# Market Lake
# Wildlife Management Area

Photo by Don Maiers

## Management Plan
## 2014

Upper Snake Region

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## 2014 – 2023 Management Plan
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Idaho Department of Fish and Game
Upper Snake Region
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# Executive Summary

Idaho Department of Fish and Game (Department) manages 32 Wildlife Management Areas (WMAs). Researchers from the University of Idaho and The Nature Conservancy evaluated the value of Idaho's WMAs to wildlife. They found the WMA network, created to support game species, "also conserves the full range of Idaho's wildlife and other ecological features" (Karl et al. 2005). Surveys and monitoring work conducted by Department biologists on Upper Snake Region WMAs confirm their value to big game, nongame, and many at-risk species identified in Idaho's State Wildlife Action Plan. In many cases, WMAs provide the principal habitat for at-risk species in the Upper Snake Region.

Wildlife Management Areas often abut other protected lands such as National Forests, Bureau of Land Management (BLM) lands, or private lands protected by conservation easement. Due to wildlife-focused management, WMAs often serve as highly productive core areas of the landscapes in which they exist. Management of these areas involves a combination of restoring and maintaining important natural habitats to contribute to landscape-level habitat function (e.g., sage-steppe, slough wetlands) and creating hyper-productive habitats (e.g., food plots, impounded wetlands) to enhance the carrying capacity for certain wildlife species.

Wildlife Management Area management plans attempt to direct management that upholds these values. They may also be bounded or guided by legislative and/or funding mandates, Department species plans, the State Wildlife Action Plan, conservation partner objectives, national wildlife conservation strategies and plans (federal and non-government organizations), and especially the Department's own strategic plan, *The Compass*. Priorities, Management Directions, Performance Targets, and Strategies have been developed to be as consistent as possible with all of these documents and to capture the broader conservation values already provided by WMAs and ensure these values are protected and enhanced.

Department staff in the Upper Snake Region manage seven WMAs that collectively comprise about 85,000 acres of land. Management focus is to maintain highly functional wildlife habitat and provide wildlife-based recreation. These areas include:

- Tex Creek WMA in Bonneville County, a crucial wintering area for the region's deer and elk
- Market Lake and Mud Lake WMAs, two deep marsh units that are vital waterbird migratory stopover and production areas in Jefferson County
- Chilly Slough Wetland Conservation Area (WCA), a protected complex of wet meadow and wetland habitats in Custer County
- Cartier Slough WMA, a natural wetland associated with slough channels of the Henrys Fork River in Madison County
- Deer Parks Complex Wildlife Mitigation Units (WMU), managed cooperatively with the BLM and Shoshone-Bannock Tribes to restore and protect highly functional habitats along the Snake River in Jefferson and Madison counties

- Sand Creek WMA (including the Chester Segment), a mosaic of deep-water and shallow wetlands, wet meadow, marsh, and sagebrush-steppe habitats in Fremont County that provide winter refuge for mule deer, elk, and moose from surrounding high-elevation public lands including Yellowstone National Park

Examples of at-risk species partially dependent on Upper Snake Region WMAs include: Ute ladies' tresses orchid, St. Anthony sand dunes tiger beetle, northern leopard frog, greater sage-grouse, Columbian sharp-tailed grouse, sandhill crane, trumpeter swan, lesser scaup, northern pintail, white-faced ibis, long-billed curlew, and yellow-billed cuckoo.

All regional wildlife areas (WMAs, WMUs, and WCAs) are funded through a combination of hunting license dollars, appropriations from federal excise taxes derived from the sale of firearms and ammunition, and funding provided by the Bonneville Power Administration and Bureau of Reclamation to mitigate habitat loss from construction of various dams in the region. Hunters pay a large portion of the management tab and they are rewarded with habitat management areas that sustain many of the region's big game herds and provide consistent waterfowl and upland game bird production and hunting opportunities. Non-hunters, who value the varied benefits provided by the Upper Snake Region's WMAs, also benefit from the broad ranging conservation values associated with Department WMAs.

## Market Lake WMA

The 5,067 acre Market Lake Wildlife Management Area (MKWMA) in Jefferson County is located two miles north of the city of Roberts and 17 miles north of Idaho Falls. Market Lake WMA was established in 1956 to restore a portion of the historic Market Lake basin for migrating and nesting waterfowl and to provide an area for waterfowl hunting.

The original Market Lake was a 12 square mile flood plain of the adjacent Snake River. The vast flocks of waterfowl that visited Market Lake during the spring and fall migrations attracted "market" hunters who harvested the birds and gave the area its name. In 1956 when MKWMA was established, only 30 acres of the original wetlands remained. Federal Aid in Wildlife Restoration (Pittman-Robertson Act) was used in acquiring property to create MKWMA. These funds, as well as state license funds, are used to manage MKWMA.

## Gem State WHA

Gem State Wildlife Habitat Area (GSWHA) is part of MKWMA. It is made up of 71 acres of riparian habitat, most of which is offsite mitigation for losses resulting from the development of the Gem State hydroelectric facility by the city of Idaho Falls. The parcel is located on the Snake River below the confluence of the Henrys Fork and the South Fork of the Snake River. The Gem State offsite mitigation area was purchased by the City of Idaho Falls and transferred to the Department for management. Gem State WHA is managed primarily as wildlife habitat and to provide public access for hunting, fishing, trapping, and wildlife viewing.

This document provides direction in the form of goals, objectives, and strategies for the management of MKWMA. The direction of MKWMA was determined after a series of public meetings. Issues pertaining to MKWMA were identified by the public and the Department. These issues were developed into goals, objectives, and strategies consistent with the Department Strategic Plan, *The Compass*. A draft version of these goals and strategies was offered for public inspection and comment in August 2013.

This plan will serve as a guide for current and future managers in planning where to direct efforts and limited resources for maximum wildlife benefit, public enjoyment, and efficient operation. As new information and technology becomes available, and if more property is acquired, strategies may be modified to most effectively reach the goals and objectives in this plan. All goals, objectives, and strategies are dependent on adequate funding, personnel, and public support.

Management Program Table development is based on Conservation Targets chosen to benefit a large number of species using MKWMA and surrounding areas. Conservation targets give direction to management goals and procedures that will restore, maintain, or improve habitats on the WMA and surrounding areas. The performance targets and strategies will guide managers on how to accomplish this.

Northern pintail was selected as a Conservation Target on MKWMA and will involve management direction to wetland and nesting areas around the WMA. This includes stop-over habitat that provides foraging areas for birds to acquire the needed energy to complete migrations or to survive harsh winter conditions. These food sources and healthy wetlands will benefit many other species on the WMA including white-faced ibis, another Conservation Target. Given the high species value of migratory waterbirds (particularly of priority species such as northern pintail, white-faced ibis, lesser scaup, sandhill crane, trumpeter swan, etc.), wetland restoration and conservation partnerships are very achievable.

Ring-necked pheasant was selected as another Conservation Target. Management of ring-necked pheasant provides direction for healthy uplands, moist soil management, riparian shrubs and the vegetation understory essential to many species utilizing MKWMA.

Market Lake WMA’s conservation target management practices will provide benefits to a large number of species utilizing MKWMA and surrounding areas. Species that will not benefit have been identified as requiring additional information for management direction.

This document provides direction in the form of Priorities, Management Directions, Performance Targets, and Strategies for the management of MKWMA. The Priorities for MKWMA were determined through a combination of public and staff input, cooperative agreements that formed portions of MKWMA, and Department statewide priorities identified in *The Compass*.

# Introduction

This management plan is designed to provide broad guidance for the long-term management of Market Lake Wildlife Management Area (MKWMA). It replaces an earlier management plan written in 1999. This new plan was completed during 2012 and 2013 after extensive public input. This plan is tiered off other Idaho Department of Fish and Game (Department) plans and policies such as:

- State Wildlife Action Plan (2005)
- Statewide management plans for:
    - waterfowl (1991)
    - upland game (1991)
    - mule deer (2010)
    - white-tailed deer (2005)
    - elk (2014)
    - moose (1991)
    - furbearer (1991)
- Statewide big game depredation management plan (1988)
- Conservation Plan for the Greater Sage-grouse in Idaho (2006)
- Policy for Avian and Mammalian Predation Management (2000)

Other plans this document uses, is part of, or references include:

- North American Waterfowl Management Plan (2012)
- Intermountain West Waterbird Conservation Plan (2006)
- U.S. Shorebird Conservation Plan (2001)
- Intermountain West Regional Shorebird Plan (2000)
- Partners in Flight Tri-National Vision for Landbird Conservation (2010)
- Idaho Partners in Flight: Idaho Bird Conservation Plan (2000)
- Idaho's Invasive Species Plan (2012)

## Department Mission

All wildlife, including all wild animals, wild birds, and fish, within the state of Idaho, is hereby declared to be the property of the state of Idaho. It shall be preserved, protected, perpetuated, and managed. It shall be only captured or taken at such times or places, under such conditions, or by such means, or in such manner, as will preserve, protect, and perpetuate such wildlife, and provide for the citizens of this state and, as by law permitted to others, continued supplies of such wildlife for hunting, fishing and trapping (Idaho Code Section 36-103).

## Department Strategic Goals

The Department's 2005 Strategic Plan, *The Compass*, is the primary guiding document for all other Department plans and outlines four goals for the Department:

- Fish, Wildlife and Habitat: Sustain Idaho's fish and wildlife and the habitats upon which they depend.
- Fish and Wildlife Recreation: Meet the demand for fish and wildlife recreation.
- Working With Others: Improve public understanding of and involvement in fish and wildlife management.
- Management Support: Enhance the capacity of the Department to manage fish and wildlife and serve the public.

The 2014 Wildlife Management Area (WMA) plans describe the management direction for each of the 32 WMAs the Department manages to help accomplish these goals. The specific *Compass* goals and objectives relevant to WMA management are included in Appendix I.

## Statewide WMA Vision

Our WMAs are managed to provide and showcase important habitat for all wildlife and to offer high-quality, wildlife-based public recreation.

## Market Lake WMA Mission

Protect and manage the wildlife resources of MKWMA, as mitigation for habitat losses elsewhere in the region, to ensure sufficient quantities of high quality and secure habitat for breeding and migrating waterfowl and for a wide variety of other game and nongame species and provide for public hunting, trapping, wildlife viewing, nature viewing, and education compatible with our primary mission.

Protect and provide habitat at MKWMA for the propagation of waterfowl and other wildlife species so as to maintain abundant populations, and provide for public hunting, trapping, wildlife viewing, nature viewing and education compatible with our primary mission.

## Modification of Plan

This plan provides broad, long-term management direction for MKWMA. It will be evaluated at least every five years to determine if adjustments are needed. The plan will be modified as needed to accommodate changing conditions and goals and to incorporate available advancements in management knowledge and techniques.

## Other Considerations

All strategies proposed in this plan are bound by the contractual agreements between cooperating agencies, the mission of MKWMA, and all applicable Department species management plans and policies**.** Issues and strategies that are inconsistent with these objectives were not considered. In addition, the implementation of all strategies will be subject to available funding, personnel, and safety considerations.

# Area Description and Current Status

Market Lake WMA in Jefferson County is two miles north of Roberts, Idaho, and 17 miles northwest of Idaho Falls and adjacent to the Snake River. Market Lake WMA lies within big Game Management Unit (GMU) 63A.

The area has a typical eastern Idaho desert climate of cold winters with variable snowfall; cool, windy, dry springs; hot, dry summers; and warm falls. Temperatures range from a recorded low of -34° F to a high of 104° F. Snow depths vary from five inches to over 13 inches. The growing season ranges from 80 to 100 days. The area generally has 85 to 95 frost-free days/year. Killing frosts usually occur September through late April. Soil frost depths average 28-36 inches. Freeze-up of the marsh is typically the middle of November, and ice-out occurs around late March or early April. Ice thickness averages 14-18 inches. Annual precipitation ranges from eight to 11 inches, but little falls during the growing season.

The elevation of MKWMA is about 4,770 feet above sea level. Topography varies 80 feet from the surface of marshes to the high, sandy, rocky ridges.

Market Lake WMA is bordered by Interstate 15 and private farm lands on the west and south. Desert lands abut on the north side and the Snake River forms the southeast boundary.

Over 231 wildlife species are found at MKWMA (Appendix VII) and it is an important migration and staging area for waterfowl in the Pacific Flyway. Approximately 50,000 snow geese, 4,000 tundra swans, 100 trumpeter swans, 2,000 Canada geese and 250,000 ducks feed, rest, and stage at the wetland complex made up of MKWMA, Mud Lake WMA, and Camas National Wildlife Refuge, during spring migration. The largest concentrations of waterfowl and waterbirds occur in March and April, but fall migration brings large numbers as well.

There are 28 species of waterfowl and 188 species of birds that use Market Lake with the most common being Canada goose, mallard, gadwall, American widgeon, northern pintail, green-winged teal, cinnamon teal, redhead, lesser scaup, sandhill crane, white-faced ibis, Franklin's gull, eared grebe, and double-crested cormorant. Trumpeter swans are common and successfully nest on MKWMA. Peregrine falcons have occupied the hack tower built in 1991 but have not successfully fledged young. The hack tower has not had peregrine nesting use since 2000. Yellow-billed cuckoos have been documented four miles upstream from the Gem State segment. Ring-necked pheasant, gray partridge, greater sage-grouse, moose, white-tailed deer, jackrabbits, cotton-tailed rabbits, and an occasional elk and pronghorn antelope reside on the WMA year-round. A few incidental birds have been observed on MKWMA including sharp-tailed grouse, brown pelican, harlequin duck, surf scoter, western gull, purple martin, American dipper, and tri-colored heron.

Market Lake WMA was first officially recognized as an Important Bird Area in Idaho in 1997. In 2010, MKWMA was designated a Global Important Bird Area by the National Audubon Society and BirdLife International. Specifically, MKWMA provides habitat for greater than 1%

of the biogeographic population of snow geese during spring migration and with the colony at Mud Lake WMA, about 25% of the known breeding population of white-faced ibis in the western United States. It also provides habitat for a nationally significant population of tundra swans in the spring.

Market Lake WMA was established primarily to preserve and improve waterfowl and upland bird production and hunting, big game wintering habitat, wildlife appreciation and education, and nongame production. In 2012, surveys were completed to estimate visitor use and information on MKWMA. Approximately 16,160 user days per year occur on MKWMA. The top three activities are wildlife viewing, hunting, and dog training at 44%, 20%, and 8%, respectively. Market Lake WMA is an important waterfowl hunting and viewing area. More information on visitor use trends can be found in Appendix IV.

Land acquisition for MKWMA began in 1956. A total of 5,067 acres have been purchased, largely (95%) with federal Pittman-Robertson (PR) funds and the other with state license dollars (3%) and Teton Dam mitigation funds (2%). Management of MKWMA has been funded with state license dollars (50%) and PR funds (50%).

The original Market Lake was a 12 square mile flood plain of the adjacent Snake River. The vast flocks of waterfowl that visited Market Lake during the spring and fall migrations attracted "market" hunters who harvested the birds and gave the area its name. In 1956 when MKWMA was established, only 30 acres (0.04 %) of the original wetlands remained. Most of the original lake bed has been drained, diked, and converted to agricultural fields. Through acquisitions and mitigation, the current MKWMA boundary includes nearly 20% of the original Market Lake. The Department has established and managed 1,710 acres of marsh (22% of the original lakebed) and 28 acres of riparian habitat. The remaining area includes 1,406 acres shrub-steppe habitat, 325 areas of perennial grasslands, and 220 acres of agriculture fields. Water to fill wetlands on MKWMA comes from water rights from the springs and sloughs on the property as well as irrigation shares of water from Butte-Market Lake Canal.

In 1993-1994, three internal dikes were built on the marsh allowing water to be managed in smaller units in effort to isolate disease and manage vegetation. Historically, agriculture was established in areas covered by seasonal wetlands. The Department continues to manage these as food plots for wildlife habitat.

The water table has changed on MKWMA and this has influenced management. In the 1980s, MKWMA contained at least 12 springs and artesian wells. During summer months, the combined spring water flow was estimated to be about 10 cubic feet per second (cfs). Currently, one of the large springs, East Springs, is now a fraction of its original size due to changes in groundwater levels. The estimated current spring water discharge volume is around seven cfs.

Current research indicates that discharge from the springs and artesian wells are likely dependent on the groundwater recharge from irrigation on the Egin Bench to the northeast. Appendix XI discusses water and hydrology of MKWMA as well as water rights associated with the WMA.

In the late 1800s, spring snow melt and flooding from the Snake River filled the historic Market Lake which covered up to 20 square miles at an estimated depth of six to seven feet. As the Snake River receded during summer months, the lake would slowly drain back into it, leaving a complex of shallow marshes and mudflats that formed incredible waterbird and shorebird habitat. As settlement occurred in the Market Lake area, anthropogenic landscape alterations interrupted the natural flow of water out of the Snake River. In 1888, the Utah and Northern Railway built a standard gauge rail which became a dike separating the lake from the river. The dikes and railroad prevented flooding of the lake and marshes. After this, the lake was smaller and would dry up in summer months.

Around 1900, irrigation on Egin Bench began. This area is 12-20 miles northeast of Market Lake. The type of irrigation used was sub-irrigation, a process wherein water percolates from canals and laterals into crop fields. This type of irrigation provided as much as three to four times more water than the soil or crops could use or hold. Much of the excess water moved away from Egin Bench toward Market Lake and Mud Lake through the regional aquifer (Stearns et al. 1939). As drainage wells and canals were installed on Egin Bench, water began to appear again in the Market Lake basin and the lake reformed. Over the next decade, drainage canals and ditches were used to drain the lake back to the river so livestock grazing and farming could continue.

Groundwater pumping for agriculture between the late 1970s and 1989 increased aquifer withdrawals from about 240,000 acre-feet in 1983 to about 370,000 acre-feet in 1990 (Spinazola 1993). Concurrent with groundwater development, change from sub-irrigation to sprinkler (i.e., center pivot) irrigation has reduced recharge into the aquifer. As a result, water discharge to Market Lake wetlands has decreased.

Marsh soils on MKWMA are primarily fluvaquents. These are very deep and poorly drained soils (called hydric soils) of old lakebeds. Sandy loams occur in some areas. These soils are underlain with basalt rock and slopes range from 4 to 20% (Appendix XIII).

MKWMA habitats reflect the moisture gradient from wet to dry. Semi-permanently flooded tall emergent marshes are dominated by bulrushes (primarily hardstem, *Schoenoplectus acutus*) and cattail (*Typha latifolia*), with average flooding depths of two feet. Seasonally flooded wet meadows support sedges (*Carex* spp.) and alkaline marsh species. Temporarily flooded or sub-irrigated mesic and alkaline meadows are dominated by Baltic rush (*Juncus balticus*), clustered field sedge (*Carex praegracilis*), saltgrass (*Distichlis spicata*), and alkali dropseed (*Sporobolis airoides*). Riparian habitats support willows (*Salix* spp.) and Russian olive (*Elaeagnus angustifolia*). Uplands and stabilized dunes are dominated by big sagebrush (*Artemisia tridentata* spp. *tridentata* and *wyomingensis*), various bunchgrasses, including needle-and-thread (*Hesperostipa comata*), and cheatgrass (*Bromus tectorum*). Approximately 150-220 acres of agricultural land within the boundary are under cultivation by sharecroppers. Different acreage is farmed annually depending on crop rotation.

