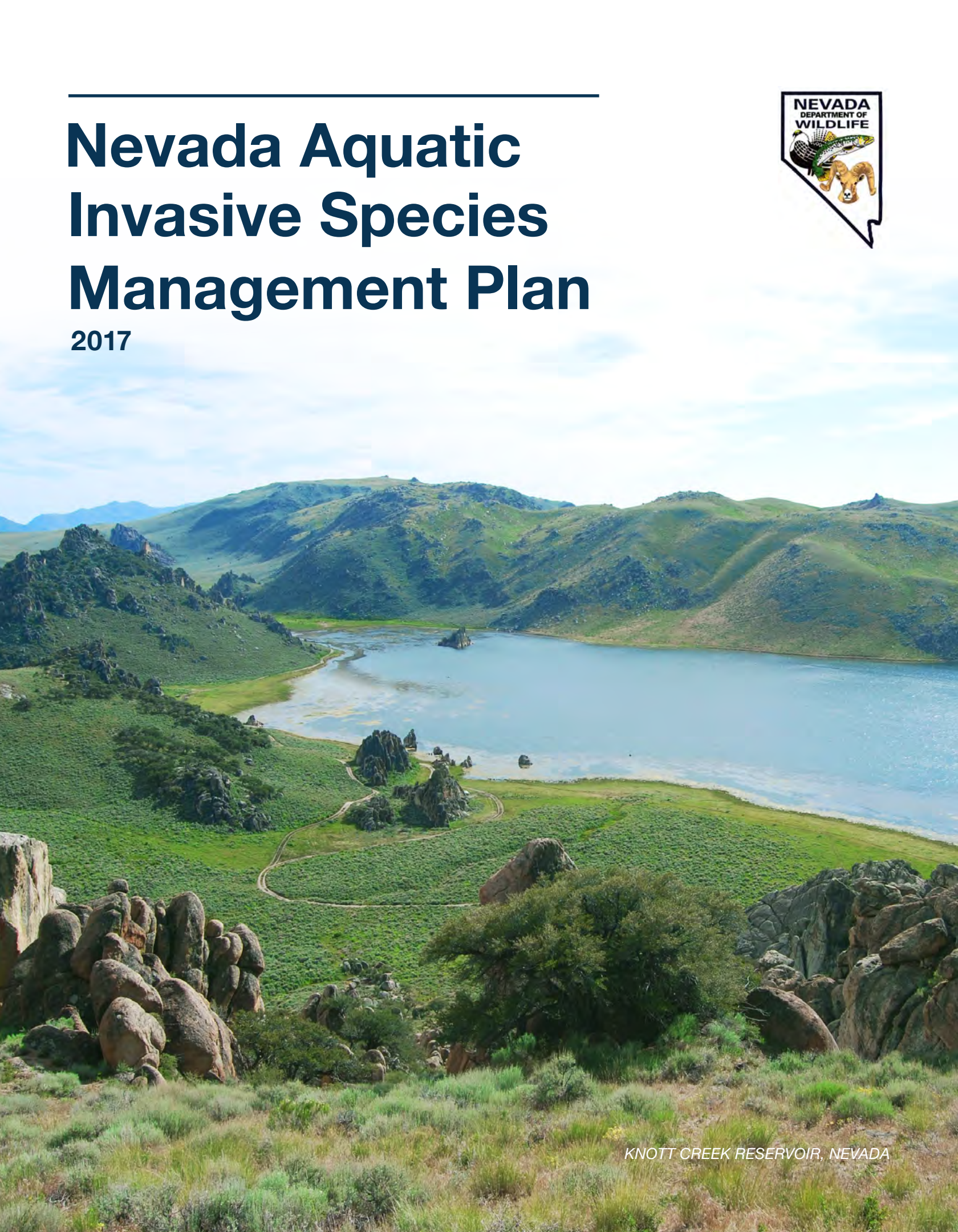
Nevada Aquatic Invasive Species Management Plan

2017



KNOTT CREEK RESERVOIR, NEVADA

This Aquatic Invasive Species Management Plan is part of a multi-stakeholder collaboration with the Nevada Department of Wildlife, and Nevada agencies and organizations and with input from the general public.

LAKE MEAD, NEVADA

This product was prepared by:

ISAN
INVASIVE SPECIES ACTION NETWORK

Suggested citation: Nevada Department of Wildlife. 2017
Nevada Aquatic Invasive Species Management Plan.
Reno. Pp 106.

State of Nevada
BRIAN SANDOVAL, GOVERNOR

Signature — Date: 9/28/17

State of Nevada
TONY WASLEY, DIRECTOR, NEVADA DEPARTMENT OF WILDLIFE

Signature — Date: 8/8/17

State of Nevada
GRANT WALLACE, CHAIRMAN, BOARD OF WILDLIFE COMMISSIONERS, NEVADA DEPARTMENT OF WILDLIFE

Signature — Date: 8/8/17

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS

AIS	Aquatic Invasive Species
ANS	Aquatic Nuisance Species
ANSTF	Aquatic Nuisance Species Task Force
APHIS	USDA Animal and Plant Health Inspection Service
BIA	US Bureau of Indian Affairs
BLM	US Bureau of Land Management
BOR	US Bureau of Reclamation
DOI	US Department of Interior
EDRR	Early Detection, Rapid Response
EIP	Environmental Improvement Project
EPA	US Environmental Protection Agency
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
FWS	US Fish and Wildlife Service
ISAC	Invasive Species Advisory Committee
HACCP	Hazard Analysis and Critical Control Point
LMNRA	Lake Mead National Recreation Area
NEPA	National Environmental Policy Act
NISA	National Invasive Species Act
NISC	National Invasive Species Council
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Service
NBWC	Nevada Board of Wildlife Commissioners
NDA	Nevada Department of Agriculture
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDEP	Nevada Division of Environmental Protection
NDF	Nevada Division of Forestry
NDSL	Nevada Division of State Lands
NDSP	Nevada Division of State Parks
NANPCA	Nonindigenous Aquatic Nuisance Prevention and Control Act
PSMFC	Pacific States Marine Fisheries Commission
PLPT	Pyramid Lake Paiute Tribe
SNWA	Southern Nevada Water Authority
TRCD	Tahoe Resource Conservation District
TRPA	Tahoe Regional Planning Agency
UNR	University of Nevada, Reno
UNLV	University of Nevada, Las Vegas
USACE	US Army Corps of Engineers
USCG	US Coast Guard
USDA	US Department of Agriculture
USDAFS	US Department of Agriculture - Forest Service
USDHS	US Department of Homeland Security
USGS	US Geological Survey
WGA	Western Governors' Association
WRP	Western Regional Panel on Aquatic Nuisance Species

EXECUTIVE SUMMARY

Nevada has been affected by a number of significant invasive species in recent decades, but none more devastating than the quagga mussel. The 2007 discovery of quagga mussels in Lake Mead catapulted the west and Nevada into action. Watercraft inspection programs have been the primary focus in containing regional mussel populations on the lower Colorado River system. Nevada's watercraft decal program has been used as a tool to engage people in Aquatic Invasive Species (AIS), and provide support to Nevada Department of Wildlife AIS program. Expanding AIS management to address additional vectors and specific species of concern are now on the horizon. The implementation of a 5 year AIS Management Plan will help guide Nevada in future actions to address AIS.

The purpose of the plan is to address the management of AIS of Nevada in a comprehensive realistic approach to minimize AIS impacts within the state and regionally. The plan focuses on the species that have significant potential to invade or spread within the state and regionally, and create economic, ecological and recreational damage to Nevada's waters.

The goals of the AIS Management Plan are to:

- Prevent new introductions of AIS to Nevada
- Limit the spread of existing AIS populations in Nevada, and eradicate or control AIS populations when possible
- Minimize harmful ecological, economic, social, and public health impacts that result from AIS

Broad objectives of Oversight and Coordination; Prevention; Outreach and Education; Monitoring, Early Detection and Rapid Response; Long-term Control; and Laws and Regulations were identified to achieve the goals of the plan. Detailed strategies and actions were then developed to achieve the objectives. The 5 strategies and 13 actions listed here have been selected from the complete list located in the Implementation Table and are considered of priority. These strategies and actions are not in any particular order of importance. In addition, the code preceding each strategy and action link to the Implementation Table located on page 54.

Strategy A.3: Establish and coordinate an interagency and stakeholder Nevada AIS Plan Implementation Team.

Action A.3.1: Prioritize and implement AIS management efforts as identified by the Nevada AIS Plan Implementation Team and priority species identified in Appendix B.

Strategy B.1: Identify and categorize potential new pathways and risk of AIS introductions when appropriate to minimize and eliminate introductions.

Action B.1.1: Coordinate with stakeholders, neighboring states, federal, and local agencies, and academia and field biologists to identify risk and pathways of new species introductions.

Action B.1.4: Generate species specific actions for prevention and/or control for species with high risk levels of introduction as defined in Appendix B.

Action B.1.7: Develop and implement an outreach and educational campaign targeting the aquarium and pet store industry to facilitate the prevention of AIS releases and introductions.

Strategy B.2: Continue the implementation of a watercraft inspection and decontamination program.

Action B.2.1: Employ a statewide watercraft inspection station supervisor.

Action B.2.2: Coordinate and establish inspection station reciprocity, where appropriate, with regional and interstate partners.

Action B.2.7: Ensure funding opportunities are evaluated and proposals submitted in a timely fashion to

establish effective and stable watercraft inspection and decontamination program elements.

Action B.2.8: Ensure adequate support staff, equipment and supplies are available to implement watercraft inspection and decontamination station training and operation.

Strategy C.1: Develop and implement outreach and education strategies that target major pathways of introduction and reflect regional themes including but not limited to the Boater Safety Program.

Action C.1.1: Collaborate with stakeholders, western states and other local entities to define major pathways and develop consistent regional outreach and education efforts, as appropriate.

Strategy D.1: Create a comprehensive early detection and monitoring program for species that have a high risk of introduction to waters of the state in collaboration with stakeholders as appropriate. Program evaluation and adaptive management, and climate change impacts are strong components of this effort.

Action D.1.1: Review and recommend use of appropriate risk assessment when a new AIS species is detected in the state.

Action D.1.4: Facilitate the use of consistent and effective monitoring, sampling protocols and laboratory analysis methods among stakeholders.

Action D.1.6: Coordinate with other agencies to establish monitoring locations and methodologies.

Action D.1.10: Develop measurement tools and criteria to evaluate and assess monitoring methodology and prevention program strengths and weaknesses.

Gathering momentum and increased involvement from key stakeholders in AIS issues of Nevada will be critical for the success in implementing the plan. With continued coordination and improved information sharing among state, federal, tribal and other partners, Nevada will address aspects of AIS prevention, monitoring, and control. Coordination with western partners and a Nevada AIS Management Plan Implementation Team will ensure that this plan remains relevant and minimizes duplication of effort. As AIS management programs continue to evolve across the west, developing ways to work collaboratively between partners will help improve watercraft inspection programs and build on other programmatic efforts. Specifically, taking steps to create reciprocity between interstate agencies and key partners within watercraft inspection programs will improve watercraft owner experience and streamline management efforts.

Finally, as the impacts of climate change are realized, this plan acknowledges that management actions currently identified may need to be adjusted or adapted. Proactive measures taken now by partners in Nevada will help ensure that natural resources and recreational amenities are protected for future use.

INTRODUCTION

The introduction and spread of AIS have caused considerable ecological and economic harm globally (Pimentel et al. 2004). While humans have introduced many species intentionally for specific purposes or uses, many species have been introduced unintentionally that affect regional ecosystems and economies. Per Nevada Revised Statute (Nevada Revised Statute 503.597), AIS are defined as an aquatic species which is exotic or not native to this State and which the Commission has determined to be detrimental to aquatic life, water resources or infrastructure for providing water in this State. Invasive species are defined as, a non-native organism whose introduction causes or is likely to cause economic or environmental harm or harm to human, animal or plant health, with respect to a particular ecosystem (Executive Order 13751 2016). The Aquatic Nuisance Species Task Force (ANSTF) further describes aquatic species as, all animals and plants as well as pathogens and parasites of aquatic animals and plants totally dependent on aquatic ecosystems for at least a portion of their life cycle (Aquatic Nuisance Species Task Force 1994). AIS can be plants, animals or microbes not native to North America, the western United States, or the State of Nevada.

The discovery of the aquatic invasive quagga mussels (*Dreissena rostriformis bugensis*) in Lake Mead National Recreation Area (LMNRA) in 2007 was an important point in AIS management in Nevada. Prior to this discovery, the management of AIS was not fully addressed and a formal Nevada statewide program did not exist. Since 2007, quagga mussels have been found throughout the lower Colorado River Basin. It is estimated that the economic impact from quagga mussels within the lower Colorado River system related to Bureau of Reclamation (BOR) projects is approximately $1 million annually (L. Willett, BOR, personal communication). This economic impact is a reflection of infrastructure management at dam facilities to control quagga mussels. Since 2007, important new partnerships have been initiated to respond to this highly invasive species. Working relationships among Nevada Department of Wildlife (NDOW), the National Park Service's LMNRA, Pacific States Marine Fisheries Commission (PSMFC), Tahoe Regional Planning Agency (TRPA), the US Fish and Wildlife Service (FWS), the Western Regional Panel on ANS (WRP) and others have been forged to address the prevention and spread of AIS, including quagga mussels.

PLAN PURPOSE

The purpose of the plan is to address the management of AIS in Nevada in a comprehensive realistic approach to minimize AIS impacts regionally. This plan focuses on the species that have significant potential to invade or spread regionally, and create economic, ecological and recreational damage to Nevada's waters. This includes species that have already been introduced into Nevada. With continued coordination and improved information sharing among state, federal, tribal and other partners, Nevada will address aspects of AIS prevention, monitoring, and control. Further, as the impacts of climate change are realized, this plan acknowledges that management actions currently identified may need to be adjusted or adapted.

The goals of the plan are to:

- Prevent new introductions
- Limit the spread of existing AIS and eradicate AIS when possible
- Minimize harmful ecological, economic, social and public health impacts

Specific objectives and strategies within this plan developed by way of stakeholder consensus will support statewide efforts in Nevada to protect, preserve and manage the unique aquatic resources of the State for the benefit of all.

PLAN DEVELOPMENT

This is the first Nevada AIS Management Plan to be developed. In the spring of 2016, NDOW initiated a contract to assist in the physical production of this document. The selected contractor, Invasive Species Action Network, worked closely with NDOW staff throughout the development process. Further, the development of an AIS management plan requires the input and expertise of a variety of state, federal, non-governmental entities and other stakeholders. The perspective from multiple entities ensures that a full suite of issues can be observed and a variety of strategies can be considered in their management. The Nevada AIS Management Plan was developed by the Nevada Aquatic Invasive Species Management Plan Working Group (see Appendix A for additional detail), a consensus built stakeholder team. With contributions via face to face meetings, conference calls and other correspondence from these stakeholders, a plan was created that reflects the needs of Nevada. The Nevada Aquatic Invasive Species Management Plan Working Group includes the following entities:

- Carson Water Subconservancy District
- Invasive Species Action Network
- Nevada Department of Agriculture
- Nevada Division of State Lands
- Nevada Division of State Parks
- Nevada Department of Wildlife
- Nevada Division of Environmental Protection
- Nevada Natural Heritage Program
- Pyramid Lake Paiute Tribe
- Southern Nevada Water Authority
- Tahoe Regional Planning Agency
- US Bureau of Land Management
- US Forest Service, Humboldt-Toiyabe Forest
- US Fish and Wildlife Service, Region 8 Pacific Southwest
- US Environmental Protection Agency
- US National Park Service, Lake Mead National Recreation Area
- University of Nevada- Reno

The process to solicit public comment was conducted through the Nevada Wildlife Commission. Public review of the plan is pursuant to the Nevada Revised Statute 241.020 and includes public notifications to sixteen county advisory boards and one independent city wildlife advisory board in addition to the Nevada Wildlife Commission. Agenda items were posted online at the county and state level in addition to posting at various office locations throughout the state in May 2017. Public and board member comments were encouraged during commission meetings. The process to solicit comments was repeated for the August 2017 monthly meeting prior to the adoption of the plan by the Nevada Wildlife Commission. This process provides a reflection of diverse perspectives from across Nevada. Additionally, the ANSTF completed a preliminary review of the plan which provided additional guidance to improve it.

Public comments received are summarized in (Appendix J). All comments were addressed or incorporated in the final document. In some circumstances a response of explanation is provided. Internal scientific review by multiple NDOW biologists also contributed to development of the plan (Appendix A).

Finally, the Lake Tahoe AIS Management Plan was referenced often in the development of the Nevada AIS Management Plan, not only for regional consistency, collaboration building, but as a model management plan. There may be a need for minor amendments to Lake Tahoe AIS Management Plan to reflect the completion and continued coordination between TRPA and NDOW into the future.

PRIORITIZING MANAGEMENT

The approach to manage invasive species combines a focus on individual species and specific pathways of introduction or spread. There are a number of AIS already established within Nevada waters. There are significant populations of quagga mussels, a high management priority, in the Lower Colorado River, including Lake Mead and Lake Mohave. A wide range of invasive species have been documented in Nevada but not all represent a high management priority. Some of the species of high management priority include; zebra mussels (*Dreissena polymorpha*), Eurasian watermilfoil (*Myriophyllum spicatum*), curly leaf pondweed (*Potamogeton crispus*), and northern pike (*Esox lucius*). There are additional AIS that pose a threat to Nevada's ecosystems and economy, some of which are present and some which have not yet been documented in Nevada (Appendix B and C). Invasive species in neighboring states as well as species suitable for establishment in Nevada are all considerations for management priority.

Examining possible pathways for species introduction is an important aspect of prevention management. There are a variety of pathways identified as means to protect Nevada from the introduction and spread of AIS. Western regional AIS management programs have focused on recreational boating as a primary pathway and consequently comprehensive boat inspection and decontamination protocols have been developed. NDOW currently implements a boat inspection and decontamination program (Appendix D). Additionally, the TRPA conducts an inspection and decontamination program in the Lake Tahoe Basin. Other pathways of interest for managers in Nevada include aquatic pet release, industrial construction, aquaculture and other sectors of recreation such as hunting, fishing, and scuba diving. Exploration of species and pathways of concern have guided this management plan.

GEOGRAPHIC SCOPE

This plan is applicable to surface waters of the state. The arid landscape and extreme environmental conditions of Nevada (average annual rainfall of less than 10 inches) foster uniquely adapted species of wildlife and plants. Surprising to many is that Nevada is the most mountainous state in the lower 48. The topography is characterized by high elevation mountain ranges (the highest point being Boundary Peak at 13,140 feet above sea level) that alternate with low elevation basins (the lowest point being the Colorado River at 479 feet above sea level) with significant variation in vegetation among basins. Five basins divide the state; Sierra Nevada Basin, Central Basin (Great Basin), Mojave Basin, Northern Basin, Arizona/New Mexico Plateau (Figure 1). The Sierra Nevada Basin is representative of the Lake Tahoe region on the western border. The watersheds in the Central and Mojave Basins at the southern end of the state drain into the Colorado River and the Northern Basin drains north into the Snake River Basin.

Nevada lies almost completely within the geographic boundaries of the Great Basin. The Great Basin is a hydrologic designation where precipitation evaporates, sinks underground or flows into lakes. The state is further divided among 14 major hydrographic basins (Figure 2) that include approximately 14,988 miles of freshwater perennial rivers and streams, and 126,257 miles of intermittent/ephemeral streams and channels, 1,782 miles of ditches and canals and 551 border miles of shared rivers (Nevada Division of Environmental Protection (NDEP) 2004). The major rivers of Nevada include the Bruneau, Carson, Colorado, Humboldt, Muddy, Owyhee, Truckee, Walker, and Virgin (Figure 3). In addition, Nevada has 1,070 lakes, reservoirs or ponds with an approximate total acreage of 533,239 and approximately 136,650 acres of wetlands (NDEP 2004).

There are several relevant waterbodies (natural lakes or reservoirs), including Lahontan Reservoir, Lake Mead, Lake Mohave, Lake Tahoe, Pyramid Lake, Rye Patch Reservoir, Walker Lake, and Wildhorse, and South Fork Reservoirs. Lake Mead, the largest reservoir (28.9 million acre-feet) in the United States, and Lake Mohave create LMNRA, which is managed by the National Park Service (NPS). Formed when Hoover Dam was built in the Colorado River in 1931, Lake Mead straddles both Nevada's southeast border and Arizona's northwest border and serves as the primary drinking water reservoir for more than 25 million people in Nevada, Arizona, California and Mexico (Tietjen and Holdren 2010). In 2007, the invasive species quagga mussels were discovered in the LMNRA and inevitably in the downstream river sections including numerous canals and reservoirs in adjoining states.

REGIONAL GEOGRAPHIC DYNAMICS

Nevada shares several major waterways with adjacent states. The largest river system is the Colorado River that enters from Utah and Arizona. The Colorado River within Nevada straddles the border of Arizona before eventually entering into California. As mentioned previously, quagga mussels were first discovered at LMNRA in 2007 and since that time the mussels have been found downstream throughout the Colorado River and in various Arizona and California waterways. More recently, Lake Powell/Glen Canyon National Recreation Area in Utah and Arizona has also become infested with quagga mussels.

Nevada's AIS Program focuses on containment at the source along the Colorado River especially within the LMNRA which sees the highest statewide volume of watercrafts entering and exiting. In 2013, NDOW, in cooperation with FWS and LMNRA, implemented a watercraft inspection and decontamination program to prevent the spread of the mussels into other Nevada and interstate waters. The program has expanded throughout the state and currently consists of 10 stationary inspection stations, three roving inspectors and two roadside stations (Appendix D).The program at LMNRA is focused on the inspection of watercraft exiting the lake. The program, however, is not mandatory due to cost restraints, traffic control and interpretation of NPS rules and regulations.

Other major interstate waterways in the state include the Carson, Walker and Truckee Rivers that all originate within the State of California. Each watershed currently has a stakeholder group that works collaboratively with adjacent county and state entities to develop strategies and implement programs to remove, control or prevent the introduction of various AIS including aquatic plants. For example, the Upper Truckee River originates in California and drains into Lake Tahoe. From Lake Tahoe, the river drains into California and then enters Nevada before terminating at Pyramid Lake. In addition, Lahontan Reservoir within the Carson River Basin is also partially fed by the Truckee River through an irrigation canal. The Lake Tahoe Basin and the upper reaches of the Truckee River contain Eurasian watermilfoil. However, it has not been found to be a significant problem in the lower reaches of the Truckee River or Lahontan Reservoir. This is due in part to the watermilfoil containment efforts within the Truckee River and removal in Lake Tahoe implemented by the TRPA and partners of the Lake Tahoe Basin AIS Coordination Committee. Interstate watershed stakeholder groups of the Walker and Carson River Basins also implement similar approaches to contain, control or eradicate species of concern. The groups are comprised of interstate, local, federal and state partners.

