

Wyoming Aquatic Invasive Species 2016 Program Summary



The Wyoming Aquatic Invasive Species (AIS) program continued to focus on outreach, watercraft inspections, and monitoring in 2016.

PERSONNEL

AIS personnel in 2016 included one permanent coordinator, five 12-month AWEC Regional AIS Specialists, three 9-month AWEC Regional AIS Specialists, and 41 seasonal technicians (39 general funded and 2 U.S. Fish and Wildlife Service funded).

OUTREACH AND EDUCATION

Outreach was focused in the regions throughout the state with AIS information at local events, fairs, and in schools.

In 2016, the boater appreciation raffle was conducted with the goals of thanking boaters for cooperation with watercraft inspections, increasing compliance with watercraft stopping at check stations by incentivizing the inspections, and gathering information from boaters about the inspection process. Information on raffle entry details was included on the back of the watercraft inspection receipt given to boaters after an inspection. Boaters entered the survey online where they were asked a series of questions about their inspection experience. There were a total of 1,591 entries in the raffle survey; of those 751 unique individuals entered the raffle.

The overall experience by boaters at watercraft check stations was positive with 92.8% indicating they were either very satisfied (79.8%) or satisfied (13.0%). Satisfaction with the timeliness of inspections was also high, with 92.9% of boaters very satisfied (81.1%) or satisfied (11.8%) with the amount of time required for inspection. Lastly, boaters rated the professionalism of inspectors high with 94.6% of boaters very satisfied (82.7%) or satisfied (11.9%). The majority of boaters (77.9%) responding to the survey had purchased a 2016 AIS decal. Raffle respondents were mostly Wyoming residents (51.3%), followed by residents of Utah (24.7%), Colorado (11.6%), Montana (4.3%), and Nebraska (3.0%). Boaters who responded to the raffle survey were from 29 different states.

TRAINING

A total of 17 watercraft inspection and decontamination trainings were conducted in 11 different locations throughout the state. A total of 103 individuals were certified at a course in 2016, bringing the total number of inspectors since 2010 to over 1,265. Private individuals were again encouraged to become AIS inspectors and to offer services to the boating public as certified inspection locations. Nineteen (19) locations were authorized as certified inspection locations and many others were certified as private authorized inspectors; 38 of which allowed their information to be given out to the public online to contact for watercraft inspections.

The Fire Equipment Inspection and Decontamination (FEID) manual and online training course were revised in 2016. This joint effort of the Bureau of Land Management, U.S. Forest Service, State Forestry, and Wyoming Game and Fish Department equips fire equipment operators with the tools and certification necessary to inspect equipment for AIS prior to use in Wyoming. In 2016, 45 FEID inspectors were certified from 21 different field offices.

WATERCRAFT INSPECTIONS

Watercraft check stations were operated from April 30 through September 25 at fourteen permanent check stations at port of entries (POE), rest areas, and other border locations to intercept watercraft entering the state (Figure 1). Roving crews also conducted inspections at waters on a rotating basis. A total of 42,615 watercraft inspections were conducted over 221 days, resulting in 26,125 individual boaters being contacted at all check stations. A total of 3,715 high risk inspections were conducted and 792 watercraft required decontamination (Table 1). The majority of decontaminations (79%) were performed on watercraft with standing water in the motor.

Eight watercraft were intercepted with suspected zebra or quagga mussels attached and were completely decontaminated; on all watercraft the suspect AIS were determined to be dead and not viable. Suspect mussel infested watercraft originated from unspecified South Carolina water (1), an unspecified water and state (1), Lake Michigan (2), Lake Erie (1), Lake St. Clair (1), and Lake Powell, UT (2). These watercraft were destined for the Columbia River (1), Nevada (1), California (4), Nebraska (1), and Flaming Gorge Reservoir, WY (1).

The greatest number of inspections were conducted at the Evanston I-80 check station (8,327), followed by Cheyenne I-25 (4,353), Glendo Reservoir (4,131), Alpine POE (3,259), and Anvil Draw-Flaming Gorge Reservoir (2,898; Figure 2). The highest inspection activity per hour occurred from 10:00am to 12:00pm and the busiest days of the week were Friday (23%) and Saturday (23%). The highest inspection activity occurred prior to the July 4th holiday (Figure 3). Total hours spent conducting watercraft inspections at all check stations and regional offices was about 32,454 hours, for a statewide average of 1.3 inspections per hour. Inspection rate (inspections/hour) ranged from <0.1 at Hog Park Reservoir to 7.0 at the Fontenelle Reservoir check station (Table 1).

