2012 Montana Department of Agriculture Annual Report on

Aquatic Invasive Species

Report Prepared by:

Montana Department of Agriculture

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ACRONYMS

AIS – Aquatic Invasive Species

Corps – U.S. Army Corps of Engineers

DNRC – Montana Department of Natural Resources and Conservation

FWP – Montana Department of Fish, Wildlife, & Parks

The department – Montana Department of Agriculture

The state – State of Montana

SUGGESTED CITATION:

Montana Department of Agriculture, 2012. 2012 Montana Department of Agriculture Annual Aquatic Invasive Species Report. Bureau of Pest Management, Department of Agriculture. Helena, MT.

SUMMARY

During 2012, the Montana Department of Agriculture strived to prevent and reduce the threat of aquatic invasive species throughout the state. The following key efforts and needs of the department addressed in this report are:

1. **Aquatic plant monitoring throughout the state**
2. **Containment of existing aquatic invasive species populations**
3. **Support of aquatic invasive species control work**
4. **Ways to increase program effectiveness**

Aquatic Plant Monitoring

The department and stakeholders perform annual surveys throughout the state to monitor the status of the three aquatic plants listed on the Montana Noxious Weed List including Eurasian watermilfoil, curlyleaf pondweed, and flowering rush. Results show no new waterbodies infested with Eurasian watermilfoil. However, crews identified several new locations of curlyleaf pondweed in western Montana. Hungry Horse Reservoir is the only additional water body found to contain flowering rush.

Containment of Aquatic Invasive Species

The department once again operated mandatory watercraft inspection stations in western and eastern Montana to contain and prevent the spread of aquatic invasive species. The six stations operated from Memorial Day weekend (May 26) through Labor Day weekend (Sept 3). Overall, 13,998 boats were inspected at department stations, which includes two department supported stations operated by Valley County Weed District. Crews identified 70 watercraft contaminated with aquatic invasive plants during these inspections.

In addition, this year the department developed two new management areas in the Missouri River Basin to contain Eurasian watermilfoil populations, the Upper Missouri River Management Area and the Lower Missouri River Management Area. The department also implemented a temporary quarantine on Beaver Lake near Whitefish, which prohibited boat use on the lake until control work could occur on Eurasian watermilfoil in order to prevent the spread of the weed to a new water body.

Support of Aquatic Invasive Species Control

Control work on aquatic noxious weeds this year occurred at six locations including Eurasian watermilfoil control work in Noxon Reservoir, Jefferson Slough, Toston Reservoir, Fort Peck Lake, and Beaver Lake. Curlyleaf pondweed control occurred in Eagle Bend Yacht Harbor on the Flathead River.

Increasing Program effectiveness

The department is striving to make improvements in program effectiveness. Improvements the department hopes to achieve include the establishment of a stable funding source for inspections, monitoring, and control work, as well as improvements with stakeholder monitoring, increasing the overall inspection season length, and improving outreach for all aquatic invasive species.

REPORT OBJECTIVE

This report provides an annual status on aquatic invasive species (AIS) work performed by the Montana Department of Agriculture, hereafter called the department. Aquatic invasive species include any plant or animal that is not native to Montana and poses a threat to the biologic or economic health of the state. Management authority for aquatic noxious weeds in Montana is the responsibility of county weed districts with support from the department. Aquatic invasive weeds currently listed on the Montana Noxious Weed List include Eurasian watermilfoil (*Myriophyllum spicatum*), curlyleaf pondweed (*Potamogeton crispus*), and flowering rush (*Butomus umbellatus*). The department also cooperates with the Department of Fish, Wildlife, & Parks (FWP) and the Department of Natural Resources and Conservation (DNRC) to prevent introduction and spread of all aquatic invasive species including zebra and quagga mussels.

AQUATIC INVASIVE SPECIES MONITORING

In order to help contain and control AIS successfully, the department performs annual monitoring throughout the state. The department, other agencies, and stakeholders are all involved in AIS monitoring. These monitoring efforts at different water bodies help the stakeholders identify AIS populations early, which facilitate control and prevent additional spread.

MONITORING RESULTS

Lower water levels and warmer weather allowed the department to begin plant surveys in the middle of June. The mild fall also allowed the department to continue surveys until the middle of October. During that time, the department surveyed 5 rivers and 14 lakes (**Table 1**).

Stakeholders performed additional surveys throughout the state through House Bill 7 funding. Details on those surveys are available from DNRC annual reports. Survey crews noted both native and non-native aquatic plants during surveys as well as GPS locations of all sampled plants. Details of each sampled water body are available in the department's Aquatic Plant Sampling Final Report submitted to DNRC.

TABLE 1.WATER BODIES SURVEYED BY THE DEPARTMENT FOR AQUATIC INVASIVE PLANTS.

Surveyed Lakes	County
Lake Helena	Lewis & Clark
Bynum Reservoir	Teton
Canyon Ferry *(Portions including duck ponds)*	Lewis & Clark/Jefferson
Fresno Reservoir	Hill
Gibson Reservoir	Teton
Hauser Lake	Lewis & Clark
Helena Valley Regulating Reservoir	Lewis & Clark
Lake Five	Flathead
Lake Frances	Pondera
Nelson Reservoir	Phillips
Pishkun Reservoir	Teton
Savage Lake	Lincoln
Willow Creek Reservoir	Lewis & Clark
Surveyed Rivers	**County**
Big Hole River	Beaverhead
Madison River (10-mile Portion)	Madison
Missouri River *(Three Forks to Great Falls)*	Lewis & Clark/Cascade
Ruby River *(Below Ruby Reservoir)*	Madison
Yellowstone River Portions	
Livingston Area	Park
Big Timber Area	Sweet Grass
Reed Point Area	Stillwater
Laurel Area	Yellowstone
Billings Area	Yellowstone
Custer Area	Yellowstone
Miles City Area	Custer
Glendive Area	Dawson
Savage Area	Richland

STATUS OF EURASIAN WATERMILFOIL

Eurasian watermilfoil (EWM) is an aquatic plant that originates from Europe and Asia. Eurasian watermilfoil first appeared in North America in the 1940s. The pet trade once commonly sold the plant as an aquarium plant. The sale of the species and the ease at which it fragments and grows from those fragments have caused the spread of Eurasian watermilfoil to most of the continental US. Eurasian watermilfoil can have adverse impacts on a water body's ecology by forming dense mats under and on the water surface.

Eurasian watermilfoil is on the Montana Noxious Weed List as a 1B priority. The state targets plants with this priority for eradication and containment. This species was first reported in Montana in 2007 in the Lower Clark Fork Basin. Since then, it has been reported in different regions throughout the state including the Missouri River headwaters, Fort Peck, and Beaver Lake near Whitefish **(Figure 1a)**.

Survey results in 2012 show no new Eurasian watermilfoil populations within the state. However, populations in Fort Peck Reservoir have significantly expanded. Lakeshore property owners are frustrated with the expansion because thick patches make it extremely difficult to access their docks. Eurasian watermilfoil has also negatively affected fish sampling as the department received reports from FWP fisheries personnel that Eurasian watermilfoil was making fish sampling with nets extremely difficult.