Invasion by Russian knapweed (*Acroptilon repens*), a noxious weed, has historically been a serious problem on MKWMA. Many of the older agricultural fields had large amounts of

Russian knapweed and some Canada thistle (*Cirsium arvense*). Through intensive treatment and continued monitoring, Russian knapweed and Canada thistle populations have been greatly minimized across most of the WMA.

The Gem State segment of MKWMA is located along the mainstem of the Snake River five miles below the confluence of the Henrys Fork and South Fork of the Snake River. It primarily supports riparian and floodplain habitat characterized by narrowleaf cottonwood (*Populus angustifolia*) forest with dense understory shrubs, primarily redosier dogwood (*Cornus sericea*). Coyote willow (*Salix exigua*) dominates floodplain meander scars, swales, and river banks. Scrub-shrub riparian habitat also occupies drier terraces, dominated by black hawthorn (*Crataegus douglasii*), Woods' rose (*Rosa woodsii*), and western snowberry (*Symphoricarpos occidentalis*). The herbaceous understory is weedy, characterized by reed canarygrass (*Phalaris arundinacea*) and Canada thistle (*Cirsium arvense*), reflecting the historic use of the land for livestock grazing.

The Gem State segment includes 46.5 acres owned by the city of Idaho Falls (City) as partial mitigation for wetland/riparian losses associated with the construction of the Gem State Hydroelectric Project. The Department has an agreement with the City to manage the Gem State segment as wildlife habitat until June 30, 2033. This agreement could be terminated as set forth in the agreement or extended by another agreement between the two parties. The Department holds the title of the property until the terms of the agreement have expired. An additional 19 acres is owned by Bureau of Land Management (BLM) and is managed by the Department as part of the mitigation area to enhance wildlife habitat. This parcel is managed through a verbal agreement between the City and BLM. The Gem State segment also includes a 5.2 acre parcel purchased by the Department in 1994, located adjacent to the mitigation area. The public uses the Gem State segment for hunting, fishing, hiking, and nature viewing. The area is isolated and small, therefore recreational use appears to be limited. From this point on, the Gem State segment will not be referred to separately in this plan, but will be referenced as part of MKWMA management entirely.

Market Lake WMA is open for recreational uses all year and is visited annually by thousands of people. Visitors come to enjoy wildlife viewing, hunting, fishing, and other nature-based activities offered on MKWMA and utilize the roads, boat ramps, trails and facilities maintained by the Department (Figure 1).

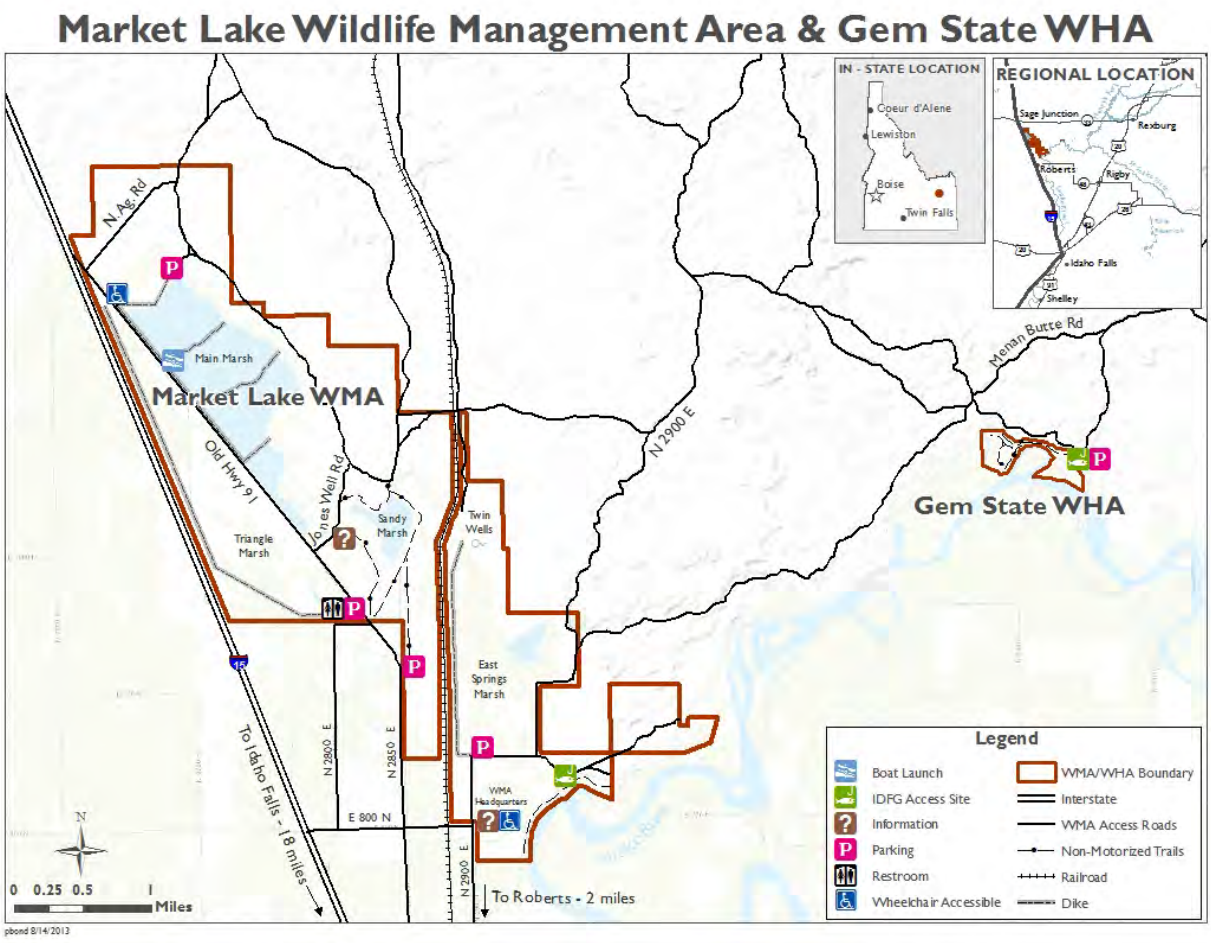


Figure 1. Map of Market Lake Wildlife Management Area.

# Management Issues

Upper Snake Region habitat staff presented information on the WMAs in the Upper Snake Region and the preparation of the 2014 WMA plans at two big game season setting public meetings in February and March of 2012. These meetings were held in Idaho Falls and Rexburg. We created displays highlighting the WMAs, the planning process, and management issues that we had identified prior to the meetings. We encouraged attendees to give us written comments regarding management of the WMAs and any issues they felt that we need to address in our future management. We directed attendees to the online survey available on the Department website (described below) and provided a form at the meetings for written comments.

Throughout 2012 (Feb-Dec), an online survey form was available on the Department website. The survey allowed participants to answer questions and provide feedback on WMA management statewide and the management of specific WMAs. Upper Snake Region habitat staff sent >600 emails to neighbors, cooperators, legislators, sportsmen's groups, land management agencies, and concerned citizens inviting them to take the online survey. A news release was printed in the Idaho Falls Post Register inviting the public to take the online survey or provide comments via email or personally.

Additionally, MKWMA staff, with significant help from the Idaho Falls Idaho Master Naturalist Group, conducted on-site surveys from July 2011 through August of 2012. These paper surveys included questions similar to the online survey and provided an opportunity for users to suggest ways to improve management of MKWMA. To capture a broad spectrum of visitors, random survey time periods, alternating between early and late in the day and between weekdays and weekends, were selected for each week. Surveys were delivered to users in person.

We received 182 online surveys specific to MKWMA and 425 on-site paper surveys from MKWMA users during 2011-2012. Of these completed surveys ($n$ = 607), 267 (44%) included suggestions/comments for management of MKWMA. Additional information gathered from these surveys on visitor use trends, as well as a list of comments, is available in Appendix IV.

In addition to management issues identified by the public during these survey processes, Department staff also identified management issues specific to MKWMA. The following is a list of all MKWMA management issues identified by members of the public or Department staff. A summary of public comments can be found in Appendix XII.

The issues identified by the public were grouped, based on similarity, into three general categories: Habitat Management, Wildlife Management, and Public Use Management. Similar comments were then combined to form management issue statements under each category. Not all comments received are within the scope of these plans. For instance, WMAs have no influence on how wolves or other predators are managed. Those are decisions made by the Commission, Director and Wildlife Populations staff. We also have little control over programs such as the pheasant release program. In instances where the comments are outside the jurisdiction of the plan, the comments have been forwarded to the appropriate entity for

consideration. Our responses below are not intended as a rebuttal to the opinions expressed by the public. Instead we have endeavored to be transparent and explain why we can or cannot act upon some ideas.

## Issues Identified by the Public

**Habitat Management (22% of public comments)**

1. **Improve or restore more habitat on MKWMA (27 comments).**

   Discussion: The majority of comments associated with this management issue described a need to improve habitat for specific species (i.e., pheasant, waterfowl, big game) or described methods that we should use to improve habitat (i.e., development of more food plots, convert fields to native vegetation, more controlled burns, more cattail treatment, more annual forage crop plantings, enlarge MKWMA). Providing high quality wildlife habitat is the primary, overarching goal of MKWMA. The Management Program we have outlined in the following section is designed to achieve this goal for the species identified in these comments, and others, using many of the methodologies identified by the public.

2. **Work with all livestock grazing around MKWMA to provide better habitat (1 comment).**

   Discussion: Vegetation management on MKWMA could include livestock grazing. Currently, mowing, prescribed fire, and mechanical manipulation are achieving desired objectives. Each year we actively work to maintain fences between MKWMA and neighboring grazed areas, improve cattle guards when necessary, and work with neighboring landowners and the state brand inspector to get trespass cattle removed from MKWMA as quickly as possible. This comment gets at the landscape aspect of this plan. We have developed strategies in the Management Program Table to address this comment.

3. **Water Level Management on MKWMA (8 comments).**

   Discussion: Comments concerning water management on MKWMA ranged from putting water back into East Springs, retaining more open water, managing water levels to maintain bird populations, and connecting Butte-Market Lake Canal to flood during high water years. The water in Market Lake is groundwater and greatly affected by irrigation and drought cycles. The discussion under Wetlands and the data in Appendix XI examine this in more detail. In summary, the water table at MKWMA has changed over the last 40 years. Market Lake WMA lies on an old lake that was fed with springs, spring runoff, and the Snake River. Some of the springs have reduced outputs and the Department has dug many of these out to improve and increase water output. There are surface water irrigation water rights on MKWMA and water is delivered by Butte-Market Lake Canal to be used on agricultural fields. The water rights are for this purpose only. Currently, excess water on MKWMA is either directed into five sink wells on the north boundary or pumped out onto BLM lands to the northeast known as Luther Lake. Some areas on MKWMA are managed to provide

seasonal shallow wetland habitat for spring and fall migrants. The Department is working with Ducks Unlimited, Pheasants Forever, Natural Resources Conservation Service (NRCS), Intermountain West Joint Venture (IWJV), and private landowners to implement practices and water use programs focused on maintaining and/or restoring wetland function across the historic Market Lake. Water is the lifeline to MKWMA and water level management is constantly being adapted to fulfill the mission of the WMA.

4. **Manage MKWMA solely for wildlife and habitat and no other recreation/public use (6 comments).**

   Discussion: Comments received mostly stated they wanted to see the WMA managed for wildlife and not for recreation other than consumptive use. Part of the Department mission is to serve Idaho by ensuring that fish and wildlife populations are preserved, protected, perpetuated, and managed to produce continuous supplies of fish and wildlife for enjoyment by all residents and visitors. At MKWMA, our mission is to, "protect and provide habitat at MKWMA for the propagation of waterfowl and other wildlife species so as to maintain abundant populations, and for public hunting, trapping, wildlife viewing, nature viewing and education." Providing high quality wildlife-based recreational opportunities and nature viewing is compatible with this primary mission and with wildlife management in general. Market Lake WMA user survey data (Appendix IV) indicates 44% of visitors to MKWMA are there to view wildlife. This is a form of outdoor recreation and is important in getting people outside and enjoying what Idaho has to offer. The habitat on MKWMA is functional and provides for important outdoor recreation activities and at the same time is fulfilling the mission of the Department.

**Wildlife Management (28% of public comments)**

1. **Increase pheasant, white-tailed deer, and upland game bird numbers (8 comments).**

   Discussion: Comments included more upland game birds, more deer (2 comments each), increase agriculture for white tails (1 comment), and more food plots (3 comments). There are multiple factors that affect population growth and decline in big game and upland bird populations, but the availability of year-round, high quality habitat is typically the most important. Providing high quality habitat for all of these species is a priority for MKWMA staff. The majority of the non-migratory wildlife on MKWMA spend a large portion of the year on or adjacent to MKWMA. This is significantly different from many of the big game populations in the region that make long migrational movements from summer to winter range. The Department recognizes that maintaining quality year-round habitat on MKWMA and promoting habitat on adjacent properties in combination with evaluating harvest impacts is crucial to maintaining healthy populations of these species in the area. We have included many strategies in the Management Program to respond to these concerns.

**2. Hunting restrictions on MKWMA (13 comments).**

Discussion: Comments received concerning hunting restrictions include waterfowl hunting methods, providing areas of refuge, requiring use of non-toxic shot for all hunting, and restricting high technology hunting devices. The Department's hunting regulations determine the restrictions concerning hunting and take. Market Lake WMA has safety areas and some hunting restrictions that are marked on the ground or are identified in the WMA regulations brochure available at MKWMA kiosks. Most of the regulations concerning waterfowl management are governed by the U.S. Fish and Wildlife Service (USFWS). Minimization disturbance to waterfowl and providing safety/refuge areas for waterfowl have proven to be beneficial to migrating birds (Madsen 1995). The Department recognizes the need for waterfowl to have refuge areas. Birds utilizing Market Lake find refuge in the area's Camas National Wildlife Refuge and many privately-owned wetlands provide undisturbed refuge areas. The Department will continue to evaluate the impacts of disturbance to migrating waterfowl, particularly as this relates to hunting activity and implement changes as deemed appropriate. There are some regulations such as access times and walk-in areas that control and limit hunting.

Non-toxic shot is required when hunting migratory waterfowl. Requiring non-toxic shot for upland game has been discussed for MKWMA. A study was conducted by the Idaho Falls chapter of Idaho Master Naturalists in 2010 to determine current lead densities on MKWMA. Results indicate that lead densities in upland areas that are subject to intense pen-reared pheasant hunting have almost reached the threshold where further restrictions on shot type would be warranted (Anderson 1982). We will continue to evaluate and monitor these impacts and make recommendations to the Fish and Game Commission as needed.

**3. Improve fishing for game fish and add fishing piers in MKWMA (4 comments).**

Discussion: The fishery at Market Lake is managed by the Fisheries Section in the Upper Snake Region. There are currently yellow perch, Utah chub, and brown bullhead (catfish) in the Main Marsh. In the 1980s, rainbow and brown trout, black crappie and bluegill were stocked in East Springs. In the past, springs and groundwater flows enabled the marshes to sustain more water into winter months. Over the years, the water table in the area has dropped dramatically and the sustainability of these areas for game fish has declined. Reduced winter flows and water volume create a situation where dissolved oxygen drops to unacceptable levels. Fishing is allowed on MKWMA year-round.

**4. Improve management of the pheasant release program (37 comments).**

Discussion: Market Lake WMA is one of the WMAs across the state where the Department releases pen-reared rooster pheasants. Hunters who wish to pursue pheasants on WMAs that release birds must purchase a pheasant permit and then adhere to pheasant hunting regulations that are applicable to the associated WMAs. Market Lake WMA typically releases rooster pheasants two days/week throughout the pheasant season. Approximately 950 roosters are released on MKWMA annually. Release dates and times are not disclosed to

the public. The comments concerning the pheasant release program were: plant more birds (6), stop the program (6), change behavior of released birds (6), increase permit cost (4), release other species (3), open season longer (4), control road hunters/safety concerns (3), try to develop a release protocol that helps hunters who are not at the WMA at the time of release to have a better chance of finding pheasants to harvest (2), eliminate the youth hunting area (1), implement surrogators (1) and continue with program (1). The Management Program of this plan addresses some of these issues. All comments have been forwarded to the Wildlife Bureau for consideration.

**5. Trapping (4 comments).**

Discussion: The comments received were on both sides of the issue. One comment was to close MKWMA for all trapping, another suggested to keep all areas open year-round, and two recommended initiating a bounty on all predators. Trapping is one of the foundational purposes for the creation of MKWMA. It is a legitimate activity when done legally. The official trapping season runs until April 15. Trapping is a managed consumptive use on MKWMA and has beneficial management implications. For example, harvest of surplus muskrats reduces damage to the dikes and minimizes repair costs.

Predators serve an important function in the natural system. Even then, most predators have a very liberal season and can be taken throughout the year. Many studies have shown that predator removal can increase production of ground nesting birds. Large scale predator management operations are expensive and require intensive management. It is seldom cost effective and usually doesn't result in positive population trends (Lokemoen 1984). Unsustainable predator control can actually have an unintended consequence of increasing predator productivity. Predator management often doesn't result in the desired outcomes (Côté and Sutherland 1997). At MKWMA, the goal is to provide sufficient quality habitat in an effort to limit the impacts of predators on game bird populations.

**Public Use Management (50% of public comments)**

**1. Allow more/less motorized vehicle access on MKWMA (10 comments).**

Discussion: Of these 10 comments, three wanted more motorized access, four wanted less motorized access, and three felt that there are too many people and vehicles on MKWMA. The majority of roads on MKWMA are open to motorized travel year-round. The road on the north and east side of Marsh 4 and the road along the north side of the North Ag fields are closed from January 1-April 1 for wintering wildlife. Big game, particularly mule deer, rely primarily on fat reserves accumulated from spring through fall and energy conservation (i.e., little movement) to survive the severe, extended winters of eastern Idaho. Each time they expend energy (e.g., fleeing from a vehicle), they have fewer reserves to rely upon toward the end of winter. Therefore, providing secure winter range with limited disturbance has a direct impact on overwinter survival. Access management is addressed in multiple areas of the following Management Program section.

2. **Provide better maps, signage, and boundary marking at MKWMA (12 comments).**

   Discussion: Market Lake WMA staff agrees that improved maps, signage, and boundary marking would be beneficial to MKWMA users. The public should be aware that vandalism and theft of signs routinely thwart this management objective and signs are costly to replace. We have included strategies in the Management Program to improve these information resources.