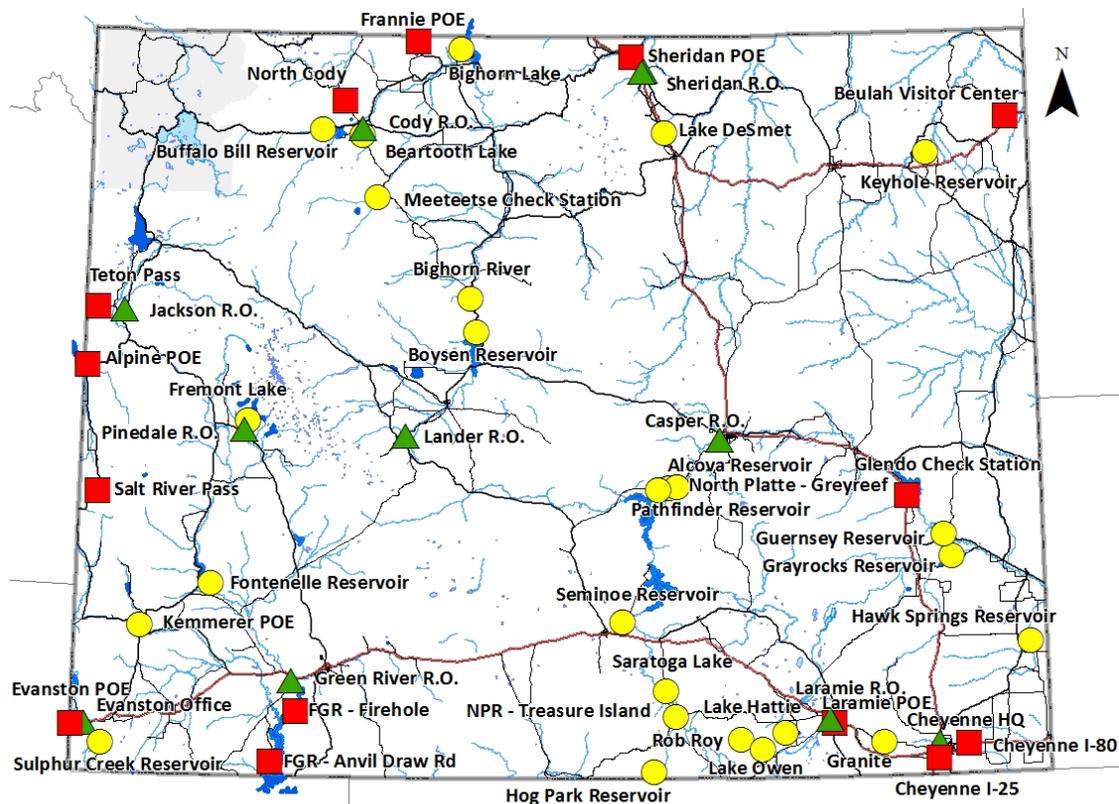


Figure 1. Location of watercraft inspections during 2016 at waters (yellow circle), borders (red square), and regional offices (green triangle).

Table 1. Total inspections, percent of boats already sealed at time of inspection, high risk inspections, percent of total inspections that were high risk, decontaminations, inspection hours and inspection frequency (inspection per hours) at check stations in 2016.

Check Station	Total Inspections	Percent Sealed	High Risk Inspections	Percent High Risk	Decons	Inspectio Hours	Inspection Frequency
CASPER							
Alcova Reservoir	764	2%	6	1%	0	244	3.1
Casper Regional Office	115	1%	32	28%	71	1.6	1.6
Glendo Reservoir	4,131	22%	39	1%	11	1,479	2.8
Guernsey Reservoir	140	21%	1	1%	0	99	1.4
North Platte River	369	2%	1	<1%	0	201	1.8
Pathfinder Reservoir	748	1%	3	<1%	0	257	2.9
Seminole Reservoir	160	7%	2	1%	0	130	1.2
Torrington POE	1,035	12%	137	13%	71	1,664	0.6
CODY/LANDER							
Beartooth Lakes	16	<1%	0	<1%	0	68	0.2
Big Horn Lake	1,303	<1%	2	<1%	2	----	----
Bighorn River	44	<1%	0	<1%	0	79	0.6
Boysen Reservoir	261	<1%	1	<1%	0	175	1.5
Buffalo Bill Reservoir	86	1%	2	2%	1	202	0.4
Cody Regional Office	58	<1%	2	3%	1	18	3.2
Frannie POE	1,107	1%	19	2%	0	1,754	0.6
Lander Regional Office	10	<1%	0	<1%	0	6	1.7
Meeteetse Check Station	7	<1%	0	<1%	0	30	0.2
North Cody Check Station	508	1%	14	3%	4	892	0.6
GREEN RIVER							
Anvil Draw-Flaming Gorge	2,898	8%	50	2%	24	2,538	1.1
Evanston Hwy 89	10	10%	0	<1%	0	42	0.2
Evanston POE	8,327	1%	1,018	12%	357	4,452	1.9
Flaming Gorge Reservoir	124	6%	13	10%	1	71	1.7
Fontenelle Reservoir	14	7%	0	<1%	0	2	7.0
Green River Regional Office	69	1%	18	26%	4	46	1.5
Kemmerer	1,127	20%	33	3%	3	795	1.4
Sulphur Creek Reservoir	75	1%	0	<1%	0	108	0.7
JACKSON/PINEDALE							
Alpine POE	3,259	1%	29	1%	4	1,645	2.0
Fremont Lake	235	<1%	3	1%	0	209	1.1
Jackson Regional Office	159	1%	25	16%	2	29	5.5
Pinedale Regional Office	45	<1%	7	16%	2	33	1.4
Salt River Pass	704	19%	31	4%	5	901	0.8
Teton Pass	346	<1%	5	1%	0	302	1.1
LARAMIE/CHEYENNE							
Cheyenne Headquarters	65	11%	4	6%	0	----	----
Cheyenne I-25 POE	4,353	25%	685	16%	96	3,530	1.2
Cheyenne I-80 POE	1,590	2%	643	40%	104	2,399	0.7
Granite Reservoir	211	10%	3	1%	0	164	1.3
Grayrocks Reservoir	644	16%	1	<1%	0	352	1.8
Hawk Spring Reservoir	52	2%	1	2%	0	64	0.8
Hog Park Reservoir	1	<1%	0	<1%	0	22	<0.1
Lake Hattie	17	12%	0	<1%	0	33	0.5
Lake Owen	1	<1%	0	<1%	0	8	0.1

Check Station	Total Inspection	Percent Sealed	High Risk Inspections	Percent High Risk	Decons	Inspection Hours	Inspection Frequency
Laramie POE	2,205	13%	194	9%	14	2,399	0.9
Laramie Regional Office	31	3%	5	16%	4	19	1.6
Rob Roy Reservoir	22	18%	0	<1%	0	40	0.6
Saratoga Lake	1	<1%	0	<1%	0	15	0.1
SHERIDAN							
Beulah Visitor Center	1,275	1%	588	46%	59	2,433	0.5
Keyhole Reservoir	2,143	3%	19	1%	4	897	2.4
Lake DeSmet	479	2%	27	6%	0	270	1.8
Sheridan POE	966	1%	26	3%	1	1,228	0.8
Sheridan Regional Office	28	<1%	6	21%	2	9	3.1
Sibley Lake	34	3%	0	<1%	0	30	1.1
Tie Hack Reservoir	3	<1%	0	<1%	0	---	---
Private Authorized	240	---	20	8%	0	---	---
TOTAL	42,615	8%	3,715	9%	792	32,454	1.3