STATUS OF CURLYLEAF PONDWEED

Curlyleaf pondweed is a submersed aquatic plant native to Europe, Africa, and Australia. Curlyleaf pondweed first appeared in the US in the mid-1800s. Curlyleaf pondweed has now spread to every state in the continental US

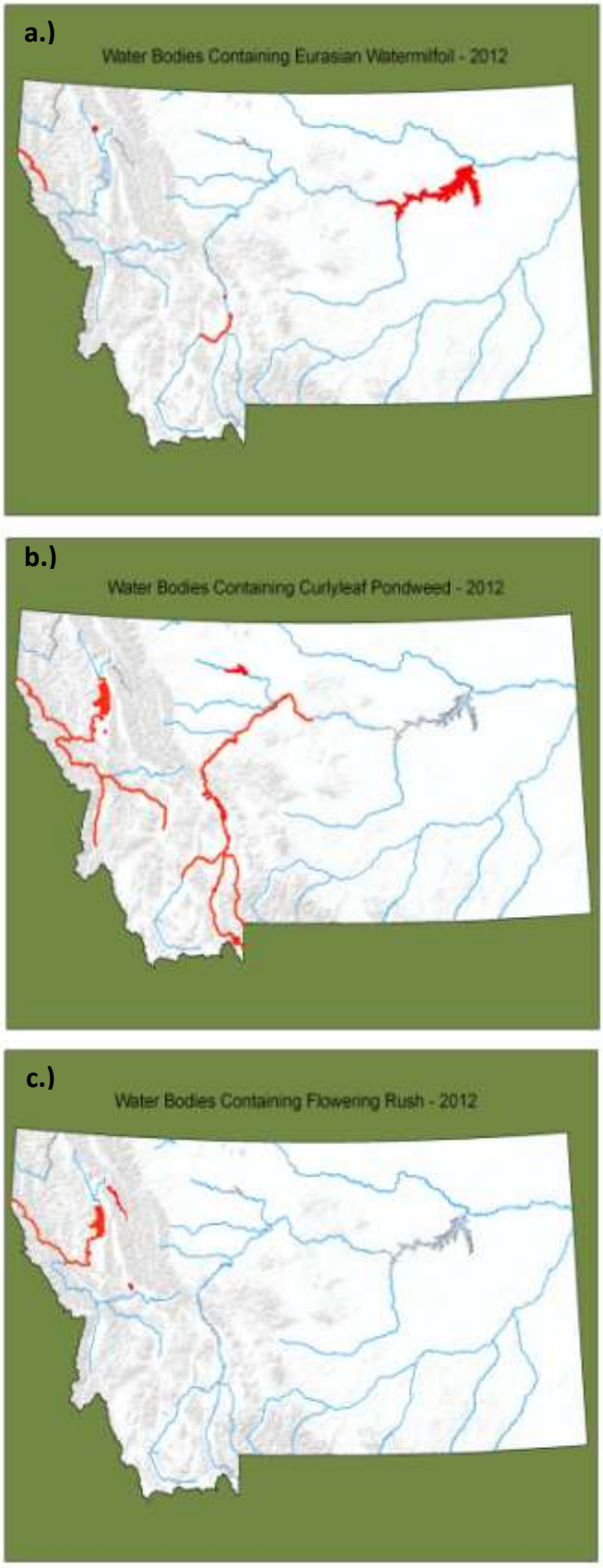

FIGURE 1. CURRENT WATER BODIES THAT CONTAIN THE STATE LISTED WEED A.) EURASIAN WATERMILFOIL, B.) CURLYLEAF PONDWEED, AND C.) FLOWERING RUSH.

except Maine and South Carolina. Curlyleaf pondweed can alter the aquatic ecology of a water body by altering oxygen levels, changing nutrient levels, and decreasing native plant diversity. Curlyleaf pondweed forms thick mats that reduce recreational opportunities and cause harm to agriculture by clogging irrigation ditches.

Curlyleaf pondweed is on the Montana Noxious Weed List as a 1B priority. The department targets plants with this priority for containment and eradication. Stakeholder surveys have revealed several new populations of curlyleaf pondweed. The current extent of curlyleaf pondweed is restricted to the western half of the state **(Figure 1b)**.

STATUS OF FLOWERING RUSH

Flowering rush is an emergent aquatic plant native to Europe and Asia. It also has the ability to grow submersed in deeper water. Flowering rush is on the Montana Noxious Weed List as a 1B priority. It was likely introduced into the US as an ornamental plant and has since spread to many states and provinces. It was introduced into Montana in Flathead Lake in 1964. Flowering rush can negatively affect aquatic ecosystems as well as affect agriculture by clogging irrigation ditches. In some states flowering rush reaches sufficient density that irrigation districts are forced to dredge their ditches to improve water flow. Unfortunately, there is no effective control for flowering rush at this time, which makes it a difficult plant to manage.

The department did not find any new flowering rush populations during surveys, though other stakeholders identified flowering rush in Hungry Horse Reservoir **(Figure 1c)**.

AQUATIC INVASIVE SPECIES CONTAINMENT

One important aspect of invasive plant management is the containment of established plant populations, as it will limit the spread of established AIS within the state. In 2012, the department used management areas for mandatory watercraft inspections, temporary quarantines, education and awareness, pet trade inspections, and control measures to combat the spread of AIS.

DESIGNATION OF NEW MANAGEMENT AREAS

On June 29, 2011, the department enacted a light, temporary quarantine for Eurasian watermilfoil in the Missouri River Basin and its corresponding roads. The objective of the quarantine was to contain Eurasian watermilfoil in those water bodies already infested. It was to remain in effect until the department could establish a permanent management area.

In 2012, the department implemented two management areas that covered the Upper Missouri River and the Lower Missouri River **(Figure 2)**. The department excluded the central area of the basin from either management areas, as there are no known Eurasian watermilfoil infestations in those areas. The new management areas allow the department to perform mandatory watercraft inspections anywhere within or adjacent to a management area.

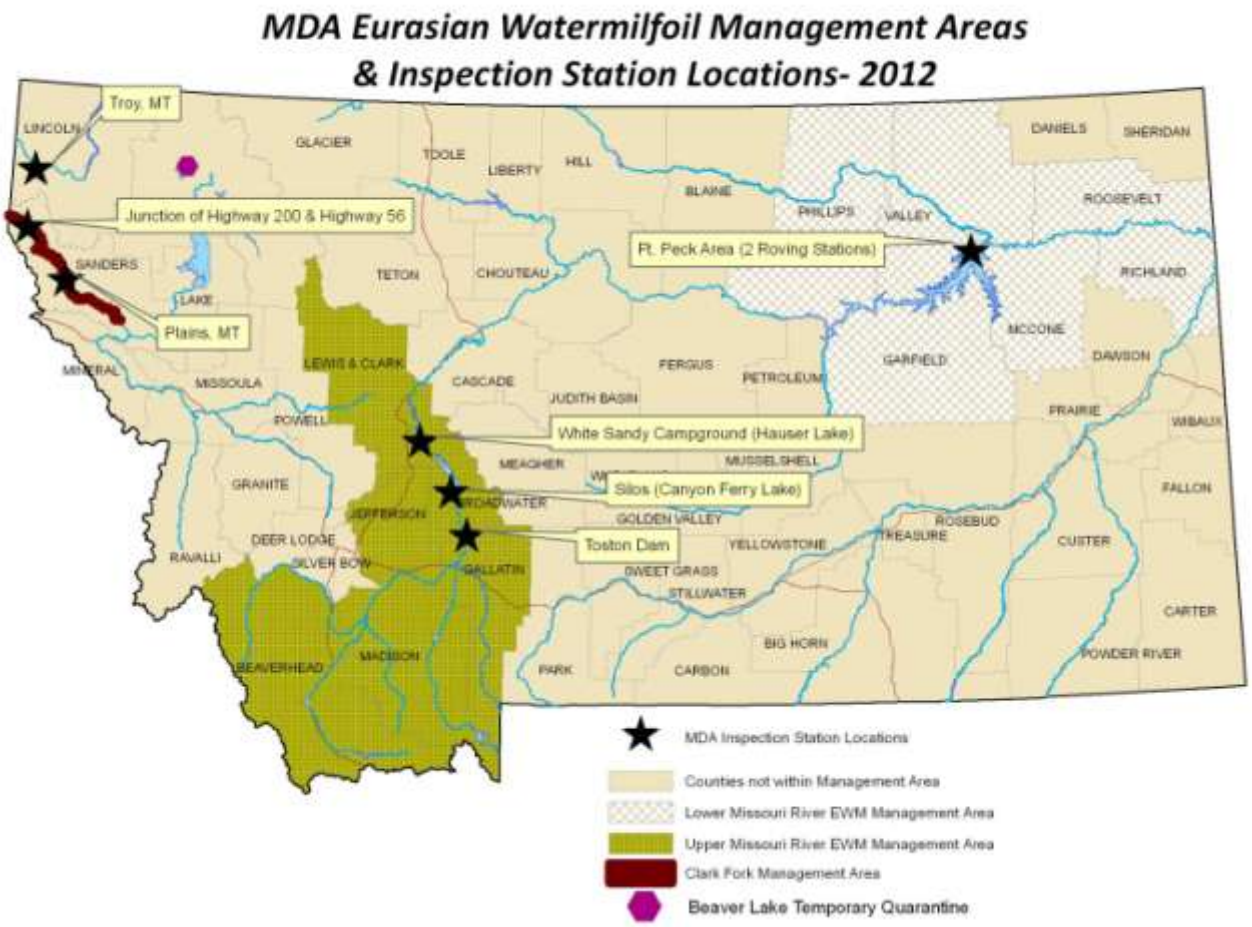

FIGURE 2. LOCATIONS OF EWM MANAGEMENT AREAS AND PLACEMENT OF DEPARTMENT OPERATED WATERCRAFT INSPECTIONS.