3. **Improve maintenance and condition of MKWMA roads (15 comments).**

   Discussion: The majority of comments were directed toward the old highway that parallels the big marsh on MKWMA. This road is paved and has been patched with cold asphalt mix annually. Many comments were to re-pave this road. The Department would like to improve and re-pave this road. The cost of paving and bringing the road to current specifications was approximately $850,000 in 2012. The cost of fixing this road is not achievable with current Department budgets and funding. The other comments were for roads in general. The Department-controlled roads are kept in a useable, but low maintenance state (i.e., useable by four-wheel drive vehicles during most spring-fall weather conditions). Maintaining smooth dirt road conditions is a difficult and expensive endeavor and improving road surfaces (i.e., gravel or pavement) would be even more expensive. Funds spent on additional road maintenance and/or improvement would come from funds that would otherwise be spent on MKWMA priorities such as habitat improvements, land acquisitions, and facilities and equipment maintenance. At this time, MKWMA staff does not intend to divert significant funds away from the core priorities to increase road maintenance but will continue to maintain MKWMA-controlled roads in a useable, low maintenance state. Problematic sections of roads will be improved as funding and priorities allow. If increased funding is available in the future, or if road maintenance becomes an increased priority, the Department will consider significant road improvements.

4. **Improve trailer boat access ramps, boat restrictions, provide or improve lake access points for watercraft access on MKWMA and Snake River (8 comments).**

   Discussion: Three of these comments recommended making improvements to the current boat ramps. One comment suggested that the Department provide more access to the Snake River, and one other was for more access to the marsh in general. Two users asked for non-gas powered or 5 hp or less boats only allowed on MKWMA. Public users are welcome to access the river and the marsh with watercraft anywhere they can as long as they follow the motorized access rules. The Snake River access is limited due to the Butte-Market Lake canal between any road and the river. Trailering of watercraft into the marsh is allowed at three locations: Marshes 2, 3, and 4. There are seven developed low-maintenance watercraft access points on MKWMA. These low-maintenance access points are designed for canoe type watercraft where the watercraft is actually lifted and carried to the water, not trailered into the lake. With a little effort, there are many locations where those who want to access the waters of MKWMA can launch small watercraft. The Region's Access Section does a very good job of maintaining the boat ramps across the Upper Snake, but there are always

repairs that are needed. Department staff makes every attempt to stay abreast of repair needs and attend to them as quickly as time and resources allow. For example, in November 2012 trailer boat ramps were rebuilt on Marshes 2 and 3. The Department will monitor other access sites and enhance or fix them as funding allows.

The size of boat motors allowed on Market Lake is somewhat regulated by water depth. Differing water depths on the marsh throughout the season offer access and limitations to a wide variety of boaters. Those who want to escape the areas used by large boat motors can typically find shallow wetlands where these boats cannot operate. The popularity of "Mud Buddy" type motors and airboats could potentially make disturbance and quality of experience an issue. The Department will continue to carefully monitor these impacts and make changes as deemed appropriate.

**5. MKWMA campsites and other user facilities (2 comments).**

Discussion: One comment recommended more campsites on MKWMA. Another comment suggested providing a picnic area, and two suggested garbage cans. Another comment would like to have another restroom installed near North Ag fields.

There is currently no overnight camping allowed at MKWMA. We will monitor campsite demand and evaluate the need for campsites if warranted. Adding visitor services is important, but with limited budgets we should direct funds toward priorities such as habitat improvements and land acquisitions. If future trends suggest improvements (i.e., campsites, garbage cans, or covered pavilions) are needed to meet use, we will re-evaluate the need for campsites and improvements.

**6. Provide more wildlife viewing access sites and photography blinds on MKWMA (3 comments).**

Discussion: There were two comments that suggested providing more wildlife viewing access sites and one comment that recommended providing photography blinds on MKWMA. The road and trail systems, with the pull outs that are currently found on MKWMA, provide significant wildlife viewing opportunity.

The Department's strategic plan, *The Compass*, recognizes the value and desirability of non-consumptive wildlife recreation. At MKWMA, we look for ways to promote that value consistent with *The Compass* and improve the non-consumptive experience. We will evaluate the need and value of erecting permanent wildlife photography/viewing blinds. All users need to follow the WMA rules when it comes to creating blinds or using tree stands. These rules are found in Appendix XIV.

**7. Provide more educational displays and volunteer/work opportunities at MKWMA along with more public outreach that highlights the value of MKWMA (7 comments).**

Discussion: There were four comments encouraging the development of more educational sites and trails on MKWMA. There was a single suggestion to provide more jobs and to do more to promote work service days on the MKWMA. Two comments asked to provide a list of things to do for boy scouts or volunteers.

There are kiosks and information signs located throughout MKWMA (Figure 1). These sites are maintained and updated as funding allows. New informative sites are being developed, including more informative signs and kiosks.

The Department works with all volunteers including eagle scouts, Idaho Master Naturalists and anyone wanting to provide volunteer services on MKWMA. Our volunteer coordinator has kept track of all registered volunteers within the Upper Snake Region. The hours donated have been successful in acquiring match and help leverage Department funding for WMA programs and other Department functions. The volunteer opportunities are available at MKWMA and more continue to develop as volunteers step up to help.

**8. Charge non-consumptive users (4 comments).**

Discussion: There were comments wanting to ensure a hunting future on all WMAs and to not have a cost to hunters and anglers. Another comment suggested using volunteers to collect donations for use of MKWMA. Part of the Department mission is to serve Idaho by ensuring that fish and wildlife populations are preserved, protected, perpetuated, and managed to produce continuous supplies of fish and wildlife for enjoyment by all residents and visitors. At MKWMA, our mission is to, "protect and provide habitat at MKWMA for the propagation of waterfowl and other wildlife species so as to maintain abundant populations, and for public hunting, trapping, wildlife viewing, nature viewing and education." Providing high quality wildlife-based recreational opportunities and nature viewing is compatible with this primary mission and with wildlife management in general. Market Lake WMA user survey data (Appendix IV) indicates 44% of visitors to MKWMA are there to view wildlife. This is a form of outdoor recreation and is important in getting people outside and enjoying what Idaho has to offer. The habitat on MKWMA is functional and provides for important outdoor recreation activities and at the same time is fulfilling the mission of the Department. Non-consumptive users provide economic benefits to local communities. Consumptive users are contributing most of the operating costs for MKWMA through Pittman Robertson taxes and license funds. Discussion on finding a way for all citizens to support Idaho's wildlife and great outdoors has been discussed, and was even a focal point of the Wildlife Summit held in August 2012.

**9. Dog training areas and dog restrictions (3 comments).**

Discussion: One comment wanted a designated dog training area and two comments wanted all dog training to cease on MKWMA. The Department recognizes the important role dog

training and dog trials play in the outdoor experience. We have established rules (updated in 2010) to provide for dog use on WMAs while at the same time protecting wildlife and having consideration for other users. For instance, dogs must be under owner control at all times. Dog trials may be conducted from August 1 through September 30. All game birds released for dog trials require a permitting process. Important nesting areas are closed until July 15 on MKWMA. There are groups that perform large scale dog trainings on MKWMA and a designated area has been provided for these groups.

**10. Restrict access during nesting season (4 comments).**

Discussion: There were two comments wanting restricted access during spring nesting season. Another two wanted a reduction in vehicle access and any disturbance to nesting birds on MKWMA. Access is restricted on the main dikes of the main marshes from April 1 until July 15. This reduces disturbance to some nesting birds. The Main Marsh has the most open water and broods will move to this area after hatching. Many waterfowl nest considerable distances from water in upland habitat. These areas do not have access restrictions but there are restrictions for dogs (see comment above) and vehicle use to reduce impacts to nesting birds. Administrative access is allowed for water management on MKWMA.

**11. Work more with Non-Government Organizations (NGOs) (2 comments).**

Discussion: The two comments asked to work closely with NGOs such as Ducks Unlimited and Pheasants Forever to increase management capabilities on MKWMA. The Department works closely with NGOs such as Teton Regional Land Trust, Ducks Unlimited, Pheasants Forever, Idaho Master Naturalists and any other conservation groups available. There have been many projects completed as well as research completed due to this collaboration. Market Lake WMA is a valuable asset to conservation and is recognized by many as a catalyst for large landscape level protection. The Department encourages work with NGOs and is continually looking for partnerships for future enhancements and protection.

**Overall Management of Market Lake WMA (6 %)**

**1. Do Not change anything on MKWMA (16 comments).**

Discussion: There were 16 comments recommending that the Department do nothing different with the management of MKWMA. Department staff appreciates the support of those who feel that MKWMA is meeting their expectations. There are things that we can and should do to make MKWMA a better place for wildlife. Habitat improvements, data collection, monitoring, and infrastructure improvements are all critical elements to ensure that MKWMA is as productive as possible into the future. Additionally, we recognize that MKWMA does not function as a complete unit in most cases. Outside influences affect the ability of MKWMA to fulfill its mission and role in conservation on a larger scale. As a Globally Important Bird Area, we need to ensure that we are fulfilling our role now and well

into the foreseeable future. That objective will necessitate constant evaluation, planning, and course corrections to keep up with the changing world.

## Public Comments on Draft Plans

In April 2014, the draft WMA plans were made available to the public for comment. The comment period closed on June 10, 2014. Market Lake WMA received input on the draft plan from a total of nine individuals. Five strongly agreed with the way the plan was written, and four additional comments did not introduce or discuss any new topics and were mostly in support of current management.

The Department received one comment from Idaho Conservation League. They were concerned with ensuring that each WMA plan considered the landscape in which it resides and non-consumptive wildlife uses. They had no comments specific to MKWMA. Significant portions of all WMA plans are dedicated to landscape scale planning. In fact, each focal species/habitat selected has an associated landscape. The MKWMA plan also incorporates wildlife viewing as a priority recreational pursuit. We believe that we have addressed these two issues very clearly.

## Issues Identified by the Department

1. **One of the major threats to wildlife across the globe is the loss of wetland habitats. Wetland habitats at MKWMA are affected by changes in water table which impacts the wildlife that depend on MKWMA and WMA function.**

   Discussion: There are many species of wildlife that utilize MKWMA at different times during the year. From spring migration of snow geese to wintering owls, the variety of habitat types on MKWMA are all important and collectively provide the diversity and functionality that make MKWMA unique and important. The Department's mission is to ensure that this continues.

   It is estimated that Idaho has lost approximately 56% of its original wetlands. As discussed earlier in the water management segment, the water that provides high wildlife and habitat diversity at MKWMA is significantly affected by irrigation practices within the Upper Snake River Plains aquifer. As groundwater tables continue to recede, the amount of ephemeral wetlands and habitats decrease, creating challenges for management. The water output of springs on MKWMA is only 25% that of the output in the 1970s (IDFG 2005). Shallowly flooded and moist soils are highly productive and necessary for healthy wetland ecosystems. The changes in irrigation from flood and sub-irrigation to sprinklers and pivots have impacts to the groundwater table and wetlands in the Market Lake basin. These changes have made wetland management and maintenance difficult and expensive. It is important to recognize that activities and water use in places miles away from Market Lake have significant impacts to the hydrological function of Market Lake. The Department manages to the best of its capabilities to ensure this ecosystem is functional, but we may have to look well beyond our current borders to fully resolve the issue.

Long term wetland habitat management in and around MKWMA will require a four-pronged approach.

**Water conservation:** The Department must find ways to maximize water use in order to keep MKWMA viable and relevant for conservation in the future. There will be no room for wasting water and we will need to work with Idaho Department of Water Resources and canal companies in order to ensure a steady supply of groundwater into the future.

**Groundwater recharge:** Research has shown that groundwater from the Egin Bench area affects the Market Lake water table (Spinazola 1993; Figure 2). Historically, the Egin area had large amounts of sub-irrigated agricultural fields. Over time, producers began converting to more efficient sprinkler and pivot irrigation practices. This change has likely had significant impacts to the amount and distribution of groundwater in the Market Lake area. Recently, there has been a large amount of discussion about groundwater recharge. The Egin area has been an area that has received a lot of attention pertaining to the benefits of groundwater recharge. The benefits of groundwater recharge in the Egin area could have real beneficial impacts to the Market Lake system. For example, the water output of springs on MKWMA is only 25% that of the output in the 1970s (IDFG 2005). This decrease has been attributed to changes in agriculture practices in the Snake River Plains aquifer.

**Flood irrigation:** Retaining flood irrigation across the region should be a priority for managers, both from a habitat created and groundwater maintenance perspective.

**Snake River flooding:** Market Lake is directly affected by water levels in the Snake River. The installations of the railroad, Interstate Highway 15, and other man-made structures have stopped the annual inflow of water to the Market Lake basin. Years with high water flow down the Snake River have increased water levels through elevation of groundwater at MKWMA and shown the value of annual flooding.

The Department will continue to work with irrigation companies and water districts to optimize water levels on MKWMA and to enhance the water holding capabilities in the Market Lake basin.

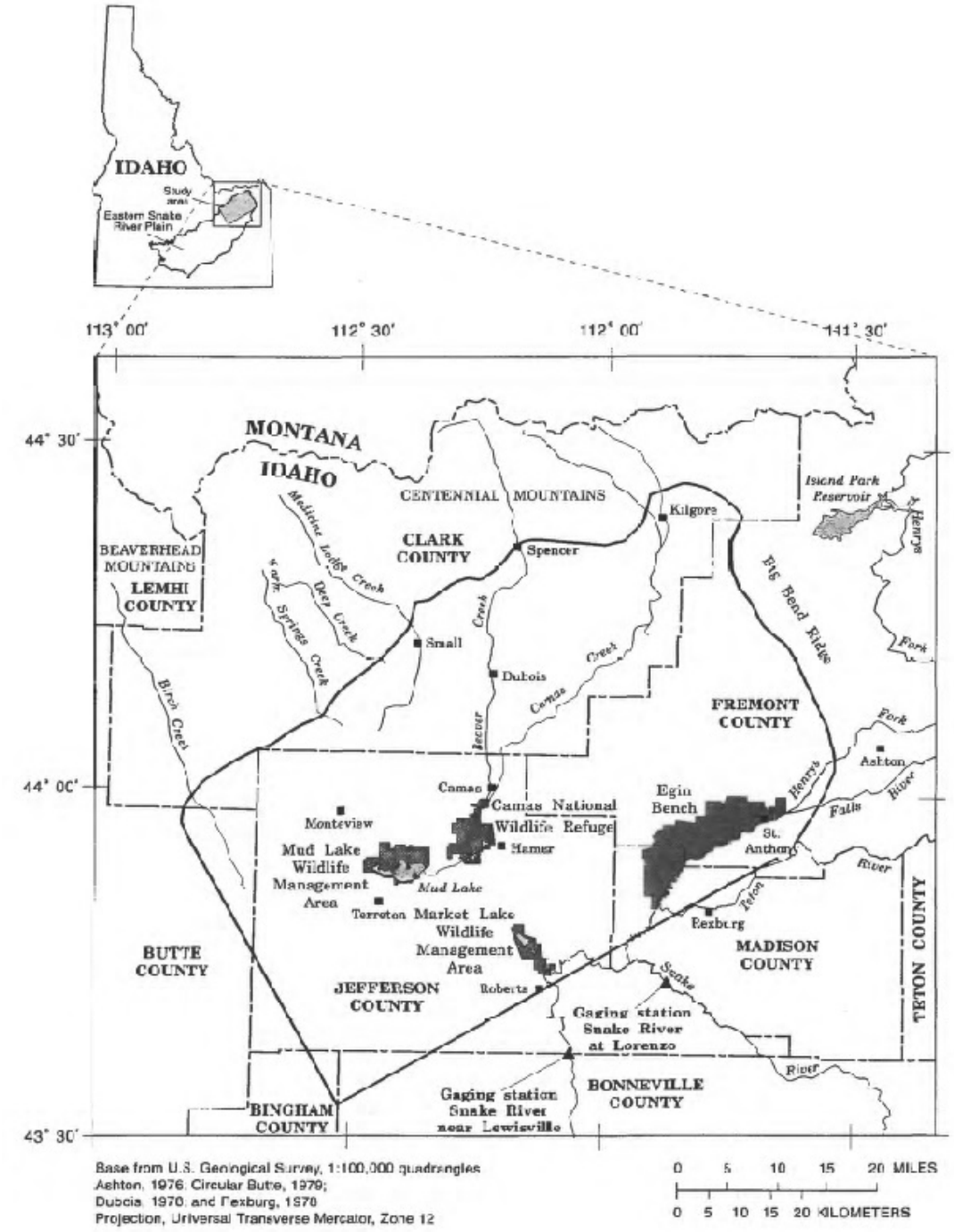


Figure 2. Map depicting the Eastern Idaho Portion of the Snake River Plain Aquifer (Spinazola 1993).

**2. Maintaining flood irrigation and active farming on MKWMA.**

Flood irrigation and active farming on MKWMA provide high quality foraging resources for breeding and migratory bird species as well as local wildlife species. Flood irrigation provides a surrogate habitat, mimicking shallow flooded wetlands. Over time, many of the agricultural producers surrounding MKWMA have transitioned to sprinkler irrigation. This transition has decreased the productivity of many agricultural fields for wildlife. In addition, this change from flood to sprinkler irrigation has had dramatic impacts to the water table and altered the water management on MKWMA. Flood irrigation and other irrigation practices beneficial to wildlife will be maintained where possible on MKWMA. Active farming will continue on MKWMA in order to maintain flood irrigation. We will also work with neighboring landowners, the NRCS, and others to encourage the maintenance of flood irrigation on the landscape.

**3. Understanding and maintaining and/or improving MKWMA's role in songbird migration is important.**

Discussion: The establishment of tree rows, shelterbelts, shrub plantings, and other such habitats has been incredibly valuable for numerous wildlife species, particularly breeding and migrating songbirds and raptors. Research done in the Camas National Wildlife Refuge, MKWMA, and Mud Lake WMA (Carlisle et al. 2008) indicates that these habitats are vitally important for many migrating songbird species. Many of these plantings are becoming decadent and are slowly disappearing. It may be the species planted were mesic shrubs planted in too arid or sandy sites. There is a need to establish new plantings that will expand, restore, and rejuvenate riparian scrub-shrub habitat. These would provide the habitat values existing stands do but will not fade out. Plants like skunkbrush sumac (*Rhus trilobata*) tap into groundwater. It is important to understand that the habitat we improve, plant, or create now is what will be available and productive in the coming decades.