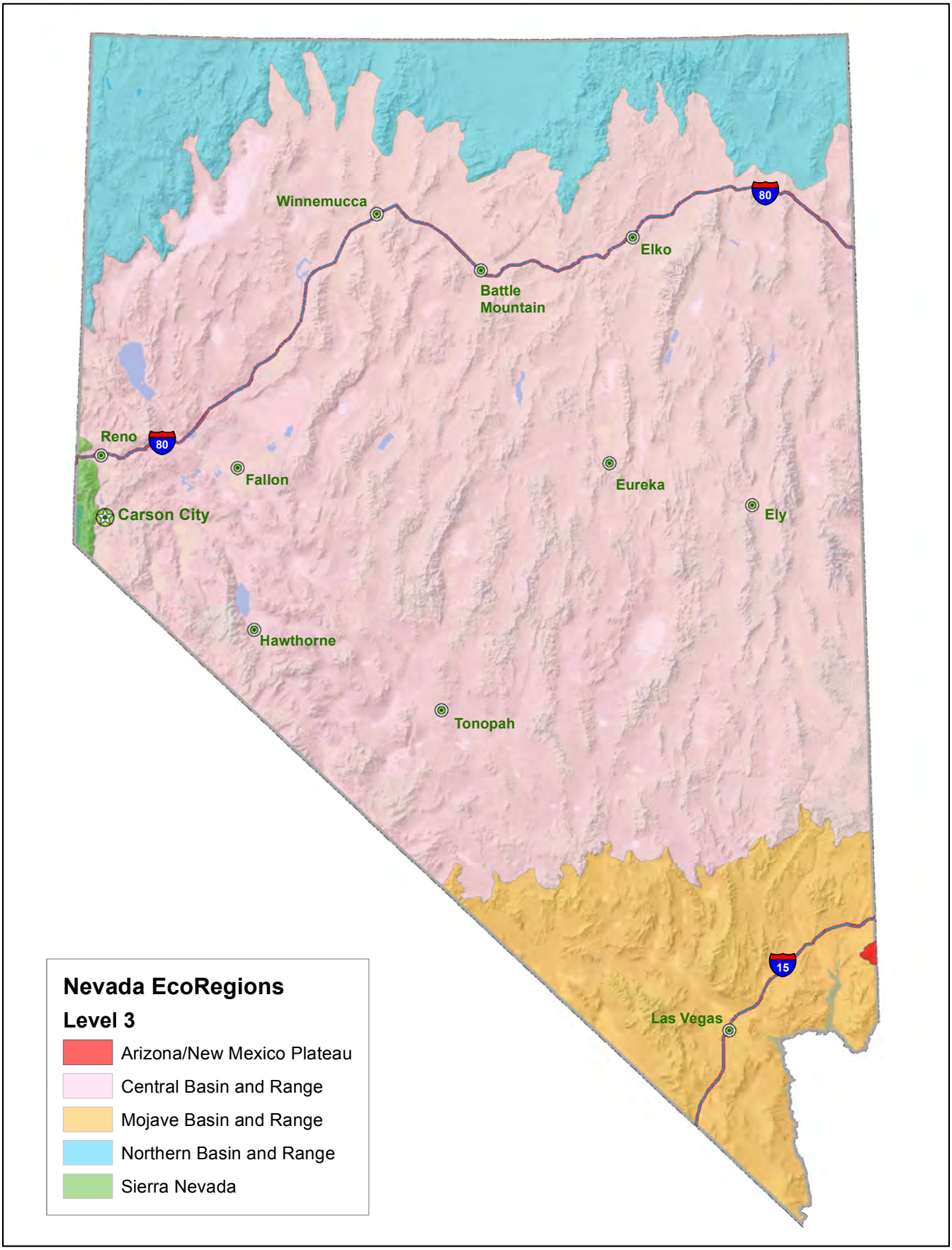


FIGURE 1. NEVADA ECOREGIONS

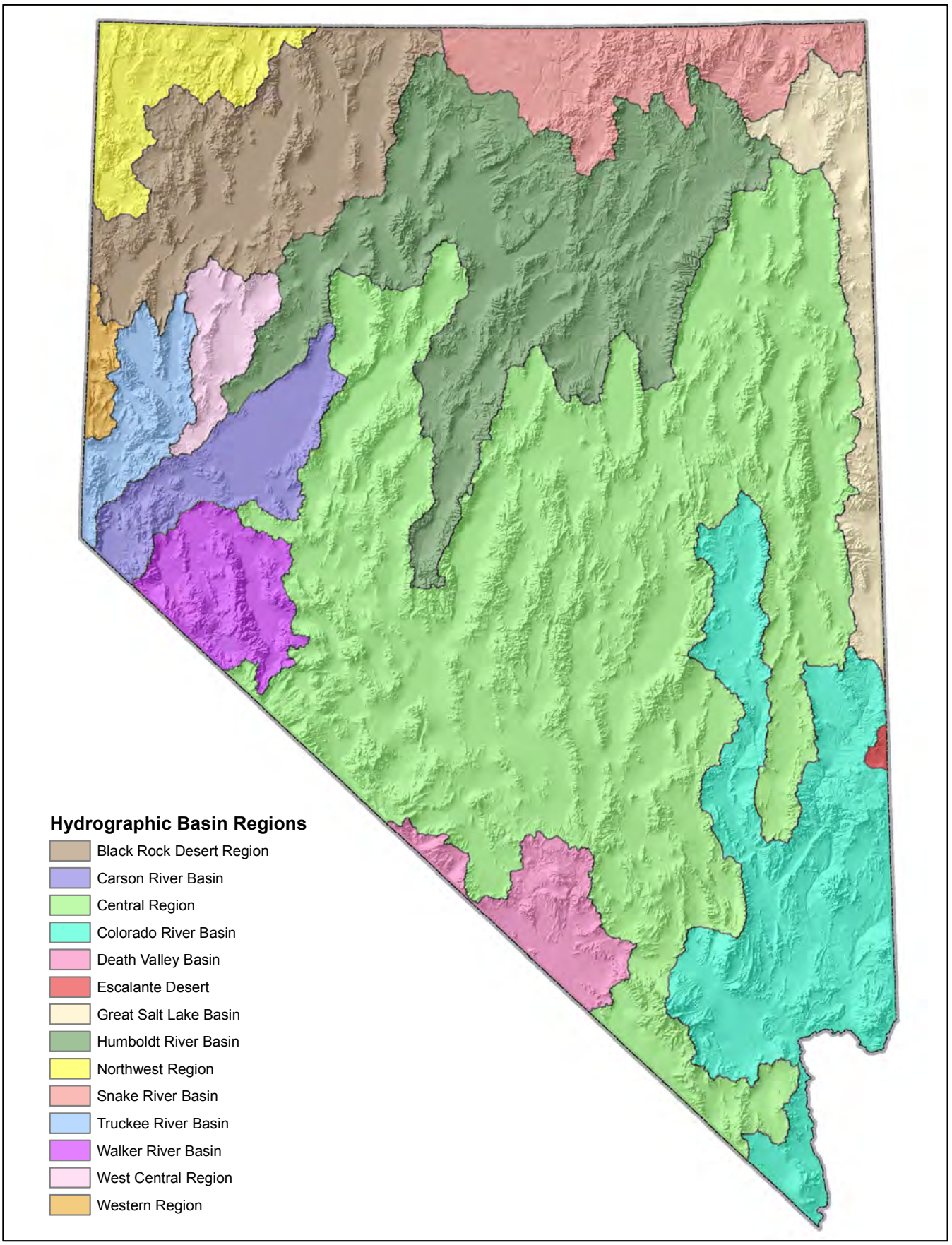


FIGURE 2. NEVADA HYDROGRAPHIC BASIN REGIONS

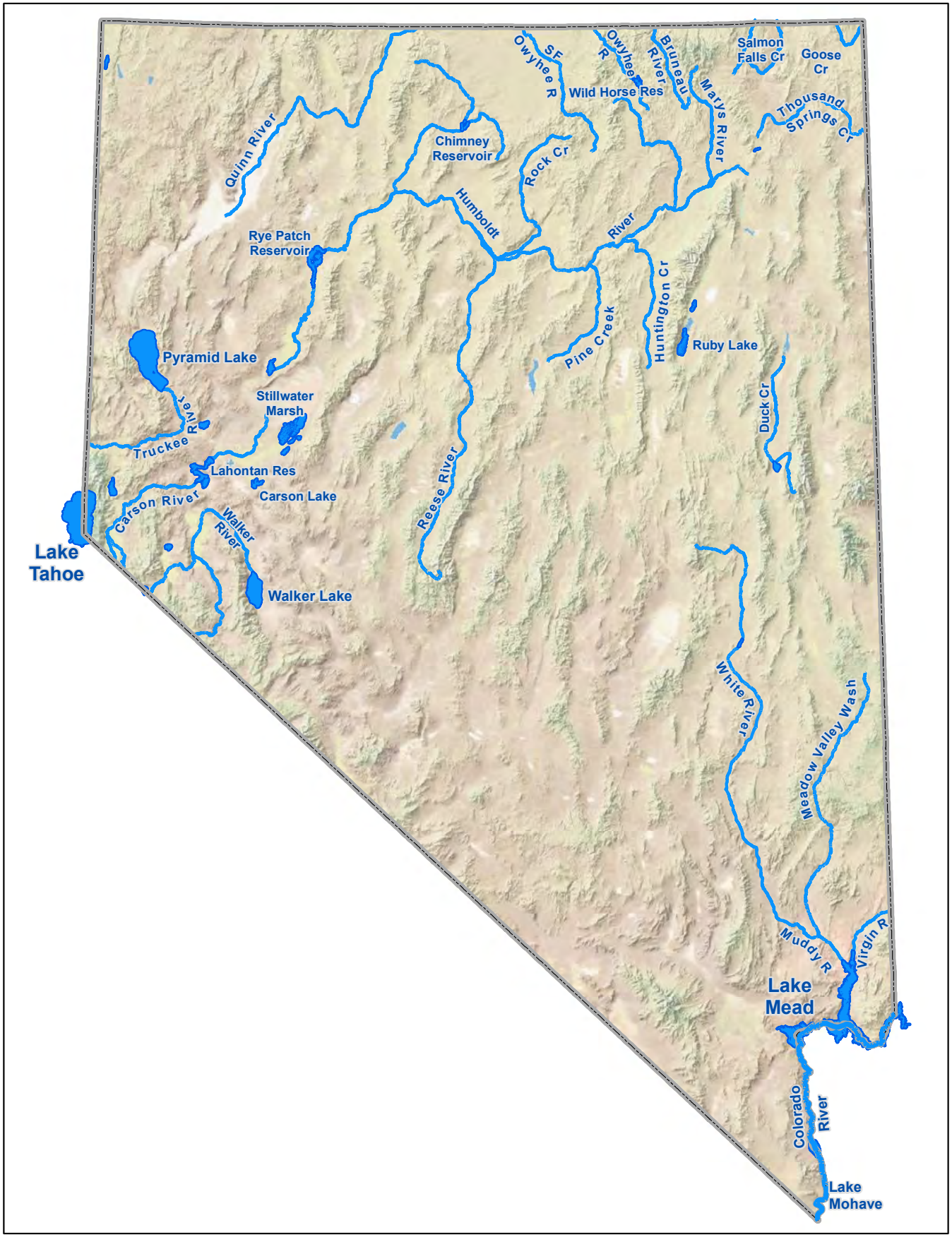


FIGURE 3. MAJOR WATERBODIES OF NEVADA

LAKE MEAD, NEVADA

CLIMATE CHANGE AND INVASIVE SPECIES

Understanding the impacts of AIS in tandem with potential changes to regional climate is an area of management interest but also of uncertainty. Research is needed to better understand possible impacts to Nevada waters and their risks from AIS. With changes in climate, there are anticipated changes to aquatic systems which include increases in surface water temperature, altered streamflow, and increased extreme weather events. The White House Committee on Climate Change identified the impacts of climate change in the Southwest region of the United States to be highly relevant (Melillo et al. 2014). For example, observations between 2001 and 2014 indicate streamflow totals ranged between 5% and 37% lower in the Southwest region (including waters of the Colorado River and Great Basin of Nevada) compared to 20th Century average flows (Garfin et al. 2014). Nevada is one of the fastest growing states in the west and is a destination for recreational boating and fishing. With nearly 70% of Nevada's total water supply being provided by surface water sources (US Environmental Protection Agency 2010), the water resources of this arid state are a management consideration of high importance.

Finally, according to the National Census (US Census Bureau 2010) in the last decade, Nevada is among the states with the highest population growth in the nation. Nevada is in close proximity to major population centers such as Los Angeles, Phoenix, Sacramento, and San Francisco and popular destinations, such as Lake Tahoe and Lake Mead, have noted annual increases in general visitation and park visitation numbers over the last 5 years (Nevada Division of Tourism 2016). Rapidly growing Nevada could face some significant impacts to water resources in the future when combined with climate change.

The synergistic effects of climate change and invasive species upon the ecosystems of Nevada are uncertain and stress a need to develop adaptive management strategies (Figure 4). Guidance documents on adaptation considerations can assist managers in how best to integrate climate change into AIS management (e.g. US Environmental Protection Agency 2008, Hellmann et al. 2008, and Pyke et al. 2008). Taking steps to minimize the introduction and spread of aquatic invasive species will be critical in this water-scarce state.

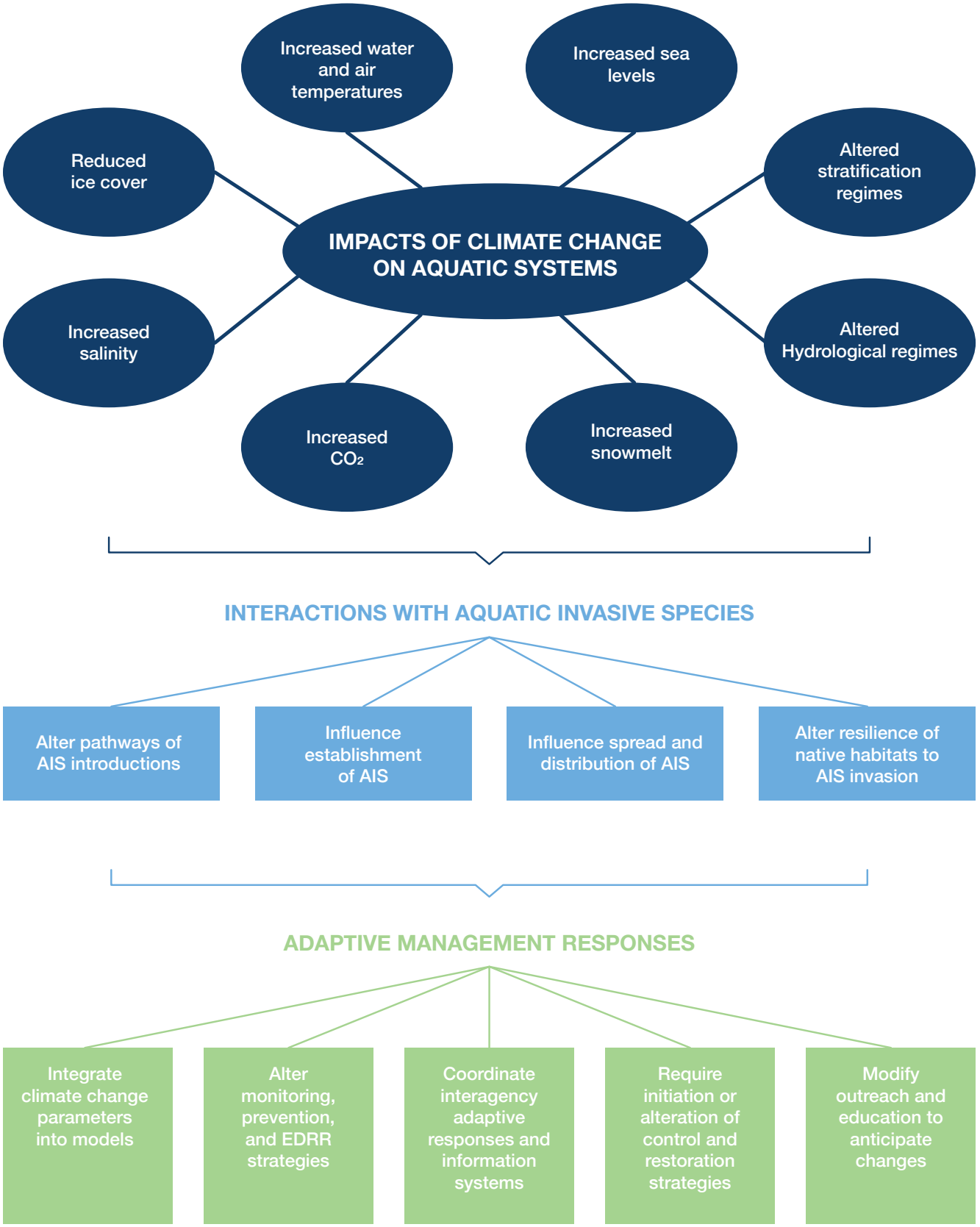


FIGURE 4. CLIMATE CHANGE IMPACTS ON AQUATIC INVASIVE SPECIES AND POSSIBLE ADAPTIVE MANAGEMENT RESPONSE. USED WITH PERMISSION FROM THE EPA (2008)

A variety of scenarios may be possible and understanding the response of invasive species to changes in water temperatures as well as habitat connectivity affecting invasion success will be relevant factors to consider. Climate-influenced streamflow could strain ecosystems already affected by invasive species. The trend in warmer temperatures may affect control programs. Earlier warm temperatures in the spring and later warm temperatures in the fall create a longer growing period. These changes could result in control actions being applied at a more frequent rate (Rahel and Olden 2008). For example, efforts to address quagga mussels throughout the Colorado River system may be faced with increased control efforts due to extended periods of warmer temperatures. Additionally, reservoirs can facilitate the spread of invasive species compared to natural lake systems (Havel et al. 2005). The creation of reservoirs in arid climates where surface water is less abundant therefore provides novel opportunities for species invasion. The synergistic effects of climate change and invasive species upon the ecosystems of Nevada are uncertain and emphasize a need to develop adaptive management strategies.

To consider how climate may affect the management of AIS in Nevada, the primary objectives of prevention, outreach and education, early detection, monitoring and rapid response, control and eradication, and laws and regulations were examined (Table 1). Areas where actions could be taken in light of climate change have been suggested. Other actions may exist that are not identified here.

TABLE 1. CLIMATE CHANGE CONSIDERATIONS FOR AIS MANAGEMENT OBJECTIVES.

AIS MANAGEMENT OBJECTIVE	CLIMATE CHANGE CONSIDERATIONS
PREVENTION	• The completion of Hazard Analysis Critical Control Point (HACCP) efforts highlight areas of introduction and spread of AIS. Plans that have already been completed may be re-examined and revised periodically whether climate impacts are realized or not. • A changing climate may create the opportunity for previous unidentified pathways of introduction or spread. Therefore a re-evaluation of vectors under new climate scenarios will allow managers to better identify resources at risk.
OUTREACH AND EDUCATION	• Outreach and education on AIS is currently underway. As new materials are developed consideration of integrating information about climate change and how it may affect AIS management will help inform the public on anticipated impacts.
EARLY DETECTION, MONITORING AND RAPID RESPONSE	• Monitoring efforts will be a critical aspect that may aid in detecting changes to ecosystems under the influences of a changing climate. Consider that there may be a need to examine a variation in monitoring protocol under different spatial and temporal situations as well as in sampling techniques (Hellmann et al. 2008).
CONTROL AND ERADICATION	• When there are changes to habitats or even in success of particular invasive species that are currently in a control management situation, a re-evaluation of current control strategies may be required as conditions change (US Environmental Protection Agency 2008).
LAWS AND REGULATIONS	• There are climate change policy considerations that may be reflected in AIS policy. Pyke et al. (2008) suggest that several aspects of policy should define the following; a) characterize interactions between invasive species and climate change, b) identify areas where climate change policies could negatively affect invasive species management, and c) identify areas where policies could benefit from the synergies between climate change and invasive species management.

CARSON RIVER, NEVADA

RAPID RESPONSE STRATEGY

Preparation in advance of the discovery of AIS is an important management aspect which is often overlooked. Prior to a discovery, several preparation aspects can be helpful to develop including understanding the authorities to respond, sources of funding that may be utilized, tools that may be needed or acquired to respond, and the command system that will be used to react to a discovery.

Often when faced with the need to respond to a new discovery, agency leadership can find there are gaps in legal authorities to act or there are unclear lines of leadership to take control of the situation. Spending time in advance of a discovery helps agency partnerships work though any potential hurdles prior to being under the duress of high-pressure decision making. Similarly, prior to a discovery, it is important to determine what, if any funding would be available to address specific response actions. This may include understanding the availability of emergency funding or setting up a mechanism to make funds available quickly. Anticipating what tools might be needed for response is also a valuable step in preparation. In some cases, securing materials that can be stored for future needs may be an option.

The use of the Incident Command System (ICS) is the preferred method to structure a response. The ICS is utilized by and a product of the Federal Emergency Management Agency's National Incident Management System program. The ICS provides clear structure for leadership and common language that all participants can use.

Below is a basic flow of events when faced with an AIS discovery to initiate a rapid response.

I. Verify – This step is used to confirm the identification of the suspected population of AIS.
II. Initial Notifications – This step is to communicate with all affected parties with jurisdiction who will be engaged in response decisions. The identification of appropriate tiers of agencies and entities is an important step to streamlining communications.
III. Activate appropriate elements of a response plan – This step engages a response team in addressing the issue in context.
IV. Define the extent of the infestation – This step helps to confirm the scope of the discovered population, which in turn helps to guide further actions and those with jurisdiction.
V. Initiate external communications – This step creates a communication line to stakeholders, the media and members of the public.
VI. Prevent further spread – This step identifies and implements actions to prevent spread from the identified area.
VII. Initiate available and appropriate control measures – This step identifies and implements actions to eradicate or contain the discovered population.
VIII. Conduct after-action and debrief – This step allows all parties engaged in the rapid response event to improve and learn from actions taken.

A number of existing tools can help inform the future development of specific planning tools for Nevada. The *Columbia River Basin Interagency Invasive Species Response Plan* (100th Meridian Initiative 2014) as well as other neighboring states have developed guidelines should management agencies be faced with the discovery of dreissenid mussels or other AIS that require a timely coordinated response.

LAKE MOHAVE, NEVADA

EXISTING AUTHORITIES AND PROGRAMS

Understanding the current authorities and programs of Nevada's management entities helps define an AIS management plan for the future. There are many authorities and programs implemented by state, federal, tribal and other stakeholders that are utilized to prevent the spread and introduction of AIS. However, no single agency or group is responsible for the management of all AIS issues in Nevada. Further, considering 84.9% of Nevada is federally-owned land (Figure 5), the management of waters is heavily focused on federal agencies with resulting federal-state partnerships to implement programs. A summary of relevant state and federal legislation and regulations that currently exist can be found in Table 2 and detailed information in Appendix E.

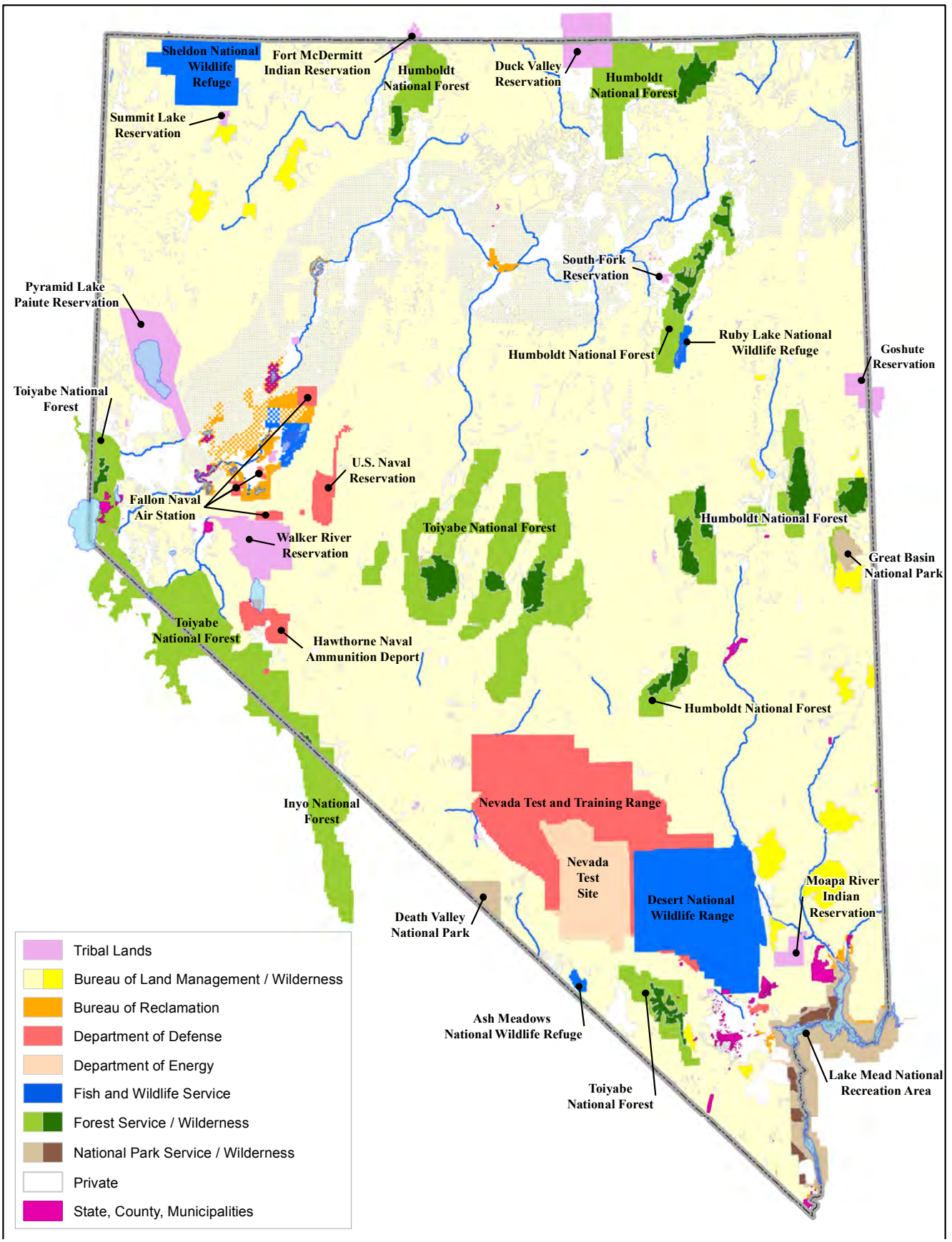


FIGURE 5.
LANDOWNERSHIP OF NEVADA INCLUDING TRIBAL LANDS, FEDERAL AND PRIVATE HOLDINGS

STATE

Two state agencies have a primary regulatory role in invasive species management in Nevada; NDOW and Nevada Department of Agriculture (NDA). The pertinent legislation and rules associated with providing these agencies with regulatory authority are in Appendix E. Other state partners play a supporting role in monitoring and research. The following state entities have a role in AIS management.

I. **Nevada Department of Wildlife** provides management oversight of AIS within the Fisheries Division. This program addresses AIS pathways through monitoring, control, inspection and education (Nevada Revised Statute 503). NDOW manages 120,000 acres of Wildlife Management Areas which includes numerous waterbodies. In addition, the NDOW Hatchery Division conducts fish health monitoring for pathogens within the state hatchery program. Under NDOW, the **Nevada Board of Wildlife Commissioners,** a governor-appointed body, is responsible for establishing broad policy, setting annual and permanent regulations, reviewing budgets, and receiving input on wildlife and boating matters. The Commission is responsible for considering and approving petitions to prohibit or regulate species (Senate Bill 245, Restricted Exotic Wildlife).

II. **Nevada Department of Agriculture** provides oversight on aquatic agriculture (Nevada Revised Statute 561.301) and has authority to inspect any conveyance that is injurious to the quality of any water in the State (Nevada Revised Statute 555.100).

III. **Nevada Department of Conservation and Natural Resources**

   a. **Division of Environmental Protection** conducts water quality and bioassessments monitoring within aquatic habitats throughout the state. These efforts target invertebrate sampling, and may include AIS species such as New Zealand mudsnail or dreissenid mussels.

   b. **Nevada Conservation Districts** (NCD) work for the conservation and proper development of the state's natural resources, including conservation of soil, and water.

   c. **Nevada Division of State Lands** (NSL) provides land and land use planning services to the State, its agencies and its people.

   d. **Nevada Division of State Parks** (NSP) manages, protects and maintains areas across Nevada, which includes many major waterbodies. In several cases, NSP works in conjunction with NDOW to implement watercraft inspection stations.

TABLE 2. SUMMARY OF CURRENT LEGAL AUTHORITIES AFFECTING AIS MANAGEMENT IN NEVADA. GREATER LEGISLATIVE DETAIL CAN BE FOUND IN APPENDIX E.