BEAVER LAKE TEMPORARY QUARANTINE

In October 2011, a DNRC employee discovered Eurasian watermilfoil in Beaver Lake. Immediately after identification confirmation, the department worked with Flathead County Weed District to organize the Flathead County Aquatic Invasive Species Task Force to respond rapidly to the new infestation. One of the first steps in responding to the Eurasian watermilfoil infestation was to place bottom barriers over the known population. Bottom barriers are non-permeable, dark fabric that prevents plant growth beneath them. The task force made plans in the winter and spring of 2012 to remove any other Eurasian watermilfoil plants with a diver-operated dredge. In July 2012, before the scheduled dredging could occur, the task force indicated that the plants were at levels that could be spread by watercraft. The department, with support from the task force, implemented a temporary quarantine on Beaver Lake for all watercraft to reduce the risk of fragmentation and transportation of Eurasian watermilfoil. The department lifted the temporary quarantine after divers dredged the remaining plants in the lake. Overall, the public was supportive of the decision to close the lake to reduce the risk of transportation of Eurasian watermilfoil into another lake.

WATERCRAFT INSPECTIONS

Animals, watercraft, trailers, fishing and hunting gear, and other objects can act as AIS vectors. A major vector for AIS spread is watercraft and their respective trailers. Watercraft inspection stations contain established AIS populations, reduce movement of AIS within the state and across state boundaries, and reduce expensive treatments of new infestations.

The department operated four mandatory watercraft inspection stations during the 2012 watercraft season and provided support for two stations operated by Valley Count Weed District on Fort Peck Reservoir **(Figure 2)**. The Department of Fish, Wildlife, & Parks also conducted watercraft inspections at major roads along Montana borders. The department placed inspection stations at strategic locations where higher numbers of high-risk watercraft were expected to pass within department established management areas. A high-risk watercraft would be any watercraft that has entered a water body previously contaminated with Eurasian watermilfoil or other AIS. During watercraft inspections, the inspectors examined the watercraft for any AIS and conducted a short survey on the public's knowledge of AIS as well as their boating habits.

WATERCRAFT INSPECTION TOTALS

Watercraft inspection stations operated by the department opened on Memorial Day weekend (May 26) and closed down Labor Day weekend (September 3). The stations operated twelve hours a day seven days a week with the exception of Wednesday when they operated only eight hours due to rotation of employees. Department inspectors checked 13,998 watercraft during the 2012 season.

2010 – 2012 COMPARISON OF TOTALS

Inspection totals for 2012 are higher than 2010 and 2011 with 8,163 and 3,213 more inspections, respectively. A breakdown of inspections by months shows that every month in 2012 had higher number of inspections than other years with exception of September and October **(Figure 3)**. Lower numbers in 2012 during those months are likely due to fewer number of inspection station operation days **(Table 2)**. Days of operation in June to August are comparable for 2011 and 2012 suggesting that the increase in inspections in 2012 is likely due to an increase in watercraft movement or watercraft use in management areas in Montana **(Figure 4)**.

NONCOMPLIANCE OF MANDATORY INSPECTIONS

Watercraft inspection stations within the department management areas are mandatory for all watercraft including non-motorized watercraft. Compliance with mandatory watercraft inspections is monitored throughout the season. During the season, 1,299 vehicles with watercraft drove by a station without stopping. In 2010, 2,032 vehicles drove by without stopping at inspection stations. Future work with local law enforcement will hopefully continue to reduce the number of drive bys.

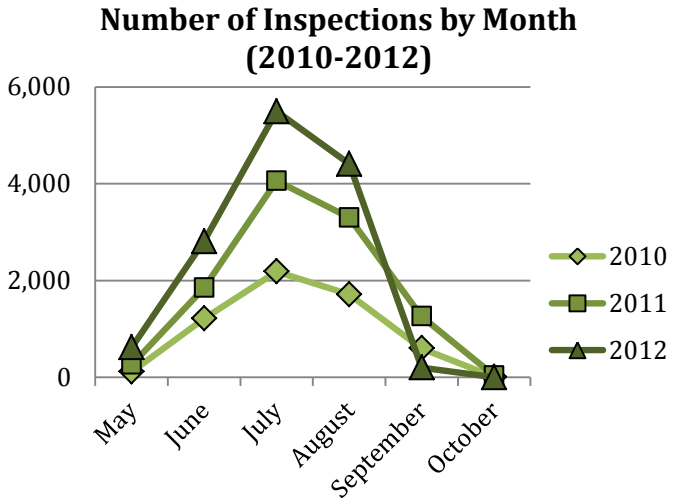

FIGURE 3. COMPARISON OF WATERCRAFT INSPECTIONS BY MONTH (2010-2012).

TABLE 2. SUMMARIZATION OF INSPECTION TOTALS FOR EACH INSPECTION LOCATION.

	Inspection Location	Inpsection Days	Total Inspections	Nonresident Boats*	Montana Boats*	Recertifications*	Drivebys	Contaminated Boats*	Contaminant Details
	Eurasian Watermilfoil Lower Missouri River Management Area								
1	Fort Peck Area (Two stations operated by Valley County Weed District)	84	2,069	151	1,918	509	Not Available	22	12 – Invasive Eurasian watermilfoil (boat pulled from lake) 7 – Invasive Eurasian watermilfoil 3 – Unidentifiable
	Eurasian Watermilfoil Upper Missouri River Management Area								
2	Canyon Ferry - Silos	33	981	23	958	222	14	16	1 – Invasive curlyleaf pondweed (boat pulled from lake) 15 – Native vegetation
3	Hauser Lake - White Sandy	49	845	17	828	242	8	12	2 – Invasive curlyleaf pondweed (boat pulled from lake) 10 – Native vegetation
4	Hauser Lake - York Bridge	10	286	4	282	17	1	2	1 – Invasive Eurasian watermilfoil 1 – Mud/scum covered
5	Toston Reservoir	8	20	0	20	1	0	3	3 – Invasive curlyleaf pondweed (boat pulled from lake)
	Eurasian Watermilfoil Lower Clark Fork Management Area								
6	Troy	102	4,212	1,735	2,477	2,252	445	32	4 – Invasive Eurasian watermilfoil 22 – Native vegetation 6 – Unidentifiable
7	Junction of Hwy 200 & Hwy 56	102	2,081	1,025	1,056	952	336	35	10 – Invasive Eurasian watermilfoil 11 – Invasive curlyleaf pondweed 11 – Native vegetation 2 – Mud/scum covered 1 – Unidentifiable
8	Plains	102	3,504	947	2,557	1,382	495	25	4 – Invasive Eurasian watermilfoil 4 – Invasive curlyleaf pondweed 1 – Invasive flowering rush 10 – Native vegetation 1 – Mud/scum covered 5 – Unidentifiable
	Totals								
		490	**13,998**	**3,902**	**10,096**	**5,577**	**1,299**	**147**	**38 – Invasive Eurasian watermilfoil** **21 – Invasive curlyleaf pondweed** **1 – Invasive flowering rush** **68 – Native vegetation** **4 – Mud/ scum fouled** **15 – Unidentifiable**