Providing shelterbelts can also lead to increased roosting sites for depredating corvids and raptors that may negatively impact survival of nests and hens. In a recent study on nest success of ducks, woody vegetation did not have a negative impact (Thompson et al. 2012). However, the study was not conducted in an area with corvids. Magpies are abundant and crows are common at MKWMA. This factor may have provided different results. Woody vegetation is not limited to the shelterbelts and tree rows planted on MKWMA. Large basin big sagebrush (*Artemisia tridenta tridenta*) is prominent on the Market Lake landscape. Some plants are over seven feet tall and provide nesting and roosting habitat for corvids (Rydalch-personal observation). Removing non-natural woody vegetation would not likely affect nest success when there are abundant natural woody habitats in the area.

**4. Pursue methods to maintain and improve wildlife habitat on private and public lands in the Market Lake area. This includes initiating habitat improvements now to ensure habitat continuity into the future.**

Discussion: Changes in land uses and farming techniques has led to dramatic alterations in the quantity and quality of wildlife habitat in the Market Lake area. Many of these changes have decreased the habitat value to wildlife. The habitat types that have changed are widely variable. The following is a list of types of habitats that have been lost or altered in the Market Lake area over time and the impacts to wildlife species.

- Flood Irrigated Agricultural Fields and Pasture Lands – Flood irrigation in the Market Lake area traditionally provided high quality foraging resources for breeding and migratory bird species as well as local wildlife species. Over time, many agricultural producers have transitioned to sprinkler irrigation. This transition has led to a decrease in the productivity of many agricultural fields for wildlife. In addition, this change from flood to sprinkler irrigation has had dramatic impacts to the water table and thus altering the wetland management on MKWMA. Between 2000–2010 the human population in Jefferson County, Idaho grew 36.5%. With population growth comes increasing demand for land and water resources for housing and other municipal, agricultural, and recreational uses. To what extent waterbirds use the surrounding agricultural lands is unknown, but many of the species found at MKWMA utilize agricultural croplands for feeding. Conversions of agricultural lands to housing and other uses could affect the sustainability of large colonies of ibis and gulls at these sites in the future. Further, continued conversion of flood-irrigated agricultural lands in the Henrys Fork corridor to sprinkler irrigation could ultimately eliminate the foraging habitat that sustains white-faced ibis populations nesting on MKWMA.
- Sagebrush Steppe – The loss of functional sagebrush steppe habitat in the area has impacted numerous wildlife species. The Market Lake area historically provided habitat to many sagebrush obligate species such as greater sage-grouse, pronghorn, sage sparrow, and other species. Over time agricultural conversion, prescribed and wildfire, conversion to grasses for forage, and other activities have greatly reduced the amount and quality of the sagebrush habitat in the Market Lake area. Protection of the remaining sagebrush stands and enhancement of disturbed stands needs to be a priority for conservation partners in this area.
- Quality Perennial Grasslands and Upland Cover – The Market Lake area at one time provided high quality upland game bird hunting opportunity. This is no longer the case. The decline in wild pheasant populations can likely be attributed to a wide number of causes, but the loss of high quality nesting and thermal cover habitats are factors.
- Shelterbelts, Tree Rows, and Shrub Stands – The establishment of tree rows, shelterbelts, shrub plantings, and other such habitats has been incredibly valuable for numerous wildlife species, particularly breeding and migrating songbirds and raptors. Providing this type of habitat on places other than the WMAs is important to provide additional habitat and to create a buffer against disaster (e.g., a fire that destroys the

shelterbelts at MKWMA) at other locations. It is important to understand that the habitat we improve, plant, or create now is what will be available and productive in the coming decades.

5. **The pheasant release program may conflict with efforts to restore wild pheasant populations on MKWMA.**

Discussion: Comments from the public about the Department's pen-reared pheasant release program were diverse, with many supporting the program with modifications and others calling for an end of the program all together. The topic of maintaining the program at all is not the focus of this concern, but rather this concern is based on potential impacts to wild pheasant populations on MKWMA with the pen-reared program being implemented on the same area.

The pheasant release program concentrates large numbers of hunters onto a small landscape. This is the very same landscape where the Department and conservation partners are trying to enhance wild pheasant populations. The concentration of hunters makes it very difficult for even wild roosters to survive the hunting season in the area surrounding the release sites. Crow counts across MKWMA and adjacent properties validate the concern of low rooster densities. Research indicates that pheasant nesting density is related to the density of crowing cocks in an area. With the hunting pressure associated with the pen-reared release program, there are very few male pheasants surviving the hunting season and this may impact reproduction by wild hens.

Many Department staff and partners feel that the Department should examine release locations for the pen-reared program. Areas that have no wild pheasant populations, but offer some kind of cover for hunting may be more desirable than potentially productive wild pheasant habitats because that might allow the Department to positively influence wild populations.

# Market Lake WMA Management Program

The Department is responsible for the conservation, protection, perpetuation, and management of all wildlife, fish, and plants in Idaho. Wildlife Management Areas enable the Department to directly affect habitat to maximize suitability for species in key areas and are an integral component in the Department's approach to fulfill its mandate in Idaho Code. Management to restore and maintain important natural habitats and create hyper-productive habitats that enhance carrying capacity for selected wildlife species remain key strategies on MKWMA. However, the most pervasive threats to WMA ecological integrity, such as noxious weeds, rural residential/commercial development, increased water diversion, and conflicting land uses on public lands, typically come from outside the WMA's boundary. Therefore, WMA managers must recognize and create opportunities to collaborate with adjacent landowners, expanding our collective conservation efforts for WMA-dependent wildlife.

An effective way to enable a broader influence over the future of MKWMA is through the use of Conservation Targets to guide management. Conservation Targets could be either a focal species or a habitat-type that benefits numerous species. According to Noss et al. (1999), focal species are those used by resource managers to determine the appropriate size and configuration of conservation areas. Conservation of species within landscapes used for other enterprises such as forestry, recreation, agriculture, grazing, and commercial development requires managers to determine the composition, quantity, and configuration of landscape elements required to meet the needs of the species present (Lambeck 1997). Since it is impractical to identify key landscape elements for all species dependent on MKWMA, a carefully selected suite of Conservation Targets can help provide for the conservation needs of many species. Additionally, identifying landscape-scale Conservation Targets across ownership boundaries helps address wildlife-related issues on MKWMA and creates a platform for conservation partnerships on the surrounding landscape.

The following six-step process was used to create the MKWMA management program described in this plan. Each of these steps is described in detail on the ensuing pages.

1) Summary of Management Priorities
2) Focal Species Assessment
3) Selection of Conservation Targets
4) Coverage Assessment of Selected Conservation Targets
5) Spatial Delineation of Conservation Target Landscapes
6) Creation of Management Program Table

## Summary of Management Priorities

Market Lake WMA, like many other WMAs, was created for a specific purpose and therefore has inherent management priorities incorporated in the cooperating agency agreements and land ownerships that formed the WMA. Market Lake WMA was created with PR, State license, and City of Idaho Falls mitigation funds.

Legal mandates associated with the 2001 appropriation of federal funding for the State Wildlife Grants program also guide the Department's management priorities. The U.S. Congress appropriated federal funds through the State Wildlife Grants program to help meet the need for conservation of all fish and wildlife. Along with this new funding came the responsibility of each state to develop a State Wildlife Action Plan (SWAP). The Department coordinated this effort in compliance with its legal mandate to protect and manage all of the state's fish and wildlife resources (IDFG 2005). The SWAP does not distinguish between game and nongame species in its assessment of conservation need and is Idaho's seminal document identifying species at-risk. Therefore, at-risk species identified in the SWAP, both game and nongame, are a management priority for the Department.

In addition to the biological goals of preserving, protecting, and perpetuating all fish and wildlife in the state of Idaho, the Department also has a statewide goal of protecting and improving wildlife-based recreation and education. The Department's strategic plan, *The Compass*, outlines multiple strategies designed to maintain or improve both consumptive (e.g., hunting, trapping, fishing) and non-consumptive (e.g., wildlife watching) wildlife-based recreation opportunities across the state.

Taking the biological and funding resources of MKWMA into consideration, in concert with these foundational priorities of MKWMA and statewide Department priorities, the Department developed the following list of broad-scale MKWMA Management Priorities.

**Market Lake WMA Management Priorities** (listed in order of priority):

1. Waterfowl Habitat
2. Special Status Species Habitat
3. Upland Game Habitat
4. Big Game and Trophy Species Habitat
5. Wildlife-based Recreation and Education

## Focal Species Assessment

This section of the MKWMA Plan is an assessment of various fish and wildlife species on MKWMA and the associated landscape in order to identify Conservation Targets to guide management. Table 1 evaluates taxa that are either flagship species (Groves 2003) and/or special status species (i.e., at-risk) identified by the Department in the Idaho Comprehensive Wildlife Conservation Strategy (IDFG 2005) and key federal agencies. Only flagship and special status species that 1) have been documented utilizing MKWMA lands, or 2) are likely to occur on MKWMA because they are found in the Market Lake watershed and utilize habitats found on MKWMA for a significant part of their life history were included in the focal species assessment.

Flagship species are popular, charismatic species that serve as symbols and catalysts to motivate conservation awareness, support, and action (Heywood 1995). Flagship species often represent a landscape or ecosystem (e.g., Market Lake watershed or wetland and sagebrush-steppe

ecotones), a threat (e.g., habitat loss or climate change), organization (e.g., State, Government or NGO) or geographic region (e.g., protected area, Department Region or state; Veríssimo et al. 2009). Waterfowl are an example of a group that fit the criteria as both focal and flagship species. In addition, they are a culturally and economically important species in Idaho and represent a founding priority for establishment of the MKWMA. Therefore, waterfowl is an important flagship species group considered in the WMA assessment.

A principal limitation of the flagship species concept is that by focusing limited management resources on culturally and economically important species, more vulnerable species may receive less or no attention (Simberloff 1998). To overcome this limitation, we are explicitly considering a wide variety of at-risk species (Groves 2003); yielding a more comprehensive assessment that includes culturally and economically important species (e.g., mallard and elk) along with formally designated conservation priorities (e.g., bald eagle and greater sage-grouse). Categories of at-risk vertebrate species considered in this assessment are: 1) species designated as endangered, threatened, proposed, or candidate for listing under the Endangered Species Act by the USFWS; 2) species designated as Idaho Species of Greatest Conservation Need (SGCN); 3) species designated as Sensitive by Region 4 (Intermountain Region) of the U.S. Forest Service (USFS); and 4) species designated as Sensitive by the Idaho State Office of the BLM.

The Idaho SGCN list was developed as part of the Idaho Comprehensive Wildlife Conservation Strategy (IDFG 2005). The Comprehensive Wildlife Conservation Strategy document is now referred to as the SWAP. Idaho's plan serves to coordinate the efforts of all partners working toward conservation of wildlife and wildlife habitats across the state.

Although the Idaho SWAP SGCN list includes most of the special status species identified by land management agencies in Idaho, some species not listed as SGCN are considered priorities by other agencies. The Market Lake watershed is a mosaic of land ownerships including private lands, lands managed by the Idaho Department of Lands, USFS, USFWS, Department of Energy, BLM, and the Department. The BLM and USFWS are key partners in this landscape as their management actions directly influence ecological function on MKWMA. To maximize coordination, communication, and partnership opportunity we include USFWS, USFS, and BLM Sensitive Species in our biodiversity assessment.

United States Forest Service Sensitive Species are animal species identified by the Intermountain Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution. The Forest Service Manual (FSM 2670.22) directs the development of sensitive species lists. This designation applies only on USFS–administered lands.

Bureau of Land Management Sensitive Species are designated by State Directors in cooperation with the State fish and wildlife agency (BLM manual 6840). The Idaho State BLM Office updated these designations in 2003. The sensitive species designation is normally used for species that occur on BLM public lands and for which BLM has the capability to significantly affect the conservation status of the species through management.

The Intermountain West Joint Venture (IWJV) also maintains a list of priority species. The IWJV has identified 40 priority species from which to base conservation planning. Although the IWJV priorities are not used as a rationale for inclusion in the table, the plan does acknowledge when a species selected by other criteria is also a priority for the IWJV.

Information on species status, occurrence, beneficial management/conservation actions, and threats were derived through consultation with Department staff, occurrence records in the Department's Idaho Fish and Wildlife Information System database, consultation with various BLM and USFS species lists, and species summaries provided in the Idaho SWAP.

Suitability of assessed species as a focal species were estimated by Upper Snake Regional Habitat and Diversity staff based on descriptions in Groves (2003) and the USFWS Focal Species Strategy for Migratory Birds (USFWS 2005). Potentially suitable focal species may include species with one or more of the following five characteristics*:*

- *Species with high conservation need*
- *Species or habitats that are representative of a broader group of species sharing the same or similar conservation needs*
- *Species with a high level of current program effort*
- *Species with potential to stimulate partnerships*
- *Species with a high likelihood that factors affecting status can realistically be addressed* (USFWS 2005)

Table 1. Status of flagship and special status species on Market Lake WMA, including their potential suitability as a focal species for management.

| Species | Status Designation(s) | Occurrence Context in Market Lake WMA Landscape | Threats | Beneficial Management and Conservation Actions | Suitability as a Focal Species at Market Lake WMA |
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| ***Mammals*** | | | | | |
| Elk (*Cervus elaphus*) | Flagship | Elk are occasional winter visitors to MKWMA. A handful of Elk summer on or adjacent to MKWMA. Elk in this area readily move between private agricultural fields and the BLM lands in the area. In winter elk travel from Island Park area to winter on MKWMA. | The primary threats to elk on MKWMA would be overharvest and lack of quality security habitat. The elk in the Market Lake area are not consistent in nature, they are continually moving about the landscape as forage resources and human disturbances change. | Continue to provide security cover and forage resources for the elk in the area. This is beneficial in that can help to decrease depredation issues on adjacent agricultural fields and offer hunter opportunity. . | ***Unsuitable as a focal species***. Elk are not abundant on the Market Lake landscape. |
| Idaho Pocket Gopher (*Thomomys idahoensis*) | SGCN | Undocumented on MKWMA. Presence is possible based on available habitat. | Population distribution in Idaho is mostly undocumented. However, loss of shrub steppe and grassland habitats in the range of this species is likely a factor affecting conservation. | The primary action recommended actions in Idaho's SWAP are documenting population distribution and initiating efforts to better document habitat associations. | ***Unsuitable as a focal species***. Limited information on distribution in the project area. Unknown distribution limits potential management feedback. |
| Moose (*Alces alces*) | Flagship | Moose are found across MKWMA, but exact densities are unknown. The moose on MKWMA are not like many of the other moose populations within the Upper Snake Region. Although there are some emigration/migration impacts to this population, it is largely driven by local production and survival. Movements from the Snake River and the private lands in the Market Lake area are common. Moose depredation on haystacks and landscaping plants can be a problem in some winters. Market Lake WMA management can help minimize these depredation concerns and issues. | Over harvest and vehicle collision are threats to the productivity of this moose population. Managers believe that illegal harvest of moose in this area is a problem and threat to this population. | More information is needed on moose numbers and movements on MKWMA and in the area. Depredating moose during the winter are a common occurrence near MKWMA. The threat to human safety has led to translocation of moose from the area. | ***Potentially suitable as a focal species***. Moose are a relatively abundant animal on MKWMA and surrounding area. They are dependent on habitats that are representative of a broader group of species sharing the same or similar conservation needs. |
| Mule Deer (*Odocoileus hemionus*) | Flagship | A few mule deer have been observed on MKWMA. The habitat is available and hunting is archery or controlled hunting only. There are pockets of mule deer along the Snake River and adjacent to MKWMA but a population estimate has not been established. | The primary threats to mule deer on MKWMA are: loss of security cover and over harvest. The change to short range weapons for deer has provided opportunity to produce mature deer in the GMU. | Mule deer can readily utilize all habitats found on MKWMA. The most appropriate conservation and beneficial management practices for mule deer on MKWMA would be to monitor harvest and populations, continue to provide appropriate seasonal habitat needs, and to ensure that there adequate security habitat is available. | ***Unsuitable as a focal species***. Mule deer are not abundant on the Market Lake landscape. |
| Myotis Guild | SGCN; BLM Sensitive | California myotis, fringed myotis, western small-footed myotis, Yuma myotis. Market Lake WMA provides valuable foraging habitat for a variety | Individuals are long-lived and exhibit low reproductive potential. Roost sites tend to be colonial, and may be limiting in | Minimize broad-spectrum insect control activities that reduce prey base. Where possible, document natural roosting habitat such as cliffs. Create day-and night-roosting | ***Unsuitable as a focal species.*** Unknown scope of occurrence and composition of guild on MKWMA. Primary use of Market Lake is likely |

| Species | Status Designation(s) | Occurrence Context in Market Lake WMA Landscape | Threats | Beneficial Management and Conservation Actions | Suitability as a Focal Species at Market Lake WMA |
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| | | of bat species, although this is poorly documented. | some areas; aggregations are susceptible to disturbance and intentional persecution. High prey densities are often associated with wetlands and other highly productive habitat. Habitat use rates and, at the population level, survival and recruitment rates likely track aerial insect prey availability. Accessible surface water also likely affects local distribution and abundance | habitat through installation of bat boxes. Deploy escapement devices on troughs and water tanks, and develop natural and artificial pooled water sources. Track with ongoing efforts of the East Idaho Bat Working Group to identify opportunities to mitigate bat mortalities from wind energy development. | as foraging habitat. Most threats to the Myotis guild are associated with roosting habitat. |
| Pronghorn (*Antilocapra americana*) | Flagship | Market Lake WMA provides tall stands of sagebrush that are critical wintering habitat for up to 200 migrating pronghorn during winters of high snow accumulations. There is little known about where these pronghorn migrate from but most likely from the Island Park and Kilgore areas (GMU 60A, 60, 61). | The primary threats to pronghorn in the Market Lake area is the loss of quality sagebrush steppe habitat and movement barriers such as: fences and roads. | Conservation and enhancement of existing sagebrush habitats and creating movement corridors for pronghorn to continue seasonal movements would be the most valued conservations measures in the Market Lake area. | ***Unsuitable as a focal species***. Limited information on distribution, populations, and detailed seasonal habitat use patterns limits potential management feedback. |
| Pygmy Rabbit (*Brachylagus idahoensis*) | SGCN; BLM Sensitive | Nearest documented occurrence is approximately seven miles northwest of MKWMA. However, suitable habitat does exist on the WMA. | Loss, alteration, and fragmentation of sagebrush-steppe. Agents of habitat loss and degradation include agricultural conversion, urbanization (and related infrastructure networks), prescribed and wildland fire, invasive plants, conifer encroachment, vegetation treatments that remove sagebrush, and unsustainable livestock grazing. Habitat fragmentation has implications for pygmy rabbits due to limited dispersal capability. | Conduct a pygmy rabbit survey within suitable habitat on the Market lake WMA. Minimize disturbance to mature sagebrush should be considered. Several recent initiatives focusing on the conservation of greater sage-grouse (i.e., BLM National Sage-Grouse Habitat Conservation Strategy, Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats, SageMap) also provide general guidance for conserving sagebrush habitats and associated species. | ***Unsuitable as a focal species*** |
| Townsend's Big-eared Bat (*Corynorhinus townsendii*) | SGCN; BLM Sensitive | Potential use of MKWMA by foraging Townsend's big-eared bat is possible but undocumented. Populations in Idaho occur predominately on the Snake River Plain, where distribution and abundance is correlated with cavity-forming rock formations. Numerous hibernacula in lava tube caves have been identified in south central and southeast Idaho (Pierson et al. 1999). | The primary issue facing this species is disturbance and destruction of roost sites through mine closures, renewed mining, recreational caving, and other roost-disturbing activities. This species is sensitive to anthropogenic disturbances. | Document state population trends. Protect/restore year-round roosting options by working with land managers. These activities are currently being undertaken by the East Idaho Bat Monitoring Initiative of the Idaho Bat Working Group. | ***Unsuitable as a focal species***. Limited information on distribution in the project area. Unknown distribution limits potential management feedback. Townsend's big-eared bat primary use of MKWMA is likely foraging over wetland areas, therefore, most prevalent threats are not likely to be addressed by WMA management. |