LEGAL AUTHORITY	SUMMARY	ENTITY AUTHORIZED
FEDERAL AUTHORITY		
Title 16 of the Lacey Act of 1900 (16 U.S.C. § § 3371-3378)	Provides that it is unlawful for any person to commit or attempt to commit any act described in § 3372(a), including to import, export, transport, sell, receive, acquire, or purchase any fish or wildlife or plant taken, possessed, transported, or sold in violation of any law, treaty, or regulation of the United States or in violation of any Indian tribal law. It is also unlawful for any person to import, export, transport, sell, receive, acquire, or purchase in interstate or foreign commerce any fish or wildlife taken, possessed, transported, or sold in violation of any law or regulation of any state or in violation of any foreign law; or to import, export, transport, sell, receive, acquire, or purchase in interstate or foreign commerce any plant taken, possessed, transported, or sold contrary to certain state or foreign laws.	Departments of Interior, Commerce and Agriculture
Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA), (P.L. 101-646,104 Stats 4761) reauthorized and amended by National Invasive Species Act of 1996 (NISA) (P.L. 104-332)	The FWS, the US Coast Guard, the EPA, the Army Corps of Engineers, and the National Oceanic and Atmospheric Administration are assigned responsibilities to develop a program of prevention, monitoring, control, and study to prevent introduction of and to control the spread of introduced aquatic nuisance species and the brown tree snake, including membership on the ANSTF. Includes the development of state management plans to address AIS.	Departments of Interior, Commerce and Defense
Executive Order (EO) 13112, issued February 1999; amended by EO13751 December 2016	Directs federal agencies to: (1) identify actions that may affect status of an invasive species; (2)(a) prevent introduction of such species; (b) detect and control such species; (c) monitor population of such species; (d) provide for restoration of native species; (e) conduct research on invasive species and develop technologies to prevent introduction of such species; (f) promote public education of such species; and (3) not authorize, fund, or carry out actions likely to cause the introduction or spread of invasive species in the United States or elsewhere unless the benefits of the action clearly outweigh the harm and the agencies take steps to minimize the harm.	Federal Agencies
Federal Insecticide, Fungicide and Rodenticide Act	Provides for federal regulation of pesticide distribution, sale and use. All pesticides distributed or sold in the USA must be registered by the EPA and properly labeled for use.	Environmental Protection Agency

LEGAL AUTHORITY	SUMMARY	ENTITY AUTHORIZED
STATE AUTHORITY		
Title 45 Nevada Revised Statute 503.597	Nevada's Revised Statute prohibits the importation, transportation or possession of any species of wildlife that the Nevada Department of Wildlife's Commission deems detrimental to the wildlife or the habitat of the wildlife in the state. The statute further provides a misdemeanor for any person who introduce any aquatic life into the state without the permission of the Board of Wildlife Commissions.	Nevada Wildlife Commission
Assembly Bill 167	This act relates to aquatic species; prohibiting a person from introducing certain aquatic species into the waters of this State; providing for the inspection of vessels for aquatic invasive species; requiring vessels to be inspected for the presence of aquatic invasive species before being operated on the waters of this State; requiring decontamination of any vessels where an aquatic invasive species is present; authorizing the impoundment or quarantine of certain vessels; requiring an aquatic invasive species fee to be paid by all operators of vessels; providing a civil penalty; and providing penalties.	Nevada Department of Wildlife
Nevada Revised Statute 488.045	This regulation requires the owner, operator or person in control of any vessel or conveyance that is transported on public roads or launched on any body of water in this State to drain the water from the vessel or conveyance and any equipment on the vessel or conveyance. This regulation also requires the owner, operator, or person in control of a vessel or conveyance that has been taken out of any body of water in this State to ensure that the drain plugs, drain valves and any other devices used to control the draining of water remain open while transporting the vessel or conveyance on public roads in the State.	Nevada Department of Wildlife
Nevada Revised Statute 555.100	Department to conduct inspections; notice to control pest, noxious weed or plant disease.	Nevada Department of Agriculture
REGIONAL AUTHORITY		
Public Law 96-551	Tahoe Regional Planning Compact gives TRPA the authority to adopt environmental quality standards, called thresholds, and to enforce ordinances designed to achieve the thresholds.	Tahoe Regional Planning Agency
Tahoe Regional Planning Agency Code of Ordinances	Chapter 63.4 addresses AIS by prohibiting the introduction of AIS or the launching of watercraft contaminated by invasive species, and requires of inspection and decontamination of watercraft and seaplanes. Chapter 80 addresses prevention and control of AIS.	Tahoe Regional Planning Agency

TRIBAL

Four primary Native American entities including the Washoe, Northern Paiute, Western Shoshone, and Southern Paiute Tribes encompass 32 reservations or colonies within Nevada. On a project or program basis, tribes support invasive species management with tribal council resolutions. An example of tribal management of AIS is Pyramid Lake. This basin ecosystem is larger than Lake Tahoe and falls entirely within the Northern Paiute Reservation. The Pyramid Lake Paiute Tribe has developed the Quagga and Zebra Mussel Aquatic Invasive Species Management Plan for the Pyramid Lake Paiute Tribe (2012). The Pyramid Lake Paiute Tribe has authority to regulate activities within the Pyramid Lake Basin, including boating, angling, AIS prevention and other activities. Other significant waterbodies in Nevada associated with tribal lands that may be impacted by AIS include sections of the Owyhee River (Shoshone-Paiute Duck Valley Reservation), the Walker River (Walker River Paiute Reservation), and Summit Lake (Summit Lake Paiute Reservation).

FEDERAL

No single federal agency has clear authority over all aspects of AIS management, but many agencies have programs and responsibilities that address aspects of this issue. Because the land base of Nevada is 84.9% federally owned, federal-state coordination efforts to manage AIS is highly relevant. The following federal entities are pertinent in the consideration of managing AIS in Nevada.

A. US Department of Agriculture (USDA)

a. **USDA Forest Service** (USFS) is guided by an internal management policy on AIS and partners with NDOW to address specific species issues. The USFS uses multiple authorities to conduct activities to prevent, detect, control, mitigate, and research aquatic and terrestrial invasive species across a wide variety of landscapes and agency programs. Specific policy direction for the management of all taxa of aquatic and terrestrial invasive species on national forests and grasslands has been issued through Forest Service Manual 2900-Invasive Species Management (FSM 2900) (USDA Forest Service 2011). Among other requirements, this national USFS policy directive (FSM 2900) calls for close coordination with state, tribal, and local partners to address invasive species on National Forest System lands and waters, including but not limited to cooperation to implement and enforce statewide aquatic invasive species management plans and other applicable regulations, plans, and approaches against invasive species. FSM 2900 is supplemented by broad guidance found within the National Strategic Framework for Invasive Species Management (USDA Forest Service 2013). Additionally, western regions of the USFS have adopted the Interagency Standards for Fire and Fire Aviation Operations protocols to address minimizing the transport of AIS in wildland fire fighting activities (Interagency Standards Group 2016).

PYRAMID LAKE, NEVADA

b. **USDA Animal and Plant Health Inspection Service** (APHIS) implements emergency protocols and partners with affected states to quickly manage or eradicate pest outbreaks, which may include AIS.

B. US Department of Defense

a. **US Army Corps of Engineers** (USACE) is tasked with the development, control, maintenance, and conservation of the nation's water resources in accordance with the laws and policies established by Congress and the Administration. The USACE – Los Angeles District serves Arizona-Nevada. The USACE Zebra Mussel Research Program (ZMRP) was authorized by the Non-Indigenous Aquatic Nuisance Prevention and Control Act of 1990, Public Law 101-646, and is the only federally authorized research program for the development of technology to control zebra mussels. The USACE AIS programs coordinate their research activities with the ANSTF to ensure leveraging of resources.

C. US Department of Commerce

a. **National Oceanic and Atmospheric Administration** (NOAA) is tasked with the conservation and management of coastal and marine ecosystems and resources. NOAA does not have any AIS authorities in Nevada; however, NOAA has a key role as a co-chair of the ANSTF.

D. US Environmental Protection Agency (EPA) mission is to protect human health and the environment. EPA conducts bioassessments throughout Nevada that may capture information on AIS. The EPA is also authorized to register pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) which may affect product use in AIS control projects. The EPA Office of Research and Development/National Exposure Research Laboratory/Environmental Science Library Services is located in Las Vegas, Nevada.

E. US Department of the Interior (DOI) is charged with the Nation's internal affairs and is structured, along with multiple bureaus and agencies, to protect and manage natural resources and cultural heritage. DOI provides scientific and other information about these resources and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliate island communities. The DOI is currently developing a department policy on invasive species to include emphasis on the importance of federal-state-tribal coordination, harmonization of policies and procedures, and reduction of regulatory impediments to effective and timely invasive species management. The following bureaus and agencies fall under the DOI.

a. **Bureau of Indian Affairs** (BIA) mission is to enhance the quality of life, to promote economic opportunity, and to carry out the responsibility to protect and improve the trust assets of American Indians, Indian Tribes, and Alaska Natives. BIA Division of Natural Resources provides oversight on invasive species management issues, participates in monitoring, and supports tribal participation in early detection and rapid response.

b. **Bureau of Land Management** (BLM) administers 47.5 million acres of public land in Nevada. BLM public lands make up approximately 63 percent of Nevada's land base. The BLM Nevada Environmental Management System includes invasive species management as a key focus area. The BLM works with state, federal and local partners to reduce the spread of invasive species with an emphasis on early detection and rapid response of new invasions. Currently, AIS management is directed by the BLM Manual, Section 6720 - Fisheries and Aquatic Resources Management (Bureau of Land Management 1991), and the ANSTF Strategic Plan (ANSTF 2013). Following the Department of Interior's completion of the DOI invasive species policy, the BLM will update the Manual to highlight the difference in game fish and aquatic invasive species. Also, as part of its implementation of the Interagency Standards for Fire and Fire Aviation Operations (Interagency Standards Group 2016), BLM takes actions to address AIS within agency firefighting activities.

c. **Bureau of Reclamation** (BOR) is responsible for thousands of miles of water distribution canals and drains, rights-of-ways, wetlands, wildlife resources, recreational areas, and reservoirs which are at risk from AIS. There are numerous BOR projects in Nevada, including power plants and dams, Boulder Canyon Project (Hoover Dam and Power Plant), Parker-Davis Project (Parker Dam and Power Plant), Davis Dam and Power Plant, Washoe Project

(Marble Bluff Dam and Fishway), Humboldt Project (Rye Patch Dam), Newlands Project (Derby Diversion Dam, Lahontan Dam and Power plant and Carson River Diversion Dam). BOR has a role in managing water for multiple uses including recreation in partnership with the natural resource agencies of Nevada. Additionally, BOR conducts dreissenid mussel monitoring at some of its Nevada facilities. The BOR Mussel Task Force currently works to build consistency in monitoring efforts across the country by internally coordinating the response to quagga and zebra mussel discoveries in western waters. The BOR Technical Services Center actively conducts research on environmental-DNA, early detection, and materials technology associated with a variety of AIS, including dreissenid mussels. The Directives and Standards, and policy of BOR related to invasive species management are as follows: Pest Management/Resource Protection (ENV 01-01; US Bureau of Reclamation 1996a), Public Notification and Aerial Pesticide Applications on Lands Managed by BOR (ENV 01-02; US Bureau of Reclamation 1998), and Pest Management (ENV 02; US Bureau of Reclamation 1996b). These Directives and Standards and the policy focus on integrated pest management and pesticide application on BOR lands. The BOR provides grant funding to cooperating agencies in Nevada.

d. **National Park Service** is tasked with the management of historical, cultural and natural parks. The NPS has several parks, national monuments and trails, and recreation areas within the boundaries of Nevada. Specific NPS managed areas in Nevada include LMNRA, Great Basin National Park, Death Valley National Park, Old Spanish National Historic Trail, Tule Springs Fossil Beds National Monument and the California National Historic Trail. The NPS is guided by their Management Policies document (National Park Service 2006) to identify the responsibility of parks to manage non-native plant and animal species and to cooperate with other agencies having jurisdiction. Additionally, the Quagga/Zebra Mussel Infestation Prevention and Response Planning Guide (US Department of the Interior National Park Service 2007) serves as a resource to NPS managed areas seeking to form a prevention program. Each NPS managed area has differing programs related to AIS that are a reflection of a diverse landscape and current park leadership. For example, LMNRA currently conducts monitoring for AIS, provides financial support to the on-site NDOW watercraft inspection and decontamination program, and conducts extensive public outreach and ongoing dreissenid mussel research. LMNRA entered into a cooperative agreement with NDOW in 2014 to collaboratively manage quagga mussel containment efforts.

e. **US Fish and Wildlife Service** addresses aquatic invasive species within the Fisheries and Aquatic Conservation program, Branch of Aquatic Invasive Species. The program seeks to prevent the introduction and spread of AIS, rapidly respond to new invasions, monitor the distribution and control of established invaders, and foster responsible conservation behaviors through its national public awareness campaigns. The AIS program also builds capacity, coordinates, and implements AIS prevention and control activities authorized under the NANPCA and NISA, including: co-chairing and administering the ANSTF, supporting regional panels of the ANSTF, and implementing a national AIS program. Significant functions of the Aquatic Invasive Species Program include;
    - Administration of ANSTF
    - Administration of ANSTF-approved state AIS management plans, including the plan development and revision process, and federal cost-share funding for implementation
    - Implementation of national Stop Aquatic Hitchhikers and Habitattitude campaigns
    - Management of injurious wildlife listing process with the use of species-byspecies scientific and economic evaluations as defined by the Injurious Wildlife Provisions of the Lacey Act (18 U.S.C. 42)

In Nevada, the FWS works closely with ESA-listed species and collaborates with tribal partners across the state. Lahontan National Fish Hatchery Complex works in partnership with the Pyramid Lake Paiute Tribe to restore Lahontan cutthroat trout. Many FWS National Wildlife

Refuges (NWR) manage aquatic habitats in Nevada, including unique areas such as Stillwater NWR, Anaho Island NWR, Ruby Lake NWR, Ash Meadows NWR and Moapa NWR.

f. **US Geological Survey** (USGS) monitors, assesses and conducts targeted science research to enhance preparedness, response and resilience. The USGS has developed and maintains the Non-Indigenous Aquatic Species (NAS) Database which is the central repository for accurate and spatially referenced biogeography accounts of nonindigenous aquatic species. At this time the NAS Database includes freshwater aquatic plants, animals, invertebrates, and fishes including a number of records for Nevada. The USGS Nevada Water Science Center provides information about Nevada's natural resources by collecting data on surface and ground water.

F. US Department of Homeland Security (USDHS) is tasked with securing the nation from threats, including protecting our borders, and conducting border inspections.

a. **US Coast Guard** (USCG) receives authority to regulate ballast water and AIS from NANPCA and NISA. NANPCA directed the USCG to issue regulations and guidelines to control the introduction and spread of AIS in the Great Lakes ecosystem. It also requires an assessment of ballast water management practices in all US ports. USCG Auxiliary operates at several Nevada waterbodies, including Lake Tahoe, Lakes Mead and Mohave.

G. Aquatic Nuisance Species Task Force is an intergovernmental organization dedicated to preventing and controlling aquatic nuisance species, and implementing the NANPCA of 1990 and the amended NISA in 1996 (Appendix D). The membership of the ANSTF is comprised of 13 federal agency and 15 ex-officio members. The ANSTF coordinates AIS efforts by working with relevant stakeholders in conjunction with six regional panels of the ANSTF. Under NANPCA, state governors are authorized to submit comprehensive management plans to the ANSTF for approval. The ANSTF will review and approve both draft and final versions of the Nevada Aquatic Invasive Species Management Plan. Grants are authorized to states for implementing approved management plans, under a 75% federal – 25% state cost share agreement.

H. National Invasive Species Council (NISC) ensures Federal programs related to invasive species are coordinated, effective and efficient. NISC was established by Executive Order 13112 in 1999 and the amended Executive Order 13751 in 2016. NISC is guided by the National Invasive Species Council Management Plan 2016-2018 (National Invasive Species Council 2016) which provides for direct actions to address invasive species. A recent interagency effort examining federal policy regarding the movement of AIS onto and off of Federal lands was undertaken to better understand the policy role of many federal agencies (Interagency Committee 2015).

a. **Invasive Species Advisory Committee** (ISAC) is a group of non-federal advisors and stakeholders that provide advice to the NISC on invasive species issues.

REGIONAL

I. **Tahoe Regional Planning Agency** leads a cooperative effort to preserve, restore, and enhance the unique natural and human environment of the Lake Tahoe Basin. TRPA is authorized by a California and Nevada Bi-State Compact to adopt environmental quality standards and to enforce ordinances designed to achieve the standards. Their authorities allow for the creation and enforcement of rules that prevent the spread and introduction of AIS in the Lake Tahoe Basin. TRPA implements their ANSTF-approved Lake Tahoe Region Aquatic Invasive Species Management Plan, California – Nevada (Tahoe Regional Planning Agency 2014). The implementation of a Nevada ANSTF-approved plan will complement the TRPA Plan. Existing relationships between NDOW, TRPA and other Tahoe Basin managers have created a solid working relationship which maximizes AIS management efforts in a coordinated efficient way. The completion of a Nevada AIS Management Plan will further enhance this working relationship.
II. **Tahoe Regional Conservation District** (TRCD) provides leadership and environmental services to stakeholders. TRCD works cooperatively with TRPA to implement a watercraft inspection and decontamination program in the Tahoe Basin.
III. **Carson Water Subconservancy District** (CWSD) is a multi-county, bi-state agency dedicated to establishing a balance between the needs of the communities within the Carson River watershed and the function of the river system. Carson Water Subconservancy District coordinates identification and treatment of Nevada listed noxious weed species on a watershedwide basis. The CWSD provides funding to the four Coordinated Weed Management Areas throughout the watershed to further their efforts. In addition, CWSD works with NSP and NDOW to strategize solutions on AIS management.
IV. **Truckee – Carson Irrigation District** (TCID) is a political subdivision of the State of Nevada organized for the purpose of representing the water right holders within the boundaries of BOR' s Newlands Project. The District is contracted by BOR to provide care, operation, and maintenance of project facilities and features. Additionally, TCID implements a pest management plan addressing aquatic and terrestrial species (Truckee-Carson Irrigation District 2016).
V. **Southern Nevada Water Authority** (SNWA), in cooperation with the LMNRA, University of Nevada – Las Vegas, University of Nevada - Reno, and other partners has developed an Interagency Monitoring Action Plan (Wong et al. 2011) to coordinate the collection and sharing of quagga mussel monitoring data and water quality information for both Lake Mead and Lake Mohave. SNWA conducts a variety of studies related to quagga mussels.
VI. **The Western Regional Panel** (WRP) on Aquatic Nuisance Species of the federal ANSTF was formed under NANCPA (as amended by NISA). The goal of the WRP is to protect western aquatic resources by preventing the introduction and spread of non-native nuisance species into western marine and freshwater systems through the coordinated management and research activities of state, tribal, federal, commercial, environmental, research entities and other regional panels. The geographic scope of the WRP encompasses 19 US states, and 4 Canadian provinces west of the 100th Meridian. NDOW is an active voting member in the WRP. Other Nevada-based partners, such as LMNRA staff and TRPA, are also active in the WRP.
VII. **100th Meridian Initiative** – Columbia River Basin Team is the most active and organized basin team within the 100th Meridian Initiative. Partners share information, research and management strategies associated with the Columbia River Basin. Geographically, northern Nevada falls within the Columbia River Basin and NDOW is an active participant in the Basin Team.

Additional partners in the region work collaboratively to address invasive species in Nevada, including but not limited to University of Nevada – Reno, the Desert Research Institute, the Nature Conservancy – Nevada, Eastern Nevada Landscape Coalition, Trout Unlimited – Nevada, and others.

GAPS AND CHALLENGES

There are many gaps and challenges that exist in the management of AIS. In some cases, there are practical steps that may be taken to address specific issues, but in others there are significant hurdles to overcome in order to address specific issues. The following gaps and challenges to managing AIS in Nevada have been identified. These gaps and challenges are by no means exhaustive and are not presented in any particular order of priority.

I. Climate change has been identified as highly influential to the water resources of Nevada. What is not clear at this time is the potential synergistic effects that can be anticipated with climate change and invasive species impacting Nevada waters. The arid climate and rapidly growing urban areas throughout Nevada and the region will play a role in the impacts of climate change in the future. Working to anticipate possible climate change scenarios and impacts from invasive species will be important for future management of water and invasive species.

II. Pyramid Lake is a significant resource that is under the protection of the Pyramid Lake Paiute Tribe. This waterbody is the largest natural lake within the state offering recreational opportunities and unique biological resources. Increasing AIS prevention efforts of this aquatic resource will require significant partnerships to ensure success. Increased engagement among the Pyramid Lake Paiute Tribe, NDOW and other state and federal entities will be essential for increasing protections against AIS at Pyramid Lake.

III. Illegal fish introductions are a significant source of AIS introductions into Nevada waters. In most cases these introductions include fish that are non-native to the region. With the assistance of partnerships, programs that address the problem of illegal fish introductions could help curb their occurrence.

IV. Fishing tournaments on Nevada waters can be a source of high risk boats and unintentional bait release. The volume of motorized boat traffic drawn to Nevada waters from around the country increases with fishing tournaments. For example, approximately 95 tournaments occur annually within LMNRA which can bring high volumes of boat traffic (>150 boats) for these fishing events. Despite current efforts to minimize the risks of tournament boats spreading invasive species additional prevention strategies, such as mandatory entry inspections, could be used to address this challenge. Additionally, specific measures could be taken to improve proper bait disposal used during tournaments.

V. The jurisdiction or authorities to manage submerged and riparian plants in some cases is not clear. In areas where specific invasive species such as purple loosestrife (*Lythrum salicaria*) or riparian noxious weeds exist there is conflict in which managing entity is most appropriate for monitoring, control or simply taking management action. Further, multiple agencies may have an overlap in responsibilities for specific species (e.g., Nevada Department of Conservation and Natural Resources and NDA regarding aquatic *Salvinia spp*).

VI. At this time, monitoring for AIS in Nevada consists largely of dreissenid mussel monitoring, with some ancillary monitoring for aquatic invasive plants, vertebrates and invertebrates done by NDOW and various partners (Appendix F). There is a need for a state-wide strategy encompassing a variety of habitats, species and partners that would assist in protecting habitats and focus on AIS management responses.

VII. At this time, inspection and decontaminations at Lake Mead within LMNRA are primarily conducted on watercrafts exiting the water. Currently, incoming boats are generally not inspected prior to launch although these boat operators receive AIS education and outreach. Incoming inspections were halted in 2007 when quagga mussels were detected in Lake Mead. Conducting entrance inspections would protect Lake Mead from other damaging AIS not currently present.

EURASIAN WATERMILFOIL

NORTHERN PIKE

AIS MANAGEMENT APPROACH

Nevada intends to manage AIS in the following focus areas to protect valuable aquatic resources: Prevention, Early Detection, Rapid Response, Control and Eradication. Nevada acknowledges the ANSTF approved interstate AIS management plan completed for Lake Tahoe and intends to seek ways to work together to leverage AIS management efforts reflected in each plan. Furthermore, the State of Nevada intends to work with neighboring western states in order to protect western aquatic resources. The primary approach for this plan has been to identify the AIS which pose the greatest risk to Nevada. Understanding pathways that are the primary mechanisms for species to be introduced and spread among and within Nevada waters is critical in focusing management efforts with limited funding and resources.

The plan allows for increased coordination with ANSTF approved management plans of neighboring California, Utah, Arizona, Oregon and Idaho, and TRPA. The primary methods to achieve coordination and collaboration with neighboring entities on AIS management will be continued participation and involvement in the WRP's Building Consensus Committee, regular participation the Western Invasive Species Collaborative Effort and regular strategic meetings between TRPA and additional stakeholders. These efforts to coordinate and collaborate with neighboring entities will assist in minimizing any duplicative efforts and leverage management actions. This plan will also guide AIS activities in Nevada to allow coordination with and recognition of regional and national initiatives such as the *Quagga-Zebra Mussel Action Plan for Western US Waters* (Western Regional Panel on ANS 2010)*, National Management and Control Plan for the New Zealand Mudsnail* (Proctor et al. 2007) *and Management and Control Plan for Bighead, Black, Grass and Silver Carps in the United States* (Conover et al. 2007).

PROBLEM DEFINITION

RECENT AIS PROBLEMS

Nevada has been affected by a number of highly destructive invasive species. In Nevada's aquatic and riparian environments, quagga mussels, tamarisk species and Eurasian watermilfoil have been most problematic. Other species have been identified with limited geographic distribution. The USGS NAS database manages information nationally on the distribution and occurrence of species. The occurrence of AIS particularly non-native fishes, crayfish, other invertebrates suggests a number of discoveries but limited establishments have occurred throughout Nevada (US Geological Survey 2017). Further, monitoring of Lahontan and Rye Patch reservoirs suggested the larval-form of dreissenid mussels may have been present during a past sampling period. However, repeat sampling has shown that the dreissenid are not established in either waterbody (Appendix D).

AIS OF CONCERN AND TYPES

As mentioned previously, there are many known invasive species in Nevada including aquatic plants, fish, invertebrates and amphibians. These species have been identified and in some cases are addressed by local management actions such as monitoring, control or outreach. In order to prioritize management and focus of AIS a ranking system of Watch, High, Low, and Unknown have been assigned to specific species (Appendix B). These ranks were assigned based on the following ways, 1) on input from the Nevada AIS Management Plan Working Group, 2) on existing federally adopted species management plans, 3) and on species that are listed as injurious by the FWS.

- Watch priority rank was assigned to species that have not been established in a waterbody, or have a high potential for introduction to Nevada either by natural range expansion or through unauthorized introductions and can have a high probability of economic and/or ecological impact.
- High priority rank was assigned to established species or species for which there is a high probability of economic and/or ecological impact.
- Low priority rank was assigned to species that are widely established but with minimal impact.
- A rank of unknown was assigned to species where there is limited information to make determination of economic or ecological impact to Nevada.

Additionally, to further categorize status has been captured based on establishment and ability to control or eradicate a species. This status is assigned as type 1 to type 5 and is defined in Appendix B.

RED EARED SLIDER

RUSTY CRAYFISH

AIS OF FOCUS IN NEVADA

Historically, invasive species management has been species-specific focused. This approach can be appropriate particularly when there are circumstances for successful eradication of a species identified early in its establishment. However, vector management allows for broader protection of Nevada resources and addresses species that may not yet be identified as a threat. Certainly some known species are of greater threat due to the damage that they may cause to Nevada resources and these species are highlighted. Non-Native Species Management Types and Priority Species of Concern identified in this plan were determined by the Nevada AIS Management Plan Working Group. Further information on individual species is explored in Appendix C.

ANIMALS

Invasive aquatic animals may include fish, bivalves, gastropods, amphibians, mammals and macroinvertebrates. The quagga mussel is the top species of priority and attributes to the significant AIS management effort currently underway in Nevada. This species is found in the Colorado Basin only. Other species of priority with isolated distribution are the rusty crayfish (*Orconectes rusticus*) and the swamp crayfish (*Procambarus clarkia*). The Asian clam (*Corbicula fluminea*) represents a highly ubiquitous species found throughout Nevada waters. With the exception of Lake Tahoe's management efforts, there are no control efforts underway to address Asian clams. Finally, the zebra mussel though not found in Nevada waters, is also a priority organism.