*Included in inspection totals

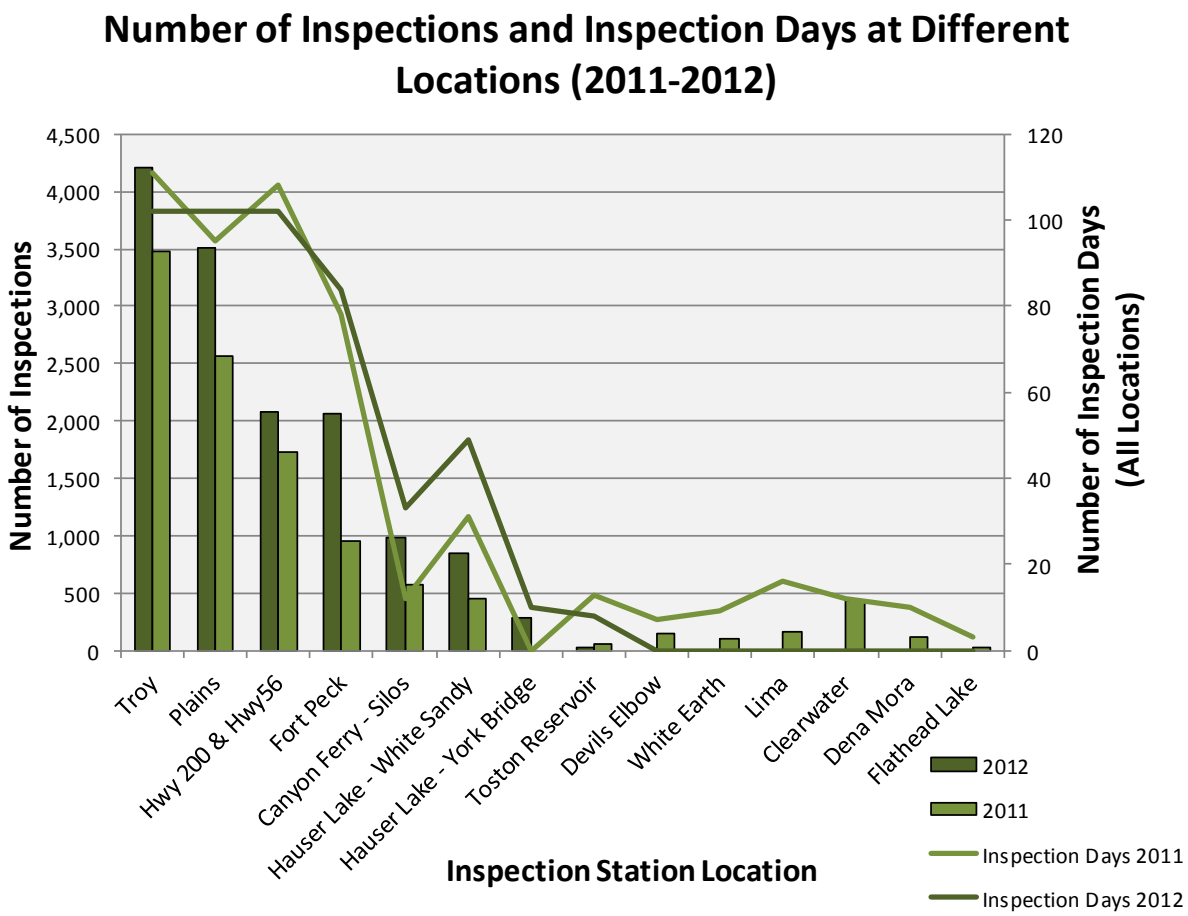

FIGURE 4. NUMBER OF INSPECTIONS (LEFT Y-AXIS) AND INSPECTION DAYS (RIGHT Y-AXIS) AT DIFFERENT LOCATIONS DURING THE 2011 AND 2012 SEASON.

ORIGIN OF WATERCRAFT

A breakdown of the boater origin shows that crews performed 10,096 inspections on Montana watercraft and 3,902 inspections on nonresident watercraft. **Figure 5** shows the origin of watercraft across the US and Canada arranged by ZIP codes. The majority of visits come from watercraft in Montana and neighboring states but include visits from 44 states across the US, 6 Canadian provinces, and 5 countries (US, Canada, England, Australia, and America Samoa) **(Table 3)**.

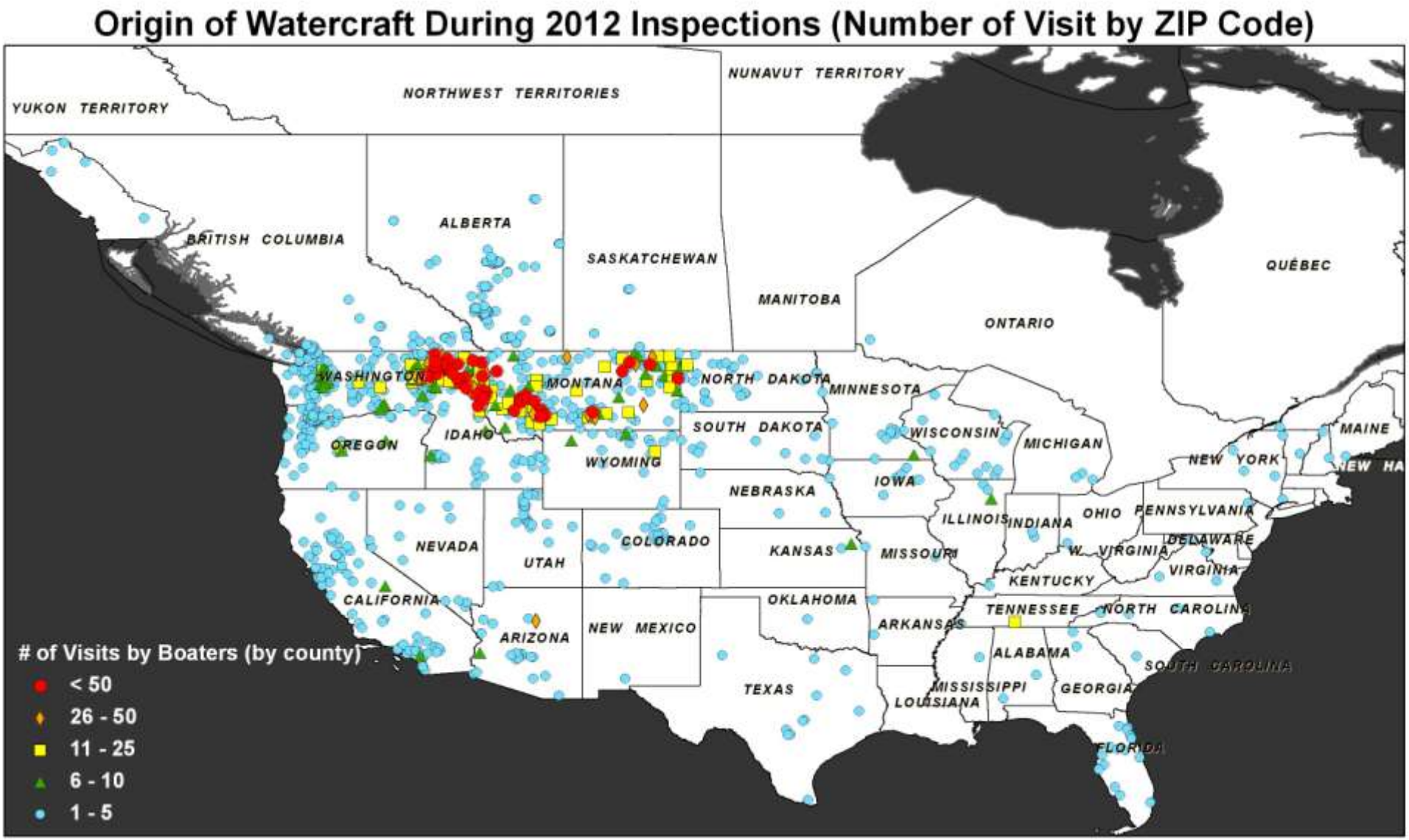

FIGURE 5. ORIGIN OF WATERCRAFT (BY ZIP CODE) DURING INSPECTIONS IN 2012.

TABLE 3. DETAILS OF WATERCRAFT ORIGINS AT EACH INSPECTION LOCATION.