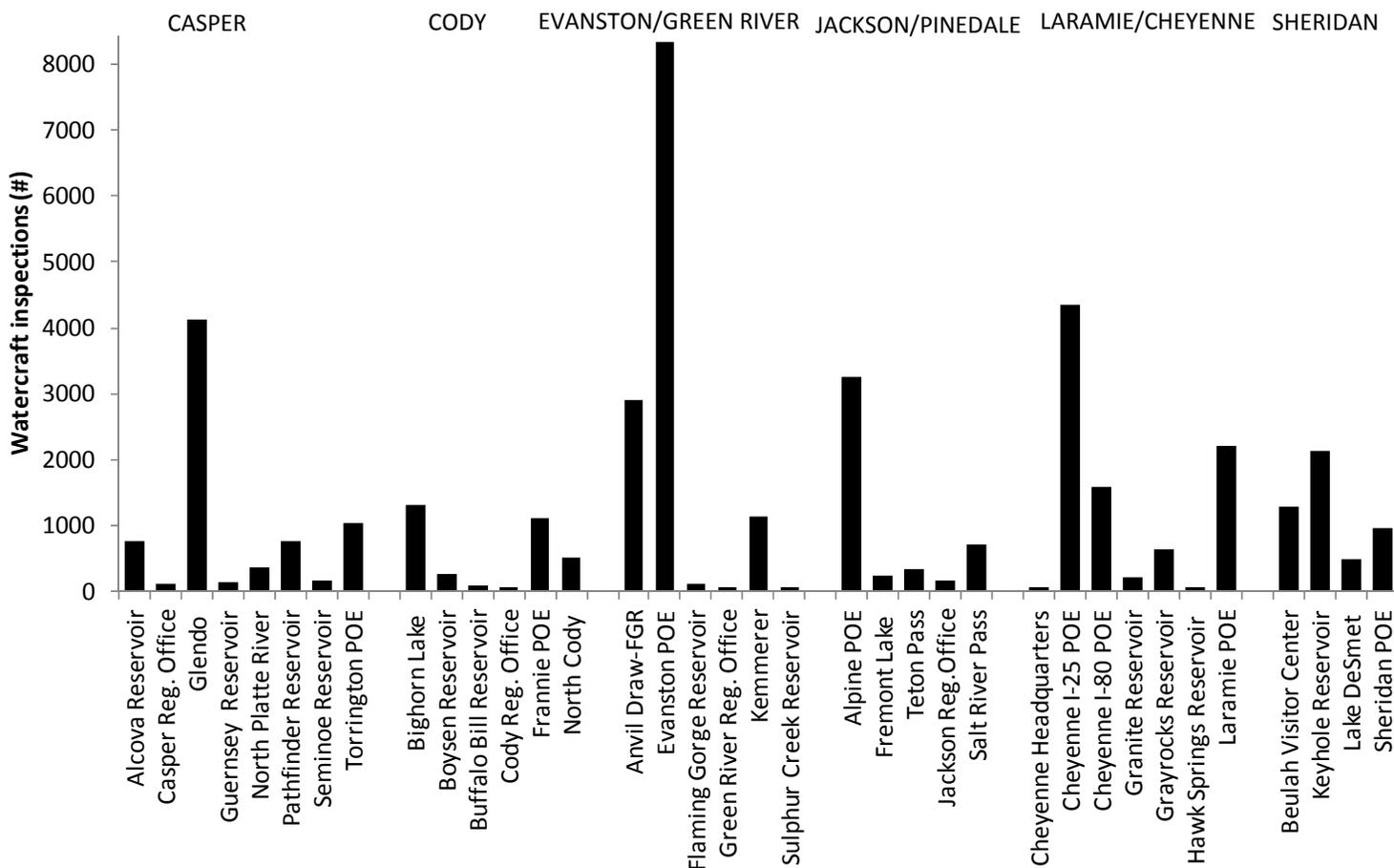


Figure 2. Total watercraft inspections by check station during 2016. Locations with fewer than 50 inspections are not included in the graph and are referenced in Table 1.