AQUATIC AND RIPARIAN PLANTS

Aquatic vascular plants include ferns and flowering plants that grow submersed in water, float on the water surface, or have basal portions inundated with foliage and upper parts immersed. Several macrophytes such as Eurasian watermilfoil and curly-leaf pondweed (*Potamogeton crispus*) are found within Nevada, but are currently managed by NDA. Eurasian watermilfoil is currently on the Nevada Noxious Weed List (Nevada Department of Agriculture 2017). Other species of interest which are not in Nevada but of priority include: hydrilla (*Hydrilla verticillata*), giant salvinia (*Salvinia molesta*), elodea (*Elodea spp*.), and water hyacinth (*Eichhornia crassipes*). The alga starry stonewort (*Nitellopsis obtuse*) is also a species of priority. By in large aquatic plants will be addressed by NDA. Plants that are found in the riparian area are also managed directly by NDA. All species of concern listed below are included on the NDA Noxious Weed List (2017) but because of their link to aquatic habitats they are mentioned here. These species include tamarisk species *(Tamarix spp.)*, purple loosestrife *(Lythrum salicaria)*, fountaingrass *(Pennisetum setaceum)*, hoary cress *(Cardaria draba)*, and whitetop *(Lepidium latifolium).*

PATHOGENS

Pathogens include bacteria, viruses or parasites. They may potentially enter Nevada on plants or animals imported into Nevada or through the water in which plants or animals are transported. Because of the potential negative impact of fish pathogens on Nevada's wild and cultured fisheries, import and transport of fish are closely regulated. Nevada law prohibits the importation of live fish infected with known bacterial pathogens. The FWS's National Wild Fish Health Survey database indicates limited fish pathogen occurrence in Nevada waters. Examples of pathogens of management priority that threaten Nevada fishes include viral hemorrhagic septicemia *(Novirhabdovirus sp.)* and largemouth bass virus (Family *Iridoviridae*, Ranavirus).

PATHWAYS OF INTRODUCTION

Determining high risk pathways for species introductions allows agencies and partners to focus limited resources to be effective in preventing species spread. Some pathways can be identified and targeted with relative straightforwardness, while other pathways prove more challenging to address. The threat that recreational boats pose in transporting and introducing AIS to new waters across the United States is well known (Johnson et al. 2001, Mari et al. 2011, Rothlisberger et al. 2011). Additional pathways such as the aquarium pet trade, private aquaculture and others pose threats as well. In some cases, Nevada has limited tools to address these threats. The use of Hazard Analysis Critical Control Plans (HACCP) then becomes an effective tool to be applied to any number of agency or partner related activities that occur on the landscape. The HACCP process can be used where activities are challenged with a set of considerations in order to identify and block pathways for introduction of invasive species. Basic HACCP guidelines can be applied to activities conducted in Nevada (Appendix H). The following are possible pathways for introduction of AIS.

I. Recreation Activities - There are many recreational activities and equipment that can spread AIS and boats have been identified as a primary pathway. For perspective, currently there are over 41,000 motorized boats registered in Nevada. Further LMNRA sold over 36,183 vessel passes in 2016 and noted an average of 4,451 boat trailers at popular launch ramp parking lots during summer weekends in 2016. A number of aspects of recreational activities may add an additional source of risk such as:
    a. Watercraft exiting quagga mussel infested waterbodies, such as Lake Mead, are a specific pathway targeted for containment and prevention strategies.
    b. Fishing tournaments result in a high volume of recreational boats entering and exiting waterbodies in a short period of time. These tournaments may be large scale; drawing boats from around the country or small scale having only local anglers attend.
    c. Fishing bait release is a pathway where species can be directly released into a waterbody.
    d. Boat dealers and boat auction houses in the region are an area that has been identified as significant risk for the spread of dreissenid mussels. Targeted programming to address this unique vector has been initiated.
    e. Out-of-state watercrafts launching into Nevada waters are considered a major threat for the introduction of AIS. For example, 33% of watercraft inspected exiting LMNRA in 2015 were out-of-state watercrafts that had recently launched. In addition, other watercraft inspection stations within the state routinely encounters between 6% to 33% out-of-state boaters launching into Nevada's waters (NDOW 2016).
II. Aquarium Release – Aquarium plants and animals are recognized as an important introduction pathway of invasive species (Padilla and Williams 2004, Rixon et al. 2005, Strecker et al. 2011). Retail markets, such as aquarium and pet stores, nurseries and garden centers, as well as mail order and internet suppliers sell a variety of plants, snails, fish and other aquatic species, many of which are invasive. Additionally, many educational classroom efforts can often be sources of intentional release of species (S Chan, Oregon Sea Grant, personal communication). Educating teachers and students could minimize this risk. Additionally, identifying aquarium species within the Nevada's Injurious Species List could help limit introductions to the state.
III. Commercial Transportation of Vehicles or Equipment – The commercial transportation or delivery of recreational boats, construction vehicles and other commercial equipment, such as floating docks can introduce AIS into new waters. Careful monitoring of such transport of equipment and proactive coordination with the transportation industry within Nevada is an important aspect of protecting waters by limiting the threat of this pathway.
IV. Retail Markets and Private Industries – There are many retail markets within Nevada that may be a potential source of invasive species.

a. Retail industries such as nursery and garden centers are able to supply a variety of species. Timely identification of problematic species and enforcement of current restriction of sale are needed to restrict this pathway.
b. Mail order and internet suppliers is a growing issue where a wide variety of species can be obtained easily and inexpensively despite species being restricted for import into the state. Many of the species identified in this plan of management priority can be purchased online.
c. Private fish farms are a small scale industry that may be an area where fish disease could be a possible risk. Most of the private hatcheries in Nevada produce species that are utilized in municipal mosquito management.
d. Products from the exotic food industry can be a pathway to introduction. However, it is not clear how much of a risk this pathway poses to Nevada waterways.

V. Field Activities – Many entities conduct field activities on Nevada's waterways for a variety of reasons including school groups, researchers, agency and tribal monitoring and educational events. There are many state and federal agencies that conduct work on different waterbodies to collect information on water quality, habitat and species. Any of these activities are a potential source for moving invasive species among water bodies. Providing general outreach and agency-internal education about best practices for field equipment cleaning, and promoting the use of the HACCP process can address the risk potential of this pathway.
    a. Wildland Fire Fighting Activities – The nature of fighting fire involves water and equipment that moves and carries water. Open water sources are often used to control a fire. Firefighting teams work across the west and are moved frequently as the fire incidents evolve. Encouraging the adoption of *Interagency Standards for Fire and Fire Aviation Operations* protocols to reduce the risk of spreading AIS via equipment is recommended.

VI. Industrial or Land Use Development Activities – The construction of new roads, placement of culverts or bridges and other movement where industrial vehicles are entering water or transporting water to do work are potential pathways for spreading AIS. Many construction vehicles and equipment move among watersheds or between states. Ensuring that pathways of introduction can be minimized by different industries is a challenge.

VII. Natural spread of AIS where resource managers generally do not have any control of introduction. The primary pathways of natural spread are discussed here.
    a. Wildlife – The potential for a variety of wildlife species such as fish, or waterfowl have been suggested to play a role in the spread of AIS. The incidental introduction and spread of AIS by wildlife may be a small risk, but options to prevent or control the spread of AIS by wildlife are equally improbable.
    b. Natural Disasters – There are events that occur naturally that could introduce or spread an invasive species. These include wind events, earthquakes, floods or other emergency events that may promote the spread of invasive species. Many of these events cannot be prevented or controlled as a means to introduce species.
    c. Free-flowing Water - The natural flow of water serves as a means for AIS to spread to new areas. AIS infested waters which are connected to other waters can provide a source of AIS. This natural aspect of species spread is largely out of the control of managers but is recognized as a means for species spread.

MANAGEMENT PLAN GOALS AND OBJECTIVES

The goals of the AIS Management Plan are to:

- Prevent new introductions of AIS to Nevada
- Limit the spread of existing AIS populations in Nevada, and eradicate or control novel AIS populations when possible
- Minimize harmful ecological, economic, social, and public health impacts that result from AIS

These goals are by nature broadly defined but serve to outline the ideal result of AIS Management Plan implementation. The six objectives detailed below and summarized in the Implementation Table further refine the goals in the context of reasonable and expected outputs. Specific, measurable strategies and actions have been identified to provide an achievable framework to meet each objective. The Nevada State Aquatic Invasive Species Management Plan Objectives meet the plan's goals to limit the introduction and spread of AIS and reduce their impacts understanding that constraints on available resources and necessary prioritization of threats may impact the ability to accomplish some strategies and actions and achieve their companion objectives.

OBJECTIVE A: OVERSIGHT AND COORDINATION

A state management plan requires strong oversight and coordination to ensure plan objectives and action items continue to meet the goals of the plan within the existing regulatory framework of the state. This requires identifying lead entities to support plan development, oversight, coordination, implementation, and adaptive review. The success of the plan is reflected in robust coordination efforts at a state, regional and national level.

OBJECTIVE B: PREVENTION

Preventing the introduction of AIS to new waters within Nevada as well as preventing further spread of existing AIS to other Nevada waters or beyond the region requires adequate inspection and decontamination procedures coupled with effective and consistent education and outreach. Additionally, targeting prevention efforts to high risk pathways will maximize limited resources.

OBJECTIVE C: OUTREACH AND EDUCATION

Thoughtful targeted outreach and education can be applied to all aspects of AIS management. Appropriate outreach can improve coordination effectiveness, increase public participation, and expand programmatic support.

OBJECTIVE D: MONITORING, EARLY DETECTION, AND RESPONSE

Early detection, containment, and control/eradication of new AIS introductions are important measures to reduce the impacts from AIS. Early detection is accomplished through comprehensive monitoring which is followed by the ability to respond appropriately and efficiently should a detection be made. Response is recognized as a collaborative effort among numerous agencies, non-governmental organizations, researchers, and other stakeholders.

OBJECTIVE E: LONG-TERM CONTROL

The ability to control AIS implies that populations can be managed to prevent further expansion of that population; whereas eradication suggests an option to completely remove the AIS population. In some cases, control or eradication measures will require collaborative effort among various agencies, nongovernmental organizations, researchers, and other stakeholders.

OBJECTIVE F: AIS LAWS AND REGULATIONS

The management of AIS is complex and requires a variety of legislative provisions to protect Nevada waters. The authority to adequately manage AIS in Nevada requires appropriate legislation and regulation.

TRUCKEE RIVER, NEVADA

STRATEGIES AND ACTIONS FOR IMPLEMENTATION

The strategies to implement the Nevada AIS Management Plan provide a framework for activities that will take place. With very few exceptions, strategies contain a component of evaluation in their implementation. The purpose of any evaluation is to gain valuable insight on the success of the plan and to allow for reflection and identification of future changes. When needed, further explanation on evaluation is stated explicitly. Otherwise, evaluation or in some cases quality assurance and quality control can be assumed to play a role in the implementation of each strategy. The following strategies have been identified to address the objectives of the plan. They are intended to be addressed within a 5-year implementation timeline. Strategies of the Nevada AIS Management Plan are considered to be dynamic and achievable. Action items are provided under the strategies to provide additional clarification on the direction of the objectives and strategies. Finally, each objective and strategy is outlined in the Implementation Table with information on the responsible entity, actions, funding and priority level.

OBJECTIVE A: DEVELOP AND MAINTAIN OVERSIGHT AND COORDINATION

Strategy A.1

Maintain a statewide Aquatic Invasive Species Coordinator to support Nevada's AIS Program.

A.1.1 Action

Ensure adequate funding is available, including promotion of Nevada's Watercraft AIS decal requirement (see Appendix D); and assessment of potential funding opportunities to support the position.

Strategy A.2

Implement the Nevada AIS Management Plan including but not limited to internal agency coordination.

A.2.1 Action

Review action items annually for completion and assessment.

Strategy A.3

Establish and coordinate an interagency and stakeholder Nevada AIS Plan Implementation Team.

A.3.1 Action

Prioritize and implement AIS management efforts as identified by the Nevada AIS Management Plan Implementation Team and priority species identified in Appendix B.

Strategy A.4

Review and adopt the Nevada AIS Management Plan as needed including potential needs associated with climate change adaptation.

A.4.1 Action

Evaluate AIS Plan strategies and actions on an annual basis to determine if AIS introductions and/or spread are influenced by changes in climate.

Strategy A.5

Submit annual progress reports and five-year program report to the FWS or as directed based on funding agreement. Other reports will be provided to other partners based on funding sources.

A.5.1 Action

Review and update the AIS Management Plan every five years or as deemed necessary.

Strategy A.6

Coordinate and collaborate with local, state, federal, tribal governments, AIS stakeholders and legislators.

A.6.1 Action

Continue annual coordination meetings and/or conference calls with the AIS Management Plan Working Group and/or the Nevada AIS Management Plan Implementation Team.

A.6.2 Action
Evaluate and contact new potential members (both statewide and out of state) for invitation to the AIS Management Plan Working Group and/or the Nevada AIS Management Plan Implementation Team.

A.6.3 Action
Develop and provide a biennium AIS program report that summarizes major activities and budgets to the state and federal legislators, federal/state and tribal partners and additional stakeholders.

Strategy A.7
Participate in regional AIS management efforts, including but not limited to the ANSTF's WRP, 100th Meridian Columbia River Basin Team, Colorado River Basin Team, Lake Tahoe AIS Coordinating Committee, and Southern Nevada Interagency AIS Quagga Meetings.

A.7.1 Action
Provide program presentations and participate in committees and working groups that further advance AIS prevention, detection and control methodologies that impact Nevada.

Strategy A.8
Identify areas where more information is needed on oversight and coordination that may be affected by climate change.

A.8.1 Action
Review and incorporate, where appropriate, up to date scientific research related to climate change and AIS into the management plan including prevention, detection, early response and control programs.

A.8.2 Action
Evaluate the economic and ecological costs and benefits of any potential proposed program action prior to implementation.

A.8.3 Action
Coordinate with tribal, local, federal, state and academic entities to remain vigilant to current climate change research.

OBJECTIVE B: PREVENT NEW AIS INTRODUCTIONS

Strategy B.1
Identify and categorize potential new pathways and risk of AIS introductions to minimize or eliminate introductions.

B.1.1 Action
Coordinate with stakeholders, neighboring states, federal, and local agencies, and academia and field biologists to identify risk and pathways of new species introductions.

B.1.2 Action
Participate in conferences and workshops that assist in establishing risk assessments of new invasive species introductions.

B.1.3 Action
Review and update the management plan species list as necessary regarding concerns and AIS types as defined in Appendix B.

B.1.4 Action
Generate species specific actions for prevention of species with high risk levels of introduction as defined in Appendix B.

B.1.5 Action
Develop and disseminate educational and outreach materials to targeted audiences regarding pathways, new introductions and threats.

B.1.6 Action
Coordinate with stakeholders and inform the general public regarding potential new high risk AIS introductions.

B.1.7 Action
Develop and implement an outreach and educational campaign targeting the aquarium and pet store industry to facilitate the prevention of AIS releases and introductions.

B.1.8 Action
Evaluate existing laws and regulations to determine their adequacy for preventing potential introductions or the spread of AIS.

B.1.9 Action
Develop new regulations as appropriate to protect Nevada from new AIS introductions and/or to reduce threats.

Strategy B.2

Continue the implementation of a watercraft inspection and decontamination program.

B.2.1 Action
Employ a statewide watercraft inspection station supervisor.

B.2.2 Action
Coordinate and establish inspection station reciprocity, where appropriate, with regional and interstate partners.

B.2.3 Action
Evaluate annually the effectiveness of the watercraft inspection and decontamination program; including locations, staffing, interceptions, prevention efforts, expenses, reporting structures and databases.

B.2.4 Action
Provide AIS field staff with the most current acceptable watercraft inspection and decontamination protocols and training annually.

B.2.5 Action
Provide AIS field staff with job site safety instructions and training; including monthly safety checks and/or training.

B.2.6 Action
Participate in regional watercraft inspection reporting structures and databases, as deemed appropriate.

B.2.7 Action
Ensure funding opportunities are evaluated and proposals submitted in a timely fashion to establish effective and stable watercraft inspection and decontamination program elements.

B.2.8 Action
Ensure adequate support staff, equipment and supplies are available to implement watercraft inspection and decontamination training and operation.

Strategy B.3
Coordinate, as feasible, with tribal government engagement in AIS management; including but not limited to Pyramid Lake Paiute Tribe in their development of prevention methods to protect Pyramid Lake, and the Shoshone-Paiute Tribes of the Duck Valley Reservation for prevention methods for Wildhorse Reservoir.

B.3.1 Action
Extend AIS training and coordinate outreach efforts with Nevada's tribal nations.

B.3.2 Action
Extend invitations to Nevada's tribal nations to participate in the Western Regional Panel and other western regional groups as appropriate.

Strategy B.4
Work collaboratively with state, local and federal enforcement personnel to educate staff on AIS regulations to increase engagement with enforcement actions.

B.4.1 Action
Develop a plan to engage with various law enforcement entities.

B.4.2 Action
Coordinate and train NDOW game wardens and other law enforcement officials in AIS prevention and regulatory compliance.

Strategy B.5
Implement HACCP training and plans for appropriate personnel within agencies and among stakeholders.

B.5.1 Action
Conduct interagency and stakeholder HACCP trainings as needed.

B.5.2 Action
Develop plans incorporating HACCP recommendations and actions into AIS prevention efforts.

Strategy B.6
Identify information needs related to AIS prevention that may be affected by climate change.

B.6.1 Action
Evaluate current climate change research and coordinate with climate researchers and other states to evaluate the potential risk, prevention, pathways and introductions due to changes in climatic variables.

OBJECTIVE C: DEVELOP OUTREACH AND EDUCATION TOOLS

Strategy C.1
Develop and implement outreach and education strategies that target major pathways of introduction and reflect regional themes including but not limited to the Nevada Boater Safety Program.

C.1.1 Action
Collaborate with stakeholders, western states and other local entities to define major pathways and develop consistent regional outreach and education efforts, as appropriate.

C.1.2 Action
Develop outreach that targets the specific user of the resource; include multi languages where appropriate.

C.1.3 Action
Provide necessary training and outreach materials to AIS personnel and other staff for distribution to the public.

C.1.4 Action
Collaborate with the Nevada Boater Safety Program and provide combined public outreach when appropriate.

Strategy C.2
Develop outreach strategies to target the Nevada State Legislature and Congress.

C.2.1 Action
Collaborate with western states and local entities to define necessary program requests and potential legislative actions.

C.2.2 Action
Develop AIS program status reports to be available publicly and provided to the Nevada State Legislature.

Strategy C.3
Develop communication strategies to stakeholders to encourage collaboration and response.

C.3.1 Action
Participate in regional, interagency and local working groups, and educational events that promote AIS prevention.

C.3.2 Action
Work with conservation education experts and non-profit organizations to develop targeted objectives and actions.

Strategy C.4
Develop outreach strategies that highlight efforts of programmatic implementation strengths and weaknesses.

C.4.1 Action
Work with conservation education experts and advertising organizations to develop and provide outreach and educational guidance.

Strategy C.5
Develop outreach strategies to improve internal agency understanding and support.

C.5.1 Action
Provide periodic program progress reports to agency management.

C.5.2 Action
Incorporate agency management into program needs and developments.

C.5.3 Action
Collaborate with agency Fisheries, Wildlife Diversity, Conservation Education, and Law Enforcement/ Boater Safety Divisions to foster internal support for AIS management.

Strategy C.6
With current public outreach efforts consider how information about climate change – invasive species interactions could be shared.

C.6.1 Action
Collaborate with experts from both the outreach and climate change communities to develop and implement appropriate outreach tools.

OBJECTIVE D: DEVELOP MONITORING, EARLY DETECTION, AND RESPONSE PLANS

Strategy D.1

Create a comprehensive early detection and monitoring program for species that have a high risk of introduction on waters of the state in collaboration with stakeholders as appropriate. Program evaluation and adaptive management, and climate change impacts are strong components of this effort.

D.1.1 Action
Review and recommend use of appropriate risk assessment when a new AIS species is detected in the state.

D.1.2 Action
Develop a reporting platform for potential AIS sighting by public citizens through hotline reports and on-line reports.

D.1.3 Action
Identify stakeholder agencies or organizations that can verify public sightings.

D.1.4 Action
Facilitate the use of consistent and effective monitoring, sampling protocols and laboratory analysis methods among stakeholders.

D.1.5 Action
Encourage and establish monitoring networks or include other interested parties to work in cooperation with agencies on monitoring.

D.1.6 Action
Coordinate with other agencies to establish monitoring locations and methodologies.

D.1.7 Action
Establish a communication group to discuss and report monitoring results.

D.1.8 Action
Support and encourage scientific research efforts, as appropriate, to assist with the identification of vector pathways, early detection, containment points, and response options.

D.1.9 Action
Evaluate the role that climatic change may have on new introductions, monitoring, early detection and rapid response.

D.1.10 Action
Develop measurement tools and criteria to evaluate and assess monitoring methodology and prevention program strengths and weaknesses.

Strategy D.2

Develop a rapid response framework that defines roles, responsibilities of potential participants, identifies potential funding sources for response actions and identifies potential methods for control for newly introduced species.

D.2.1 Action
Establish elements of the Incident Command System structure to identify roles and responsibilities for new introduced species.

D.2.2 Action
Identify potential funding sources for supporting rapid response activities.

D.2.3 Action
Provide training to appropriate Incident Command Team members for a rapid response.

D.2.4 Action
Retain and update the Incident Command Team framework and member contact information.

D.2.5 Action
Participate in regional rapid response events, when possible including Lake Tahoe and Columbia River Basin's Rapid Response Planning Teams.

D.2.6 Action
Evaluate and update available AIS databases to identify AIS establishments and identify problem species, regions, and high risk introductions.

D.2.7 Action
Develop monitoring protocols and determine responsibilities for identification and response to potential high risk AIS introductions.

OBJECTIVE E: EVALUATE AND DEVELOP LONG-TERM CONTROL MECHANISMS

Strategy E.1
Coordinate with partners on response efforts to control detected AIS, when possible.

E.1.1 Action
Prepare resources and gain authorizations to utilize control measures, as needed.

E.1.2 Action
Identify and encourage research to inform long-term control options and consider areas of climate change-AIS interactions.

E.1.3 Action
Identify areas where more information, including economic and ecological impacts, is needed for long-term control that may be affected by climate change.

OBJECTIVE F: EVALUATE AND DEVELOP AIS LAWS AND REGULATIONS

Strategy F.1
Conduct periodic reviews of current AIS laws and regulations to determine effectiveness, and seek areas of improvement for protections to Nevada waters that reflect regional consistency as appropriate.

F.1.1 Action
Evaluate, review and adopt, where appropriate, recommendations on regulation modifications from Building Consensus in the West (Showalter Otts and Nanjappa 2014 and 2016).

F.1.2 Action
Coordinate with law enforcement and the Nevada Attorney General's office to incorporate regulations and/or changes to laws.

F.1.3 Action
Participate in the development of Tahoe Regional Planning Agency's regulatory processing to maintain consistency among programs.

MARLETTE LAKE, NEVADA

PRIORITIES FOR ACTION

The above listed objectives are all necessary for attainment of the three goals. The strategies and actions associated with the six objectives described are all essential to achieve each individual objective. Each objective was established to meet the three primary goals of the plan: to prevent and limit the spread and introduction of AIS into Nevada's waterbodies and to control or eradicate AIS populations that have the potential to cause harmful ecological, economic and public health harm. To implement the goals and objectives contained within the plan requires the application of strategies followed by tangible and measurable actions. In order to implement the plan, an AIS Coordinator and adequate support staff is necessary and required to achieve or coordinate a majority of the strategies and actions. If the AIS Coordinator and support staff are maintained to implement the plan, then priority strategies and actions can be addressed. Listed below, but not in any priority order, are the highest priority action items identified.

OBJECTIVE A: DEVELOP AND MAINTAIN OVERSIGHT AND COORDINATION

Strategy A.3: Establish and coordinate an interagency and stakeholder Nevada AIS Plan Implementation Team.

> **Action A.3.1:** Prioritize and implement AIS management efforts as identified by the Nevada AIS Implementation Team and priority species identified in Appendix B.

A majority of Nevada's land is managed by resource managers derived from various federal government and tribal partners (Figure 5). In addition, the state manages various parks and wildlife management areas. In order to implement many of the strategies and actions within the AIS Management Plan will require the participation of many of these partners. The establishment of a statewide Nevada AIS Management Plan Implementation Team will provide the structure to assist in the implementation including project and monitoring prioritization, evaluation, and scientific review.

OBJECTIVE B: PREVENT NEW AIS INTRODUCTIONS

Strategy B.1: Identify and categorize potential new pathways and risk of AIS introductions to minimize or eliminate introductions.

> **Action B.1.1:** Coordinate with stakeholders, neighboring states, federal, and local agencies, and academia and field biologists to identify risk and pathways of new species introductions.
>
> **Action B.1.4:** Generate species specific actions for prevention for species with high risk levels of introduction as defined in Appendix B.
>
> **Action B.1.7:** Develop and implement an outreach and educational campaign targeting the aquarium and pet store industry to facilitate the prevention of AIS releases and introductions.

The prevention of new AIS introductions into the state will require the cooperation of neighboring states and federal agencies. For example, if a neighboring state may have an infestation of AIS that Nevada currently does not then, through collaboration with that state, Nevada can determine the risk of introduction and the potential pathways of introduction. By using this process, Nevada can generate species specific actions to prevent introduction. Another major pathway of undesirable AIS into Nevada is the introduction and release of aquarium and pet industry organisms. This action will be to develop and implement an educational program that targets aquarium and pet industry businesses and the public to discourage the release of pets and aquatic plants.

Strategy B.2: Continue the implementation of a watercraft inspection and decontamination program.

> **Action B.2.1:** Employ a statewide watercraft inspection station supervisor.
>
> **Action B.2.2:** Coordinate and establish inspection station reciprocity, where appropriate, with regional and interstate partners.

Action B.2.7: Ensure funding opportunities are evaluated and proposals submitted in a timely fashion to establish effective and stable watercraft inspection and decontamination program elements.

Action B.2.8: Ensure adequate support staff, equipment and supplies are available to implement watercraft inspection and decontamination station training and operation.