			Breakdown of Inspections at Each Location							
			Lower Clark Fork Management Area			Lower Missouri River Management Area	Upper Missouri River Management Area			
State/Province	Percentage of Total Inspections by State	Total	Troy	Plains	Hwy 200 & Hwy56	Fort Peck	Canyon Ferry - Silos	Hauser Lake - White Sandy	Hauser Lake - York Bridge	Toston Reservoir
MT - Montana	63.99%	8,957	2,275	2,457	878	1,430	902	728	268	19
ID - Idaho	12.02%	1,683	953	194	517	12	4	3		
WA - Washington	8.12%	1,137	396	412	310	12	5	2		
OR - Oregon	1.26%	177	58	94	23	2				
CA - California*	0.81%	114	33	58	23					
ND - North Dakota*	0.54%	75	3	11	4	49	3	3	2	
AZ - Arizona*	0.47%	66	37	17	11	1				
WY - Wyoming	0.42%	59	15	6	4	32	1	1		
UT - Utah*	0.37%	52	6	29	16		1			
CO - Colorado*	0.23%	32	12	12	5	1	2			
WI - Wisconsin*	0.16%	23	6	2	3	9	2	1		
FL - Florida	0.15%	21	5	9	4			3		
NV - Nevada*	0.14%	19	5	6	6	1	1			
MN - Minnesota*	0.13%	18	4	2	8	3			1	
TX - Texas*	0.13%	18	10	3	4			1		
SD - South Dakota*	0.11%	16	4	2	6	4				
TN - Tennessee*	0.11%	15	1	13	1					
AK - Alaska	0.11%	15	2	5	6	1	1			
IA - Iowa*	0.08%	11	3	1	1	2	2	2		
IL - Illinois*	0.06%	8	3			5				
KS - Kansas*	0.06%	8	8							
NE - Nebraska*	0.05%	7	2	2	1			1	1	
MI - Michigan*	0.04%	6	1	4	1					
NM - New Mexico*	0.04%	6	1	3	2					
NY - New York*	0.04%	6	3	2	1					
AR - Arkansas*	0.04%	6	2	2	1	1				
NC - North Carolina	0.04%	6	2		2	2				
OK - Oklahoma*	0.03%	4	4							
AL - Alabama*	0.02%	3		2	1					
IN - Indiana*	0.02%	3	2		1					
VA - Virginia*	0.02%	3	1	1		1				
NH - New Hampshire	0.02%	3	2		1					
GA - Georgia	0.02%	3	1	2						
ME - Maine	0.01%	2		1	1					
KY - Kentucky*	0.01%	2			2					
LA - Louisiana*	0.01%	2		1	1					
MO - Missouri*	0.01%	2		2						
SC - South Carolina	0.01%	1			1					
WV - West Virginia*	0.01%	1		1						
PA - Pennsylvania*	0.01%	1	1							
OH - Ohio*	0.01%	1					1			
VT - Vermont*	0.01%	1		1						
CT - Connecticut*	0.01%	1	1							
MS - Mississippi*	0.01%	1	1							
America Samoa	0.01%	1		1						
Canada										
AB - Alberta	1.31%	183	102	35	45	1				
BC - British Columbia	0.43%	60	40	11	9					
SK - Saskatchewan	0.10%	14	1		2	11				
NB - New Brunswick	0.01%	2			1	1				
ON - Ontario*	0.01%	1	1							
QC - Quebec*	0.01%	1	1							
Australia	0.01%	1	1							
England*	0.01%	1	1							
Unknown	8.14%	1,139	202	100	178	488	56	100	14	1
	Grand Total	**13,998**	**4,212**	**3,504**	**2,081**	**2,069**	**981**	**845**	**286**	**20**
	Percentage of Total by Station		**30.09%**	**25.03%**	**14.87%**	**14.78%**	**7.01%**	**6.04%**	**2.04%**	**0.14%**
	Inspection days	490	**102**	**102**	**102**	**84**	**33**	**49**	**10**	**8**
	Average Boats/Day	**135.5**	**20.6**	**34.4**	**41.3**	**24.6**	**29.7**	**17.2**	**28.6**	**2.5**
		Total	**Troy**	**Plains**	**Hwy 200 & Hwy56**	**Fort Peck**	**Canyon Ferry - Silos**	**Hauser Lake - White Sandy**	**Hauser Lake - York Bridge**	**Toston Reservoir**

***States infested with zebra mussels and/or quagga mussels.**

WATERCRAFT LAUNCH INFORMATION

Surveys performed by crews during the inspection process show that boaters have visited lakes and rivers around the US. The vast majority of visits include Montana water bodies followed by Idaho water bodies, and then Washington water bodies **(Figure 6).** These high percentages of watercraft visiting Montana waters provide many opportunities for AIS to move between waters.

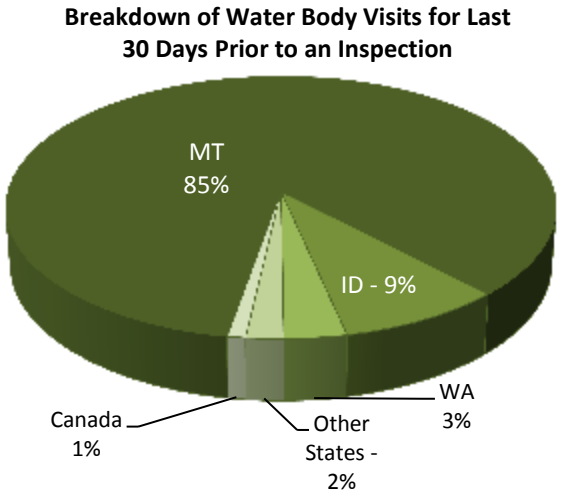

FIGURE 6. PERCENTAGES OF WATER BODIES VISITED BY BOATERS AT INSPECTION STATIONS.

AIS BOATER SURVEYS

As part of the inspection, inspectors asked the following five questions:

SURVEY QUESTION 1: HOW FREQUENTLY DO YOU USE YOUR WATERCRAFT?

Inspection crews asked the public how frequently they use their watercraft. Answers suggested that most boaters typically do not use their watercraft more than once a week **(Figure 7)**. If boaters allow their watercraft to dry out completely between water body visits, it is less likely AIS will live if transported to a new water body.

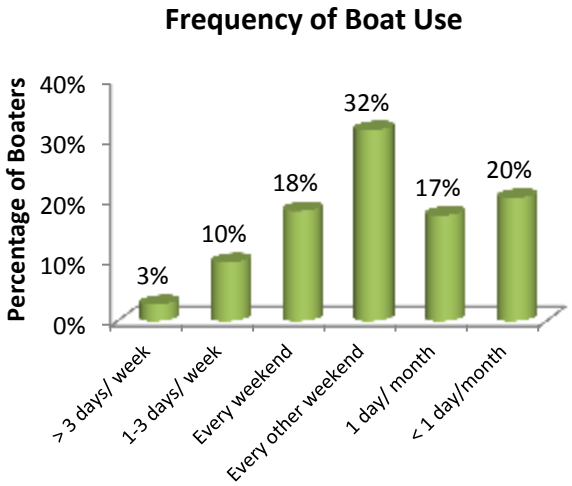

FIGURE 7. ANSWER TO BOATER SURVEY QUESTION 1: HOW FREQUENTLY DO YOU USE YOUR WATERCRAFT?

SURVEY QUESTION 2: HOW OFTEN DO YOU DRAIN YOUR WATERCRAFT?

Draining watercraft helps them dry out and prevent suitable conditions for AIS to survive. Inspection crews asked boaters how frequently they drain their watercraft after each use. The vast majority (86%) say they drain their watercraft after each use **(Figure 8)**. This helps ensure that that potential hitchhiking AIS do not have water to survive.

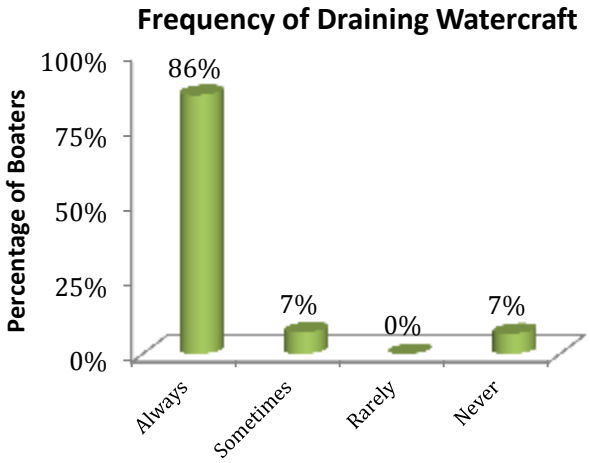

FIGURE 8. ANSWER TO BOATER SURVEY QUESTION 2: HOW OFTEN DO YOU DRAIN YOUR WATERCRAFT AFTER EACH OUTING?