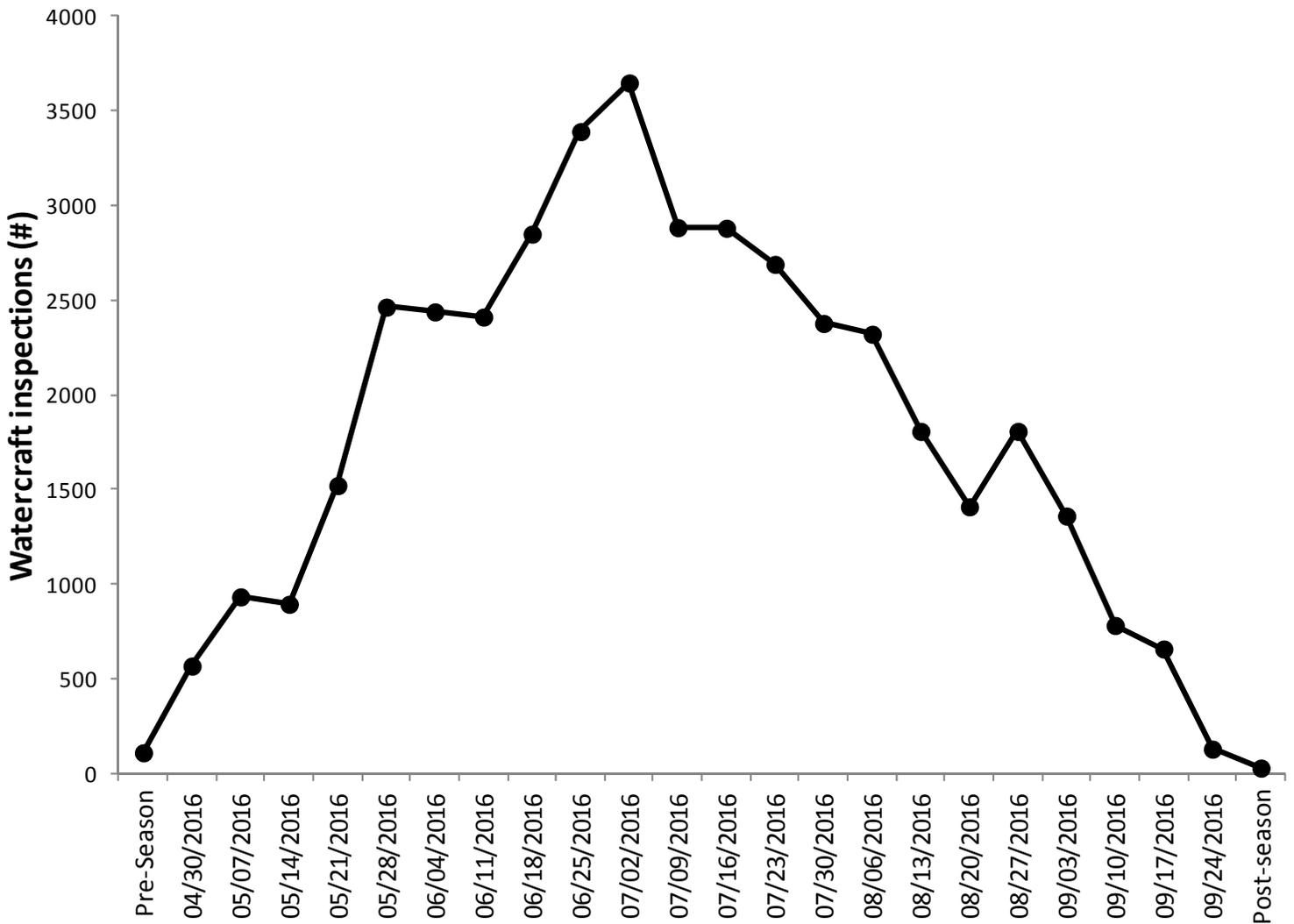


Figure 3. Weekly watercraft inspection totals at all waters during 2016 including pre-season (prior to April 30) and post-season (after September 25) inspections.

A total of 3,513 watercraft (8.2% of the total) entered a check station with an intact seal, indicating the watercraft had been previously inspected. All watercraft must display an aquatic invasive species decal prior to launch in Wyoming waters. A total of 8,466 (27.9%) of watercraft next launching in Wyoming did not have a valid AIS decal at the time of inspection.

The majority of watercraft at the inspection station were motorized (72.0%), with lesser non-motorized use (28.0%). The majority of motorized watercraft were outboard (34.2%), followed by inboard/outboard (22.5%), personal watercraft (7.2%), inboard (6.0%), and jet boats (2.0%). Based on registration state of inspected watercraft or trailer, inspection of resident boats (37.8%) was much lower than non-resident boats (62.2%). The majority of nonresident use came from watercraft registered in Utah (23.0%), Colorado (18.5%), Montana (4.6%), Idaho (4.0%), and Nebraska (1.6%; Figure 4). Watercraft were registered in 49 states (none were registered in Hawaii), and 2 Canadian provinces (Alberta and Ontario). Of all registered watercraft through the inspection station, 72.15% were inspected one-time, whereas 27.9% were repeat boaters who had been through an inspection station more than one time during the season. The greatest number of repeat visits was a Colorado registered watercraft that had been through three different check stations during the season on 23 different days.