The watercraft inspection and decontamination program has been a strong and successful component of Nevada's current AIS program. Although the program originally focused on preventing the spread of quagga mussels through watercraft transport from the Lower Colorado River, the current operation of the program also prevents the spread and introduction of other undesirable AIS throughout the state through the inspection and decontamination process. The implementation of the Nevada Management Plan's strategies and actions for the watercraft inspection and decontamination stations will ensure the future success of the program in preventing new and containing existing AIS.

OBJECTIVE C: DEVELOP OUTREACH AND EDUCATION TOOLS

Strategy C.1: Develop and implement outreach and education strategies that target major pathways of introduction and reflect regional themes including but not limited to the Boater Safety Program.

Action C.1.1: Collaborate with stakeholders, western states and other local entities to define major pathways and develop consistent regional outreach and education efforts as appropriate.

A strong and well developed outreach program will assist in preventing the introduction and spread of AIS in the state. Without the support and understanding of AIS issues from the public, the plan would be without full merit. A well-developed outreach program should consist of similar if not identical regional and interstate messaging to the greatest extent possible. Through the teamwork of the WRP and other stakeholders, pathways and consistent messaging can be realized.

OBJECTIVE D: DEVELOP MONITORING, EARLY DETECTION AND RESPONSE PLANS

Strategy D.1: Create a comprehensive early detection and monitoring program for species that have a high risk of introduction on waters of the state in collaboration with stakeholders, as appropriate. Program evaluation and adaptive management, and climate change impacts are strong components of this effort.

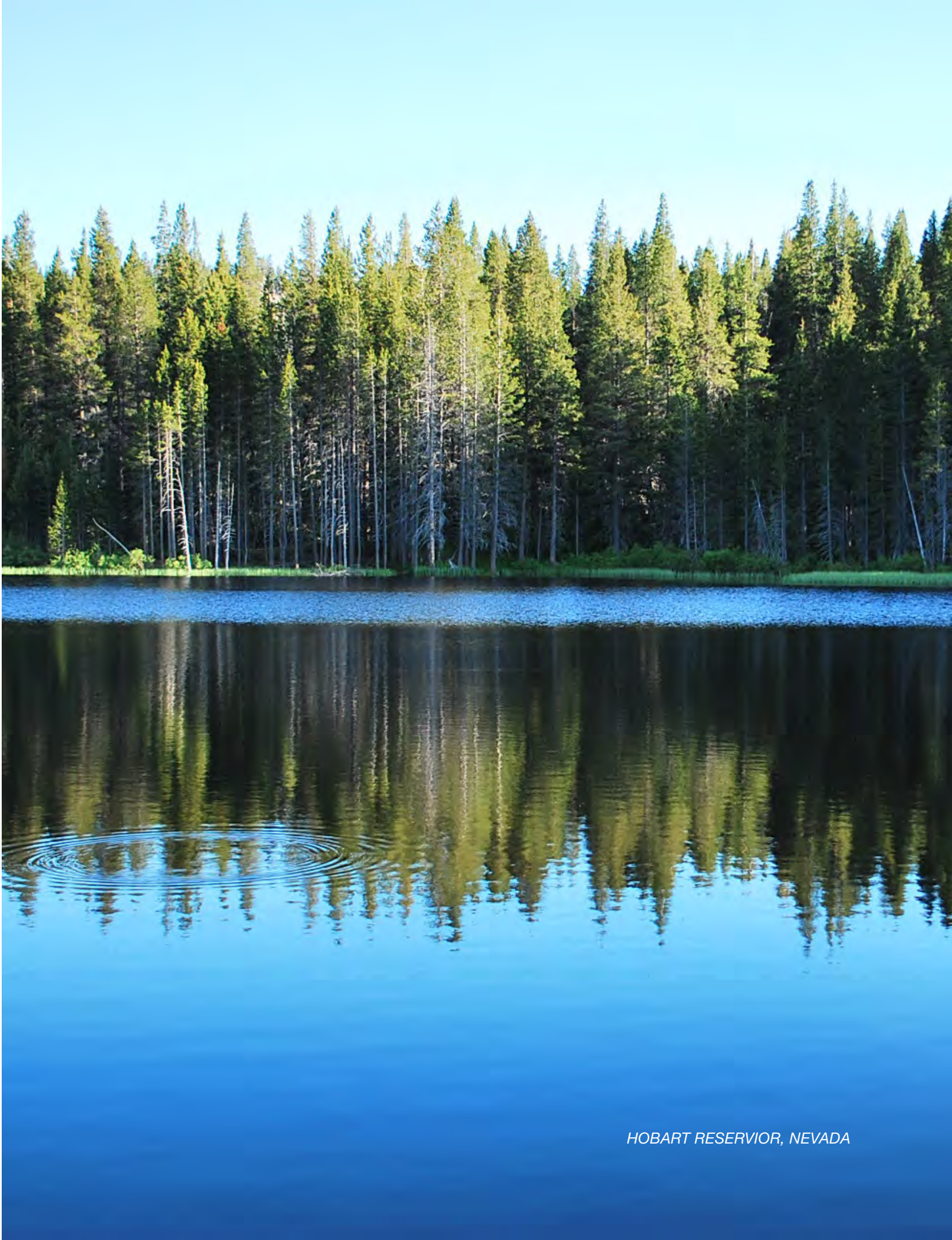
Action D.1.1: Review and recommend use of appropriate risk assessment when a new AIS species is detected in the state.

Action D.1.4: Facilitate the use of consistent and effective monitoring, sampling protocols and laboratory analysis methods among stakeholders.

Action D.1.6: Coordinate with other agencies to establish monitoring locations and methodologies.

Action D.1.10: Develop measurement tools and criteria to evaluate and assess monitoring methodology and prevention program strengths and weaknesses.

Through the initiation of a Nevada AIS Management Plan Implementation Team and the application of appropriate risk assessments, early detection and monitoring protocols will be developed that are appropriate for species with the highest risk of introductions. Other monitoring and detection protocols (e.g. quagga/zebra mussel) will follow the recommended criteria developed and approved by the WRP. Evaluation tools and criteria will be incorporated into the early detection and monitoring protocols.



HOBART RESERVIOR, NEVADA

IMPLEMENTATION TABLE

The implementation table of the Nevada AIS Management Plan identifies the estimated funding needed as well as the appropriate agency and cooperating entities that will implement portions of the plan. This table is a reflection of the outlined objectives and strategies that have been identified. The funding identified is considered for a 5-year period of implementation. The table also contains a priority ranking from low to high for each action item.

IMPLEMENTATION TABLE

Total Estimated Expenses for Implementation Table (5 year): $5.2355m
Notes: -0- Funding need, if any, may already be incorporated into another strategy
--- Not applicable

STRATEGY	ACTION	LEAD ORGANIZATION	COOPERATING ORGANIZATION	FUNDING SOURCE	5-YEAR ANTICIPATED FUNDING NEED	PRIORITY
OBJECTIVE A: DEVELOP AND MAINTAIN PLAN OVERSIGHT AND COORDINATION						
A.1 Maintain a Statewide AIS Coordinator	**A.1.1** Ensure adequate funding is available, including promotion of Nevada's Watercraft AIS decal requirement (see Appendix D); and assessment of potential funding opportunities to support the position.	NDOW	FWS, & Resource Managers & Steakholders	AIS Decal Fee & Available Federal Grants	1 FTE 475k	High
A.2 Implement the Nevada AIS Management Plan including but not limited to internal agency coordination.	**A.2.1** Review action items annually for completion and assessment.	NDOW	---	---	-0-	High
A.3 Establish and coordinate an interagency and stakeholder Nevada AIS Plan Implementation Team.	**A.3.1** Prioritize and implement AIS management efforts as identified by the Nevada AIS Plan Implementation Team and priority species identified in Appendix B.	NDOW	Resource Managers	---	-0-	High
A.4 Review and adapt the Nevada AIS Management Plan as needed including potential needs associated with climate change adaptation.	**A.4.1** Evaluate AIS plan strategies and actions on an annual basis to determine if AIS introductions and/or spread are influenced by changes in climate.	NDOW	FWS, & Resource Managers & Stakeholders	---	-0-	Med
A.5 Submit annual progress reports and five-year program report to the FWS as directed based on funding agreement. Other reports will be provided to other partners based on funding sources and agreements.	**A.5.1** Review and update the AIS Management Plan every five years or as deemed necessary.	NDOW	FWS, & Resource Managers & Stakeholders	AIS Decal Fee & Available Grants	40k	High

STRATEGY	ACTION	LEAD ORGANIZATION	COOPERATING ORGANIZATION	FUNDING SOURCE	5-YEAR ANTICIPATED FUNDING NEED	PRIORITY
OBJECTIVE A: DEVELOP AND MAINTAIN PLAN OVERSIGHT AND COORDINATION						
A.6 Coordinate and collaborate with local, state, federal, tribal governments, AIS stakeholders and legislators.	**A.6.1** Continue annual coordination meetings and/or conference calls with the AIS Management Plan Working Group and/or the AIS Management Plan Implementation Team	NDOW	FWS, & Resource Managers & Steakholders	---	10k	High
	A.6.2 Evaluate and contact new potential members (both statewide and out of state) for invitation to the AIS Management Plan Working Group and/or the AIS Management Plan Implementation Team.	NDOW	FWS, & Resource Managers & Steakholders	---	-0-	Med
	A.6.3 Develop and provide a biennium AIS program report that summarizes major activities and budgets to the state and federal legislators, federal/state and tribal partners and additional stakeholders.	NDOW	---	---	-0-	Med
A.7 Participate in regional AIS management efforts, including but not limited to the ANS Task Force's Western Regional Panel on ANS, 100th Meridian Columbia River Basin Team, Colorado River Basin Team, Lake Tahoe AIS Coordinating Committee, and Southern Nevada Interagency AIS Quagga Meetings.	**A.7.1** Provide program presentations and participate in committees and working groups that further advance AIS prevention, detection and control methodologies that impact Nevada.	NDOW	---	---	5k	High

STRATEGY	ACTION	LEAD ORGANIZATION	COOPERATING ORGANIZATION	FUNDING SOURCE	5-YEAR ANTICIPATED FUNDING NEED	PRIORITY
OBJECTIVE A: DEVELOP AND MAINTAIN PLAN OVERSIGHT AND COORDINATION						
A.8 Identify areas where more information is needed on oversight and coordination that may be affected by climate change.	**A.8.1** Review and incorporate, where appropriate, up to date scientific research related to climate change and AIS into the management plan including prevention, detection, early response and control programs.	NDOW	FWS, & Resource Managers, Stakeholders & Academia	Available Grants	25k	High
	A.8.2 Evaluate the economic and ecological costs and benefits of potential proposed program actions.	NDOW	---	---	-0-	High
	A.8.3 Coordinate with tribal, local, federal, state and academic entities to remain vigilant to current climate change research.	NDOW	Academia & Resource Managers	Available Grants	-0-	High

STRATEGY	ACTION	LEAD ORGANIZATION	COOPERATING ORGANIZATION	FUNDING SOURCE	5-YEAR ANTICIPATED FUNDING NEED	PRIORITY
OBJECTIVE B: PREVENT NEW AIS INTRODUCTIONS						
B.1 Identify and categorize potential new pathways and risk of AIS introductions to minimize or eliminate introductions.	**B.1.1** Coordinate with stakeholders, neighboring states, federal, and local agencies, and academia and field biologists to identify risk and pathways of new species introductions.	NDOW	Academia, Stakeholders & Resource Managers	---	-0-	High
	B.1.2 Participate in conferences and workshops that assist in establishing risk assessments of new invasive species introductions.	NDOW	Academia, Stakeholders & Resource Managers	Available Grants	5k	
	B.1.3 Review and update the management plan species list as necessary regarding concerns and AIS types as defined in Appendix A.	NDOW	FWS, & Resource Managers & Stakeholders	Available Grants	10k	Med
	B.1.4 Generate species specific actions for prevention of species with high risk levels of introduction as defined in Appendix B.	NDOW	FWS, & Resource Managers & Stakeholders	Available Grants	10k	High
	B.1.5 Develop and disseminate educational and outreach materials to targeted audiences regarding pathways, new introductions and/or threats.	NDOW	FWS, & Resource Managers, Stakeholders & Academia	Available Grants	25k	High
	B.1.6 Coordinate with stakeholders and inform the general public regarding potential new high risk AIS introductions.	NDOW	FWS, & Resource Managers & Stakeholders	---	---	High

STRATEGY	ACTION	LEAD ORGANIZATION	COOPERATING ORGANIZATION	FUNDING SOURCE	5-YEAR ANTICIPATED FUNDING NEED	PRIORITY
OBJECTIVE B: PREVENT NEW AIS INTRODUCTIONS						
B.1 Continued	**B.1.7** Develop and implement an outreach and educational campaign targeting the aquarium and pet store industry to facilitate the prevention of AIS releases and introductions.	NDOW	FWS, & Resource Managers & Stakeholders	AIS Decal Fee and Available Grants	50k	High
	B.1.8 Evaluate existing laws and regulations to determine their adequacy for preventing potential introductions or the spread of AIS.	NDOW	---	---	-0-	Med
	B.1.9 Develop new regulations as appropriate to protect Nevada from new AIS introductions and/or to reduce threats.	NDOW	---	---	-0-	Med
B.2 Continue the implementation of a watercraft inspection and decontamination program.	**B.2.1** Employ a statewide watercraft inspection station supervisor.	NDOW	FWS, & Resource Managers	AIS Decal Fee and Available Grants	1 FTE 375k	High
	B.2.2 Coordinate and establish inspection station reciprocity, where appropriate, with regional and interstate partners.	NDOW	FWS, & Resource Managers, Stakeholders	---	---	High
	B.2.3 Evaluate annually the effectiveness of the watercraft inspection and decontamination program; including locations, staffing, interceptions, prevention efforts, expenses, reporting structures and databases.	NDOW	FWS, NPS, BOR, & NSP	AIS Decal Fee and Available Grants	3.5m	High

STRATEGY	ACTION	LEAD ORGANIZATION	COOPERATING ORGANIZATION	FUNDING SOURCE	5-YEAR ANTICIPATED FUNDING NEED	PRIORITY
OBJECTIVE B: PREVENT NEW AIS INTRODUCTIONS						
B.2 Continued	**B.2.4** Provide AIS field staff with the most current acceptable watercraft inspection and decontamination protocols and training annually.	NDOW	Western Regional Panel	---	-0-	High
	B.2.5 Provide AIS field staff with job site safety instructions and training; including monthly safety checks and/or training.	NDOW	---	---	-0-	High
	B.2.6 Participate in regional watercraft inspection reporting structures and databases, as deemed appropriate.	NDOW	Western Regional Panel & Pacific States Marine Fisheries Commission	AIS Decal Fee and Available Grants	100k	Med
	B.2.7 Ensure funding opportunities are evaluated and proposals submitted in a timely fashion to establish effective and stable watercraft inspection and decontamination program elements.	NDOW	---	---	-0-	High
	B.2.8 Ensure adequate support staff, equipment and supplies are available to implement watercraft inspection and decontamination station training and operation.	NDOW	NPS, NSP & other Resource Managers	---	-0-	High

STRATEGY	ACTION	LEAD ORGANIZATION	COOPERATING ORGANIZATION	FUNDING SOURCE	5-YEAR ANTICIPATED FUNDING NEED	PRIORITY
OBJECTIVE B: PREVENT NEW AIS INTRODUCTIONS						
B.3 Coordinate, as feasible, with tribal government engagement in AIS management; including but not limited to Pyramid Lake Paiute Tribe in their development of prevention methods to protect Pyramid Lake, and the ShoshonePaiute Tribes of the Duck Valley Reservation for prevention methods for Wildhorse Reservoir.	**B.3.1** Extend AIS training and coordinate outreach efforts with Nevada's tribal nations.	NDOW	USFWS, PLPT, & other NV Tribal Partners	Available Grants	8k	High
	B.3.2 Extend invitations to Nevada's tribal nations to participate in the Western Regional Panel and other western regional groups as appropriate.	Western Regional Panel	Western Regional Panel, PLPT, & other NV Tribal Partners and Resource Managers	---	-0-	Med
B.4 Work collaboratively with state, local and federal enforcement personnel to educate staff on AIS regulations to increase engagement with enforcement actions.	**B.4.1** Develop a plan to engage with various law enforcement entities.	NDOW	NPS, County Sheriff Dept., NV Highway Patrol, Tribal Police	---	5k	
	B.4.2 Coordinate and train NDOW game wardens and other law enforcement officials in AIS prevention and regulatory compliance.	NDOW	---	---	-0-	High
B.5 Implement HACCP training and plans for appropriate personnel within agencies and among stakeholders.	**B.5.1** Conduct interagency and stakeholder HACCP trainings as needed.	NDOW & FWS	All Partners	USFWS & Available Grants	10k	High
	B.5.2 Develop plans incorporating HACCP recommendations and actions into AIS prevention efforts.	NDOW & FWS	All Partners	USFWS & Available Grants	-0-	Med

STRATEGY	ACTION	LEAD ORGANIZATION	COOPERATING ORGANIZATION	FUNDING SOURCE	5-YEAR ANTICIPATED FUNDING NEED	PRIORITY
OBJECTIVE B: PREVENT NEW AIS INTRODUCTIONS						
B.6 Identify information needs on AIS prevention that may be affected by climate change.	**B.6.1** Evaluate current climate change research and coordinate with climate researchers and other states to evaluate the potential risk, prevention, pathways and introductions due to changes in climatic variables.	NDOW, FWS, Academia	FWS, & Resource Managers & Stakeholders	AIS Decal Fee & Available Federal Grants	20k	Med

STRATEGY	ACTION	LEAD ORGANIZATION	COOPERATING ORGANIZATION	FUNDING SOURCE	5-YEAR ANTICIPATED FUNDING NEED	PRIORITY
OBJECTIVE C: DEVELOP OUTREACH AND EDUCATION TOOLS						
C.1 Develop and implement outreach and education strategies that target major pathways of introduction and reflect regional themes including but not limited to the Boater Safety Program.	**C.1.1** Collaborate with stakeholders, western states and other local entities to define major pathways and develop consistent regional outreach and education efforts as appropriate.	NDOW	Western Regional Panel	AIS Decal Fee & Available Federal Grants	-0-	High
	C.1.2 Develop outreach that targets the specific user of the resource; include multi languages where appropriate.	NDOW	Western Regional Panel	AIS Decal Fee & Available Federal Grants	275k	High
	C.1.3 Provide necessary training and outreach materials to AIS personnel and other staff for distribution to the public.	NDOW	---	---	-0-	Med
	C.1.4 Collaborate with the Boater Safety Program and provide combined public outreach when appropriate.	NDOW	NDOW	---	-0-	Med
C.2 Develop outreach strategies to target the Nevada State Legislature and Congress.	**C.2.1** Collaborate with western states and local entities to define necessary program requests and potential legislative actions	NDOW	Western Regional Panel	---	-0-	Med
	C.2.2 Develop AIS Program status reports to be available publicly and provided to the Nevada State Legislature.	NDOW	Western Regional Panel	---	-0-	High

STRATEGY	ACTION	LEAD ORGANIZATION	COOPERATING ORGANIZATION	FUNDING SOURCE	5-YEAR ANTICIPATED FUNDING NEED	PRIORITY
OBJECTIVE C: DEVELOP OUTREACH AND EDUCATION TOOLS						
C.3 Develop communication strategies to stakeholders to encourage collaboration and response.	**C.3.1** Participate in regional, interagency and local working groups, and educational events that promote AIS prevention.	NDOW	FWS, & Resource Managers & Stakeholders	---	-0-	High
	C.3.2 Work with conservation education experts and non-profit organizations to develop targeted objectives and actions.	NDOW	FWS, & Resource Managers & Stakeholders	---	-0-	Med
C.4 Develop outreach strategies that highlight efforts of programmatic implementation strengths and weaknesses.	**C.4.1** Work with conservation education experts and advertising organizations to develop and provide outr each and educational guidance.	NDOW	FWS, & Resource Managers & Stakeholders	AIS Decal Fee & Available Federal Grants	50k	Med
C.5 Develop outreach strategies to improve internal agency understanding and support.	**C.5.1** Provide periodic program progress reports to agency management.	NDOW	---	---	-0-	High
	C.5.2 Incorporate agency management into program needs and developments.	NDOW	---	---	-0-	High
	C.5.3 Collaborate with agency Fisheries, Wildlife Diversity, Conservation Education, and Law Enforcement/Boater Safety Divisions to foster internal support for AIS management.	NDOW	---	---	-0-	High
C.6 With current public outreach efforts consider how information about climate change – invasive species interactions could be shared.	**C.6.1** Collaborate with experts from both the outreach community and climate change to develop and implement appropriate outreach tools.	NDOW	FWS, & Resource Managers & Stakeholders	---	-0-	Med

STRATEGY	ACTION	LEAD ORGANIZATION	COOPERATING ORGANIZATION	FUNDING SOURCE	5-YEAR ANTICIPATED FUNDING NEED	PRIORITY
OBJECTIVE D: DEVELOP MONITORING, EARLY DETECTION AND, RESPONSE PLANS						
D.1 Create a comprehensive early detection and monitoring program for species that have a high risk of introduction on waters of the state in collaboration with stakeholders as appropriate. Program evaluation and adaptive management, and climate change impacts are strong components of this effort.	**D.1.1** Review and recommend use of appropriate risk assessment when a new AIS species is detected in the State.	NDOW & Resource Managers	FWS, & Resource Managers & Stakeholders	---	-0-	High
	D.1.2 Develop a reporting platform for potential AIS sighting by public citizens through hot line reports and on-line reports.	NDOW & Resource Managers	FWS, & Resource Managers & Stakeholders	AIS Decal Fee and Available Grants	25k	Med
	D.1.3 Identify stakeholder agencies or organizations that can verify public sightings.	NDOW & Resource Managers	FWS, & Resource Managers & Stakeholders	---	-0-	Med
	D.1.4 Facilitate the use of consistent and effective monitoring, sampling protocols and laboratory analysis methods among stakeholders.	NDOW & Resource Managers	FWS, & Resource Managers & Stakeholders	---	-0-	High
	D.1.5 Encourage and establish monitoring networks or include other interested parties to work in cooperation with agencies on monitoring.	NDOW & Resource Managers	FWS, & Resource Managers & Stakeholders	AIS Decal Fee and Available Grants	50k	Med
	D.1.6 Coordinate with other agencies to establish monitoring locations and methodologies.	NDOW	FWS, & Resource Managers & Stakeholders	---	-0-	High
	D.1.7 Establish a communication group to discuss and report monitoring results.	NDOW & Resource Managers		---	-0-	Med

STRATEGY	ACTION	LEAD ORGANIZATION	COOPERATING ORGANIZATION	FUNDING SOURCE	5-YEAR ANTICIPATED FUNDING NEED	PRIORITY
OBJECTIVE D: DEVELOP MONITORING, EARLY DETECTION AND, RESPONSE PLANS						
D.1 Contiuned	**D.1.8** Support scientific research efforts, as appropriate, to assist with the identification of vector pathways, early detection, containment points, and response options.	NDOW, Resource Managers and Academia	FWS, & Resource Managers & Stakeholders	AIS Decal Fee and Available Grants	50k	High
	D.1.9 Evaluate the role that climatic change may have on new introductions, monitoring, early detection and rapid response.	NDOW, Resource Managers and Academia	FWS, & Resource Managers & Stakeholders	AIS Decal Fee and Available Grants	25k	Med
	D.1.10 Develop measurement tools and criteria to evaluate and assess monitoring methodology and prevention program strengths and weaknesses.	NDOW, Resource Managers and Academia	FWS, & Resource Managers & Stakeholders	AIS Decal Fee and Available Grants	Unknown	High
D.2 Develop a rapid response framework that defines roles, responsibilities of potential participants, identifies potential funding sources for response actions and identifies potential methods for control for newly introduced species.	**D.2.1** Establish elements of the Incident Command System structure to identify roles and responsibilities for new introduced species.	NDOW, FWS, Resource Managers, Stakeholders	FWS, & Resource Managers & Stakeholders	AIS Decal Fee and Available Grants	25k	High
	D.2.2 Identify potential funding sources for supporting rapid response activities.	NDOW, FWS, Resource Managers, Stakeholders	FWS, & Resource Managers & Stakeholders	---	-0-	High
	D.2.3 Provide training to appropriate Incident Command Team members for a rapid response.	NDOW & Resource Managers	FWS, & Resource Managers & Stakeholders	AIS Decal Fee and Available Grants	10k	High
	D.2.4 Retain and update the Incident Command Team frame work and member contact.	NDOW & Resource Managers	FWS, & Resource Managers & Stakeholders	---	-0-	High

STRATEGY	ACTION	LEAD ORGANIZATION	COOPERATING ORGANIZATION	FUNDING SOURCE	5-YEAR ANTICIPATED FUNDING NEED	PRIORITY
OBJECTIVE D: DEVELOP MONITORING, EARLY DETECTION AND, RESPONSE PLANS						
D.2 Contiuned	**D.2.5** Participate in regional rapid response events, when possible including Lake Tahoe and Columbia River Basin's Rapid Response Planning Teams.	NDOW	USFWS, & Resource Managers & Stakeholders	AIS Decal Fee and Available Grants	2.5k	High
	D.2.6 Evaluate and update available AIS databases to identify AIS establishments and identify problem species, regions, and high risk introductions.	NDOW & Resource Managers	FWS, & Resource Managers & Stakeholders	---	-0-	High
	D.2.7 Develop monitoring protocols and identify responsibilities to identify and respond to potential high risk AIS introductions.	NDOW & Resource Managers	FWS, & Resource Managers & Stakeholders	---	Undefined without known organism	High

STRATEGY	ACTION	LEAD ORGANIZATION	COOPERATING ORGANIZATION	FUNDING SOURCE	5-YEAR ANTICIPATED FUNDING NEED	PRIORITY
OBJECTIVE E: EVALUATE AND DEVELOP LONG-TERM CONTROL MECHANISMS						
E.1 Coordinate with partners on response efforts to control detected AIS, when possible.	**E.1.1** Prepare resources and gain authorizations to utilize control measures, as needed.	NDOW & Resource Managers	FWS, & Resource Managers & Stakeholders	---	-0-	High
	E.1.2 Identify and encourage research to inform long-term control options and consider areas of climate change-AIS interactions.	NDOW & Resource Managers	FWS, & Resource Managers & Stakeholders	AIS Decal Fee and Available Grants	50k	Med
	E.1.3 Identify areas where more information, including economic and ecological impacts, are needed on long-term control that may be affected by climate change.	NDOW & Resource Managers	FWS, & Resource Managers & Stakeholders	---	-0-	Med

STRATEGY	ACTION	LEAD ORGANIZATION	COOPERATING ORGANIZATION	FUNDING SOURCE	5-YEAR ANTICIPATED FUNDING NEED	PRIORITY
OBJECTIVE F: EVALUATE AND DEVELOP AIS LAWS AND REGULATIONS						
F.1 Conduct periodic reviews of current AIS laws and regulations to determine effectiveness, and seek areas of improvement for protections to Nevada waters that reflect regional consistency as appropriate.	**F.1.1** Evaluate, review and adopt, where appropriate, recommendations on regulation modifications from WRP's Building Consensus in the West	NDOW & Resource Managers	FWS, & Resource Managers & Stakeholders	---	-0-	High
	F.1.2 Coordinate with law enforcement and the Nevada Attorney General's office to incorporate regulations and/or changes to AIS laws.	NDOW & Resource Managers	FWS, & Resource Managers & Stakeholders	---	-0-	High
	F.1.3 Participate in the development of Tahoe Regional Planning Agency's regulatory process to maintain consistency among programs.	TRPA, NDOW & Resource Managers	FWS, TRPA & Resource Managers & Stakeholders	---	-0-	High

PLAN REVIEW

The Nevada State AIS Management Plan is a document that shall be reviewed on a periodic basis to reflect regional changes both in threats posed to Nevada resources as well as management strategies meant to improve response and prevention measures. NDOW will conduct an annual review of program activities and will provide this information to stakeholders as well as make available publicly. An important aspect of the AIS Management Plan is the ability to monitor and evaluate if the objectives, strategies and actions are being attained. The ability to perform monitoring and evaluation on the management plan incorporates the need to assess the effectiveness in achieving the overall goals, objectives, strategies and actions, ensure accountability to stakeholders and funding mechanisms, improve decision making regarding a projects/action design, and implementation regarding success factors, barriers, and project failures.