SURVEY QUESTION 3: HOW OFTEN DO YOU CLEAN YOUR WATERCRAFT AFTER USE?

If boaters wash their watercraft with 140°F water, AIS will die. Inspection crews asked boaters how frequently they clean their watercraft after each use. Most boaters (62%) always clean their watercraft after each use, while the rest clean their watercraft at least once a season **(Figure 9)**. The

majority of people are helping prevent the spread of AIS by cleaning their watercraft after each trip.

SURVEY QUESTION 4: WHICH AIS HAVE YOU HEARD OF?

As a gauge to see if boaters are becoming more educated about AIS, inspection crews asked about their knowledge of AIS. Inspectors asked boaters to list AIS that they have learned about or have heard of. Most AIS mentioned include Eurasian watermilfoil, zebra mussels and quagga mussels (**Figure 10)**. These three species are often the poster children for AIS in Montana. It appears that AIS education in Montana is successfully educating the public about these species. However, the state needs to place more emphasis on other AIS threats to protect Montana more completely.

SURVEY QUESTION 5: HOW DID YOU HEAR ABOUT THE AIS YOU KNOW?

To help the department and partners understand how the public is learning about AIS, inspection crews asked them how they learned about the AIS they know. Responses mainly included brochures, talking with state agencies, signs, and newspapers **(Figure 11)**. As the department does not know the scale and efforts of all education methods around the state, other methods and materials may also be effective if used more frequently.

CONTAMINATED WATERCRAFT

Of the 13,998 watercraft that crews inspected, 147 watercraft were contaminated **(Table 2 Pg. 7)**. Contamination does not mean that they had AIS attached to the watercraft; it simply means their watercraft or trailer had vegetation, mud, or some other organism attached. Of those 147 contaminated

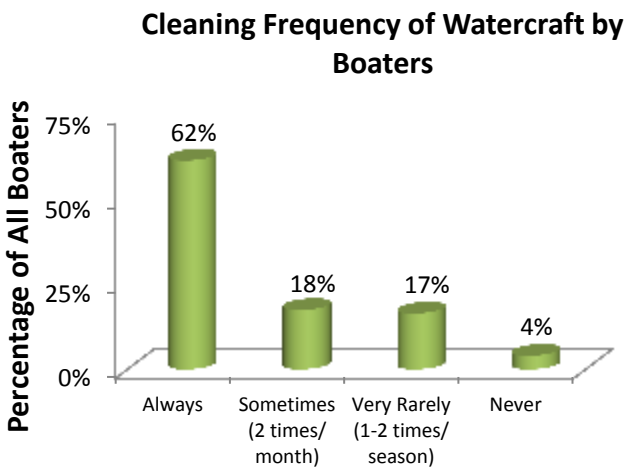

FIGURE 9. ANSWER TO BOATER SURVEY QUESTION 3: HOW OFTEN DO YOU CLEAN YOUR BOAT AFTER AN OUTING?

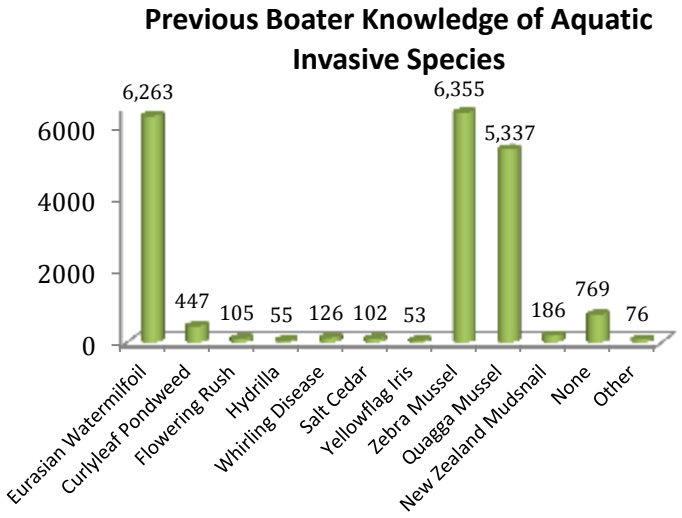

FIGURE 10. ANSWER TO BOATER SURVEY QUESTION 4: WHICH AIS HAVE YOU HEARD OF?

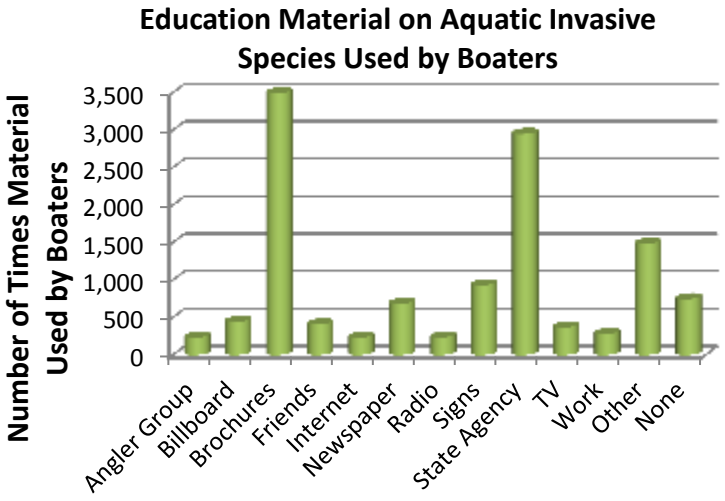

FIGURE 11. ANSWER TO BOATER SURVEY QUESTION 5: HOW DID YOU HEAR ABOUT THE AIS YOU KNOW?

watercraft inspected, crews found 60 of them contaminated with AIS. Inspection crews found Eurasian watermilfoil on 38 watercraft. Curlyleaf Pondweed was attached on 21 watercraft, and flowering rush was attached on one watercraft.

WATER BODIES VISITED BY CONTAMINATED WATERCRAFT PRIOR TO INSPECTION

When the department identifies AIS on a watercraft or trailer, it is vital crews find out where that watercraft has launched in the 30 days prior to the inspection. This helps the department trace back AIS to the infested water body and identify other waterbodies that may require survey work. **Figure 12** shows those water body track-backs. Fortunately, every incidence when crews discovered AIS, the department previously knew the visited lake contained that species of AIS. The only exceptions are Hauser Lake and Fresno Reservoir for Eurasian watermilfoil. However, in both of these incidents the boaters also visited other water bodies that are positive for Eurasian watermilfoil.

FUTURE LAUNCH LOCATION OF CONTAMINATED WATERCRAFT

When crews discover AIS during an inspection, they find out where the watercraft is destined to launch next **(Figure 13)**. In many situations, the watercraft is likely to stay in the same AIS-contaminated water body. However, in several occasions the watercraft was destined for non-infested waters, *e.g.* a watercraft contaminated with Eurasian watermilfoil destined for St. Mary Lake in Glacier National Park. There were also nine incidents were the boater did not know where they planned to launch next.

PET TRADE INSPECTIONS

As an effort to reduce the dispersal of AIS by the pet trade, the department began inspecting pet stores licensed to sell plants. The inspector looked for any aquatic plant on the Montana Noxious Weed List. A nursery inspector visited 13 of the 19 pet stores, and none of them carried any aquatic invasive plants. One of the biggest threats in the pet trade is the internet plant trade. The vast numbers of places that sell aquatic plants make it difficult to monitor. Whenever someone notifies the department that an internet site offers to ship a state-listed plant into the state, the nursery specialist contacts the business informing them that the sale of that plant in the state is prohibited.