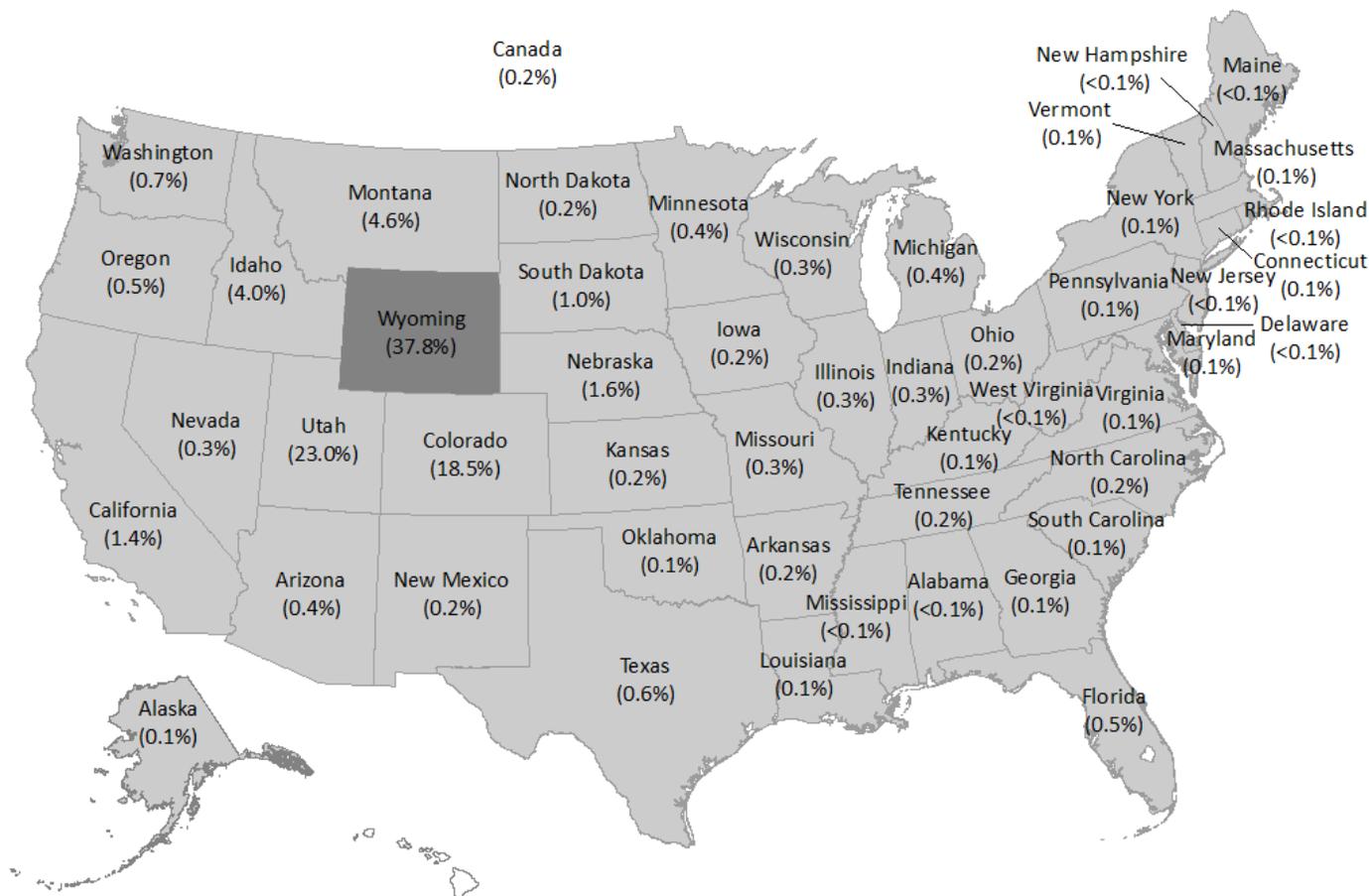


Figure 4. Map indicating registration of watercraft or trailer (state and percent of total) inspected during 2016.

The top ten waters boaters had last been at prior to inspection include Flaming Gorge Reservoir, UT/WY (10.8%), followed by Glendo Reservoir, WY (7.7%); Keyhole Reservoir, WY (5.3%); Big Horn Lake, WY/MT (4.0%); Snake River, WY/ID (3.3%); Grayrocks Reservoir, WY (3.2%); Palisades Reservoir, WY/ID (2.5%); Alcova Reservoir, WY (2.4%); Pathfinder Reservoir, WY (1.9%), and the Green River, WY (1.9%). Boaters indicated they had been to 1,799 different waters in 49 states, 3 Canadian provinces (Alberta, British Columbia, Saskatchewan), Mexico, and Australia, prior to inspection in Wyoming. Of those, Utah, Colorado, Idaho, Montana, and Nebraska received the highest visitation. Overall, 52.5% of watercraft inspected were last used out of state. Most boats originating from out of state came from waters close to the Wyoming border (Figure 5).

Of the last waters visited, 593 are considered suspect or positive for zebra/quagga mussels with the greatest use from Lake Powell, UT/AZ (496 inspections; 1.3% of total watercraft inspected); Deer Creek Reservoir, UT (281 inspections; 0.7%); Colorado River (198 inspections; 0.5%); Pueblo Reservoir, CO (159 inspections; 0.4%), White River, IN (58 inspections; 0.25); Lake Havasu CA/AZ (47 inspections; 0.1%), Lake Mead, NV (34 inspections; 0.1%); and Lake of the Ozarks, MO (21 inspections; 0.1%; Figure 5). A total of 2,479 inspections (6.6% of total) were conducted on watercraft that were last used on a water considered to be positive for zebra or quagga mussels; over half of those had been at the positive water within the last month.

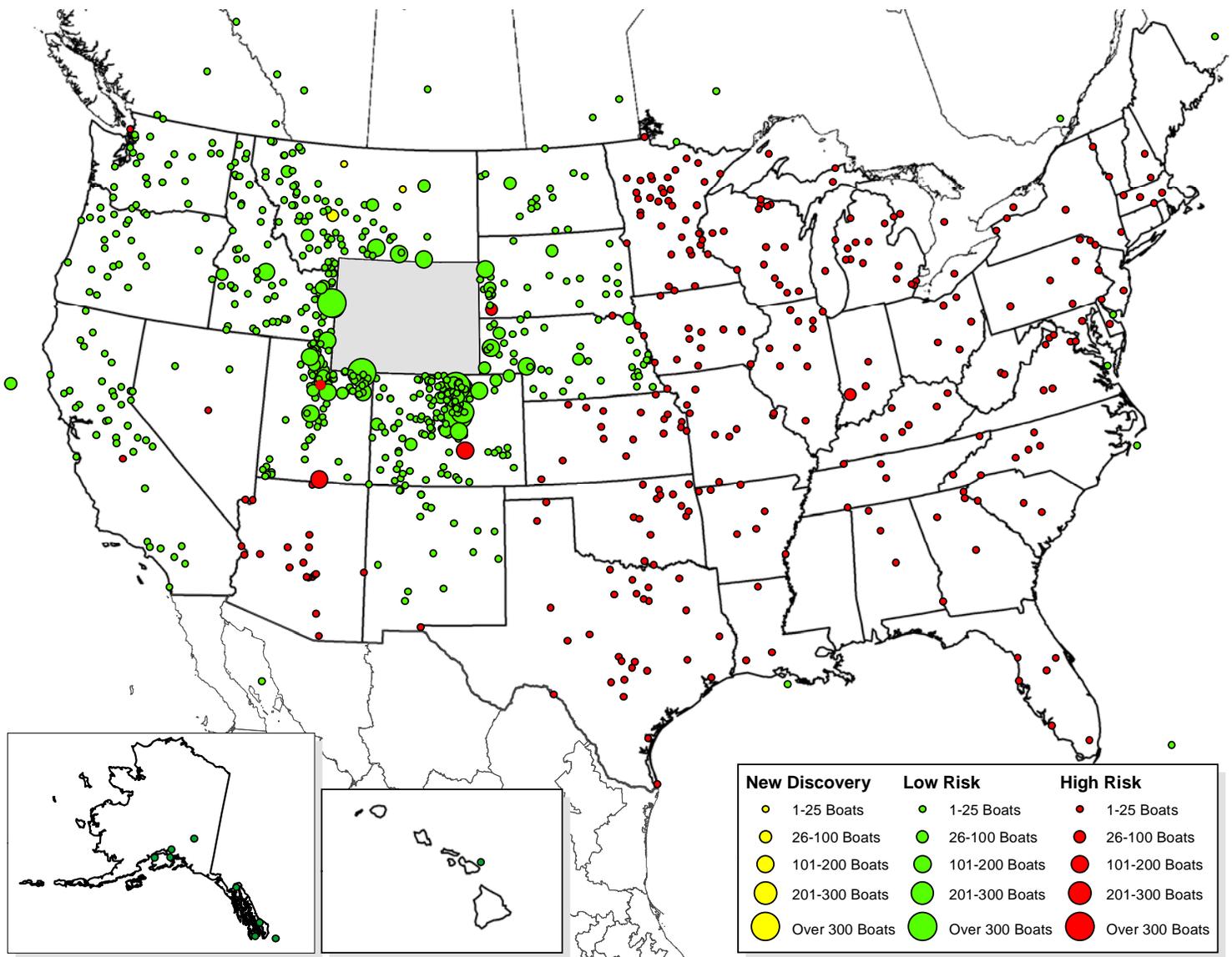


Figure 5. Map indicating origin of watercraft bound for Wyoming that were last used out of state and inspected at a permanent check station during 2016. New discovery indicates a water that was confirmed for zebra/quagga mussels during the 2016 boating season.