Although many of the strategies and actions in the Implementation Table can be easily measured as effectively implemented (e.g. retain an AIS coordinator), others can be more difficult to evaluate. Several key components will assist in evaluating the effectiveness and implementation of the more difficult evaluations. Specifically, ensuring the information collected to implement the plan and actions are focused, feasible, useful, credible, valid, and reliable and in some instances repeatable. The monitoring and evaluation process will focus on the top priority strategies and actions developed from the Implementation Table. The Nevada AIS Management Plan Implementation Team comprised of various stakeholders will develop the necessary tools that will be required to evaluate the effectiveness of individual projects or actions. In addition, the AIS coordinator will provide annual reports summarizing the progress attained towards accomplishment of each strategy and action and their respectful relationship to fulfilling the objectives and goals.

Minor revisions may be considered for incorporation into the Nevada AIS Management Plan as appropriate. The structure of the current plan allows for minor adjustments to be made to the document that will not require approval from the federal ANSTF. The types of dynamic information that may be subject to minor changes includes, but are not limited to; strategies to implement objectives, and updates to Nevada legislation or regulation. Finally, there may be a need to modify strategies in the future if new information on climate change or AIS becomes available.

ASIAN CLAM WITH QUAGGA MUSSELS

CONCLUSION

Addressing AIS continues to be an evolving area of management as our scientific understanding improves, political climate varies and management tools grow. An AIS Management Plan for Nevada will help provide specific guidance to elevate AIS management issues in the state. As with any complex natural resource management issue, the support and expansion of collaborative efforts will only work to protect Nevada's unique resources into the future.

LITERATURE CITED

100th Meridian Initiative - Columba River Basin Team. 2014. Columbia River Basin Interagency Invasive Species Response Plan: Zebra Mussels and Other Dreissenid Species. Pp.232.

Aquatic Nuisance Species Task Force. 1994. Aquatic Nuisance Species Program. Washington, DC. Pp 150.

Aquatic Nuisance Species Task Force. 2013. Strategic Plan. Washington, DC. Pp 29.

Brown, E. Editor. 2016. The Student Training Curriculum for Watercraft Inspectors and Decontaminators to Prevent and Contain the Spread of Aquatic Invasive Species. Colorado Parks and Wildlife, Denver, CO. Pp 200.

Building Consensus in the West. 2013. A Multi-State Vision for Watercraft Inspection Programs – Meeting Summary August 13, 2013 Denver, CO. Pp. 30.

Bureau of Land Management. 2017. BLM Manual 6720, Aquatic Resource Management.

California Department of Fish and Wildlife. 2017. CDFA Quarantined Monthly Vessel Report.

Conover G, R Simmonds and M Whalen, eds. 2007. Management and Control Plan for Bighead, Black, Grass, and Silver Carps in the United States. Asian Carp Working Group, Aquatic Nuisance Species Task Force, Washington DC. pp 223.

Executive Order 13751 December 5, 2016. Amends Executive Order 13112 February 3, 1999.

Garfin G, G Franco, H Blanco, A Comrie, P Gonzalez, T Piechota, R Smyth, and R Waskom. 2014. Ch. 20: Southwest Climate Change Impacts in the United States: The Third National Climate Assessment, eds: JM Melillo TC Richmond, and GW GW Yohe. US Global Change Research Program, 462-486.

Havel JE, CE Lee and MJ Vander Zanden. 2005. Do Reservoirs Facilitate Invasions into Landscapes? Bioscience 55:518-525.

Hellmann JJ, JE Byers, BG Bierwagen and JS Dukes. 2008. Five Potential Consequences of Climate Change for Invasive Species. Conservation Biology 22: 534-543.

Interagency Committee on the Movement of AIS onto and off of Federal Lands and Water. 2015. Federal Lands Policy Options for Addressing the Movement of AIS onto and off of Federal Lands, pp 57.

Interagency Standards Group. 2016. Interagency Standards for Fire and Fire Aviation Operations. National Interagency Fire Center, Boise, ID. pp 462.

Johnson, LE, A Ricciardi, and JT Carlton. 2001. Overland Dispersal of Aquatic Invasive Species: A Risk Assessment of Transient Recreational Boating. Ecological Application 11:1789-1799.

Leung B, DM Lodge, D Finnoff, JF Shogren, MA Lewis, and G Lamberti. 2002. An ounce of prevention or a pound of cure: bioeconomic risk analysis of invasive species. Proceedings of the Royal Society of London B 269:2407-2413.

Li S, P Wang, W Yuan, Z Su and SH Bullard. 2016. Endocidal Regulation of Secondary Metabolites in the Producing Organisms. Scientific Reports 6:29315.

Mari L, E Bertuzzo, R Casagrandi, M Gatto, SA Levin, I Rodriquez-Iturbe, and A Rinaldo. 2011. Hydrologic Controls and Anthropogenic Drivers of the Zebra Mussel Invasion of the Mississippi-Missouri River System. Water Resources Research 47: 1-16.

Melillo, JM, TC Richmond, and GW Yohe, Eds. 2014: Climate Change Impacts in the United States: The Third National Climate Assessment. U.S. Global Change Research Program, 841 pp. doi: 10.7930/J0Z31WJ2.

National Invasive Species Council. 2006. Invasive Species Definition Clarification and Guidance. White paper.

National Invasive Species Council. 2016. Management Plan: 2016-2018. Washington, DC. Pp 50.

Nevada Department of Agriculture. 2017. Noxious Weed List. Available at http://agri.nv.gov/Plant/Noxious_Weeds/Noxious_Weed_List/ Retrieved May 4, 2017.

Nevada Department of Environmental Protection. 2004. Aquatic Resources Data.

Nevada Department of Wildlife. 2016. Annual Report for US FWS Grant F12AP01236.

Nevada Department of Wildlife. 2016. Annual Reports for US FWS Grants F12AP01236 and F12AF00286

Nevada Division of Tourism. 2016. Discover the Facts. Volume XXIV, 14 pp.

Padilla DK and S Williams. 2004. Beyond ballast water: Aquarium and Ornamental Trades as Sources of Invasive Species in Aquatic Ecosystems. Frontiers in Ecology 2: 131-138.

Pimentel D, R Zuniga, and D Morrison. 2004. Update on the Environmental and Economic Costs Associated with Alien-Invasive Species in the United States. Ecological Economics 52:273-288.

Pyramid Lake Paiute Lake Tribe. 2012. Quagga and Zebra Mussel Aquatic Invasive Species Management Plan for the Pyramid Lake Paiute Tribe Pyramid Lake, Nevada. Pp 60.

Pyke CR, R Thomas, RD Porter, JJ Hellmann, JS Dukes, DM Lodge and G Chavarria. 2008. Current Practices and Future Opportunities for Policy on Climate Change and Invasive Species. Conservation Biology 22:585-592.

Proctor T, B Kerans, P Clancey, E Ryce, M Dybdahl, D Gustafson, R Hall, F Pickett, D Richards, R Draheim, J Chapman, R Wiltshire, D Becker, M Anderson, B Pittman, D Lassuy, P Heimowitz, P Dwyer, E Levri - New Zealand Mudsnail Working Group. 2007. New Zealand Mudsnail Management and Control Plan. ANS Task Force, Washington, DC. pp. 100.

Rahel FJ and JD Olden. 2008. Assessing the Effects of Climate Change on Aquatic Invasive Species Conservation Biology 22: 521-533.

Rixon CAM, IC Duggan, NMN Bergeron, A Ricciardi and HJ Macisaac. 2005. Invasion Risks Posed by the Aquarium Trade and Live Fish Markets on the Laurentian Great Lakes. Biodiversity and Conservation 14: 1365-1381.

Rothlisberger JD, WL Chadderton, J McNulty and D Lodge. 2011. Aquatic invasive species transport via trailered boats: What is Being Moved, Who is Moving it and What Can Be Done? Fisheries 35:121-132.

Showalter Otts S and P Nanjappa, eds. 2014. Preventing the Spread of Aquatic Invasive Species by Recreational Boats: Model Legislative Provisions and Guidance to Promote Reciprocity State Watercraft Inspection and Decontamination Programs. National Sea Grant Law Center, University, MS. Pp44.

Showalter Otts S and P Nanjappa, eds. 2016. Model Regulation for State Watercraft Inspection and Decontamination Programs. National Sea Grant Law Center, University, MS. Pp 42.

Strecker AL, PM Campbell and JD Olden. 2011. The Aquarium Trade as an Invasion Pathway in the Pacific Northwest. Fisheries 36: 74 – 85.

Tietjen TE, and GC Holdren. 2010. Lake Mead Limnology and Ecosystem Management: Lake and Reservoir Management 26:229.

Tahoe Regional Planning Agency. 2014. Lake Tahoe Region Aquatic Invasive Species Management Plan, California – Nevada, 35 pp. + Appendices.

Truckee – Carson Irrigation District. 2016. Invasive Species Management Plan.

US Bureau of Reclamation. 1996a. Directives and Standards, Pest Management/Resource Protection (Integrated Pest Management) Program ENV 01-01

US Bureau of Reclamation. 1996b. Policy, Pest Management ENV 02

US Bureau of Reclamation. 1998. Directives and Standards, Public Notification of Aerial Pesticide Applications on Lands Managed Directly by Reclamation ENV 01-02

US Census Bureau. 2010. Brief: Population Distribution and Change 2000 to 2010, pp 12.

US Department of Agriculture, Forest Service. 2011. Invasive Species Management – National Forest System Policy Directive. Forest Service Manual 2900, pp 28.

US Department of Agriculture, Forest Service. 2013. Forest Service National Strategic Framework for Invasive Species Management, pp 36.

US Department of the Interior, National Park Service. 2006. Management Policies, pp 180.

US Department of the Interior, National Park Service. 2007. Quagga/Zebra Mussel Infestation Prevention and Response Planning Guide. Pp. 43.

US Environmental Protection Agency. 2010. WaterSense Nevada Water Fact Sheet. EPA 832-F-10-015.

US Environmental Protection Agency. 2008. Effects of Climate Change for Aquatic Invasive Species and Implications for Management and Research. National Center for Environmental Assessment, Washington, DC; EPA/600/R-08/014.

US Geological Survey. 2017. Nonindigenous Aquatic Species Database (Nevada data set). Available at https://nas.er.usgs.gov. Retrieved January 30, 2017.

Vander Zanden MJ and J Olden. 2008. A management framework for preventing the secondary spread of aquatic invasive species. Canadian Journal of Fisheries and Aquatic Science 65: 1512-1522.

Western Regional Panel on Aquatic Nuisance Species. 2010. Quagga Zebra Mussel Action Plan, pp. 45.

White House Committee on Climate Change. 2014. National Climate Assessment, pp. 841.

Whittier TR, PL Ringold, AT Herlihy and SM Pierson. 2008. A calcium-based invasion risk assessment for zebra and quagga mussels (Dreissena spp). Frontiers in Ecology and the Environment 6:doi:10.1890/070073.

Wong D, K Turner, SL Gerstenberger and JM Miller. 2011. Interagency Monitoring Action Plan: Quagga Mussels in Lakes Mead and Mohave. Pp 98.

GLOSSARY

Aquatic invasive species – A nonindigenous species that threatens the diversity or abundance of native species or the ecological stability of infested waters, or commercial, agricultural, aquacultural or recreational activities dependent on such waters.

Aquatic species - All animals and plants as well as pathogens or parasites of aquatic animals and plants totally dependent on aquatic ecosystems for at least a portion of their life cycle.

Ballast water - any water and associated sediments used to manipulate the trim and stability of a vessel. References to ballast water in this document refer to the ballast water of recreational watercraft, or commercial watercraft but does not refer to ballast water of commercial ships.

Containment – to stop or attempt to stop AIS from spreading.

Control – as appropriate, eradicating, suppressing, reducing, or managing invasive species populations, preventing spread of invasive species from areas where they are present, and taking steps such as restoration of native species and habitats to reduce the effects of invasive species and to prevent further invasions; to mitigate against the effect of AIS through reductions in the species population size.

Decontamination – a treatment with the intent to kill, destroy, and remove AIS to the extent technically and measurably possible.

Dreissenid mussel – freshwater, bivalve mollusks that typically have a dark and white striped pattern on their shell. Dreissenid mussels of interest are *Dreissena polymorpha* and *Dreissensa rostiformis bugensis* which are non-native to the United States.

Eradicate – managing invasive species with a goal to completely eliminate the invasive species population from a specified waterbody or habitat.

Hazard Analysis Critical Control Points – a management tool that provides structured methods to identify risks and focus procedures that are currently being used successfully in natural resource pathway activities.

Incident Command System – a standardized on-scene incident management concept designed to allow responders to adopt an integrated organizational structure equal to the complexity and demands of any single incident or multiple incidents without being hindered by jurisdictional boundaries. ICS is commonly used in emergency situations.

Infested waterbody – a waterbody that has an established (recruiting or reproducing) population of AIS.

Inspection – process to determine whether a conveyance presents an AIS risk.

Introduction – intentional or unintentional escape, release, dissemination, or placement of a species into an ecosystem as a result of human activity.

Invasive Species - as per Executive Order 13112, an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.

Native species – with respect to a particular ecosystem, a species that, other than as a result of introduction, historically occurred or currently occurs in that ecosystem.

Nuisance Species – may cause ecological and economic harm but may also be native or non-native.

Pathogen – a biological agent that causes disease or illness to its host.

Pathway – refers to the activity by which an invasive species can be transported or introduced into a novel environment (e.g. commercial shipping); see vector.

Prevention – to stop or attempt to stop the introduction of AIS.

Reciprocity –the acceptance of conveyance inspection and/or decontamination by several or all jurisdictions when similar protocols and standards are employed by similarly trained professionals for the purpose of increasing the efficacy of watercraft inspection and decontamination programs, enhancing resource protection, and improving boater experience and communication among managing agencies.

Vector – refers to the specific mode by which an invasive species can be transported or introduced into a novel environment (e.g. ballast water, hull fouling, etc.); see pathway.

Veliger – planktonic larvae of many bivalve mollusks including quagga and zebra mussels.

APPENDICES

A. AIS Management Plan Working Group

B. Ranking Aquatic Invasive Species for Management Priority

C. Description of Priority Species for Management

D. Watercraft Inspection and Decontamination Implementation

E. Authorities and Program Support Materials

F. Monitoring Implementation Plan

G. Waterbody Classification Based on AIS Monitoring

H. Hazard Analysis and Critical Control Point Framework

I. NDOW AIS Program Health and Safety Policy and Implementation Plan

J. Summary of Public Comments

APPENDIX A: NEVADA AQUATIC INVASIVE SPECIES MANAGEMENT PLAN WORKING GROUP

A sincere thank you to the following individuals who contributed to the development and completion of this document.

- Sudeep Chandra, Associate Professor, University of Nevada- Reno
- Dale Conner, Nevada Division of State Parks
- Charlie Donhue, Administrator, Nevada Division of State Lands
- Jim Harvey, Fishery Biologist, US Forest Service, Humboldt-Toiyabe Forest
- John Heggeness, Nevada Division of Environmental Protection
- Lynn Hettrick, Plant Industry Division Administrator, Nevada Department of Agriculture
- Brenda Hunt, Watershed Program Manager, Carson Water Subconservancy District
- Eric Johnson, Administrator, Nevada Division of State Parks
- Leah Elwell, Program Director, Invasive Species Action Network
- Louanne McMartin, Assistant AIS Coordinator, US Fish and Wildlife Service, Region 8 Pacific Southwest
- Eric Miskow, Biological Data Manager, Nevada Natural Heritage Program
- Mark Sappington, Branch of Natural Resources Chief, National Park Service, Lake Mead National Recreation Area
- Jon Sjöberg, Fisheries Division Administrator, Nevada Department of Wildlife
- Ben Smith, Aquatic Biological Technician, National Park Service, Lake Mead National Recreation Area
- Ron Smith, AIS Coordinator, US Fish and Wildlife Service, Region 8 Pacific Southwest
- Theresa Thom, Water Resource Office Manager, National Park Service, Lake Mead National Recreation Area
- Todd Tietjen, Limnologist, Southern Nevada Water Authority
- Karen Vargas, Fisheries Wildlife Staff Specialist, AIS Coordinator, Nevada Department of Wildlife
- Nancy Vucinch, Fishery Biologist, Pyramid Lake Paiute Tribe
- John Wilson, Fishery Biologist, US Bureau of Land Management
- Stephanie Wilson, Water Program, Nonpoint Source Pollution and Watershed Priorities, US Environmental Protection Agency, Region 9
- Heather Whitesides, AIS Education Coordinator, National Park Service, Lake Mead National Recreation Area
- Dennis Zabaglo, Aquatic Resource Program Manager, Tahoe Regional Planning Agency

Additional staff with Nevada Department of Wildlife that contributed to the development and completion of this document includes:

- John Elliott, Fisheries Biologist 4 Eastern Region
- Pat Kelly, Fisheries Wildlife Staff Specialist, Fish Hatcheries
- Aaron Meier, Public Information Officer 2
- Jordan Neubauer, Management Analyst lll
- Jack Robb, Deputy Director
- Brandon Senger, Fisheries Biologist 4 Southern Region
- Pat Sollberger, Fisheries Wildlife Staff Specialist, Sport Fish
- Kim Tisdale, Fisheries Biologist 4 Western Region
- Bonnie Weller, GIS Biologist 3

APPENDIX B: RANKING AQUATIC INVASIVE SPECIES FOR MANAGEMENT PRIORITY

Non-native species that have been detected in Nevada as well as those that pose a threat to Nevada ecosystems and economies have been identified below. The USGS NAS Database houses all records of non-indigenous species and has informed the following information as well as expert consultation. The priority ranking for species for Nevada's AIS Management Plan was also assimilated through priority species list from bordering states and the potential for introduction to Nevada based on pathway, climate and environmental factors. A variety of documents were referenced to finalize the information provided here (e.g. Leung et al 2002, Whittier et al. 2008, Vander Zanden and Olden 2008 etc.). Discussions among Nevada AIS Management Plan Working Group members comprised of federal, state, interstate, tribal, academia and regional stakeholders, has built the list through scientific understanding. The list is incomplete and will be reviewed and updated as additional information becomes available. Categorizing species for management allows agencies and stakeholders to prioritize efforts and funding.

The status of a species defines the current knowledge of its presence in Nevada as well as management considerations. The status types are defined as follows:

Type 1: A species which has not yet been detected in Nevada with a possible risk potential for introduction and establishment
Type 2: A species which is limited in its geographic distribution in Nevada and control options may be available
Type 3: A species established in Nevada and control options may be available
Type 4: A species established in Nevada and no control options are available
Type 5: A species that poses an unknown risk potential for establishment in Nevada

The rank delineation supplies management information for level of management concern and action with the rank type of greatest to least concern, respectively:

Watch (WATCH): species that are not established, have a high potential for introduction to Nevada either by natural range expansion or unauthorized introductions and have a high probability of economic and/or ecological impact,

High (HIGH): established species or species for which there is a high probability of economic and/or ecological impact,

Low (LOW): species that are widely established but with minimal impact, and

Unknown (UNK): species that are not established, where there is limited information to make a determination of economic or ecological impact to Nevada

RANKING AQUATIC INVASIVE SPECIES FOR MANAGEMENT PRIORITY

SCIENTIFIC NAME	COMMON NAME	STATUS	RANK
Mollusks			
Corbicula fluminea	Asian clam [1]	Type 3	LOW
Dreissena bugensis	quagga mussel	Type 4	HIGH
Dreissena polymorpha	zebra mussel	Type 1	WATCH
Limnoperna fortunei	golden mussel	Type 1	WATCH
Pomocea spp.	apple snail	Type 1	UNK
Potamopyrgus antipodarium	New Zealand mudsnail	Type 4	LOW
Crustaceans			
Cherax quadricarinatus	Australian red claw crayfish	Type 2	HIGH
Orconectes rusticus	rusty crayfish	Type 1	WATCH
Pacifastacus leniusculus	signal crayfish	Type 2	HIGH
Procambarus clarkia	swamp crayfish	Type 3	HIGH
Reptiles and Amphibians			
Apalone spinifera	spiny softshell turtle	Type 2	HIGH
Trachemys scripta elegans	red-eared slider	Type 2	WATCH
Lithobates catesbeianus	American bullfrog	Type 2	WATCH
Nerodia fasciata fasciata	Southern watersnake	Type 1	WATCH
Xenopus spp	African clawed frog	Type 1	UNK
Fishes			
Archocentrus nigrofasciatus	convict cichlid	Type 3	HIGH
Cetopsidae and Trichomycteridae	South American parasitic catfish	Type 1	UNK
Channa argus	snakehead	Type 1	HIGH
Cyprinella lutrensis	red shiner	Type 3	HIGH
Cyprinus carpio	common carp	Type 4	LOW
Esox lucius	northern pike	Type 3	HIGH
Gambusia affinis	western mosquitofish	Type 3	HIGH
Lepisoteidae spp.	gar	Type 1	UNK
Lates and Luciolates spp.	Nile perch	Type 1	UNK
Hoplias malabraius	tiger fish	Type 1	UNK

[1] Due to the status of Lake Tahoe as an "Outstanding Natural Resource Water" under the Clean Water Act, Tahoe Regional Planning Agency AIS Management Plan may have assigned a different management priority to this species.

SCIENTIFIC NAME	COMMON NAME	STATUS	RANK
Fishes Continued			
Hypophalmichthys molitrix	silver carp	Type 1	WATCH
Hypophthalmichthys nobilis	bighead carp	Type 2	WATCH
Hypostomus plecostomus	sailfin catfish species	Type 1	HIGH
Monopterus spp.	Asian swamp eel	Type 1	UNK
Neogobius melanostomus	round goby	Type 1	UNK
Piranha spp.	Piranha	Type 1	UNK
Poecilia latipinna x velifera	black molly	Type 3	HIGH
Poecilia reticulate	guppy	Type 3	HIGH
Pterygoplichthys spp.	sailfin catfish	Type 1	HIGH
Pylodictis olivaris	flathead catfish	Type 1	HIGH
Tilapia and Sarotherodon	tilapia	Type 3	HIGH
Aquatic and Riparian Plants			
Myriophyllum spicatum	Eurasian watermilfoil	Type 3	HIGH
Potamogeton crispus	Curly-leaf pondweed	Type 3	HIGH
Hydrilla verticillata	Hydrilla	Type 1	HIGH
Salvinia molesta	giant salvinia	Type 1	HIGH
Elodea spp.	Elodea	Type 1	HIGH
Eichhornia crassipes	water hyacinth	Type 1	HIGH
Nitellopsis obtusa	starry stonewort	Type 1	HIGH
Tamarix spp.	tamarisk	Type 3	HIGH
Lepidium latifolium	whitetop	Type 3	HIGH
Pennisetum setaceum	fountain grass	Type 2	LOW
Cardaria draba	hoary cress	Type 3	LOW
Butomus umbellatus	flowering rush	Type 1	WATCH
Lythrum salicaria	purple loose strife	Type 2	HIGH
Arundo donax	giant reed	Type 2	LOW
Pathogens			
Bothriocephalus acheilognathi	Asian tapeworm	Type 3	HIGH
Myxobolus cerebralis	whirling disease parasite	Type 4	LOW
Novirhabdovirus	viral hemorrhagic septicemia	Type 1	HIGH
Ranavirus	largemouth bass virus	Type 1	HIGH
Spring viraemia of carp virus	carp virus	Type 1	HIGH

APPENDIX C: DESCRIPTION OF PRIORITY SPECIES FOR MANAGEMENT

Species listed below include ones that have been detected in Nevada and those not yet detected but of management concern due to potential economic or ecological impacts. For each species information has provided on the known distribution if present in Nevada, pathways of introduction and spread and management considerations. General information on each species was generated from the NAS USGS Database (https://nas.er.usgs.gov). More information can be learned on each species including distribution maps and collection information at this site.

MOLLUSKS, CRUSTACEANS, AND FISH

Invasive aquatic animals may include fish, bivalves, gastropods, amphibians, mammals and macroinvertebrates.