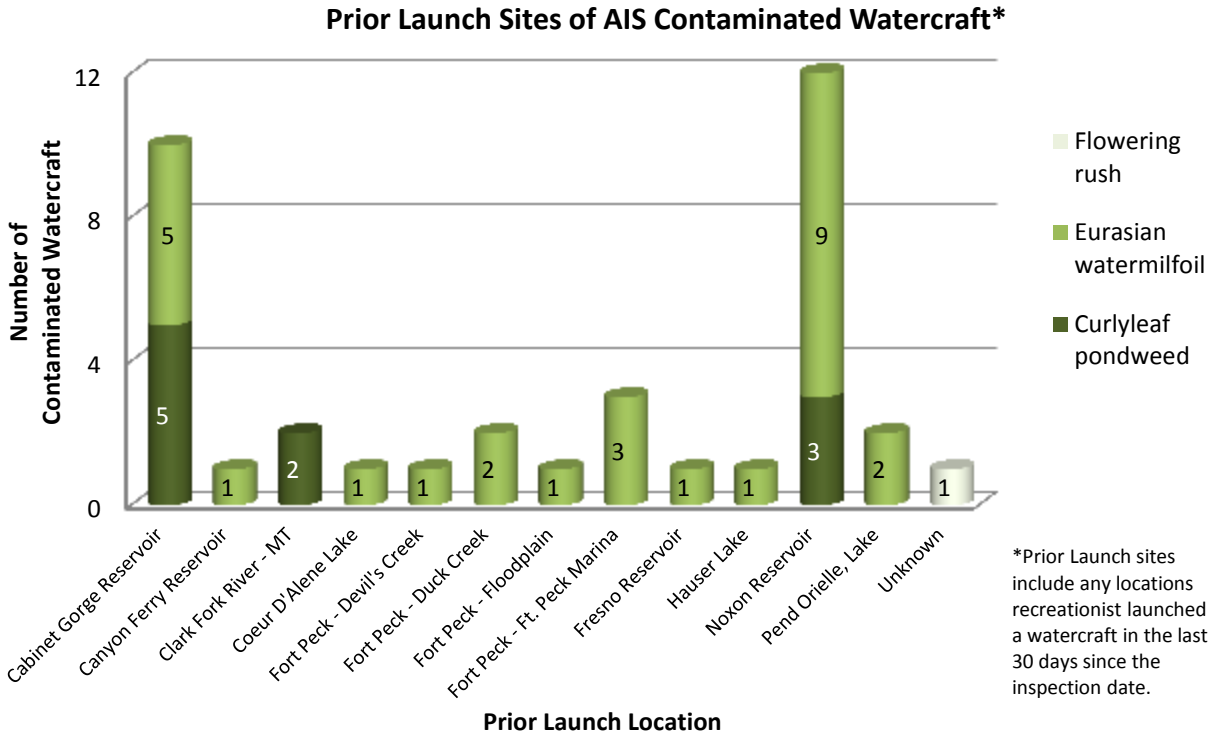

FIGURE 12. PRIOR LAUNCH SITES VISITED BY AIS CONTAMINATED WATERCRAFT IN THE LAST 30 DAYS PRIOR TO THE INSPECTION DATE.

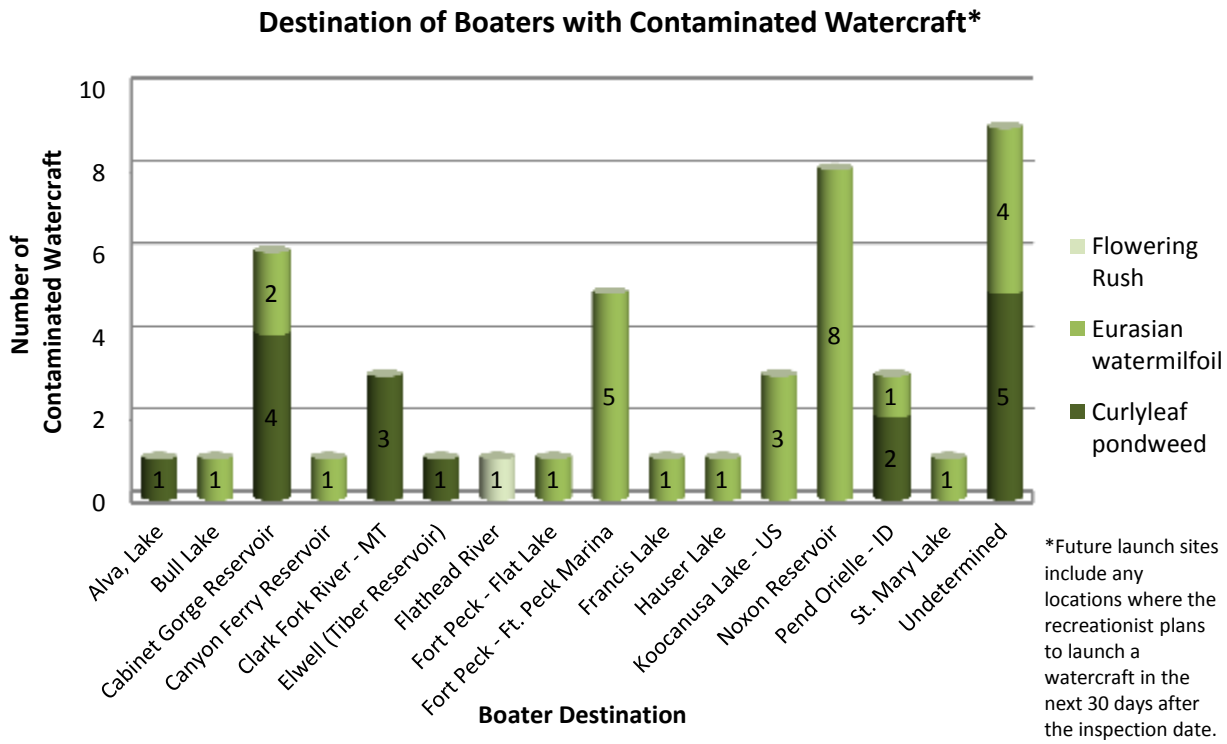

FIGURE 13. WATER BODY DESTINATION OF BOATERS WITH CONTAMINATED WATERCRAFT.

AQUATIC INVASIVE SPECIES CONTROL

Several stakeholders have performed aquatic invasive plant control in the state. These control efforts included work on curlyleaf pondweed and Eurasian watermilfoil (**Figure 14**). Methods of plant control used in Montana this year include chemical applications and mechanical control such as hand-removal, bottom barriers, and diver operated dredges. Several of the control efforts are a direct result of monitoring work conducted in 2011.

FIGURE 14. LOCATIONS AND DESCRIPTIONS OF AQUATIC INVASIVE PLANT CONTROL WORK THROUGHOUT MONTANA.

NOXON RESERVOIR EURASIAN WATERMILFOIL CONTROL

The Sanders County Task Force has worked to control the population of Eurasian watermilfoil in the lower Clark Fork Basin since its discovery in 2007. The task force performed test trials and preliminary control in previous years. The task force began full-scale control of 172 acres of Eurasian watermilfoil this year with chemical treatments including endothall, diquat, and/or triclopyr. Small patches of curlyleaf and flowering rush located inside Eurasian watermilfoil treatment plots were also treated. Post-treatment results show that chemical control was highly effective on target species and showed

minimal negative effects on native vegetation. In addition, the task force had 231 bottom barriers placed around high traffic areas such as docks and ramps. These bottom barriers reduce the possibility that a watercraft near those locations would transport fragments of Eurasian watermilfoil.

EAGLE BEND YACHT HARBOR CURLYLEAF PONDWEED CONTROL

Several stakeholders in the Flathead Basin worked with Eagle Bend Yacht Harbor to have a small 10-acre infestation of curlyleaf pondweed treated with chemicals in the harbor. Eagle Bend Harbor is located on the Flathead River just upstream of the inlet to Flathead Lake. The group treated the harbor in May before lake levels began to rise in Flathead Lake. Control in the harbor was effective, though control in the channel leading to the harbor appeared to be less effective due to low water temperature and water cloudiness. Repeat application will be necessary to remove the infestation completely so Eagle Bend Yacht Harbor plans to retreat the harbor in May of 2013.

JEFFERSON SLOUGH EURASIAN WATERMILFOIL REMOVAL

The Missouri River Headwaters Task Force worked on removal of Eurasian watermilfoil in the Jefferson Slough near Whitehall, MT. The slough appears to be the uppermost infestation of Eurasian watermilfoil in the Missouri River Basin. The department delineated the uppermost infestation during monitoring efforts in 2011 and 2012. Work in the slough included hand-removal and diver-operated dredging. The task force contracted with Montana Conservation Corps to perform most of the hand removal. The control worked occurred the last week in July during peak growth of Eurasian watermilfoil. During the five days of work, crews covered 1.68 miles of the slough and removed 3,053 lbs. of Eurasian watermilfoil.