When boaters were asked where their destination (next water) was going to be the majority (71.5%) indicated they were planning to launch in Wyoming. The top ten destination waters included Flaming Gorge Reservoir, WY/UT (18.4%); Glendo Reservoir (14.1%); Keyhole Reservoir, WY (6.4%); Big Horn Lake, WY (5.9%); Snake River, WY/ID (4.3%); Grayrocks Reservoir, WY (4.2%); Bear Lake, ID/UT (4.0%); Alcova Reservoir, WY (2.4%); North Platte River, WY (2.3%), and Jackson Lake, WY (2.3%). A small percentage of boaters (0.8%) indicated they would be visiting a suspect/positive water next with the majority visiting Angostura Reservoir, SD or Lake Powell, UT/AZ.

MONITORING

Monitoring was conducted on 93 waters in 2016 including 66 lakes or reservoirs and 27 streams or rivers (Figure 6). Plankton tows and water quality surveys were conducted at 284 sites on 66 waters to detect larval (veliger) mussels and to document temperature, pH, dissolved oxygen, conductivity, water clarity, calcium and hardness. Shoreline surveys were conducted at 173 sites on 85 waters to detect juvenile and adult mussels, crayfish, clams, snails, and aquatic plants.

Plankton tow samples are sent to the Bureau of Reclamation Lab in Colorado or the Montana Fish, Wildlife and Parks Lab (MTFWP) to be analyzed by cross-polarized light microscopy. If a positive or a suspected positive result occurred from microscopy, the samples are sent to an independent lab for DNA analysis. Specimens detected during shoreline surveys are analyzed by the Colorado Wildlife and Parks Animal Health Lab and plant samples are identified by the MTFWP Aquatic Plant Specialist.

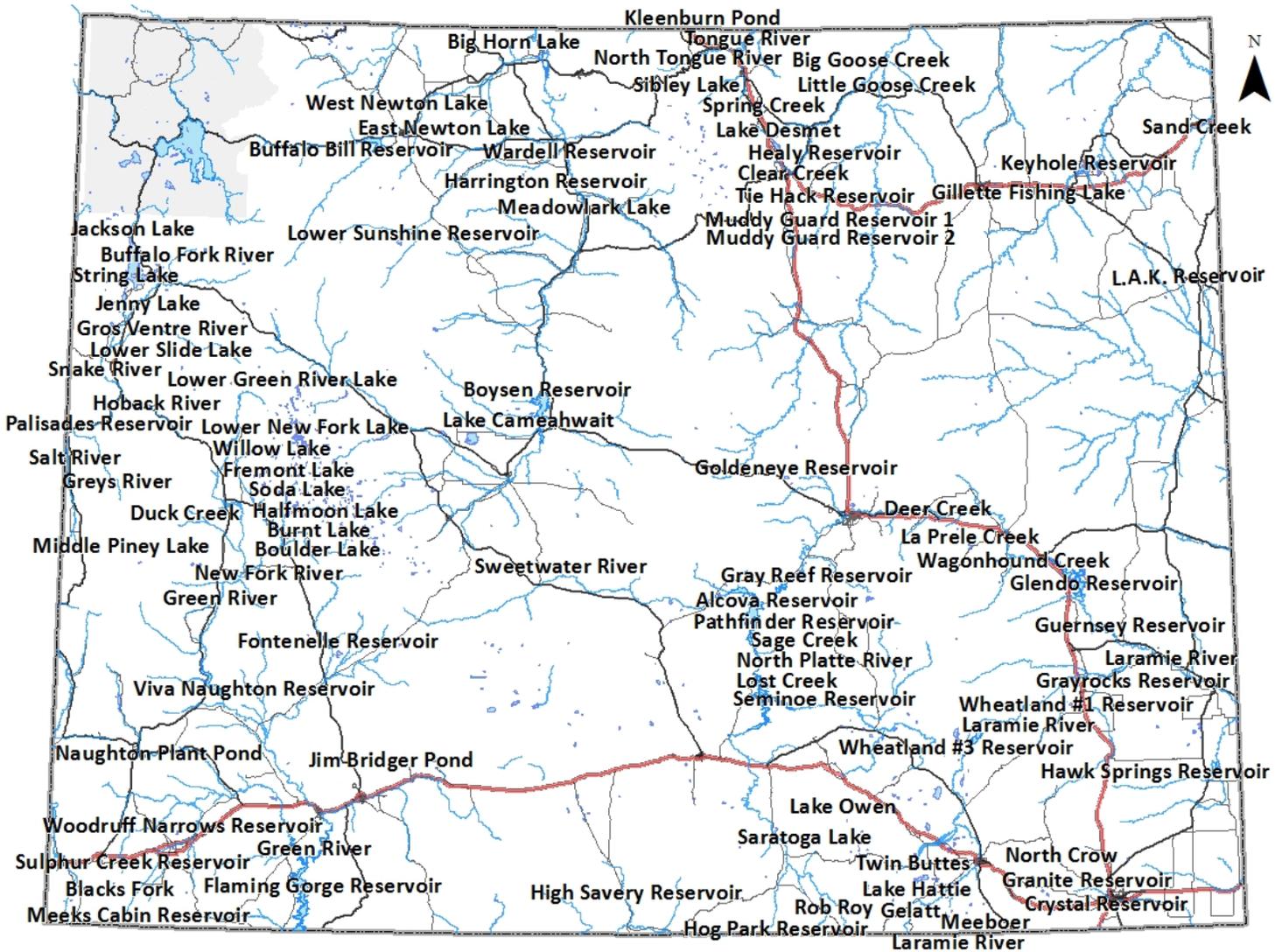


Figure 6. Map of 2016 monitoring locations.