A. Present in Nevada

1. Quagga mussel (*Dreissena bugensis*) are native to Eurasia and first detected in Nevada in 2007. In Nevada, this species is found in the Colorado Basin only.
    - Pathways for introduction and spread include movement of fouled watercraft, natural flow of water from infested waterbodies and any other fouled equipment moved from infested waters.
    - Management considerations for quagga mussels are a primary driver for current programmatic efforts in Nevada. Preventing their spread to other Nevada waterbodies include rigorous watercraft inspections and decontaminations. Control or eradication is not possible with the current population. If *D. bugensis* were to be found in a new waterbody, possible chemical (e.g. potash) or physical (waterbody draw down/freezing) eradication techniques would be considered.
2. Crayfishes. There are three non-native crayfish present in Nevada including rusty crayfish (*Orconectes rusticus*) which is native to the Ohio River Basin, swamp crayfish (*Procambarus clarkia*) native to the Gulf coastal plain and the southern Mississippi River Basin and signal crayfish (*Pacifastacus leniusculus*) are native to the Pacific Northwest of the United States. Rusty crayfish are found in Spring Mountain Ranch State Park (Clark County). Swamp crayfish are found in Lake Mead and many waters within Nye County. Signal crayfish have been found in Lake Tahoe, Lahontan Reservoir and many waterbodies in western Nevada.
    - Pathways for introduction include bait transfer and aquarium trade.
    - Management considerations for invasive crayfish include an examination of bait rules. In locations where invasive crayfish threaten native species an exploration of eradication efforts may be appropriate.
3. Asian clam (*Corbicula fluminea*) is native to Asia, the Mediterranean and Africa. This species is highly ubiquitous throughout Nevada waters.
    - Pathways for introduction and spread of this species are not well understood. However it is assumed that fouled watercraft and other contaminated equipment can spread this species.
    - Management considerations for Asian clams in Nevada fall into two areas: 1) Lake Tahoe management efforts implemented by the Tahoe Regional Planning Agency which include a full suite of control techniques to eradicate the species from the Lake; 2) elsewhere in Nevada there are no control efforts implemented to address Asian clams.

4. Northern Pike (*Esox lucius*) are native to Arctic, Great Lakes and Mississippi River Basin. This species has been found in multiple waters across the state including the Truckee River, Lahontan Reservoir, Humboldt River, and numerous smaller waters.
    - Pathways for introduction of pike are typically illegal introduction or agency stocking programs.
    - Management considerations for pike include education and outreach on illegal fish planting, examination of current fines associated with illegal introductions, and possible fish removal efforts.
5. Red-eared slider (*Trachemys scropta elegans*) indigenous range broadly covers the Midwestern United States with the closest introduced populations in California, and Lake Mead, Lake Mohave and the lower Colorado River.
    - Pathways for introduction most likely are pet release and escape.
    - Management considerations for this turtle species include increased outreach and education to pet owners, pet industry, classrooms and other partners, consideration for inclusion on the state prohibited wildlife list, and consideration to legally prohibit their sale in the state.

Not reported in Nevada but of priority

1. Zebra mussel (*Dreissena polymorpha*) are native to East Asia and China. Introduced populations of *D. polymorpha* have occurred across Eastern United States, and in locations in California.
    - Pathways for introduction are similar to *D. bugensis* with fouled watercraft, and contaminated equipment.
    - Management considerations for *D. polymorph*a are addressed in the current management approach with watercraft inspection and decontamination. If *D.polymorpha* were to be found in a new waterbody, possible chemical (e.g. potash) or physical (waterbody draw down) eradication techniques would be considered.
2. Asian tapeworm (*Bothriocephalus acheilognathi*) is a freshwater fish parasite that is native to Eurasia. The primary host is grass carp, however it has been found in the fish families of Cyprinidae, Poecilidae and Cichlidae and Centrachidae. Asian tapeworm has historically been present in Nevada within the Muddy River corridor but is currently unconfirmed.
    - Pathways for introduction for Asian tapeworm are likely accidently introduced with grass carp and subsequent spread through baitfish transfer.
    - Management considerations include examination of baitfish rules and aquaculture protocols as needed.

AQUATIC AND RIPARIAN PLANTS

Aquatic vascular plants include ferns and flowering plants that grow submersed in water, float on the water surface, or have basal portions inundated with foliage and upper parts immersed. Plants that are found in the riparian area are also managed directly by NDA. The species of concern listed here are included on the Nevada Noxious Weed List (2017) and include: tamarisk species (*Tamarix spp.*), purple loosestrife (*Lythrum salicaria*), crimson fountain grass (*Pennisetum setaceum*), hoary cress (*Cardaria draba*), whitetop (*Lepidium latifolium*) and Russian olive (*Elaeagnus angustifolia*). Information concerning their management can be found on the NDA web site at agi.nv.gov/noxiousweeds/.

Present in Nevada

1. Eurasian watermilfoil (*Myriophyllum spicatum*) is a common aquarium plant native to Europe, Asia and northern Africa. Introduced populations are found in the Lake Tahoe area with additional regional populations across California, Oregon and Idaho.
    - Pathways for introduction include fragmentations which can be moved with waterbased equipment and watercraft, and the aquarium trade.
    - Management considerations for milfoil are addressed in the current watercraft inspection program. In some cases, control options may be examined for small novel populations.
2. Curly-leaf pondweed (*Potamogeton crispus*) is a submersed aquatic plant that is native to Eurasia, Africa and Australia. Introduced populations are found in the Truckee River and Lake Tahoe with additional regional populations across California and Arizona.
    - Pathways for introduction include plant fragments which can be moved with waterbased equipment and watercraft and transferred naturally by waterfowl.
    - Management considerations for pondweed are addressed in the current watercraft inspection program. In some cases, control options may be examined for small novel populations.

Not reported in Nevada but of priority

1. Hydrilla (*Hydrilla verticillata*) is a submersed perennial herb that is native to the Indian subcontinent. Regionally, introduced populations are in California, Idaho and Arizona.
    - Pathways of introduction include the aquarium pet trade, water garden industry and recreational watercraft.
    - Management considerations for hydrilla may be addressed in the current watercraft inspection program. In some cases, control options may be examined for small novel populations.
2. Giant salvinia (*Salvinia molesta*) is a free-floating aquatic fern that is native to southeast Brazil. Regionally, populations are found in Southern California and Arizona.
    - Pathways of introduction include transport on water-based equipment and watercraft, waterfowl, as well as the aquarium and water garden industry.
    - Management considerations for salvinia may be addressed in the current watercraft inspection program. In some cases, control options may be examined for small novel populations. Emerging research suggests salvinia might be susceptible to endocide treatments (Li et al. 2016).

3. Elodea (*Elodea spp*.) is a submersed perennial native to South America. Regionally, populations are found primarily in California, Oregon, and Washington.
    - Pathways of introduction include the aquarium trade as well as recreational watercraft and natural movement by downstream dispersal.
    - Management considerations for Elodea may be addressed in the current watercraft inspection program. In some cases, control options may be examined for small novel populations.

4. Water hyacinth (*Eichhornia crassipes*) is a free-floating perennial native to South America. Regionally, populations are found across California, Arizona and Oregon.
    - Pathways of introduction include the water gardening trade, as well as dispersal by natural flow of water and wind.
    - Management considerations for water hyacinth may include targeted outreach to water gardeners and industry.
5. Starry stonewort (*Nitellopsis obtusa*) is a macroalga that is native to Europe and Asia, with introduced populations occurring in the Great Lakes region and Midwestern United States.
    - Pathways of introduction include recreational watercraft, and natural spread via wildlife and fragmentation of the algae.
    - Management considerations include continued rigorous implementation of watercraft inspection and decontamination.

PATHOGENS

The following pathogens are of consideration for their impact on the fishery of Nevada.

Present in Nevada

1. *Myxobolus cerebralis*, the parasite that causes whirling disease in wild and hatchery salmonids, has been found in a few locations across Nevada, including the Truckee River.
    - Pathways of introduction include infected decomposed wild fish, infected wild obligate host *Tubifex tubifex*, recreational equipment that has been exposed to the parasite and natural dispersal by flow of water.
    - Management considerations in natural systems are very limited and are focused on encouraging proper cleaning of equipment to prevent further spread. However, in hatchery situations the parasite can be addressed with upgrading fish runways to concrete, and disposal of infected fish.

Not reported in Nevada but of priority

1. Viral hemorrhagic septicemia (*Novirhabdovirus* sp; VHS) is a virus that affects a wide variety of fish species. The virus is indigenous to eastern and western Europe, Japan and the Pacific and Atlantic coasts of North America. Outbreaks in North America have been limited to the Great Lakes area to date.
    - Pathways of introduction include the transfer of bait fish among waterbodies or ballast water of watercraft or equipment.
    - Management considerations include an examination of bait regulations as well as continued rigorous watercraft inspection and decontamination programs.
2. Largemouth bass virus (Ranavirus) is a virus that primarily affects largemouth bass. Outbreaks in North America have been limited to central and eastern United States. Bonytail chub are an impacted species of interest to Nevada.
    - Pathways of introduction include water containing the virus, which could include watercraft and equipment, as well as transfer of live fish for aquaculture.
    - Management considerations include an examination of possible aquaculture procedures.
3. Spring viraemia of carp virus is a virus that largely affects carp species. The virus likely originated in Europe, and was recently discovered in central and southeast United States after several outbreaks.
    - Pathways of introduction include infected fish, however it has been suggested that the movement of baitfish may also be possible pathway for the virus.
    - Management considerations include an examination of aquaculture procedures to minimize potential to transfer the virus as well as bait regulations.

APPENDIX D: WATERCRAFT INSPECTION AND DECONTAMINATION IMPLEMENTATION

With the successful passage of Nevada's Aquatic Invasive Species Bill (AB167) in mid-2011 and the threat of quagga mussel-contaminated watercraft heading northbound from Lake Mead NRA, NDOW applied for grant funding to establish seasonal watercraft inspection stations at high priority waters at risk of becoming established with quagga mussels. AB167 established an annual Aquatic Invasive Species Decal for motorized and non-motorized watercraft; however, the revenue generated from the decal has not been sufficient to provide for a statewide watercraft inspection program. After a successful grant application through FWS, the first inspection stations opened in late 2012 and were operated by Nevada State Parks through a contract with NDOW. The stations were located within Nevada State Recreational Areas and included stations at Wild Horse, Lahontan and Rye Patch Reservoirs.

Wild Horse Reservoir, located in northeastern Nevada, was identified as a high priority water by NDOW due to its inclusion in the Snake River Basin and eventually in the Columbia River Drainage. Although located in a remote section of Nevada, the reservoir is a prime fishing location and receives numerous fishing and recreational boats during the summer months. The seasonal station was operated by NSP until 2015, when it was moved to a roadside station north of Elko and under the operation of NDOW. The roadside inspection station expanded to address watercraft headed northbound towards other Nevada lakes including Wild Horse Reservoir in addition to other waters within the Snake River Basin.

In 2015, NDOW also assumed responsibility for the operation of the Lahontan and Rye Patch Reservoir stations. Three seasonal stations were in operation at Lahontan Reservoir and one station at Rye Patch Reservoir. Lahontan Reservoir is a high use recreational and fishing location due to its close proximity to the Reno/Sparks area. Although more remote than Lahontan Reservoir, Rye Patch Reservoir, receives both recreation and fishing watercraft and is located adjacent to Interstate 80. The four stations are located at or near entrances to the State Recreation Areas.

During the period between 2012 and 2015, watercraft were inspected prior to entrance and when exiting both Lahontan and Rye Patch Reservoirs. Watercrafts were inspected in both directions due to positive quagga mussel monitoring results that occurred in both waters during the spring of 2011. Since the initial quagga positive results, NDOW has not recorded any quagga positive results at either reservoir utilizing the laboratory analysis of microscopy and polymerase chain reaction (PCR). In 2016, after five years of negative results, both reservoirs were delisted from the quagga suspect/positive list to non-detected based on the Waterbody Quagga/Zebra Listing and Delisting Classification developed by the WRP on ANS, Building Consensus Committee (Appendix G). Currently, mandatory inspections are required prior to launch. In addition, a majority of watercrafts are also checked upon their exit to ensure drain plugs and other backorder devices are removed during transport.

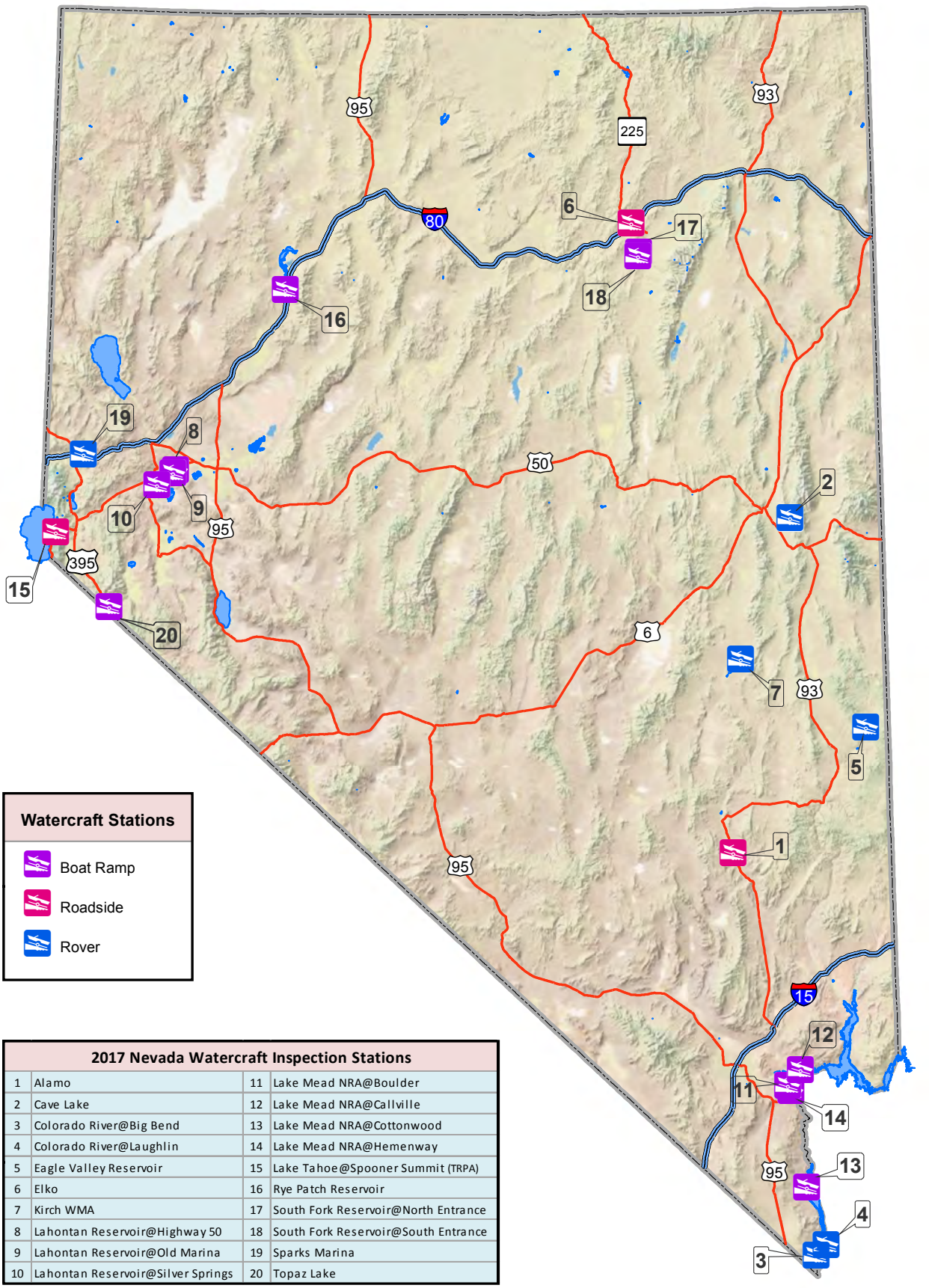
Since the discovery of quagga mussels in Lake Mead NRA in 2007, the threat of quagga contaminated watercraft exiting LMNRA with destinations to other waters in Nevada and other western states continued to be an issue with land and water resource managers. In 2013, in coordination with the NPS at LMNRA and the FWS, NDOW proposed to provide year-round free-of charge inspection and decontamination staff at three existing stationary decontamination stations at Lake Mead and Lake Mohave. The operation continues and has expanded to four stations with grant funding opportunities awarded to NDOW through FWS and the NPS. The primary focus has been on the decontamination of long-term moored watercraft that are exiting the recreation area. However, boat ramp exit and occasionally entry inspections are also implemented in the program. In addition, AIS staff also provides AIS outreach to the boating public.

The inspection/decontamination program is voluntary at the LMNRA due to the 24 hour a day watercraft launching and exiting availability. However, watercraft users are informed that it is a violation of Nevada State Law to transport AIS. Overall, the inspection program at the LMNRA has been successful and is documented by a significant decrease in quagga contaminated watercraft entering other states (California Department of Fish and Wildlife 2017). In addition, the Colorado River in Nevada remains the only quagga positive water within the state. The number of watercraft inspected and decontaminated has continued to increase every year at LMNRA. In 2016, over 10,000 watercrafts were inspected and over 650 watercraft decontaminated (NDOW 2016).

NDOW also operates several seasonal inspection and decontamination stations throughout the state including traveling rover stations and stations at other high priority waters. Inspectors are trained utilizing protocols developed by the Western Regional Panel on ANS Building Consensus Committee (Brown 2016) and are provided with training to ensure on-site safety (Appendix I). In addition, the TRPA operates a Lake Tahoe inspection station that is located in Nevada. The current NDOW program has a total of three seasonal rover stations that visit six waterbodies; two seasonal roadside stations, and nine boat ramp stations. Overall, twenty watercraft inspection and decontamination stations are operated within the state with four of those stations opened year round at Lake Mead NRA (Figure 6).

With the exception of LMNRA and the TRPA stations, funding for the operation of the stations has been through FWS Boater Access grants with match provided by NDOW's AIS Decal fee. In addition, in 2017, NDOW received a small grant from the Bureau of Reclamation to assist with the Lahontan Reservoir stations.

LAKE MEAD DECONTAMINATION STATION



2017 Nevada Watercraft Inspection Stations			
1	Alamo	11	Lake Mead NRA@Boulder
2	Cave Lake	12	Lake Mead NRA@Callville
3	Colorado River@Big Bend	13	Lake Mead NRA@Cottonwood
4	Colorado River@Laughlin	14	Lake Mead NRA@Hemenway
5	Eagle Valley Reservoir	15	Lake Tahoe@Spooner Summit (TRPA)
6	Elko	16	Rye Patch Reservoir
7	Kirch WMA	17	South Fork Reservoir@North Entrance
8	Lahontan Reservoir@Highway 50	18	South Fork Reservoir@South Entrance
9	Lahontan Reservoir@Old Marina	19	Sparks Marina
10	Lahontan Reservoir@Silver Springs	20	Topaz Lake

FIGURE 6. NEVADA WATERCRAFT INSPECTION STATIONS 2017

APPENDIX E: AUTHORITIES AND PROGRAM SUPPORT MATERIALS

Existing Legal Authorities

Nevada Department of Wildlife
Title 45 Nevada Revised Statute (NRS) - Wildlife NRS 503.597 Nevada's Revised Statute prohibits the importation, transportation or possession of any species of wildlife that the Nevada Department of Wildlife's Commission deems detrimental to the wildlife or the habitat of the wildlife in the state. The statute further provides a misdemeanor for any person to introduce any aquatic life into the state without the permission of the Board of Wildlife Commissioners.

NRS Title 45 – Wildlife NRS 503.597 - Chapter 503 – Hunting, Fishing and Trapping, Miscellaneous Protective Measures Introduction or removal of aquatic life or wildlife: Approval required; investigation; regulations; penalties.

1. Except as otherwise provided in this section, it is unlawful, except by the written consent and approval of the Department, for any person at any time to receive, bring or have brought or shipped into this State, or remove from one stream or body of water in this State to any other, or from one portion of the State to any other, or to any other state, any aquatic life or wildlife, or any spawn, eggs or young of any of them.
2. The Department shall require an applicant to conduct an investigation to confirm that such an introduction or removal will not be detrimental to the wildlife or the habitat of wildlife in this State. Written consent and approval of the Department may be given only if the results of the investigation prove that the introduction, removal or importation will not be detrimental to existing aquatic life or wildlife, or any spawn, eggs or young of any of them.
3. The Commission may through appropriate regulation provide for the inspection of such introduced or removed creatures and the inspection fees therefor.
4. The Commission may adopt regulations to prohibit the importation, transportation or possession of any species of wildlife which the Commission deems to be detrimental to the wildlife or the habitat of the wildlife in this State.
5. A person who knowingly or intentionally introduces, causes to be introduced or attempts to introduce an aquatic invasive species or injurious aquatic species into any waters of this State is guilty of:

   (a) For a first offense, a misdemeanor; and

   (b) For any subsequent offense, a category E felony and shall be punished as provided in NRS 193.130.
6. A court before whom a defendant is convicted of a violation of subsection 5 shall, for each violation, order the defendant to pay a civil penalty of at least $25,000 but not more than $250,000. The money must be deposited into the Wildlife Account in the State General Fund and used to:

   (a) Remove the aquatic invasive species or injurious aquatic species;

   (b) Reintroduce any game fish or other aquatic wildlife destroyed by the aquatic invasive species or injurious aquatic species;

   (c) Restore any habitat destroyed by the aquatic invasive species or injurious aquatic species;

   (d) Repair any other damage done to the waters of this State by the introduction of the aquatic invasive species or injurious aquatic species; and

(e) Defray any other costs incurred by the Department because of the introduction of the aquatic invasive species or injurious aquatic species.

7. The provisions of this section do not apply to:

(a) Alternative livestock and products made therefrom; or

(b) The introduction of any species by the Department for sport fishing or other wildlife management programs.

8. As used in this section:

(a) Aquatic invasive species means an aquatic species which is exotic or not native to this State and which the Commission has determined to be detrimental to aquatic life, water resources or infrastructure for providing water in this State.

(b) Injurious aquatic species means an aquatic species which the Commission has determined to be a threat to sensitive, threatened or endangered aquatic species or game fish or to the habitat of sensitive, threatened or endangered aquatic species or game fish by any means, including, without limitation:

(1) Predation;

(2) Parasitism;

(3) Interbreeding; or

(4) The transmission of disease.

[Part 43:101:1947; A 1949, 292; 1951, 494]—(NRS A 1957, 175; 1969, 1358; 1993, 431, 1676; 1995, 514; 2003, 1552; 2011, 2401; 2015, 100)

AB167 Aquatic Invasive Species Act (2011) passed by the Nevada State Legislature and the Governor of Nevada, enacted provisions for the protection of the waters of the State from aquatic invasive species. The bill prohibits a person from introducing certain aquatic species into the waters of the State and provides for the inspection of vessels for aquatic invasive species. It also requires watercraft to be inspected for the presence of aquatic invasive species before being operated on the waters of the State and requires decontamination of any vessels where an aquatic invasive species is present. In addition, the law authorizes the impoundment or quarantine of certain vessels and requires an aquatic invasive species fee to be paid by all operators of watercraft in the state. AB167 also provided civil penalties for individuals who knowingly introduce AIS into the States waters. Section 2 of the bill made it a misdemeanor for a first offense and a category E felony for any subsequent offense for knowingly or intentionally introducing any aquatic species which may be detrimental to the aquatic resources, aquatic species or water resources of the State. Section 2 also provided for an additional civil penalty of not less than $25,000 and not more than $250,000 for anyone convicted of such introductions.

Section 4 of the bill authorized NDOW to set up inspection stations for vessels operating on the waters of the State, to inspect such vessels for AIS, and to prohibit any person from operating a vessel without first complying with the inspection program. Section 4 also prohibits any person operating a vessel from leaving an impaired body of water and entering another body of water in the State without first having the vessel decontaminated. In addition, Section 4 allows a peace officer to inspect a vessel at any point if the peace officer has a reasonable belief based on articulable facts that an aquatic invasive species may be present on the vessel. Finally, if a person refuses to comply with a peace officer or the requirements of an inspection station, section 4 allows the person's vessel to be impounded or quarantined. Section 5 of the bill authorizes a peace officer to a keep a vessel impounded or quarantined until it has been decontaminated and shown to be in compliance with the requirements of NDOW.

Other provisions of AB167 requires the Wildlife Commission to establish an annual aquatic invasive species fee which must not exceed $10 for a motorboat owned or operated by a resident of the State and $5 for any other vessel owned or operated by a resident of the State. The fee for a nonresident motorboat owner must be $20 and $10 for any other non-motorized vessels owned or operated by nonresidents of the State. Section 6 also required the Department to issue an aquatic invasive species decal as evidence of payment of the AIS fee. Section 6 prohibits any person from operating a vessel on the waters of the State without first paying the fee and attaching the decal to his or her vessel as proof of payment.

NRS 488.045 (2016) This regulation requires the owner, operator or person in control of any vessel or conveyance that is transported on public roads or launched on any body of water in this State to drain the water from the vessel or conveyance and any equipment on the vessel or conveyance. This regulation also requires the owner, operator, or person in control of a vessel or conveyance that has been taken out of any body of water in this State to ensure that the drain plugs, drain valves and any other devices used to control the draining of water remain open while transporting the vessel or conveyance on public roads in the State.

Nevada Administrative Code

Nevada Administrative Code Title 503 – Hunting, Fishing and Trapping, Miscellaneous Protective Measures NAC 503.072 Injurious aquatic species: Fish; mollusks; amphibians; crustaceans. (NRS 501.105, 501.181, 503.597) For the purposes of NRS 503.597, the following species are classified as injurious aquatic species:

COMMON NAME	SCIENTIFIC CLASSIFICATION
FISH	
Asian swamp eel	All species in the genus *Monopterus*
Bighead carp	*Hypophthalmichthys nobilis*
Flathead catfish	*Pylodictus olivaris*
Gar	All species in the family Lepisosteidae
Nile perch	All species in the genera *Lates* and *Luciolates*, except for *Lates calcarifer*
Northern pike	*Esox lucius*
Piranha	All species in the genera *Serrasalmus, Serrasalmo, Pygocentrus, Pristobrycon, Hydrolycus, Rooseveltiella* and *Pygopristis*
Round goby	*Neogobius melanostomus*
Silver carp	*Hypophthalmichthys molitrix*
Snakeheads	All species in the genera *Ophicephalus, Channa* and *Parachanna*
South American parasitic catfish	All species in the families Cetopsidae and Trichomycteridae
Tiger fish	*Hoplias malabaricus*

MOLLUSKS	
Apple Snails	All species in the genus *Pomocea*
AMPHIBIANS	
African clawed frogs	All species in the genus *Xenopus*
CRUSTACEANS	
Rusty crayfish	*Orconectes rusticus*
Australian red claw crayfish	*Cherax quadricarinatus*

Title 503 Nevada Administrative Code– Hunting, Fishing and Trapping, Miscellaneous Protective Measures NAC 503.074 Aquatic invasive species: Mollusks. (NRS 501.105, 501.181, 503.597) For the purposes of NRS 503.597, the following species are classified as aquatic invasive species:

COMMON NAME	SCIENTIFIC CLASSIFICATION
Golden mussels	*Limnoperna fortunei*
New Zealand mud snails	*Potamopyrgus antipodarum, P. jenkinsi*
Quagga and zebra mussels	All species in the genus *Dreissena*

State Programs

Department of Agriculture

CHAPTER 555 Nevada Revised Statute - CONTROL OF INSECTS, PESTS AND NOXIOUS WEEDS NRS 555.010 Director: Authorization to investigate and control pests, plant diseases and disorders, and noxious weeds; establishment of program to certify agricultural products as being free from noxious weeds.