FORT PECK EURASIAN WATERMILFOIL CHEMICAL CONTROL TEST PLOTS

The US Army Corps of Engineers established test plots for chemical control of Eurasian watermilfoil in Fort Peck Reservoir and below the dam in the adjacent Dredge Cuts. The Corps treated four different test plots measuring 21.6 acres in all with endothall and/or triclopyr. The Corps will use the results from the test plots to create a management plan for Eurasian watermilfoil in Fort Peck Lake.

BEAVER LAKE EURASIAN WATERMILFOIL REMOVAL

As described earlier, the Flathead County Task Force continued efforts to remove Eurasian watermilfoil in Beaver Lake. Surveys showed some remaining plants in the patch discovered in 2011, as well as several small satellite populations in the lake. All known plants were either covered with bottom barrier or removed with a diver-operated dredge.

TOSTON RESERVOIR EURASIAN WATERMILFOIL REMOVAL

Similar to last year, DNRC contracted to have Eurasian watermilfoil removed with a diver-operated dredge in Toston Reservoir. The crews removed a total of 2,523 lbs. of Eurasian watermilfoil. This is higher than last year, but more areas were accessible because crews used a smaller, portable dredge in

addition to the normal dredge mounted on a pontoon. In addition, FWP crews placed several bottom barriers around the boat ramp to reduce the risk of transporting AIS to another water body.

LOOKING AHEAD TO INCREASE PROGRAM EFFECTIVENESS

STABLE FUNDING SOURCE FOR INSPECTIONS AND MONITORING

One-time-only funding provided by the legislature to the department during the 2011 session allowed the department to operate watercraft inspections and conduct baseline monitoring for the 2011 and 2012 field seasons. Uncertainty and lack of state funding hinders the department, FWP, and DNRC in developing effective action plans for long-term prevention and control strategies. During years of the legislative session, the hiring process for seasonal employees needs to occur at the same time as the legislative session. However, uncertainty of funding for that season can prevent the department and FWP from finding the best-qualified inspectors; potential employees generally do not accept jobs just for May and June and tend to find summer jobs with other agencies or organizations that provide long-term seasonal work.

SUPPORT STAKEHOLDER MONITORING

The state has seen an increase in the concern of other stakeholders and the public over AIS. The department has seen an increase in the number of plant samples sent in from the public worried they might have an invasive plant in their water body. This suggests that the education effort by all stakeholders is helping make the public more aware. In addition, more counties and non-profit organizations have begun to perform annual plant monitoring. However, there are still opportunities to incorporate more county weed districts, organizations, and the public to improve the state's early detection and monitoring program. The department will work to train and educate people in identification in AIS. Funds do not allow monitoring of all water bodies by state agencies, so other stakeholders and the public offer a good opportunity to cover those gaps in monitoring.

INCREASE WATERCRAFT INSPECTION LENGTH

In 2012, the department watercraft inspections closed following Labor Day weekend. It appears that closing that early may have caused the department to miss some of the boating season traffic. **Figure 15** shows the weekly numbers of inspections from each station. Based on a normal bell curve many of our stations are skewed left suggesting that extending the department inspections longer into September will balance out the bell curve and in the process capture the majority of watercraft travel during the year. Eurasian watermilfoil fragments in August and September, which makes watercraft highly susceptible to transport those viable fragments to other water body during that time. Extending the inspection season through September or October would ensure that boaters are not transporting those fragments. In order to extend the season, more funds would need to be available for the department. Without additional department inspection funding, the department may need to shift the inspection season later into the year to capture the period at which invasive plants are reaching peak height and during fragmentation. The difficulty in this lies with the fact that curlyleaf pondweed fragments in the early summer (July) while Eurasian watermilfoil fragments in late summer (August –

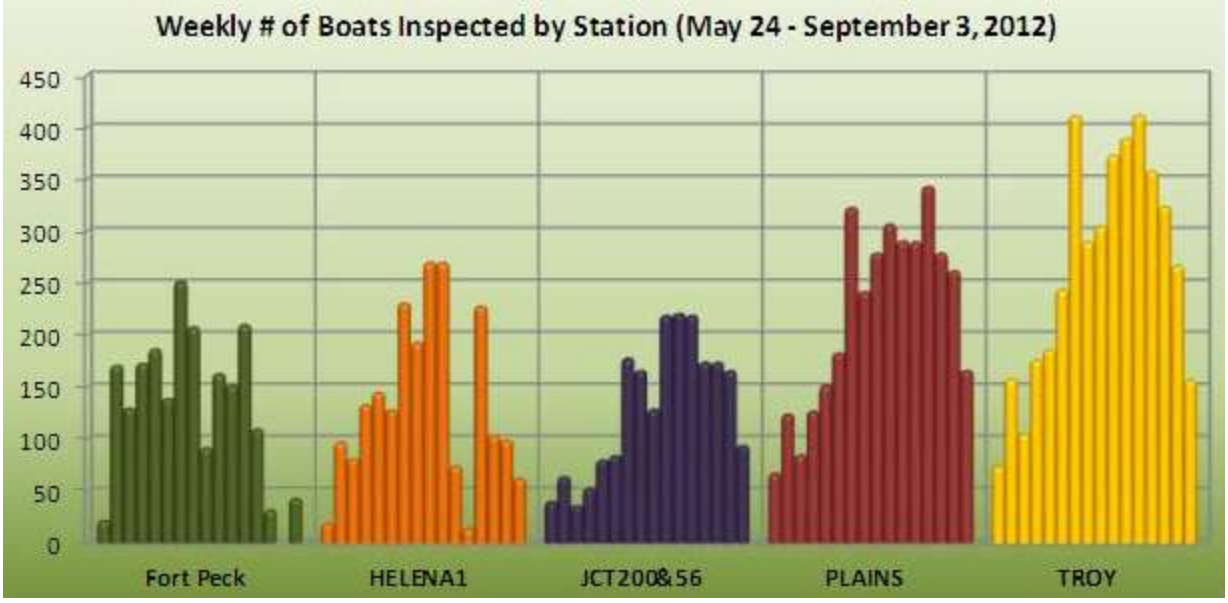

FIGURE 15. WEEKLY NUMBER OF INSPECTIONS FOR EACH INSPECTION STATION FROM MEMORIAL DAY WEEKEND TO LABOR DAY WEEKEND.

September). This shift could also prevent department inspection stations from finding invasive mussels on boats coming into MT waters at the beginning of the boating season. This shift would leave a period where boaters could inadvertently transfer AIS without detection.

Additional inspections early in the year would likely help prevent AIS spread. In 2012, Idaho began watercraft inspections in February. Within a week of opening its inspection stations, inspectors found invasive mussels on commercially hauled watercraft from the Great Lakes region. Beginning the inspection season earlier in the year especially at the south and east borders would be beneficial as those borders are highly susceptible to AIS invasion. Those areas are susceptible to AIS, particularly invasive mussels, due to boats hauled from the Great Lakes region and Lake Mead area, which both contain AIS.

IMPROVE OUTREACH OF ALL AIS

Based on results from inspection station surveys on knowledge of AIS **(Figure 10 Pg.12)** the department needs to ensure that the public is receiving education on all AIS. The education so far by all stakeholders appears to have made the public aware of Eurasian watermilfoil, zebra mussels, and quagga mussels, but much room remains to improve awareness of the other AIS. The department will utilize the noxious weed training and development Specialist and stakeholders to help improve and provide material and education to the public and other vital partners.

CONCLUSION

With the help of legislation and funding made available, Montana can actively continue to prevent the spread of aquatic invasive species. Funding helps state agencies coordinate among themselves and with other vital stakeholders to ensure AIS spread does not continue within the state. The department and

their partners utilize funding for activities including monitoring, water body sampling, early detection/ rapid response, control efforts, watercraft inspections, and education and outreach. The Montana Department of Agriculture is committed, along with many others, to protect the state's resources and water uses for generations to come.