No zebra or quagga mussels were detected by plankton tow monitoring or shoreline surveys in 2016 (Table 2). Current AIS populations in Wyoming include New Zealand mudsnails, Asian clam, rusty crayfish, and curly pondweed (Table 2).

Existing Aquatic Invasive Species in Wyoming

Sampling of existing populations of invasive species in Wyoming is conducted annually to monitor known populations and determine whether populations have spread.

Asian clams were first detected in the Laramie River in 2011 (Table 2). Asian clams were found at Tunnel Road, Monolith and Jelm access points to the river (Figure 7). In 2013, surveys found the highest concentration of Asian clam at Monolith, as far away from the access as one-half mile upstream. Additionally, Asian clams were observed at the Tunnel Road Bridge. Asian clams were also detected in the main stem of the North Platte River in 2013, downstream from Guernsey Reservoir. Asian clam shells were found near Optimist Park access point, however, no live clams were found there and the shells were sparsely distributed. No additional populations were detected in 2016.

Brook stickleback are currently widespread throughout Wyoming's warmer water streams (Figure 7). No additional monitoring was conducted in 2016.

Curly Pondweed was first found in Wyoming in 2011 in Lake DeSmet (Table 2). It was subsequently found in additional waters including Keyhole and Boysen reservoirs. Curly pondweed was also detected in the North Platte River between Kortez Reservoir and Pathfinder Reservoir, a section of river called the Miracle Mile, and at New Fork Lake at the constriction between upper and lower New Fork Lake. Curly pondweed was detected in the Shoshone River for the first time in 2014 (Figure 7).

New Zealand mudsnails were first found in the Snake River in 1999 (Table 2). This population still persists, and populations have since been found in Polecat Creek, Bighorn River, Shoshone River, and Lake Cameahwait (Figure 7). A single New Zealand mudsnail was found in the Salt River in 2015. Sampling in 2016 did not find any mudsnails.

Rusty crayfish were first found in Wagonhound Creek, a North Platte River tributary, in 2006 (Table 2). Several eradication efforts have been conducted since that time. The North Platte River was sampled for crayfish above and below the confluence with Wagonhound Creek in 2014 and no crayfish were detected. Sampling in 2016 near the North Platte River confluence did not find any evidence of rusty crayfish (Figure 7).

Table 2. Status of waters sampled in 2016 and detection year of AIS.

Water	Zebra/Quagga Mussels	Other Invasive Species
<i>Lakes and Reservoirs</i>		
Alcova Reservoir	Negative	None
Beck Lake	Negative	None
Big Horn Lake	Negative	None
Big Sandy Reservoir	Results Pending	None
Boulder Lake	Negative	None
Boysen Reservoir	Negative	Curly pondweed (2013)
Buffalo Bill Reservoir	Negative	None
Burnt Lake	Negative	None
Crystal Reservoir	Negative	None
East Newton Lake	Negative	None
Flaming Gorge Reservoir	Negative	None
Fontenelle Reservoir	Negative	None
Fremont Lake	Negative	None
Gelatt Lake	Negative	None
Gillette Fishing Pond	Not Tested	None
Glendo Reservoir	Negative	None
Goldeneye Reservoir	Not Tested	None
Granite Reservoir	Negative	None
Gray Reef Reservoir	Not Tested	None

Grayrocks Reservoir	Negative	None
Water	Zebra/Quagga Mussels	Other Invasive Species
Guernsey Reservoir	Negative	None
Halfmoon Lake	Negative	None
Harrington Reservoir	Negative	None
Hawk Springs Reservoir	Negative	None
Healy Reservoir	Negative	None
High Savery Reservoir	Negative	None
Hog Park Reservoir	Negative	None
Jackson Lake	Negative	None
Jenny Lake	Results Pending	None
Jim Bridger Pond	Results Pending	None
Keyhole Reservoir	Negative	Curly pondweed (2013)
Kleenburn Pond	Not Tested	None
LAK Reservoir	Negative	None
Lake Cameahwait	Not Tested	New Zealand mudsnail (2014)
Lake DeSmet	Negative	Curly pondweed (2011)
Lake Hattie	Negative	None
Lake Owen	Negative	None
Lower Green River Lake	Negative	None
Lower Slide Lake	Negative	None
Lower Sunshine Reservoir	Negative	None
Meadowlark Lake	Negative	None
Meeboer Lake	Negative	None
Meeks Cabin Reservoir	Negative	None
Middle Piney Lake	Negative	None
Muddy Guard #1 Reservoir	Negative	None
Muddy Guard #2 Reservoir	Negative	None
Naughton Plant Pond	Negative	None
New Fork Lake	Negative	Curly pondweed (2012)
Palisades Reservoir	Negative	None
Pathfinder Reservoir	Negative	None
Pilot Butte Reservoir	Negative	None
Rob Roy Reservoir	Negative	None
Saratoga Lake	Results Pending	None
Seminole Reservoir	Negative	None
Sibley Lake	Negative	None
Soda Lake	Negative	None
String Lake	Results Pending	None
Sulphur Creek Reservoir	Negative	None
Tie Hack Reservoir	Negative	None
Twin Buttes Reservoir	Results Pending	None
Upper North Crow	Negative	None
Viva Naughton Reservoir	Negative	None
Wardell Reservoir	Negative	None
West Newton Lake	Negative	None
Wheatland Reservoir #1	Negative	None
Wheatland Reservoir #3	Negative	None
Willow Lake	Negative	None
Woodruff Narrows	Negative	None
Yellowstone Lake	Negative	None
<i>Streams and Rivers</i>		
Blacks Fork	Not Tested	None
Bighorn River	Not Tested	New Zealand mudsnail (2012)

