Species: A live, exotic wildlife species, subspecies, or hybrid of that

species, including viable embryos or gametes, that may not be possessed, sold, purchased, exchanged, or transported in Montana, except as provided in MCA 87-5-709 or ARM 12.6.2220.

SB 343 - Montana Aquatic Invasive Species Act - Enacted in 2009, the Act established the state's invasive species program and authorized the use of invasive species check stations to prevent the movement of invasive species from infested to uninfested areas. Montana Fish, Wildlife, and Parks has primary authority to implement the program and the agency's regulations identify listed prohibited species and set forth the restrictions for contaminated bodies of water.

Appendix D. Map of watershed basins and sub-basins in Montana. One example of a possible geographic approach to implementing an all-taxa invasive species framework.