| Species | Status Designation(s) | Occurrence Context in Market Lake WMA Landscape | Threats | Beneficial Management and Conservation Actions | Suitability as a Focal Species at Market Lake WMA |
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| White-tailed Deer (*Odocoileus virginianus*) | Flagship | White-tailed deer are common on MKWMA, but actual populations are unknown. Although they are common, populations are not high on MKWMA. White-tails use adjacent private lands and the Snake River corridor to meet seasonal needs. Movement between the Snake River and MKWMA is common for the deer in this area. | | Maintain and expand complex riparian cover in the Gem Lake Segment. | *Potentially suitable as a Focal Species.* White-tailed deer are heavily dependent on riparian habitat, which is a naturally limited feature on the MKWMA. However, white-tailed deer on MKWMA utilize the sage brush on the periphery and are important game animals on the WMA. |
| ***Birds*** | | | | | |
| American Avocet (*Recurvirostra americana*) | SGCN, IWJV | Market Lake WMA is utilized as migration stop-over habitat for American avocet. Some nesting may occur, but that is not documented. | Loss of mud flat and shallow wetlands during migration times. | Enhance and/or maintain the amount of shallow wetland and mud flat habitat in the area during migrational time periods. | *Unsuitable as a focal species* given ephemeral use of MKWMA. |
| American White Pelican (*Pelecanus erythrorhynchos*) | BLM Type 2, SGCN | Market Lake WMA is an important foraging and roosting habitat for white pelicans, particularly early in the season. Up to 50 pelicans have been observed using Market Lake during pre-nesting surveys. | The primary regional threats to pelicans are loss or disturbance at nesting colonies. | Maintain security of main marsh units during early spring through mid-summer to maintain pelican foraging and roosting habitat. | *Unsuitable as a focal species* given ephemeral use of MKWMA. |
| Bald Eagle (*Haliaeetus leucocephalus*) | BLM Type 1, SGCN, USFS R4 Sensitive | There are two nesting pairs of bald eagles (one upstream and one downstream) of MKWMA. Both are along the Snake River, but neither is on MKWMA proper. | Perhaps the greatest threat to bald eagles in Idaho is disturbance during the nesting period from activities such as forestry, human recreation, and construction projects. Shooting, poisoning, and electrocution are also significant threats in the Upper Snake Region, Idaho. | Population recovery goals have been met in the Upper Snake Region, Idaho. Nest monitoring should continue. Disturbance around nest sites should be minimized or avoided altogether, especially during late–winter/early–spring when eagles are initiating territory establishment and breeding activities. Continue building an eagle data base for MKWMA and the surrounding area. | ***Potentially suitable as a focal species.*** Breeding bald eagles can be a valuable indicator of human disturbance, particularly from recreation and management activities. |
| Black Tern (*Chlidonias niger*) | BLM Type 3, SGCN, | Market Lake provides seasonal habitat. No nesting has been documented, however. As they have low site fidelity, nesting locations can vary widely each year, depending on marsh habitat conditions. Therefore, Market Lake provides potential breeding habitat. | Greatest threat to black terns in Idaho is loss of marsh habitat and human disturbance (although black terns appear to be tolerant of nearby human activity as long as the colony is not entered). | Minimize disturbance during nesting season and monitor species productivity and use on MKWMA. Management that benefits other colony-nesters at Market Lake will benefit black tern. | Unsuitable as a focal species given poorly documented use of MKWMA. |
| Black-crowned Night Heron (*Nycticorax nycticorax*) | SGCN | In the Great Basin, there are approximately 2,800 breeding pairs (Ivey and Herziger 2005). Of these, approximately 800 pairs breed in Idaho at multiple locations in the southern half of the state. Market Lake WMA supports one of the three known breeding colonies of black-crowned night heron in the Upper Snake Region | Greatest threat to black-crowned night heron is loss of marsh habitat and human disturbance in colonies. | Maintaining quality wetland and riparian habitats, including maintaining suitable water levels will benefit this species. Consistent periodic monitoring may help alert managers to habitat or population problems. | ***Potentially suitable as a focal species*** due to its dependence on secure marsh habitats for breeding. The presence of this species as breeders is both a good indicator of breeding habitats on MKWMA, and surrounding foraging habitats on the Snake River system. |
| Black-necked Stilt (*Himantopus mexicanus*) | SGCN, IWJV | Market Lake WMA is utilized as migration stop-over habitat for black-necked stilts. Some nesting may occur, but that is not documented. | Loss of mud flat and shallow wetlands during migration times. | Enhance and/or maintain the amount of shallow wetland and mud flat habitat in the area during migrational time periods. | ***Unsuitable as a focal species*** given ephemeral use of MKWMA . |

| Species | Status Designation(s) | Occurrence Context in Market Lake WMA Landscape | Threats | Beneficial Management and Conservation Actions | Suitability as a Focal Species at Market Lake WMA |
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| Brewer's Sparrow (*Spizella breweri*) | BLM Type 3, SGCN, IWJV | Brewer's sparrow is a common breeder in sagebrush habitat within MKWMA and vicinity. | Shrub steppe obligate species, closely associated with big sagebrush. Habitat destruction and degradation in sage steppe are the primary threats to Brewer's sparrow populations. | Conservation actions should focus on preserving areas of intact, un-fragmented shrub steppe habitat. | ***Potentially suitable as a focal species.*** Brewer's sparrow is a sagebrush obligate and representative of sagebrush-dependent species sharing similar conservation needs. Unqualified scope of occurrence on MKWMA would require preliminary work to determine the extent of breeding. |
| California Gull (*Larus californicus*) | SGCN | In the Great Basin and Northern Rocky Mountains there are approximately 71,936 breeding pairs. Just over half of these (36,320 pairs) bred in southern Idaho, as of 1993 (Trost and Gerstell 1994). Only known colony in the Upper Snake region is on Island Park Reservoir. Market Lake and vicinity provide some level of foraging habitat for this species. | The main threat to this species in the Upper Snake Region is ongoing human disturbance at the nesting colony within Island Park Reservoir. | Prevent disturbance at breeding colonies. | ***Unsuitable as a focal species***. Occurrence context on MKWMA does not reflect main threats to the population. Lack of knowledge limits potential management feedback. |
| Caspian Tern (*Sterna caspia*) | SGCN | Only known colony in the Upper Snake region is on Island Park Reservoir. In 2004 there were two active colonies in Idaho. Market Lake and vicinity provide some level of foraging habitat for this species, although most foraging birds are observed further upstream in Fremont County. | The main threat to this species in the Upper Snake Region is ongoing human disturbance at the nesting colony within Island Park Reservoir. | Prevent disturbance at breeding colonies. | ***Unsuitable as a focal species***. Occurrence context on MKWMA does not reflect main threats to the population. Lack of knowledge limits potential management feedback. |
| Cattle Egret (*Bubulcus ibis*) | SGCN | Cattle egrets are documented breeders on MKWMA and commonly use MKWMA during migration movements. | In Idaho, cattle egrets generally breed in mixed–species colonies in willows or tamarisks along water, on islands, or in bulrush/cattail marshes. Nests are generally located off the ground, although may be located near water level in bulrush marshes. Cattle egrets forage in open pastures, fields, and meadows, usually in association with cattle or other livestock, feeding primarily on insects. | Maintain breeding habitat in main marsh units of MKWMA and support strategies that maintain suitable foraging habitat in the WMA landscape such as conservation easement acquisitions. Also, activities that benefit foraging white-face ibis on the landscape scale will benefit cattle egret conservation. | ***Potentially suitable as a focal species*** due to its dependence on a combination of marsh breeding habitats and surrounding agricultural lands for foraging. However, limited breeding numbers limits potential management feedback. Best use of this species as a focal species may be within breeding or foraging guild. |
| Clark's Grebe (*Aechmophorus clarkii*) | SGCN | An estimated 400-500 Clark's grebes of these breed in Idaho, where breeding distribution is primarily associated with the extensive Snake River drainage in the southern and southeastern parts of the state. Only known colony in the Upper Snake region is on Mud Lake WMA. Market Lake provides transitional habitat for this species. | Two of the main issues for grebes nesting in Idaho are water quality and water level fluctuations. Nesting colonies also are sensitive to disturbance by humans approaching the colony on foot or by boat. | Prevent disturbance and maintain beneficial water levels at breeding colonies. | ***Unsuitable as a focal species***. Occurrence context on MKWMA does not reflect main threats to the population. Lack of knowledge limits potential management feedback. |

| Species | Status Designation(s) | Occurrence Context in Market Lake WMA Landscape | Threats | Beneficial Management and Conservation Actions | Suitability as a Focal Species at Market Lake WMA |
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| Common Loon (*Gavia immer*) | SGCN, USFS R4 Sensitive, | Common loons are occasionally seen on MKWMA during spring and fall migration periods. Uncommon on WMA. The only documented breeding site in the Upper Snake Region is on Indian Lake in Fremont County. | Threats to most Idaho waterbirds are not related to the use of transitional habitat but are related to maintenance of nesting breeding habitat. | Degradation of habitat through shoreline nesting habitat due to human development and/or disturbance | ***Unsuitable as a focal species***. Presence of common loon is limited to transitional use of Main Marsh at MKWMA and Snake River Habitats. |
| Ferruginous Hawk (*Buteo regalis*) | BLM Type 3, SGCN, IWJV | The sage/steppe uplands on MKWMA and adjacent landscape are good quality nesting/foraging habitat for this hawk. There is a perennially active nest near the north boundary of the WMA. | Ferruginous hawks nest close to the ground and are susceptible to human disturbance. Population declines have been attributed to the negative effects of cultivation, grazing, poisoning, and controlling small mammals, mining, and fire in nesting habitats. A more recent concern is the development of wind farms, where hawks can potentially collide with turbines during spring and fall migration. | Primary conservation actions include maintaining prey populations (ground squirrels, etc.), and mitigating development impacts from recreation, urbanization, infrastructure and wind energy development. | ***Potentially suitable as a focal species***. However, limited and seasonal occurrence on MKWMA limits potential management feedback at the focal species scale. |
| Forster's Tern (*Sterna forsteri*) | SGCN | Forster's terns are documented breeders at MKWMA. In 2005 the Department estimated between 3-5 pairs breeding on MKWMA. MKWMA is one of five documented breeding sites in the state, probably representing fewer than 100 breeding pairs. | Similar to other marsh-nesting colonial waterbirds, water level fluctuations and human disturbance can result in nest failure | Maintaining water levels and minimizing human disturbance during nesting should be a priority. Consistent monitoring of the breeding colonies should be implemented, , such that all colonies are surveyed every three years | ***Potentially suitable as a focal species*** due to its dependence on a MKWMA for breeding and foraging. Due to low number of breeding individuals at MKWMA, best use of this species as a focal species may be within breeding or foraging guild. |
| Franklin's Gull (*Larus pipixcan*) | SGCN | In 2010, the Department counted 14,426 Franklin's gull nests at MKWMA. In 2012 the number of nests counted declined to 7,894. Despite this decline, breeding colonies at Market Lake and Mud Lake WMAs currently comprise one of the largest Franklin's gull breeding concentrations throughout their range. | Franklin's gull colonies can be seriously affected by fluctuating water levels, potentially leading to complete abandonment. Exotic plant species and overgrowth of marsh plants can create habitat that is too dense for nesting. Franklin's gulls are particularly sensitive to human disturbance early in the breeding cycle and again during the chick phase, and will abandon with excessive human exposure. | Maintaining a suitable water level likely is the most important conservation action, followed by maintaining vegetation that is open enough for nest construction. Consistent monitoring of breeding colonies should be implemented, such that all colonies are surveyed every three years. Caution should be exercised when entering these colonies, and all research activities should be planned carefully to avoid periods of peak sensitivity, and disturbance should be limited to as much as possible. | ***Potentially suitable as a focal species.*** This species has a potential to provide valuable feedback to managers due to its breeding numbers on the WMA and its dependence on WMA wetlands for nesting and brood-rearing. Also, due to this species' dependence on foraging habitats on private lands adjacent to MKWMA, it could provide valuable input on species and waterbird conservation on a landscape level. |
| Great Egret (*Ardea alba*) | SGCN | Great egrets are documented breeders at MKWMA. In the Great Basin, there are approximately 1,119 breeding pairs (Ivey and Herziger 2005). Of these, approximately 26 pairs breed in Idaho at 4–6 sites in the southern half of the state. | Similar to other marsh-nesting colonial waterbirds, water level fluctuations and human disturbance can result in nest failure | Maintaining water levels and minimizing human disturbance during nesting should be a priority. Consistent monitoring of the breeding colonies should be implemented, , such that all colonies are surveyed every three years | ***Potentially suitable as a focal species*** due to its dependence on a MKWMA for breeding and foraging. Due to low number of breeding individuals at MKWMA, best use of this species as a focal species may be within breeding or foraging guild. |

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| Greater Sage-grouse (*Centrocercus urophasianus*) | BLM Sensitive, SGCN, USFS Sensitive, ESA Candidate | Market Lake WMA provides year-round habitat for greater sage-grouse In severe winters, where snow accumulations are substantial, as many as 200 hundred sage-grouse historically moved into the tall sagebrush pockets across the WMA. In 2012 and 2013, leks north of MKWMA (south of Hwy 33) were monitored for Sage-grouse use. These leks are on BLM administered lands and searches resulted in no recent observations or sign of greater sage-grouse. | Loss, degradation, and fragmentation of sagebrush habitat are the major threats to the greater sage–grouse in Idaho. Habitat degradation factors include alteration of historical fire regimes, conversion of sagebrush habitat, water developments, use of herbicides and pesticides, invasive species, urbanization, energy development, mineral extraction, and recreation. | Identify, protect, and maintain existing sagebrush seasonal habitats particularly breeding and winter habitats. Identify new lek/breeding habitats in MKWMA vicinity. Where possible, restore damaged and lost sage-steppe habitat. Manage projects to significantly reduce fragmentation of existing sagebrush habitats and to reduce human disturbance. Continue to monitor the leks near MKWMA. | ***Un suitable as a focal species*.** Sage-grouse have a high conservation need and are representative of a group of species sharing similar conservation needs. They have a high level of current Department program effort and are a species with potential to stimulate partnerships. However, numbers around Market Lake are suppressed, suitable habitat is lacking and getting management feedback would be challenging |
| Hooded Merganser (*Lophodytes cucullatus*) | SGCN | Hooded mergansers are observed occasionally during migrational periods at MKWMA. Limited potential breeding habitat is present on Gem Lake WHA but nesting is not documented. | Hooded merganser populations have suffered on both breeding and wintering grounds from habitat alteration, mostly associated with changing forestry practices and especially snag removal. | Maintain cottonwood overstory, particularly older age classes. | ***Unsuitable as a focal species***. Presence of hooded merganser is likely limited to transitional use of Main Marsh at MKWMA and Snake River Habitats. |
| Lesser Scaup (*Aythya affinis*) | SGCN, IWJV | Common nesting duck on MKWMA, which is likely one of the most important nesting areas for this species in the Upper Snake Region. Pairs and broods are associated with fresh seasonal and semi-permanently flooded wetlands and lakes with emergent vegetation, such as bulrush and cattail. The lesser scaup prefers smaller bodies of water and nests on dry ground, usually close to water, such as in the wet–meadow zone of wetlands, but also in tracts of native prairie, hayfields, or even sparse shrub patches. | Many threats faced by the lesser scaup throughout its range do not apply in Idaho. In Idaho, degradation of habitat is a potential issue. Loss or degradation of wetlands due to drainage and conversion to agriculture, dredging and filling, modification of water levels, levee construction, changes in siltation, and introduction of exotic plants are all potential issues of concern that may impact both breeding and wintering habitats for this species. | Primary actions should focus on restoring wetlands and associated uplands through cooperative joint ventures of federal and state, resource agencies, private and public landowners. | ***Potentially suitable as a focal species.*** This species has a potential to provide valuable feedback to managers due to its breeding numbers on the WMA and its dependence on WMA wetlands for nesting, brood-rearing and foraging. |
| Loggerhead Shrike (*Lanius ludovicianus*) | BLM Sensitive | Loggerhead shrike nesting habitat exists on MKWMA within grassland and grassland shrub habitats. Loggerhead shrikes are commonly found on MKWMA. However, nesting and habitat use of the landscape are not well documented. | Loss of grassland habitat, degradation and loss of nesting trees/shrubs within grasslands, degradation of foraging habitat due to overgrazing, low reproductive success due to reductions in prey base (grasshoppers and beetles) due to pesticides. | Protect or restore grassland habitat with scattered trees or shrubs. Avoid overgrazing by livestock and minimize use of pesticides to control grasshoppers. | ***Unsuitable as focal species***.. Limited information on distribution in the project area. Unknown distribution limits potential management feedback. |
| Long-billed Curlew (*Numenius americanus*) | SGCN, IWJV | Long-billed curlews are documented breeders on the shorter grass fields on MKWMA as well as adjacent to the WMA. | The greatest threat to long-billed curlew in Idaho is loss of habitat. Conversion of grasslands to croplands, residential development, and | Protect nesting areas from fragmentation and human disturbance from approximately mid-April to mid-June. Maintain agricultural lands and practices around breeding areas through conservation easement acquisitions and NRCS | ***Potentially suitable as a focal species***. Long-billed curlews are very sensitive to habitat fragmentation and changes in land use on a landscape scale. However, |