Within the limits of any appropriation made by law:

1. The Director may:

(a) Investigate the prevalence of; and

(b) Take the necessary action to control, vertebrate and invertebrate pests of plants and animals, plant diseases, physiological plant disorders and noxious weeds for the protection of the crops, livestock, public health, wildlife, water quality and beneficial uses of land in the State of Nevada.

2. The Director may, by regulation, establish and administer a program to certify agricultural products as being free from noxious weeds to support the control and prevention of the spread of noxious weeds in this State and to allow businesses in this State to market those products in compliance with any applicable federal law or regulation or any other requirement specified by the Director.

[1:53:1941; 1931 NCL § 373.01] + [1:108:1943] + [1:179:1945] + [1:217:1947; 1943 NCL § 373.04] (NRS A 1959, 245; 1961, 521; 1967, 316; 1975, 555; 1993, 1709; 1997, 479; 1999, 3640; 2015, 3586)

NRS 555.021 Director: Cooperation for suppression of vertebrate pests.

The Director may cooperate, financially or otherwise, with any federal agency or Department, any other state agency or department, any county, city, public district or political subdivision of this State, any public or private corporation, and any natural person or group of natural persons in suppressing vertebrate pests injurious to the state agricultural interests and in suppressing vertebrate pest vectors of diseases transmissible and injurious to humans.

(Added to NRS by 1975, 555; A 1993, 1710; 1999, 3640)

NRS 555.035 Account for the Control of Weeds; creation; use of money in Account; acceptance of gifts and grants.

1. There is hereby created in the State General Fund the Account for the Control of Weeds to be administered by the Director. Money in the Account must be used for the abatement of weeds. The Director may adopt regulations for the administration of the Account.

2. The Account is a continuing account without reversion to the State General Fund. The money in the Account must be invested as the money in other state funds or accounts is invested. The interest and income earned on the money in the Account, after deducting any appropriate charges, must be credited to the Account. All claims against the Account must be paid as other claims against the State are paid.

3. The Director may accept gifts, grants and donations from any source for deposit in the Account.

(Added to NRS by 2005, 2452)

NRS 555.100 Department to conduct inspections; notice to control pest, noxious weed or plant disease.

1. The Department shall, if necessary or if a complaint is made to the Department, cause an inspection to be conducted of any premises, land, means of conveyance or article of any person in this State if it is found to be infested with any pest, noxious weed or plant disease that is injurious to:

(a) The public health or quality of any water in this State; or

(b) Any wildlife, beneficial use of land or agriculture in this State.

2. The Department may provide a written notice of its findings to the owner or occupant of the premises, land, means of conveyance or article and require the owner or occupant to control the pest, noxious weed or plant disease in the manner and within the period specified in the notice.

3. A notice issued pursuant to the provisions of subsection 2:

(a) May be served upon the owner or occupant by an officer or employee of the Department; and

(b) Must be served in writing, by certified mail or personally, with receipt given therefor.

[Part 1:56:1917; 1919 RL p. 2628; NCL § 449] — (NRS A 1961, 522; 1993, 1710; 1999, 3640; 2001, 699; 2003, 533; 2015, 3586)

NRS 555.110 Premises infested with pest, noxious weed or plant disease declared to be public nuisance; abatement by Department.

1. Any premises found to be infested with any pest, noxious weed or plant disease is hereby adjudged and declared to be a public nuisance. If such a nuisance exists at any place within the jurisdiction of the Department and the owner or occupant of the premises, after notification, refuses or neglects to abate the nuisance within the period specified, the Department shall cause the nuisance to be abated at once by controlling pests, noxious weeds or plant diseases in a manner to be determined by the Department.

2. The expense thereof must be paid from any money made available to the Department by direct legislative appropriation or otherwise.

[Part 1:56:1917; 1919 RL p. 2628; NCL § 449] — (NRS A 1961, 522; 1993, 1710; 1999, 3641; 2003, 534; 2015, 3586)

NRS 561.301 Aquatic agriculture: Promotion, protection and regulation. Aquatic agriculture, which includes the propagation, cultivation and harvesting of plants or animals indigenous to water in a man-made, controlled or selected aquatic environment for the commercial production of food, is one of the agricultural enterprises conducted in this state. The Department shall promote, protect and regulate aquatic agriculture to the extent that the Department is authorized to regulate other forms of agriculture and other agricultural products. The Department shall confer with the Department of Wildlife regarding aquatic agriculture to prevent any adverse effects on existing aquatic animals.

(Added to NRS by 1985, 624; A 1993, 1727; 1999, 3662; 2003, 1582; 2015, 3608)

NRS 555.005 Definitions. As used in this chapter, unless the context requires otherwise:

1. Department means the State Department of Agriculture.

2. Director means the Director of the Department.

3. Noxious weed means any species of plant which is, or is likely to be, a public nuisance, detrimental or destructive and difficult to control.

4. Pest means any form of animal or vegetable life detrimental to the crops, horticulture, livestock, public health, wildlife, quality of water and beneficial uses of land in this State, including, without limitation, any insect, snail, nematode, fungus, virus, bacterium, microorganism, mycoplasma, weed, parasitic plant or any other plant that is normally considered to be a pest of cultivated plants, uncultivated plants, agricultural commodities, horticultural products or nursery stock, or that the Director declares to be a pest.

Regional Programs

The Tahoe Regional Planning Compact

Public Law 96-551

To grant the consent of the Congress to the Tahoe Regional Planning Compact, and to authorize the Secretary of Agriculture and others to cooperate with the planning agency thereby created.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That in order to encourage the wise use and conservation of the waters of Lake Tahoe and of the resources of the area around said lake, the consent of the Congress is hereby given to the Tahoe Regional Planning Compact heretofore adopted by the States of California and Nevada, which compact reads as follows:

Tahoe Regional Planning Compact

Article I – Findings and Declarations of Policy

It is found and declared that:

1. The waters of Lake Tahoe and other resources of the region are threatened with deterioration or degeneration, which endangers the natural beauty and economic productivity of the region.

2. The public and private interests and investments in the region are substantial

3. The region exhibits unique environmental and ecological values which are irreplaceable.

4. By virtue of the special conditions and circumstance of the region's natural ecology, developmental pattern, population distributions and human needs, the region is experiencing problems of resource use and deficiencies of environmental control.

5. Increasing urbanization is threatening the ecological values of the region and threatening the public opportunities for use of the public lands.

6. Maintenance of the social and economic health of the region depends on maintaining the significant scenic, recreational, educational, scientific, natural public health values provided by the Lake Tahoe Basin.

7. There is a public interest in protecting, preserving and enhancing these values for the residents of the region and for visitors to the region.

8. Responsibilities for providing recreational and scientific opportunities, preserving scenic and natural areas, and safeguarding the public who live, work and play in or visit the region are divided among local governments, regional agencies, the States of California and Nevada, and the Federal Government.

9. In recognition of the public investment and multi-state and national significance of the recreational values, the Federal Government has an interest in the acquisition of recreational property and the management of resources in the region to preserve environmental and recreational values, and the Federal Government should assist the States in fulfilling their responsibilities.

10. In order to preserve the scenic beauty and outdoor recreational opportunities of the region, there is a need to insure an equilibrium between the region's natural endowment and its manmade environment.

In order to enhance the efficiency and governmental effectiveness of the region, it is imperative that there be established a Tahoe Regional Planning Agency with the powers conferred by this compact including the power to establish environmental threshold carrying capacities and to adopt and enforce a regional plan and implementing ordinances which will achieve and maintain such capacities while providing opportunities for orderly growth and development consistent with such capacities. The Tahoe Regional Planning Agency shall interpret and administer its plans, ordinances, rules and regulations in accordance with the provision of this compact. The complete Compact is housed at www.trpa.org.

APPENDIX F: MONITORING IMPLEMENTATION PLAN

A completed Nevada AIS Management Plan will assist Nevada partners in strategizing a comprehensive and collaborative effort for AIS monitoring across the state. Future efforts should include but are not limited to better documentation, adoption of best practices among monitoring entities and collaborative planning of monitoring efforts.

Currently in Nevada, various entities routinely monitor Nevada's aquatic environment for water quality parameters, habitat, and the presence of native or intentionally introduced species. Aquatic invasive species are often encountered through routine monitoring or may be reported by the general public. General statewide monitoring strategies typically do not target invasive species due to financial constraints. However, a majority of AIS that have been identified in Nevada, excluding reports by the public, have been during general and routine monitoring such as aquatic bioassessments, fish population assessments and stream/lake habitat quality monitoring. If an invasive species has been confirmed in a specific area, and is of management priority, then targeted monitoring may be implemented. An exception to statewide monitoring for a particular invasive species has been the development of quagga and zebra mussel monitoring.

Following the discovery of quagga mussels at Lake Mead in 2007, NDOW began routinely monitoring for quagga and zebra mussels at state lakes and reservoirs with high risk for establishment or introduction. Quagga and zebra mussel monitoring is performed during the warm weather months at over twelve popular watercraft reservoirs and lakes. The collection of samples generally includes three plankton tow samples per station and three distinct sample locations within a waterbody. The laboratory analysis of the samples includes a minimum of microscopy in addition to in vivo amplification of specific gene fragments utilizing polymerase chain reaction (PCR). PCR analysis is performed at a minimum of one complete set of samples per waterbody per year. At lakes and reservoirs considered high risk due to high boater traffic and the potential introduction of mussels, PCR is routinely performed several times per season. For confirmation purposes of any potential laboratory positive result, NDOW's monitoring protocol calls for an immediate increase in both the frequency and location of samples collected at a waterbody to confirm the result. All samples collected would be analyzed utilizing both microscopy and PCR.

In addition to NDOW's waterbody sampling for dreissenid species, other organizations also routinely monitor for the mussels in uninfested waterbodies. The Bureau of Reclamation routinely monitors for quagga and zebra mussels at four of Nevada's uninfested reservoirs and lakes including Rye Patch and Lahontan Reservoirs, and Pyramid Lake. The Tahoe Basin is also routinely monitored by the Tahoe Regional Planning Agency. Currently, no other waterbodies in Nevada outside of the Colorado River system have been found to contain either quagga or zebra mussels.

LAMOILLE LAKE, NEVADA

APPENDIX G: WATERBODY CLASSIFICATION BASED ON AIS MONITORING

Classifying waterbodies based on the current monitoring efforts in Nevada. By utilizing a protocol to determine waterbody status, this allows Nevada water managers to have a system to categorize waters. The waterbody classification system is adopted from the WRP on Aquatic Nuisance Species, Building Consensus Committee (Building Consensus in the West 2013).

Waterbody definitions:

- **Status Unknown** – Waters that have not been monitored.
- **Undetected/Negative** - Sampling/testing is ongoing and nothing has been detected, or nothing has been detected within the time frames for de-listing.
- **Inconclusive** (temporary status) - Water body has not met the minimum criteria for detection.
- **Suspect** – Water body that has met the minimum criteria for detection.
- **Positive** – Multiple (2 or more) subsequent sampling events that meet the minimum criteria for detection.
- **Infested** – A water body that has an established (recruiting or reproducing) population of AIS.

De-listing a Water Body for Zebra and Quagga Mussels:

- **Inconclusive** – 1 year of negative testing including at least one sample taken in the same month of subsequent year as the positive sample (accounting for seasonal environment variability) to get to undetected/negative.
- **Suspect** – 3 years of negative testing to get to undetected/negative.
- **Positive** – 5 years of negative testing to get to undetected/negative.
- **Infested** – Following a successful eradication or extirpation event including a minimum of 5 years' post-event testing/monitoring with negative results.

DEFINITIONS

Verification – the scientifically-based process to confirm the presence of Aquatic Invasive Species (AIS).
Detection, detect or detected – the verified presence of AIS.
Minimum to verify detection - 2 independent results from the same sample, using scientifically accepted techniques.

APPENDIX H: HAZARD ANALYSIS AND CRITICAL CONTROL POINT FRAMEWORK

Hazard Analysis and Critical Control Point (HACCP) planning is a management tool that provides a structured method to identify risks and focus procedures in natural resource pathway activities. Understanding pathways and developing plans to reduce non-target species and prevent biological contamination are necessary to avoid unintended spread of species.

The five Steps to HACCP Planning

1. Describing the activity: The activity description includes specific information such as who, what, when, where, how, and why of the project. The description offers a historical, working reference to facilitate plan review and communication with the facility staff and other resource management agency personnel.

2. Charting the flow of tasks for the activity: This step provides an important visual tool that the HACCP team can use to complete the remaining steps of the plan. Here, a clear and concise, yet complete description of the tasks necessary to complete the overall activity is diagrammed in a linear fashion.

3. Identifying potential non-targets: Any species that has a reasonable potential to be moved or introduced to new habitats should be identified in order to implement appropriate control measures to prevent an unintended invasion. These may include vertebrates, invertebrates, plants, or other organisms (e.g., diseases, pathogens, and parasites).

4. Analyzing non-targets: It is crucial to identify significant non-targets with respect to each required task within a larger activity so that effective measures to control them may be employed. During the analysis, the significance of each potential non-target is assessed by considering risk.

5. Completing the action plan: The action plan addresses specific methods to control risks of non-target species. It lists specific information about controls, monitoring procedures, methods for evaluation, and corrective actions.

Additional web resources on HACCP planning and forms can be found here: www.haccp-nrm.org/

APPENDIX I: NDOW AIS PROGRAM HEALTH AND SAFETY POLICY AND IMPLEMENTATION PLAN

In 2016, NDOW developed the Aquatic Invasive Species Program Health and Safety Policy to ensure a safe work place for all employees involved in AIS management and implementation of the watercraft inspection and decontamination program. The complete document is housed at www.ndow.org

Nevada Department of Wildlife (NDOW) Aquatic Invasive Species (AIS) Program Health and Safety Policy

Developed per Nevada Revised Statute 618.383 and Nevada Administrative Code 618.540

Every staff member of the Nevada Department of Wildlife's Aquatic Invasive Species Program is expected to make every effort to integrate safety and health considerations into all parts of their daily activities. Safety program effectiveness is a shared responsibility. Each staff member must contribute their fair share in order for NDOW to remain a successful and viable government agency. We are committed to provide a safe work place for all employees and encourage all employees to be involved.

The objective of our safety and health program is to reduce or eliminate the potential for on-the-job injuries and illnesses. The AIS Program is charged with the responsibility for assuring that each staff member is provided with the tools and resources necessary to accomplish their job tasks in a safe manner consistent with established procedures, safety and health rules and criteria. Violations of safety and health policy and procedures will not be tolerated by NDOW management or staff and is subject to progressive discipline. The AIS Safety Policy is in addition and meant to supplement NDOW's General Safety Policy.

The AIS Program Safety Policy is intended to be a living document, thus hazard identifications and control methods can easily be adopted into the policy through the use of appendices and tables provided at the end of this document.

Every staff member is encouraged to identify unsafe conditions and be assured that immediate action for viable safety concerns will follow to permanently solve the concern. Each staff member can also feel confident that identifying unsafe conditions will not result in any type of reprisal to them. The prevention of accidents and mishaps is crucial to the success of the safety program. If every employee does their part, we will all have a safe place to work.

APPENDIX J: SUMMARY OF PUBLIC COMMENTS

This section contains a summary or in some cases detailed information regarding the comments received on the Plan. The majority of comments or suggestions were incorporated and ultimately created a better final document. The very few comments that were not incorporated are simply a reflection of different editorial, format or bibliographical styles.

The plan was reviewed by the Nevada Board of Wildlife Commission which includes 17 County Advisory Boards to Manage Wildlife (CABMW). At both the Commission meeting and the Advisory Board meetings, public comment was captured. The plan was reviewed by the CABMW's and the Nevada Board of Wildlife Commission on two separate meetings (June & August 2017). At both the Commission meeting and the Advisory Board meetings, public comment was captured. The Commission meeting was attended by NDOW Fisheries staff and included a presentation and answers to specific questions.

Nevada Board of Wildlife Commissioners Meeting
Public meeting attended by Karen Vargas, Nevada AIS Coordinator and Jon Sjöberg, Fisheries Division Administrator. All comments and responses were made at the June 2017 meeting. No major comments were received at the August 2017 Commission meeting. The Commission unanimously approved the plan on August 11, 2017.

Comment: Commissioner Drew brought up that the Carson CABMW was concerned with concept of reciprocity for watercraft inspections. He said they want to be more consistent with the neighboring states and the TRPA. Commissioner Drew recommended reaching out to the Carson CABMW chairman for clarification of their comments.

> ***Response***: *The concept of reciprocity can be easily incorporated into the plan. The intent of the Western Regional Plan is to develop reciprocity between inspection programs. Due to the infestation at Lake Mead, Nevada could be one of the last to have shared reciprocity with other programs. Note: Action regarding reciprocity was incorporated into the final plan.*

Comment: Commissioner Hubbs had questions in regards to including climate change into the plan and potential difficulties receiving federal funds.

> ***Response***: *If the grant funding the State of Nevada receives from the FWS, NPS and BOR went away the Nevada program would be cut at least in half. The fees from the decal do not bring in enough funds to cover the current program. Climate change is an important aspect of the plan.*

Comment: John Hiatt, Clark CABMW, said the whole issue of invasive species is important. Invasive species are a great threat to Nevada's wildlife. We have been remiss in not addressing it earlier on. We talk of quagga mussels as unintentional but we also have intentional species introduction. Virtually every warm spring has non-native species and aquatic invertebrate species introduced into it. There needs to be a way that people can dispose of their unwanted invasive animals purchased through the pet trade responsibly. Disposal of unwanted pets should be part of the plan.

> ***Response***: *Fisheries Administrator Jon Sjöberg said that the plan addresses key aquatic invasive plant species; although the current program's primary focus is watercraft, quagga and zebra mussels. Concerns such as the pet trade and other introductions are addressed in the plan.*

Comment: Paul Dixon, Clark CABMW, asked whether plants as well as vertebrates are in the plan because of so many invasive plants in reservoirs.

> ***Response****: see previous response*

Individual County Wildlife Board Meeting General Comments

Several County Wildlife Advisory Boards (i.e. White Pine, Eureka, Clark, Clark City) unanimously voted to support the Draft Nevada Aquatic Invasive Species Management Plan in June 2017 during their regularly scheduled meeting.

Elko County Wildlife Advisory Board was presented with the Draft plan in June 2017, and will determine their support on the Draft in August 2017.

Clark County Wildlife Advisory Board commented to consider that funds for the Nevada AIS program should have a large education program.

Carson City County Wildlife Advisory Board commented on the inclusion of information to develop a reciprocity program with the Tahoe Basin.

One member of the public at the Carson City County Wildlife Advisory Board meeting recommended taking the Draft Plan before the TRPA.

Douglas County Wildlife Advisory Board was presented the Draft plan in June 2017 and will determine their support on the Draft in August 2017. Several comments focused on coordination and consistency between and among the many partners and stakeholders in the County.

ANSTF Comments Preliminary Review

Comments from Susan Pasko, Executive Secretary ANSTF

Introduction – suggested to modify content on invasive species definition

Climate change and invasive species – content as provided in two sections is ineffective

Existing Authorities - A variety of typos, inconsistent acronyms or minor edits were suggested

Pathways for Introduction/Strategies/Climate change/Rapid response sections – suggested clarifying language or minor edits to improve content and flow for reader.

***Response**: all comments and suggestions were incorporated into the plan.*

Comments from Al Cofranceso, US Army Corps of Engineers, ANSTF Federal member corrected detail specific to the USACE.

***Response**: all comments and suggested edits were incorporated into the plan.*

Comments from Mike Ielmini, US Forest Service, ANSTF Federal member corrected detail specific to USFS.

***Response**: all comments and suggested edits were incorporated into the plan.*

Comments from Jolene Trujillo, Bureau of Reclamation, ANSTF Federal member corrected detail specific to BOR.

***Response**: all comments and suggested edits were incorporated into the plan.*

Comments from Paul Zajicek, National Aquaculture Association, ANSTF Ex Officio member

Maps were appreciated.

Suggest plan authors review and adopt the National Research Council's Science and Decisions: Advancing Risk Assessment (2009) or the ANSTF risk analysis methodology to use in the process to identify and assess resident nonnative species or species that could be introduced for potential risks.

Suggest that both sections on climate change be merged and edited.

Suggest that a stakeholder organization to coordinate the implementation of the plan will be needed for the plan to be successful.

Response

- An action was created that would task a stakeholder team to develop risk assessment process that was adopted by the state.
- Climate change content was edited as suggested.
- An action was created that would further the longevity of a stakeholder team in the long-term implementation of the plan.

Comments from Kim Bogenschutz, Association of Fish and Wildlife Agencies, ANSTF Ex Officio member

Executive Summary – should be expanded to include summaries of ANS problems, management plan sections, major recommendations, and implementation plans

Introduction – good, includes very good summary of Existing Authorities and Programs

Problem Definition and Ranking – good, no additional comments

Goals and Objective, Strategies, Actions, and Cost Estimates – very neatly outlined, no inclusion of basis of cost estimates but included in implementation table

---

Priorities for Actions – included in implementation table

Implementation Table – liked the use of different colors for different objectives, it is not clear if funding sources are current or needed and what current funding and staffing is (if any).

Program Monitoring and Evaluation – ok

Glossary – good

Literature Cited – good

Appendices – good overview of species ranking and priority species for management

Response

- *The executive summary was expanded and revised as suggested.*
- *All cost estimates are included in the implementation table as a way to streamline the information.*
- *Additional details were added to implementation table column headings.*
- *Additional detail was added to program monitoring and evaluation.*

Comments from Don Maclean, FWS and Administrative staff to the ANSTF and coordinator of the State/Interstate AIS management plan grant program

Missing content (as per ANSTF Management Plan Guidance document)

Executive summary – additional information is required in this section such as summarizing objectives and strategies.

Introduction, plan development – additional information on how the plan came together and how it will coordinate with other current plans.

Introduction, review process in plan development – additional information on the process used to obtain comments and review and how that review was incorporated into the final plan.

Introduction, coordination with neighboring states/management entities – additional information of this coordination and how Nevada will minimize duplication of effort.

Problem Definition and Ranking – additional information on waterbodies and current management efforts such as; How many shared water bodies are of concern to NV?

Is NV only concerned with the larger reservoirs? Are there infested waters that flow into NV where containment could be conducted? Is containment on those waters already occurring?

Has NV considered approaching adjacent states with infestations about which they are concerned to discuss what can be done collaboratively?

- Goals – refinement of goals such as: For prevention, is the goal no new introductions what-soever? Is it a decrease in new introductions? For limiting spread, eradication, and control, is there any way to make it more specific? Is it limiting spread by a certain amount or for certain specific species? Is it for specific conservation or other societal goals? For minimizing impacts, does NV have a plan for what criteria it will use to determine if it has been successful?
- Objectives, Strategies and Action – refinement of how the objectives align with goals for successful implementation.
- Priorities for Action – suggested a short-term priorities list could be developed based on the stated strategies and actions.
- Program Monitoring and Evaluation – suggested more information to understand how the plan's success will be measured.

General Comments
Scientific term usage for consistency throughout the document.

Acronyms both in how they are used and where they are used for consistency throughout the document.

Definition terms to be refined for better understanding.

Suggested additional maps that better describe landownership, particularly tribal areas and federal landownership.

Specific Comments
Multiple areas were noted for formatting for consistency and errors.

Multiple areas were noted for editorial errors or redundancy.

Several areas of text were suggested to move for better clarification.

Several areas were suggested for additional language to better current or intended management actions.

Pathways of Introduction section suggested that additional information to characterize pathways information or statistics specific to Nevada.

Multiple entries were noted for citation or bibliographic content errors or inconsistency.

Multiple entries were noted within the strategies and actions that could be better clarified to increase understanding.

Several areas were suggested for additional language to better understand scientific link.

AIS definition origin and accurate history of the definition development was noted.

Response

Missing Content

- *The Executive Summary was substantially edited to provide broader information on the entire plan, including a summary of actions of highest priority.*
- *The Introduction was edited to provide background on the development of the plan.*
- *The Introduction was edited to provide detail on the process used for review and input.*
- *The Introduction was edited to provide greater detail both on current and anticipated collaboration with neighboring managing entities.*
- *Problem Definition and Ranking was suggested to include more information on shared waterbodies or interstate management. This content was developed but placed following*
- *Geographic Scope under Regional Geographic Dynamics.*
- *Goals were further refined to provide greater understanding for the reader.*
- *Objectives, Strategies and Action - edits focused on clarifying the connection between the goals and the objectives.*
- *Priorities for Action were identified from the list of Strategies and Actions. A list of 18 were determined and added in the Executive Summary and following the Goals.*
- *Program Monitoring and Evaluation – suggested more information to understand how the plan's success will be measured.*

General Content

- *Consistency of scientific term usage was applied throughout the document.*
- *All acronyms both in how they are used and where they are used were edited for consistency throughout the document.*
- *Where suggested all definition terms were refined for better understanding.*
- *A landownership map was included that highlights both the federal and tribal landownership. Also, the ecoregions map was edited to include major highways and major cities for improved detail.*

Specific Content

- *All areas that were noted for formatting for consistency and errors, editorial errors or redundancy, suggested text order, suggested language were accepted and corrected.*
- *Additional detail on Pathways of Introduction section was provided to give statistics or information specific to Nevada.*
- *All citation or bibliographic content errors were corrected.*
- *Multiple strategies and actions were clarified.*
- *Several areas of text were clarified to better understand scientific link.*
- *AIS definition origin and accurate history of the definition development was edited to reflect this information.*