Buffalo Fork River	Not Tested	None
Water	Zebra/Quagga Mussels	Other Invasive Species
Clear Creek	Not Tested	None
Deer Creek	Not Tested	None
Duck Creek	Not Tested	None
Green River	Not Tested	None
Greys River	Not Tested	None
Gros Ventre River	Not Tested	None
Hoback River	Not Tested	None
La Prele Creek	Not Tested	None
Laramie River	Not Tested	Asian clam (2011)
Little Goose Creek	Not Tested	None
Lost Creek	Not Tested	None
New Fork River	Not Tested	None
North Platte River	Not Tested	Curly pondweed (2012 @ Miracle Mile) Asian clam (2012 @ Downstream)
North Tongue River	Not Tested	None
Polecat Creek	Not Tested	New Zealand mudsnail (2001)
Sand Creek	Not Tested	None
Sage Creek	Not Tested	None
Salt River	Not Tested	New Zealand mudsnail (2015)*
Shoshone River	Not Tested	Curly pondweed (2014)
Snake River	Not Tested	New Zealand mudsnail (1999)
Spring Creek	Not Tested	None
Sweetwater River	Not Tested	None
Tongue River	Not Tested	None
Wagonhound Creek	Not Tested	Rusty crayfish (2006)

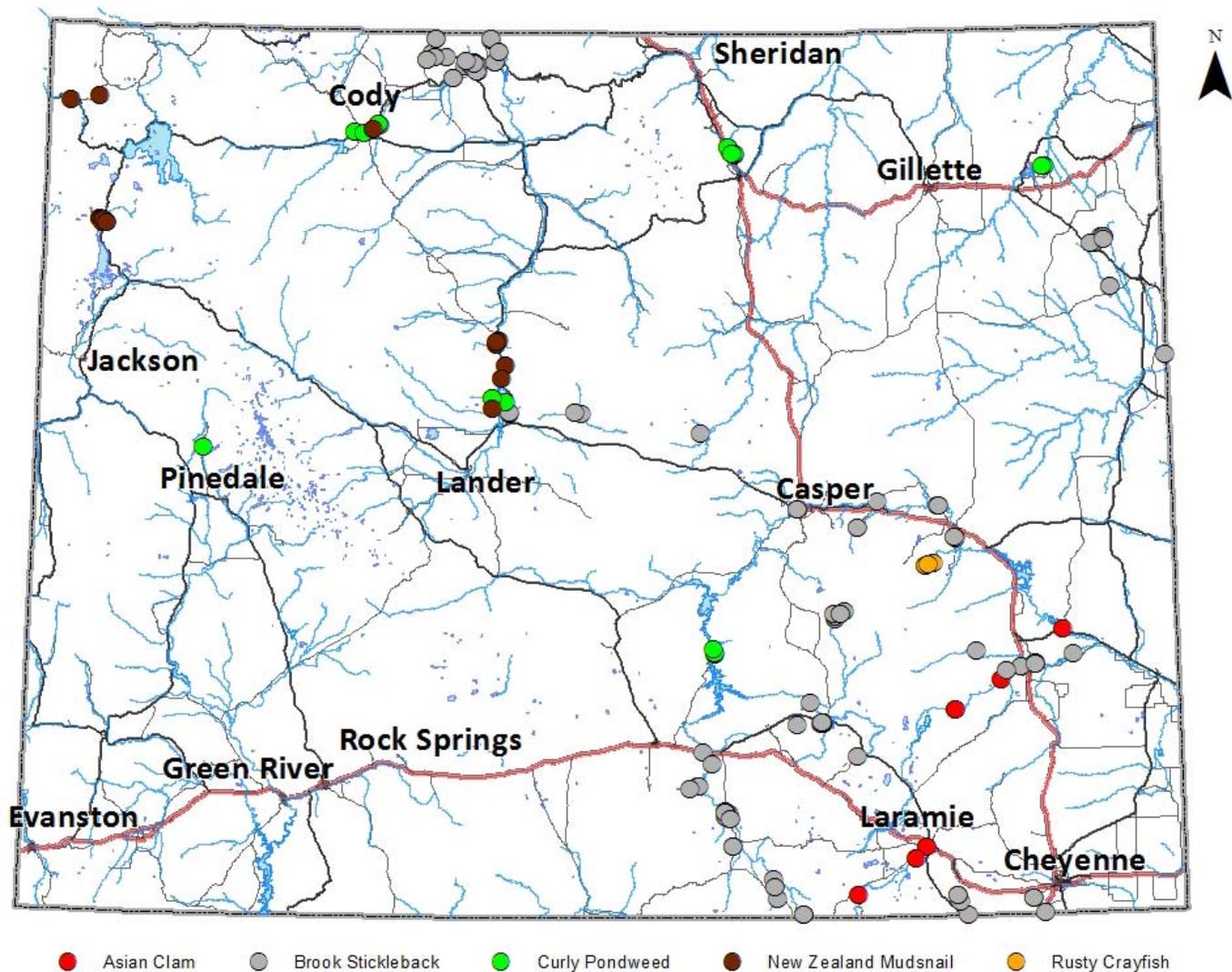


Figure 7. Distribution of aquatic invasive species populations in Wyoming as of 2016.

FUNDING

The Wyoming AIS program is funded through a 2-year legislative appropriation and from monies generated from the sale of the mandatory AIS decal required of all watercraft before launch. Decal revenues are used to offset the amount of money appropriated by the Wyoming legislature. The total AIS program budget for fiscal years 2015 and 2016 was \$2.6 million.

In 2016, a total of 43,278 decals were sold resulting in receipt of \$665,940 (Table 3). Of the resident motorized decals sold, 5,981 (\$179,430) were three-year decals. Sales of nonresident non-motorized and resident non-motorized decals increased from 2015 (Table 3).

Table 3. Type, count, and monies generated from AIS decals sold in 2016 compared to 2015.

Decal type	Count		Sales	
	2015	2016	2015	2016
Resident Motorized	17,409	15,634	\$301,790	\$275,960
Resident Non-motorized	11,424	13,379	\$57,120	\$66,895
Nonresident Motorized	7,354	7,274	\$220,620	\$218,220
Nonresident Non-motorized	5,967	6,991	\$89,505	\$104,865
TOTAL	42,154	43,278	\$669,035	\$665,940