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| | | | increasing recreational use has all resulted in losses of suitable habitat in Idaho. Carlisle (personal comm.) has also documented significant losses from recreational shooting. | programs that support moderate grazing, flood irrigation and grass hay production. | most curlew nesting occurs off of the WMA. |
| Mallard (*Anas platyrhyncho*) | Flagship, IWJV | Mallards are abundant on the Market Lake landscape, they are highly valued by waterfowl hunters and the harvest rates are higher than any other dabbling duck on MKWMA. | The species is threatened by wetland habitat degradation and loss from pollution and pesticide pollution, wetland drainage, peat-extraction, changing wetland management practices (e.g., decreased grazing and mowing in meadows leading to scrub over-growth). The species also suffers mortality as a result of lead shot ingestion. It is also susceptible to duck virus enteritis, avian influenza, and avian botulism so may be threatened by future outbreaks of these diseases (although it may be able to withstand sporadic losses due to its high reproductive potential). | Protect breeding and nesting areas and continue to provide critical migrational stop-over habitat. Monitor harvest, production, and disease outbreaks in the region. Banding of mallards could provide valuable information on movement and production from MKWMA. | ***Potentially suitable as a focal species***. Due to high management status, their dependence on MKWMA wetlands and associated uplands and partnership potential. Also, due to this species' likely dependence on nesting habitats on adjacent private lands, it could provide valuable input on species and waterbird conservation on a landscape level. |
| Northern Pintail (*Anas acuta*) | SGCN | Pintails are common on MKWMA. Market Lake supports nesting pintail populations, but MKWMA provides critical stop-over habitat for thousands of migrating birds during the spring and fall months. More detailed information on nesting habitat and use of the WMA would be beneficial for management. | The species is threatened by wetland habitat loss on its breeding and wintering grounds. The species is also threatened by changing wetland management practices (decreased grazing and mowing in meadows leading to scrub over-growth). It also suffers poisoning from lead shot ingestion and is susceptible to avian botulism and avian influenza. | Protect breeding and nesting areas and continue to provide critical migrational stop-over habitat. Production is limited in the Market Lake area, but MKWMA provides critical migrational stop-over habitat for northern pintails. Monitor harvest, production, and disease outbreaks in the region. | **Potentially suitable as a focal species.** Important game animal and social acceptance. Partnership leverage as well as habitat availability and management capabilities make pintail a potential focal species. |
| Prairie Falcon (*Falco mexicanus*) | BLM Sensitive | There are no documented active Prairie falcon nests on MKWMA, but prairie falcons are common visitors to MKWMA, where they likely utilize upland foraging habitats. | Habitat loss from rural-residential development and large-scale agricultural development adversely impacts prairie falcons particularly in areas where ground squirrels are important forage species. Human disturbance is a frequent cause of nest failure. | Enhancement/maintenance of steppe and grassland habitats (and activities that benefit ground squirrels, rodents and small upland birds) will benefit foraging prairie falcons. | ***Unsuitable as a focal species***. Occurrence context on MKWMA does not reflect main threats to the population. Lack of knowledge limits potential management feedback. |

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| Peregrine Falcon (*Falco peregrinus anatum*) | BLM Sensitive, SGCN, USFS Sensitive, | Peregrine falcons are common visitors to MKWMA. There is a peregrine hack tower maintained on MKWMA. This tower was built in 1991 and has been occupied, but has not successfully fledged young. | Loss of habitat, particularly at cliff nest sites or adjacent wetlands, is a key threat to peregrine falcons. Disturbance at nest sites during breeding is also a threat to this species. | Market Lake WMA and the surrounding area has very limited natural nesting habitat for peregrines, but hack towers have proven to be suitable nesting habitat and peregrines have successfully fledged young from these towers (Camas NWR and Mud Lake WMA). MKWMA and surrounding habitats provides an abundant prey base for peregrines. Management on MKWMA has focused on minimizing disturbance at nest sites and monitoring peregrine use of MKWMA. Market Lake WMA and area use by peregrines is poorly understood. | ***Unsuitable as a focal species*.** The MKWMA tower has been inactive in recent years and peregrine use of the WMA has been largely transitional. Limited information on use of MKWMA by peregrines limits the potential value of management feedback. |
| Red-necked Grebe (*Podiceps grisegena*) | | Red-necked grebes are observed occasionally during migrational periods at MKWMA. | Highly susceptible to pollutants but bioaccumulation appears to occur mostly on wintering grounds. Susceptible to disturbance by recreationists during nesting, both from exposure of nests when birds are flushed off nests and separation of young from adults when rapidly approached by boats. Because of their reliance on wetland habitat, draining of wetlands and/or drought are potentially serious issues for this species in Idaho. | Maintaining water levels and minimizing human disturbance during nesting should be a priority. | ***Unsuitable as a focal species***. Presence of red-necked grebe is likely limited to transitional use of Main Marsh at MKWMA and Snake River Habitats, limiting the potential for valuable feedback to WMA managers. |
| Ring-necked Pheasant (*Phasianus colchicus*) | Flagship | Wild ring-necked pheasants were once abundant in the Market Lake area. Pheasant populations around Market Lake have dramatically declined over the years. No single factor has been clearly identified as the reason for these declines, but habitat loss and alteration, in combination with pesticide use, and alterations in farming methods have all likely contributed to these declines. | Habitat loss, changes in farming practices, use of pesticides, and altered predator densities all threaten ring-necked pheasant populations. | Improving nesting and brood-rearing habitat in the Market Lake area in combination with providing seasonal food sources would promote more productive pheasant populations. Implementing high quality habitat improvement projects with local land owners, particularly programs that partner with other agency programs would greatly improve conditions for pheasants across this landscape. | **Potentially suitable as a focal species.** Important game animal and social acceptance. Partnership leverage as well as habitat availability and management capabilities make pheasant a potential focal species. |
| Sage Sparrow (*Artemisiospiza belli*) | BLM Sensitive, IWJV | MKWMA has suitable breeding habitat but their occurrence is poorly documented. | Degradation and fragmentation of sagebrush habitat are the major threats to the sage sparrow in Idaho. Habitat degradation factors include alteration of historical fire regimes, conversion of sagebrush habitat, water developments, use of herbicides and pesticides, invasive species, urbanization, energy development, mineral extraction, and recreation. | Identify, protect, and maintain existing in-tact sagebrush habitats. Where possible, restore damaged and lost sage-steppe habitat. Manage projects to significantly reduce fragmentation of existing sagebrush habitats and to reduce human disturbance. | **Unsuitable as a focal species** given poorly documented use of MKWMA. |

| Species | Status Designation(s) | Occurrence Context in Market Lake WMA Landscape | Threats | Beneficial Management and Conservation Actions | Suitability as a Focal Species at Market Lake WMA |
|---|---|---|---|---|---|
| Sandhill Crane (*Grus canadensis*) | SGCN, IWJV | Sandhill cranes on MKWMA and vicinity are part of the Rocky Mountain Population (RMP). Market Lake WMA provides breeding and migrational stop over habitat for the sandhill cranes in the RMP. | Greatest threat to RMP cranes is loss of migration-staging habitat. However, loss and degradation of wetland/riparian breeding habitat is also an issue. | Protect and restore wetland/riparian habitat for breeding sandhill cranes and maintain agricultural production for foraging areas where appropriate on MKWMA. Document breeding locations on MKWMA, including nesting brooding locations. | ***Potentially suitable as a focal species.*** This species has a potential to provide some valuable feedback to managers due to its breeding numbers on the WMA and its dependence on WMA habitats for nesting, brood-rearing and foraging. However, lack of current knowledge on the species' use of WMA habitats may limit potential management feedback. |
| Short-eared Owl (*Asio flammeus*) | Sensitive SGCN | Suitable breeding and foraging habitat is present on MKWMA and immediate vicinity. Short-eared owls are common breeders in this landscape. Species is known to be nomadic; therefore additional suitable habitat may be unoccupied in some years. | As ground-nesters (often in loose colonies), the short-eared owl is particularly vulnerable to habitat loss and degradation, and human disturbance. Residential, commercial, transportation, utility, and agricultural development of suitable nesting habitats are key factors in local short-eared owl population declines. Timing of agricultural activities such as tilling, mowing, burning, etc. can adversely affect short-eared owls breeding in agricultural areas. Because of their low-flying hunting technique and colonial tendencies, populations of short-eared owls in proximity to roads are potentially subject to high mortality due to vehicle collisions. | This species benefits from any actions or projects that protect, enhance, or restore potentially suitable foraging and breeding habitats. Projects designed to benefit other grassland and shrub-steppe species (e.g., greater sage-grouse sharp-tailed grouse, mule deer) also will benefit short-eared owls. Monitoring for use of agricultural lands prior to ground disturbing actions also would benefit the short-eared owl. | ***Potentially suitable as a focal species.*** This species has a potential to provide some valuable feedback to managers due to its breeding numbers on the WMA and its dependence on WMA habitats for nesting, brood-rearing and foraging. However, Nomadic ecology may complicate population monitoring. |
| Snowy Egret (*Egretta thula*) | SGCN | Snowy egrets are documented breeders at MKWMA. In the Great Basin, there are approximately 1661 breeding pairs (Ivey and Herziger 2005). Of these, approximately 326 pairs breed in Idaho at four sites in the southern half of the state. | Similar to other marsh-nesting colonial waterbirds, water level fluctuations and human disturbance can result in nest failure | Maintaining water levels and minimizing human disturbance during nesting should be a priority. Consistent monitoring of the breeding colonies should be implemented, , such that all colonies are surveyed every three years | ***Potentially suitable as a focal species*** due to its dependence on a MKWMA for breeding and foraging. Due to low number of breeding individuals at MKWMA, best use of this species as a focal species may be within breeding or foraging guild. |
| Swainson's Hawk (*Buteo swainsoni*) | BLM Type 5, SGCN, IWJV | In general, Swainson's hawk utilization of MKWMA is poorly documented. However, they are a likely breeder and may also utilize MKWMA habitats during migration. | Main threats are vulnerability of this species as it congregates in large numbers during migration and on the wintering grounds (e.g., Argentina). On breeding grounds, conversion of native grasslands to crops can degrade or eliminate nesting habitat. Development of wind farms may cause direct | Maintain and/or restore native grasslands in order to retain adequate foraging and nesting habitats. Identify nesting trees and avoid disturbance there during breeding. Migration corridors should be identified and important stopover habitat protected. Better data on mortality rates of migrating Swainson's hawks (and other raptors) as a result of wind farm development are needed. | ***Unsuitable as a focal species***. Occurrence context on MKWMA does not reflect the main threats to Swainson's hawk (e.g., vulnerability on migration and wintering grounds). Limited and non-quantified seasonal occurrence on MKWMA limits potential management feedback at the focal species scale. |

| Species | Status Designation(s) | Occurrence Context in Market Lake WMA Landscape | Threats | Beneficial Management and Conservation Actions | Suitability as a Focal Species at Market Lake WMA |
|---|---|---|---|---|---|
| | | | mortality if migrating hawks collide with turbines during spring and fall migration. | | |
| Trumpeter Swan (*Cygnus buccinator*) | BLM Type 3, SGCN, USFS R4 Sensitive, USFWS State Imperiled Species Type 3, IWJV | Market Lake WMA provides high quality habitat for trumpeter swans. There have been two nesting pairs documented on MKWMA in 2012. Boat and access restrictions for breeding waterfowl provides for low disturbance nesting areas for swans and other waterfowl. Deflectors have been placed on majority of the power lines around MKWMA to minimizing bird strikes. This should reduce power line collisions in the future. | Managing disturbance at nest sites or potential nest sites is likely an important factor to nest establishment and success. Most successful nest sites in Idaho occur on managed, protected wetlands. Loss and degradation of wetland and riparian habitat is also a prevalent threat to breeding swans. In winter, key mortality factors are power line strikes, starvation during cold weather, and illegal shooting. | Reduce human disturbance at known and potential nest sites. Protect and restore wetland/riparian habitat for breeding trumpeter swans. Document/monitor breeding locations & nest success on the WMA, including nesting brooding locations. Manage pond drawdowns to maximize macrophyte abundance. Mark power lines near rivers, known foraging areas and travel routes. Continue to document new winter field feeding areas. | ***Potentially suitable as a focal species.*** The Upper Snake River and its tributaries are important winter habitat for migrating swans and important breeding/brooding habitat for local populations. Market Lake WMA is one of the few consistently successful nesting territories for trumpeter swans in Idaho. Also, trumpeter swans are dependent on habitats that are representative of a broader group of species sharing the same or similar conservation needs. They are designated a focal species for wetland conservation by the IWJV. |
| Western Burrowing Owl (*Athene cunicularia hypugaea*) | BLM Sensitive SGCN | Known to occur on MKWMA and the adjacent landscape during the breeding season. | Burrowing owls breed in open, well-drained grasslands, prairies, farmlands, steppes, and may have some association with irrigated agriculture. In Idaho, burrowing owls typically use burrows excavated by badgers. Loss of nesting habitat through urbanization and agricultural conversion is a serious threat throughout Idaho. Indiscriminate shooting of badgers may limit nest sites. Recent concern that illegal shooting of burrowing owls may be impacting populations (Carlisle personal comm.) Pesticides are a potentially significant threat to this species as it often nests close to agricultural fields. | Many of the recommended conservation actions In Idaho's SWAP relate to statewide population assessments or monitoring to better understand threats. However, management that identifies nesting areas, limits human disturbance in known nesting areas and reduces exposure to pesticides will benefit nesting burrowing owls on MKWMA. | ***Unsuitable as a focal species***. Occurrence context on MKWMA does not reflect main threats to the population. Also, limited information on occurrence and us of MKWMA limits potential management feedback. |
| White-faced Ibis (*Plegadis chihi*) | BLM Type 4, SGCN, IWJV | Market Lake WMA combined with Mud Lake WMA provides critical nesting and breeding habitat for 37% of white-faced ibis in the intermountain population. The flood irrigated portions of MKWMA and adjacent properties are crucial foraging areas supporting these ibis colonies in the Upper Snake region. | Threats to the white-faced ibis in the Market Lake area are: water level fluctuations during the nesting period and the loss of foraging resources as the amount of flood irrigated lands and natural wetlands decreases in the region. | Maintain stable water levels and minimize human disturbance around active nesting colonies. Work collaboratively with the NRCS and private landowners within 22 km area around the WMA. | **Potentially suitable as a focal species.** This species has a potential to provide valuable feedback to managers due to its breeding numbers on the WMA and its dependence on WMA wetlands for nesting and brood-rearing. Also, due to this species' dependence on foraging habitats on private lands adjacent to MKWMA, it could provide valuable input on species |

| Species | Status Designation(s) | Occurrence Context in Market Lake WMA Landscape | Threats | Beneficial Management and Conservation Actions | Suitability as a Focal Species at Market Lake WMA |
|---|---|---|---|---|---|
| | | | | | and waterbird conservation on a landscape level. |
| Western Grebe (*Aechmophorus occidentalis*) | SGCN | An estimated 4,034 of these birds breed in Idaho, primarily along the Snake River drainage in the southern and southeastern parts of the state. There are five recently active colonies in the Upper Snake Region, including MKWMA, Mud Lake WMA, Island Park Reservoir, Mesa Marsh, and Silver Lake in Harriman State Park. | Two of the main issues for grebes nesting in Idaho are water quality and water level fluctuations. Nesting colonies also are sensitive to disturbance by humans approaching the colony on foot or by boat. | Prevent disturbance and maintain beneficial water levels at breeding colonies. | ***Potentially suitable as a focal species*** due to its dependence on a MKWMA for breeding and foraging. Best use of this species as a focal species may be within breeding or foraging guild. |
| Willow Flycatcher (*Empidonax traillii*) | BLM Type 3, IWJV | Documented occurrences during the breeding season in riparian habitats on MKWMA. | Loss, degradation, and fragmentation of lowland riparian habitat due to water diversions, impoundments, heavy livestock grazing etc. Increase in nest predator access due to meadow desiccation and conifer encroachment is also an issue (Great Basin Bird Observatory 2010). | Conservation strategies for riparian and spring habitat benefit this species. Maintain or restore shrub willow patches, preferably in multiple patches along a given riparian reach. Manage grazing such that it does not significantly fragment or reduce the density of willow patches. Maintain the presence of wet soils and nearby surface water. Reduce nest predator access by preventing conifer encroachment into riparian habitat. (Great Basin Bird Observatory 2010). | ***Potentially suitable as a focal species.*** Willow flycatcher is a riparian obligate and representative of riparian-dependent species sharing similar conservation needs. Unqualified scope of occurrence on MKWMA would require preliminary work to determine the extent of breeding. |
| Wilson's Phalarope (*Phalaropus tricolor*) | BLM Sensitive, SGCN, IWJV | Breeds and utilizes MKWMA wetlands as transitional habitat. However, the level of breeding on the WMA is poorly documented | Loss of freshwater habitats. Human disturbance during the nesting and brood-rearing period is a concern. | Utilize seasonal closures to protect nesting waterfowl. Manage for hemi-marsh with diverse vegetation types. Maintain stable spring early summer water levels (in managed wetlands) to minimize nest loss and maintain stable brood-rearing habitat. Implement a disturbance regime to manage for a beneficial wetland plant mosaic that includes sedges, spikerushes and bulrush; and avoids development or perpetuation of cattail stands. Where possible, utilize late-season partial drawdowns to maximize macrophyte production. Also, given the arid landscape surrounding MKWMA, maintaining optimal brood-rearing habitat at Department-managed wetlands is crucial to maximizing benefits to phalaropes. | ***Potentially Suitable as a Focal Species.*** Wilson's phalaropes require well-managed uplands adjacent to wetland/marsh habitats to breed successfully. Their habitat needs represent many other species dependent on MKWMA wetlands. However, the extent of breeding on MKWMA is not well-documented and would require substantial initial effort to better understand their occurrence context on WMA lands. |
| Yellow-billed Cuckoo (*Coccyzus americanus*) | Candidate ESA, SGCN | Several documented occurrences in 2010-2012 on the Deer Parks WMU approximately two miles from the Gem Lake segment of MKWMA. The stronghold of this species in the Upper Snake Region roughly conforms to the Snake River ACEC. | The primary threat to yellow-billed cuckoo is loss and degradation of breeding habitat, Estimates of riparian habitat losses range from 90–95% in Arizona, 90% in New Mexico, 90–99% in California, and >70% nationwide. | Conservation actions in Idaho should focus on more accurately determining numbers of existing yellow-billed cuckoos, mapping locations of remnant populations, and developing watershed level conservation strategies that protect high quality riparian habitat. | ***Unsuitable as a focal species***. Not documented on MKWMA. Riparian habitat on the Gem Lake segment may support breeding at the landscape scale by providing a buffer or foraging habitat, but actual breeding or occurrence on the WMA is not documented. |

| Species | Status Designation(s) | Occurrence Context in Market Lake WMA Landscape | Threats | Beneficial Management and Conservation Actions | Suitability as a Focal Species at Market Lake WMA |
|---|---|---|---|---|---|
| ***Reptiles/Amphibians*** | | | | | |
| Common Garter Snake (*Thamnophis sirtalis*) | BLM Sensitive | Occurs on MKWMA but context of occurrence is poorly documented. | Threats to common garter snakes are most likely related to loss and degradation of riparian and wetland habitats and hibernacula. | Management that protects restores or improves riparian and other wet habitats and enhances prey species availability (i.e., earthworms, insects, amphibians, and small mammals) will benefit common garter snake. Identifying and protecting hibernacula will also benefit common garter snake. | ***Unsuitable as a focal species.*** Limited information on utilization of MKWMA habitats limits the potential value of management feedback. |
| Northern Leopard Frog (*Rana pipiens*) | SGCN | Occurs on MKWMA but context of occurrence is poorly documented. Data regarding population trend in southern Idaho are limited, but localized declines are suspected. | As with most amphibians, the loss and degradation of wetland and riparian habitat is thought to be the most prevalent threat to populations. Introduced competitors and predators, such as bullfrogs and sport fishes, can cause amphibian population declines and losses. Disease is also a concern, particularly the chytrid fungus, *Batrachochytrium dendrobatidis*. | A comprehensive understanding of population status throughout the region and state is needed. Wetland protection and restoration of degraded sites will be beneficial. | ***Potentially suitable as a focal species***. General ecological requirements for northern leopard frog are on MKWMA. Lack of knowledge on local populations limits potential management feedback. |

## Selection of Conservation Targets

The biodiversity of MKWMA is represented by numerous vertebrates, invertebrates, plants and ecological communities. It is impractical to evaluate and plan for the conservation of all these elements. Therefore, Conservation Targets, a sub-set of species and communities, were selected to represent the biodiversity of MKWMA for management and conservation; while still reflecting the management priorities of MKWMA.

Conservation Targets for the MKWMA Management Plan were selected from species ranked as potentially suitable focal species in Table 1. Invertebrates and plants are not included in this assessment due to practical considerations including lack of data and funding. However, they may be part of a guild or habitat assessed. Conservation Targets could also include habitats that effectively represent suites of the flagship and special status species evaluated in Table 1, regardless of their potential suitability as a focal species. A final consideration in the selection of Conservation Targets was the best professional judgment of the Upper Snake Regional Habitat Manager and MKWMA staff. Effective Conservation Targets cannot be selected based solely on species assessments. They must reflect regional threats, priorities, existing conservation partnerships and the limitations of WMA personnel and funding.

**The Conservation Targets selected to guide management on MKWMA** (corresponding MKWMA Priority in parentheses) are:

1. Northern Pintail (Waterfowl Habitat)
2. Ring-necked Pheasant (Upland Game Bird Habitat)
3. White-faced Ibis (Distance Foraging Species)

**Northern Pintail**

Northern pintail was selected as a Conservation Target on MKWMA because:

- Northern pintail is a priority species and SGCN.
- Northern pintail fulfill all criteria for suitability as a focal species.
- Large numbers utilize MKWMA during migration.
- Wetland conservation and restoration to benefit northern pintail is beneficial management and conservation action for many of the species evaluated (68% of species in Table 1).
- Habitat needs for northern pintail can be mapped, assessed, and monitored on MKWMA and the adjacent landscape.
- Wetland habitat restoration and conservation can be spatially monitored by Department staff.
- Given the high species value of wetland habitats—particularly of priority species such as northern pintail, white-faced ibis, mallard, sandhill crane, trumpeter swan, ring-necked pheasant, etc.—wetland restoration and conservation partnerships are very achievable.
- Waterfowl dependent on wetlands (mallard, northern pintail, and Canada geese) are flagship species and are the primary foundational priority for the creation of MKWMA.

**Ring-necked Pheasant**

Ring-necked pheasant was selected as a Conservation Target to represent Upland Game Bird Habitat on MKWMA because:

- Ring-necked pheasant were once the dominant upland game bird on MKWMA and are a highly valued game species.
- Ring-necked pheasant fulfill all criteria for suitability as a focal species.
- There is currently research being conducted and research has been done in the past on Mud Lake WMA that provides information specific to pheasant survival and habitat use in an area much like Market Lake area.
- The seasonal habitat requirements of ring-necked pheasant are particularly valuable as a surrogate for other flagship and special status species.
- Crow counts have been completed on MKWMA since 2000. Currently there are 15 stations monitored (Appendix XV) so there is good baseline data to evaluate response to management actions.

**White-faced Ibis**

White-faced ibis was selected as a Conservation Target to represent Special Status Species Habitat on MKWMA because:

- White-faced ibis fulfill all criteria for suitability as a focal species.
- The breeding and migrational habitat requirements of white-faced ibis are particularly valuable as a surrogate for other flagship and special status species.
- Research has recently been conducted on white-faced ibis that demonstrates the value of flood irrigation for ibis. The value of flood irrigation is shared by numerous game and other nongame species (mallard, northern pintail, long-billed curlew, Franklin's gull, shorebirds, etc.).

## Coverage Assessment of Selected Conservation Targets

We define an effective Conservation Target as one providing meaningful conservation benefits for multiple species that share similar habitat requirements or life history traits. They are useful for directing limited management resources and maximizing conservation effort. One measure of effectiveness is to assess the number of species that a Conservation Target benefits (or covers) within the management landscape.

Regional Habitat and Diversity staff worked together to complete the coverage assessment table (Table 2). We evaluated each of the Conservation Targets to determine which species from Table 1 would benefit from management activities focused on that target. Evaluations are based on knowledge of species habitat requirements, occurrence within the management landscape, and the scope of current and planned management actions. The assessment considered only those habitat features or needs relevant to the species as it occurs on the management landscape. Our results indicate that the selected Conservation Targets on MKWMA provide substantial, but variable habitat benefits for an array of assessed species. We found that management efforts

directed towards maintaining or enhancing wetland habitat will provide conservation benefits for 44 of the 49 assessed species while those actions targeting white-faced ibis, although important, will benefit 37 other species.

We also evaluated which species or guilds would receive little or no tangible benefit from management actions for specific Conservation Targets; these are designated "conservation needs." We identified conservation needs for several species or guilds and determined that further data will be useful to inform the next WMA planning process. Recent studies suggest the conservation needs of some of these species (e.g., the Myotis guild) are increasing dramatically. A prudent management strategy is to consider a landscape where these species may be prioritized for management in the future. Broad strategies for addressing these management needs are identified in the following Management Program Table (pages 57-62), but typically include collection of additional baseline data.

Table 2. Analysis of Conservation Target coverage and identification of conservation needs.

| | **Conservation Targets**[a] | | | |
|---|---|---|---|---|
| **Species Assessed in Table 1** | **Northern Pintail** | **Ring-Necked Pheasant** | **White-faced Ibis** | **Conservation Need** |
| Elk (*Cervus elaphus*) | P | P | P | |
| Moose (*Alces alces*) | P | P | P | Yes |
| Mule Deer (*Odocoileus hemionus*) | P | P | P | Yes |
| Myotis Guild | P | P | P | Yes |
| Pronghorn (*Antilocapra americana*) | P | P | P | |
| Pygmy Rabbit (*Brachylagus idahoensis*) | P | | P | |
| White-tailed Deer (*Odocoileus virginianus*) | P | P | P | Yes |
| American Avocet (*Recurvirostra americana*) | P | | P | |
| American White Pelican (*Pelecanus erythrorhynchos*) | P | | | |
| Bald Eagle (*Haliaeetus leucocephalus*) | P | P | | Yes |
| Black Tern (*Chlidonias niger*) | P | | P | |
| Black-crowned Night Heron (*Nycticorax nycticorax*) | P | P | P | |
| Black-necked Stilt (*Himantopus mexicanus*) | P | | P | |
| Brewer's Sparrow (*Spizella breweri*) | | P | | |
| California Gull (*Larus californicus*) | P | | P | |
| Caspian Tern (*Sterna caspia*) | P | | P | |
| Cattle Egret (*Bubulcus ibis*) | P | P | P | |
| Clark's Grebe (*Aechmophorus clarkii*) | P | P | P | |
| Western Grebe (*Aechmophorus occidentalis*) | P | P | P | |
| Common Loon (*Gavia immer*) | P | P | P | |
| Ferruginous Hawk (*Buteo regalis*) | | P | | |

| | Conservation Targets[a] | | | |
|---|---|---|---|---|
| **Species Assessed in Table 1** | **Northern Pintail** | **Ring-Necked Pheasant** | **White-faced Ibis** | **Conservation Need** |
| Forster's Tern (*Sterna forsteri*) | P | P | P | |
| Franklin's Gull (*Larus pipixcan*) | P | P | P | |
| Great Egret (*Ardea alba*) | P | P | P | |
| Greater Sage-grouse (*Centrocercus urophasianus*) | | P | | |
| Hooded Merganser (*Lophodytes cucullatus*) | P | P | | |
| Idaho Pocket Gopher (*Thomomys idahoensis*) | P | | P | |
| Lesser Scaup (*Aythya affinis*) | P | P | P | |
| Loggerhead Shrike (*Lanius ludovicianus*) | P | P | P | |
| Long-billed Curlew (*Numenius americanus*) | P | P | P | |
| Mallard (*Anas platyrhynchos* ) | P | P | P | |
| Northern Pintail (*Anas acuta*) | X | P | P | |
| Prairie Falcon (*Falco mexicanus*) | P | P | | |
| Peregrine Falcon (*Falco peregrinus anatum*) | P | P | P | |
| Red-necked Grebe (*Podiceps grisegena*) | P | P | P | |
| Ring-necked Pheasant (*Phasianus colchicus*) | P | X | P | |
| Sage Sparrow (*Artemisiospiza belli*) | P | P | P | |
| Sandhill Crane (*Grus canadensis*) | P | P | P | |
| Short-eared Owl (*Asio flammeus*) | P | P | | |
| Snowy Egret (*Egretta thula*) | P | P | P | Yes |
| Swainson's Hawk (*Buteo swainsoni*) | P | P | P | |
| Trumpeter Swan (*Cygnus buccinator*) | P | P | P | |
| Western Burrowing Owl (*Athene cunicularia hypugaea*) | | P | | Yes |
| White-faced Ibis (*Plegadis chihi*) | P | | X | |
| Willow Flycatcher (*Empidonax traillii*) | P | P | P | |
| Wilson's Phalarope (*Phalaropus tricolor*) | P | P | | Yes |
| Yellow-billed Cuckoo (*Coccyzus americanus*) | P | | | Yes |
| Common Garter Snake (*Thamnophis sirtalis*) | P | P | P | Yes |
| Northern Leopard Frog (*Rana pipiens*) | P | P | P | Yes |

[a] Entries marked with "X" indicate that the majority or all habitat needs for an assessed species within the management landscape are being met by management actions benefitting the Conservation Target. Entries marked with "P" indicate only a portion of the species habitat needs are being met by management actions for the Conservation Target. Conservation needs exist where target-specific management actions provide little or no tangible habitat benefit for an assessed species. Blank cells under conservation targets may indicate a conservation need or where dissimilar habitat needs preclude conservation benefits.

## Spatial Delineation of Conservation Target Landscapes

Each of the focal species selected as Conservation Targets for MKWMA also utilize habitats off of MKWMA to meet their annual needs. In the case of the migratory animals, the species that will benefit from improved wetland habitats also range off of MKWMA. Therefore, it is crucial that we actively participate in habitat conservation efforts within the landscape, beyond the borders of MKWMA, if we are to maintain the integrity of the WMA itself. As a hypothetical example, if the forage resources in the Market Lake area for the white-faced ibis that nest on MKWMA are negatively impacted by loss of flood irrigation or other changes, we could do little within the boundaries of MKWMA to sustain numbers in the long term.

This section describes the methods used to define spatial landscapes for each of MKWMA Conservation Targets. We used the best data available (i.e., seasonal movement data from MKWMA and the scientific literature, species ecology data from the scientific literature, and local knowledge) to construct these Conservation Target-specific landscapes. These landscapes are then utilized in the Management Program Table (pages 57-62) to identify Conservation Target-specific Management Directions, Performance Targets, and Strategies for both MKWMA and the landscape.

**Northern Pintail Landscape**

Market Lake WMA provides breeding and migrational habitat for northern pintails. Maintaining MKWMA and the surrounding area in productive pintail habitat is a high priority for the Department. Pintails use MKWMA and the surrounding area for breeding/nesting, migrational stop-over, molting, and seasonal foraging needs. The focus for delineating the MKWMA Northern Pintail Landscape was the breeding/nesting habitat requirements for pintails. The literature indicates that pintails tend to locate their nests farther from water than other ground nesting ducks; sometimes a mile or more, but most often within 100 yards (Bellrose 1980).

The value of migrational forage and loafing habitat is not ignored in the defined landscape. All of the migrational habitats on MKWMA are encompassed by the breeding/nesting one mile buffer. The Department recognizes that pintails will forage miles away from the wetland habitats associated with MKWMA. The focus of the pintail landscape identified in Figure 3 is specific to MKWMA wetland habitats.

We used the following steps to estimate the MKWMA Northern Pintail Landscape (all GIS analyses performed with ArcGIS 10.1 [ESRI, Redlands, Calif.], unless otherwise noted):

- An ArcGIS shapefile of MKWMA boundary and a wetland shapefile from the USFWS National Wetlands Inventory were used to clip designated wetlands within the MKWMA boundary. These wetlands would provide brood-rearing and seasonal migration habitats (foraging, loafing, molting, etc.) for northern pintail.
- We buffered the boundaries of these waterways by one mile to include the majority of nesting and breeding habitats used by northern pintails and other ducks on MKWMA (Bellrose 1980).

- The outer boundary of the resulting buffer defined MKWMA Northern Pintail Landscape (Figure 3).

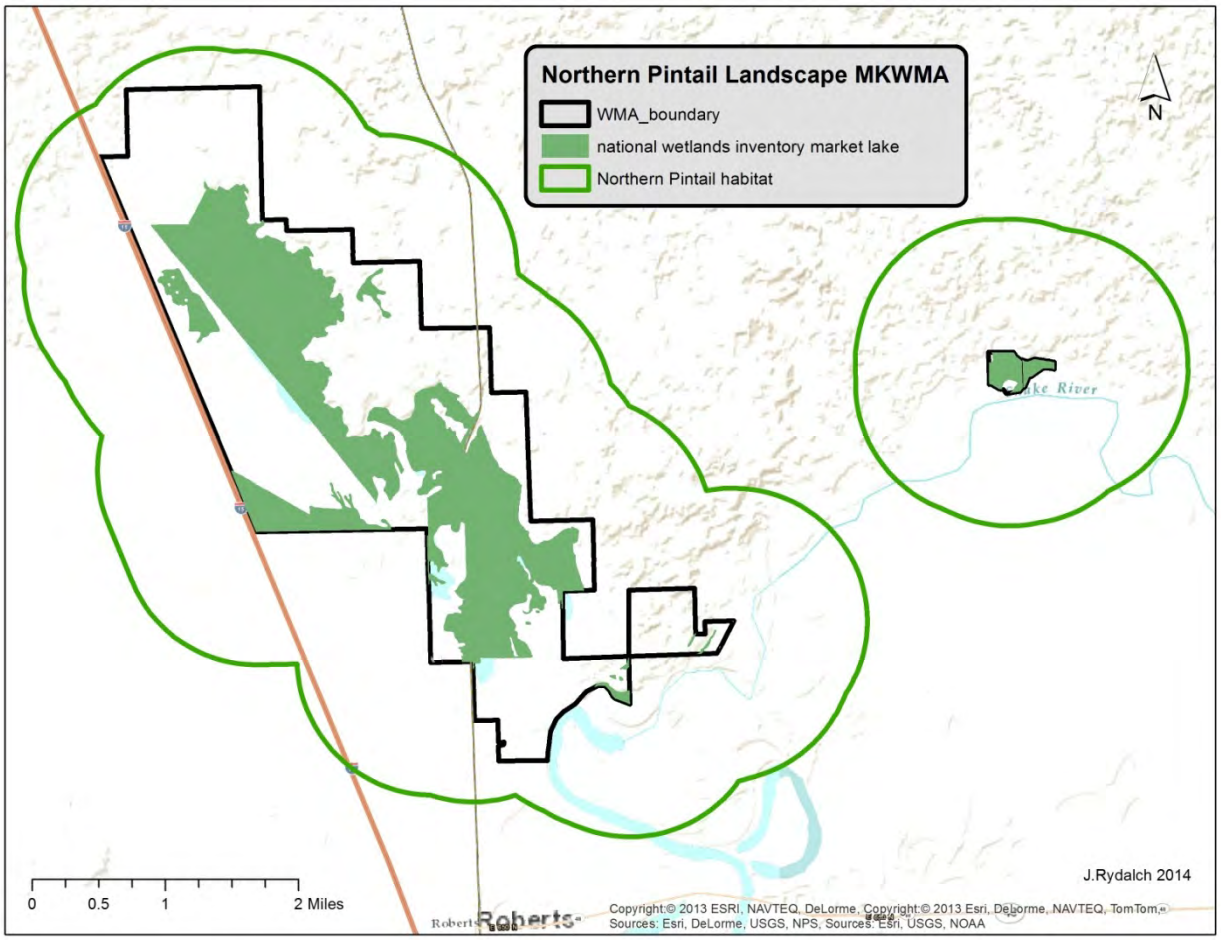


Figure 3. Northern Pintail Landscape depicting the potential habitat use area of pintails on Market Lake WMA.

**Ring-necked Pheasant Landscape**

There is considerable literature that discusses home range size for ring-necked pheasant across the United States. The majority of this work identifies the home range size of most pheasants is close to one square mile. (Flake et al. 2012, Perkins et al. 1997, Whiteside and Guthery 1983, Smith et al. 1999, Hanson and Progulske 1973). We took the one square mile as a baseline for pheasant home range and incorporated a more conservative 1.5 mile value for the ring-necked pheasant landscape layer for MKWMA. We took the 1.5 mile home range size and buffered MKWMA boundary by 1.5 miles.

We used the following steps to create the MKWMA Ring-necked Pheasant Landscape:

- ArcGIS shapefile of MKWMA boundary and buffered it by a 1.5 mile radius
- The outer boundary of the resulting buffer defined MKWMA Ring-necked Pheasant Landscape (Figure 4)

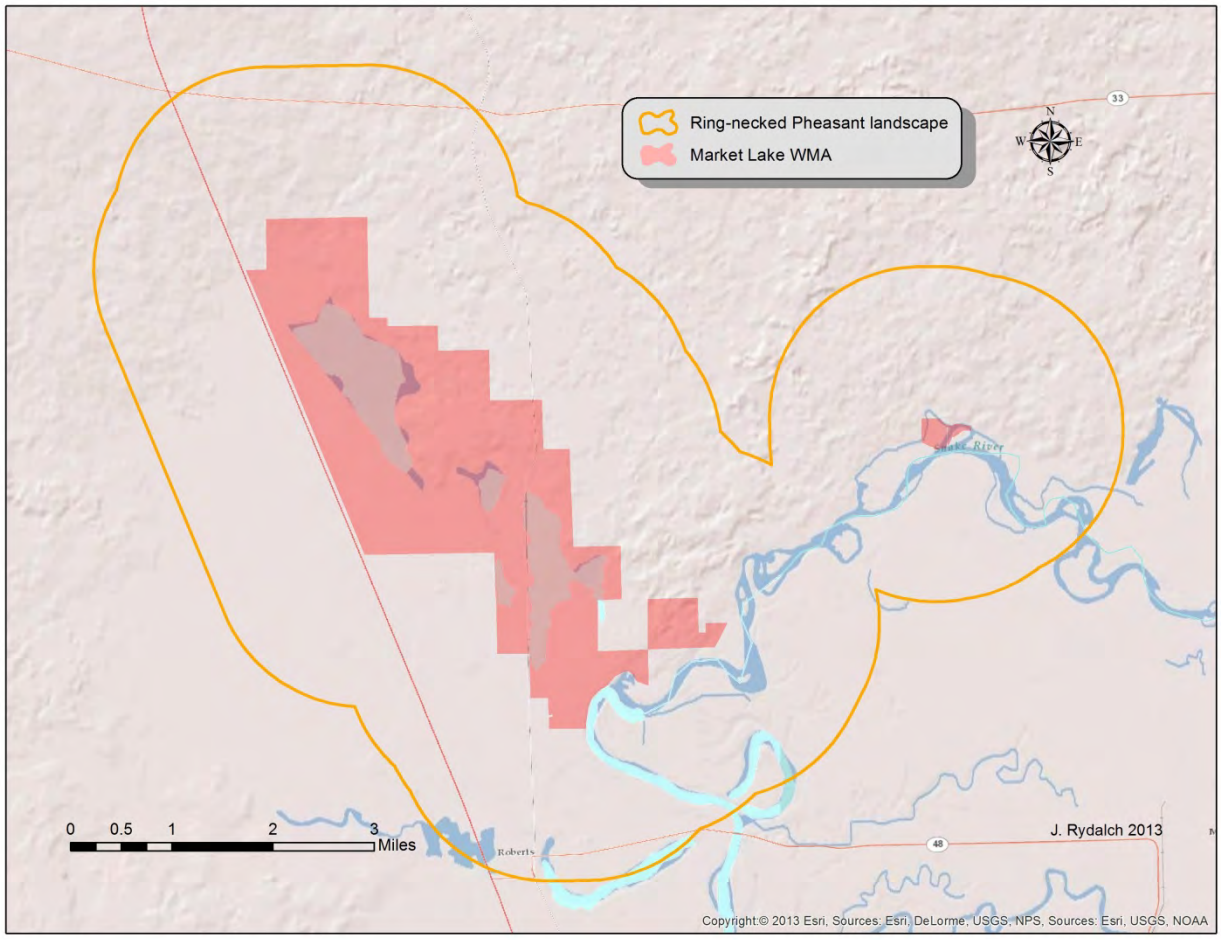


Figure 4. Ring-necked Pheasant Landscape depicting the likely year-round use area of pheasant that utilize Market Lake WMA.

**White-faced Ibis Landscape**

Market Lake WMA provides globally critical breeding and foraging habitat for white-faced ibis. Maintaining MKWMA and the surrounding area in productive ibis habitat is a high priority for the Department.

We used the following steps to estimate the MKWMA white-faced ibis Landscape from these data:

- Reviewed the literature associated with white-faced ibis and the Market Lake area. A recent publication (Moulton et al. 2012) indicated that irrigated agricultural lands within 22 kilometers of MKWMA were of critical importance to breeding white-faced ibis associated with Mud Lake WMA. Using this information we proceeded to develop the white-faced ibis Landscape.
- Acquired shapefiles of MKWMA boundary.
- Created a 22 km buffer around MKWMA property boundary.
- Digitized a polygon crop layer using 2011 CropScape raster data within the 22km buffer. This crop data was analyzed and determined to be either center pivot or flood irrigated. Moulton et al. 2012 study determined which types of fields would be considered ibis foraging habitat.
- Utilized the outer boundary of the resulting buffer, the crop layer data and Moulton et al. 2012 study to define the MKWMA white-faced ibis Landscape (Figure 5).

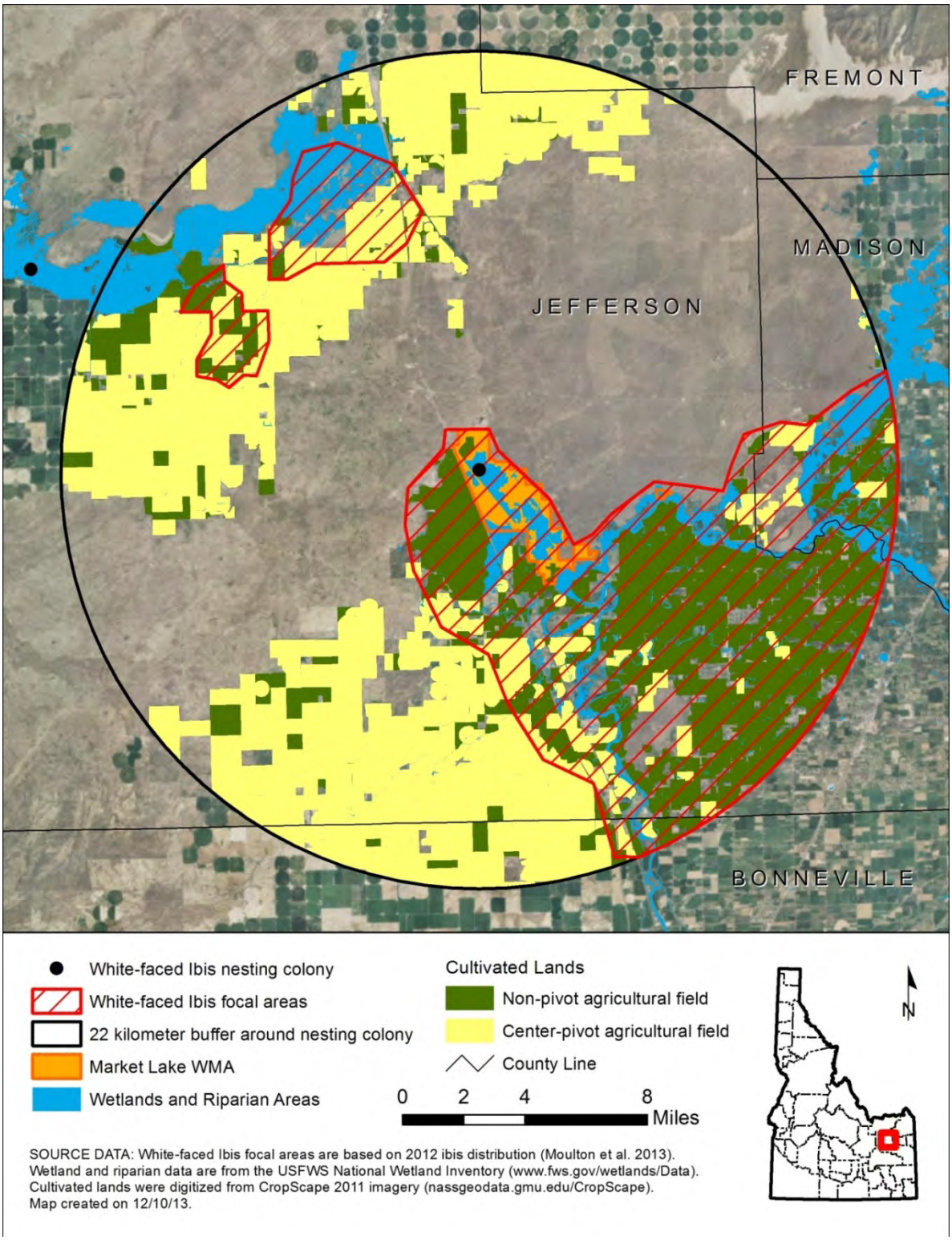


Figure 5. White-faced Ibis Landscape depicting the typical breeding season landscape used by white-faced ibis nesting on Market Lake WMA.

# Market Lake WMA Management Program Table

The following table outlines the Management Directions, Performance Targets, Strategies, and Outcome Metrics MKWMA staff will use to manage for the Conservation Targets selected (page 48) to represent each MKWMA Priority (page 33) at both MKWMA and Conservation Target-specific landscape scale. The last section of the table outlines strategies that will be used to increase our knowledge of the voids identified in the Conservation Target coverage assessment (Table 2). The Compass Objective column links the Management Directions in this table to the objectives of the Department's strategic plan, *The Compass* (Appendix I).

| **WMA Priority: Waterfowl Habitat** | | | | | |
|---|---|---|---|---|---|
| ***Conservation Target: Northern Pintail*** | | | | | |
| **Scope** | **Management Direction** | **Performance Target** | **Strategy** | **Metric** | **Compass Objective (Appendix I)** |
| MKWMA | Provide quality migrational, breeding/nesting, and brood-rearing habitat for northern pintails. | Annually, provide 50 acres of unharvested/standing agricultural crops for migrating waterfowl | Through farming efforts on MKWMA leave Department's share of crop standing in field or identify specific fields for crop production specifically for waterfowl and upland game birds | Acres Improved and/or Maintained | A, B, C, E, F, H |
| | | Annually, enhance or maintain 70 acres of seasonal pintail habitat through moist soil and shallow water management | Seasonally flood moist soil management units where possible, to provide waterfowl resources | | |
| | | | Seasonally flood the Triangle Marsh and other suitable locations so as to maximize invertebrate production for foraging waterfowl and waterbirds (increase duration of saturation and shallow flooding during spring and attempt to maintain groundwater closer to the surface for longer in early summer). | | |
| | | | Implement a water management plan and database that utilizes water drawdowns, drying up of units, duration of impoundment, and other water management strategies to maintain highly productive waterfowl habitats | | |
| | | | Use mechanical disturbance (e.g., disking, mowing, harrowing, etc.), fire, seasonal flooding, and seeding where appropriate to increase diversity and productivity of wet meadow and shallow marsh vegetation | | |
| | | Annually, improve or actively manage 200 acres of waterfowl upland nesting habitat. | As productivity of perennial grass/forb upland nesting habitat deteriorates, re-seed with appropriate grass species and legume mix in order to maintain quality upland nesting cover. | | |
| | | | Control or manage predator perching habitat | | |
| | | | Use mechanical disturbance (e.g., disking, mowing, harrowing, etc.), fire, and seeding where appropriate to increase diversity and productivity of upland nesting habitat | | |
| | | Annually, improve or actively manage 200 acres of waterfowl breeding/nesting, brood-rearing and migrational/molting in wetland habitats. | Use mechanical disturbance, fire, water level management, and herbicide applications to maintain the appropriate ratio of open water to vegetative cover in wetland habitats (maintenance of productive hemi-marsh habitat | | |
| | | | As productivity of palustrine scrub shrub (PSS) and palustrine emergent wetland (PEM) habitats deteriorate, use mechanical disturbance (disking, mowing, etc.), fire, water management, herbicide, and other appropriate methods to maintain quality waterfowl habitat. | | |
| | | Annually, flood irrigate 400 acres of agricultural cropland in a manner that is beneficial for breeding and migrating waterfowl. | Spatially and temporally manage agricultural production and wildlife farming activities to provide forage resources | | |

| **WMA Priority: Waterfowl Habitat** | | | | | |
|---|---|---|---|---|---|
| ***Conservation Target: Northern Pintail*** | | | | | |
| **Scope** | **Management Direction** | **Performance Target** | **Strategy** | **Metric** | **Compass Objective (Appendix I)** |
| MKWMA | Provide quality migrational, breeding/nesting, and brood-rearing habitat for northern pintails. | Annually, monitor and manage waterfowl disease outbreaks on 5,000 acres on MKWMA | Implement a waterfowl disease monitoring and management protocol for MKWMA | Acres monitored | A, B, C, E, F, H |
| | | Annually, submit at least one grant proposal from State, Federal, and NGO programs to benefit northern pintail breeding/nesting habitats on MKWMA. Examples of this would be NAWCA Grants, HIP Projects, Candidate Species Grants, Idaho Fish and Wildlife Foundation Grants, etc. | Restore portions of East Springs, Corral springs and others that have potential and are possible. | Proposals submitted | |
| | | | Implement projects or actions as opportunities arise in the future | | |
| | | Provide secure breeding and nesting habitats for waterbirds on MKWMA | Seek to implement seasonal activity closures to minimize disturbance to breeding pintails where appropriate. | Violations detected | |
| | | Annually, evaluate the efficiency and effectiveness of 15 miles of water delivery infrastructure and 100 acres of managed water impoundments to provide quality Northern Pintail habitat | Implement infrastructure and impoundment improvements that will enhance/maintain wetland productivity for waterfowl | Acres Improved and/or Maintained | |
| | Increase our knowledge of northern pintail use and production on MKWMA. | Within the next 5 years develop an effective method for monitoring waterfowl nesting success and production | Coordinate with State Waterfowl Manager to develop monitoring methods for waterfowl nesting success and production | Projects Completed and Management Improvements Identified | A, B, C, E, F, G, H |
| | | Within the next 5 years develop effective monitoring for migrating waterfowl | Coordinate with State Waterfowl Manager to develop monitoring methods for migrating waterfowl | | |
| Northern Pintail Landscape (Figure 4) | Provide quality migrational, breeding/nesting, and brood-rearing habitat for northern pintails. | Annually, provide 200 acres of migratory foraging habitat for northern pintail | Convert rhizomatous grass fields (e.g., expired CRP fields) or crested wheatgrass stands on private lands to more beneficial bunchgrass/forb mix stands for nesting waterfowl | Acres Improved | A, B, C, E, F, G, H, J, K |
| | | | Provide technical assistance to conservation partners on projects that will enhance or maintain northern pintail habitat. | | |
| | | | Develop cooperative upland, riparian, and wetland habitat improvement projects to plant vegetation, control noxious weeds, and manage livestock within riparian habitats on public and private lands | | |
| | | | Work with private landowners to leave standing grain | | |
| | | | Work with private landowners and conservation partners, and government agencies to implement wet soil/shallow wetland management practices that are beneficial to pintails across the landscape (i.e., timely flooding of habitats) | Projects identified Incorporating habitat needs, landowners contacted, and projects implemented | |
| | | | Provide information to private landowners on the impacts of vegetation manipulation activities (i.e., mowing, burning, disking, herbicide application, etc..). | | |
| | | | Work with the Department Farm Bill Coordinator to prioritize, identify, and implement CRP-SAFE, WRP and other applicable projects within the landscape | | |
| | | | Utilize data on northern pintail habitat needs to inform proposed public and State land projects | | |
| | | | Prioritize HIP projects within the Market Lake Habitat District on northern pintail habitat improvements in the landscape | | |
| | Increase our knowledge of northern pintail seasonal habitat requirements, movements, population dynamics, and the potential effects of human activity | Within 10 years, participate in one project that furthers knowledge of habitat needs of for northern pintail in this landscape | Conduct and/or support research that documents movement, habitat use, and/or production on northern pintails | Project Completed | A, B, C, E, F, H, J, K |

| **WMA Priority: Upland Game Bird Habitat** | | | | | |
|---|---|---|---|---|---|
| ***Conservation Target: Ring-Necked Pheasant*** | | | | | |
| **Scope** | **Management Direction** | **Performance Target** | **Strategy** | **Metric** | **Compass Objective (Appendix I)** |
| MKWMA | Provide high quality, year-round habitat for Ring-Necked Pheasant | Annually, improve and/or actively manage 300 acres of pheasant breeding, nesting and brood-rearing habitat across MKWMA | Maintain vigor and diversity in perennial grass/forb fields with periodic disturbance (i.e., burn, graze, hay, interseeding, mechanical) | Acres Improved and/or Maintained | A, B, C, E, F, H |
| | | | Implement management actions in perennial stands (i.e., grass, grass/forb, alfalfa) on a rotational basis to maintain diversity, heterogeneity, and adequate grass height-density for nesting across the landscape | | |
| | | | Identify areas and implement restoration activities in crested wheatgrass monocultures and other marginalized habitats. | | |
| | | | Implement wet soil management practices that enhance brood-rearing habitats across MKWMA (i.e., brood strips, timely flooding of appropriate habitats, etc.) | | |
| | | | Maintain food plots across MKWMA that provides forage and security habitat for pheasant during the breeding and brood-rearing time frames | | |
| | | | Establish/Maintain crowing strips in appropriate habitats on MKWMA | | |
| | | | Remove nesting and perch habitat for avian predators in pheasant nesting habitats | | |
| | | | Improve riparian habitats with willow/shrub plantings and noxious weed control | | |
| | | | Minimize human disturbance in pheasant nesting habitats. Adaptive access management strategies such as seasonal human entry closures, road closures, and other actions could be implemented in nesting habitats | | |
| | | Annually, improve and maintain 500 acres of pheasant fall/winter habitat on MKWMA | Improve or maintain quality of winter thermal and security cover such as: cattail, bulrush, willow, wind break, and shrub habitats, through mechanical treatment, controlled burning, water management, seedings, and other management efforts. | | |
| | | | Maintain productive food plots that are strategically placed across MKWMA that will provide high quality fall/winter forage for Ring-Necked Pheasant | | |
| | | | Incorporate mast producing shrubs into habitat plantings for winter cover and forage | | |
| | | Annually control noxious weeds within pheasant habitat through CWMA grant | Control weeds via chemical, mechanical and biological control methods. | Acres treated, grants awarded | A, B, C, E, F, H |
| | | | Annually apply for a grant from Idaho Department of Agriculture via the CWMA to accomplish more weed control | | |
| | Increase our knowledge of Ring-necked Pheasant seasonal habitat requirements, movements, population dynamics, and the potential effects of human activity | In the next five years develop a plan to improve wild Ring-Necked Pheasant production | Conduct annual spring crow counts, brood counts, or other appropriate population monitoring protocols to monitor pheasant trends over time. | Plan completed | A, B, C, E, F, G, H |
| | | | Conduct a project that examines the impacts of the Department's Pheasant stocking program on existing wild Pheasant populations and hunter crowding issues | | |
| | | | Periodically conduct projects that examine nest success and production across MKWMA. Implement appropriate management activities identified in the state-wide upland game bird management plan. | | |
| | | | Develop and implement a study to examine the seasonal movements, habitat use, production, and survival of Ring-Necked Pheasant utilizing MKWMA | | |
| Ring-Necked Pheasant Landscape (Figure 4) | Provide high quality, year-round habitat for Ring-Necked Pheasant | Annually, improve and/or actively manage 300 acres of pheasant breeding, nesting and brood-rearing habitat across the Ring-Necked Pheasant landscape | Convert rhizomatous grass fields (e.g., expired CRP fields) or crested wheatgrass stands on private lands to more beneficial bunchgrass/forb mix stands | Acres Improved | A, B, C, E, F, G, H, J, K |
| | | | Implement shrub planting projects on private and public lands to provide nesting, forage, security, and thermal habitat | | |
| | | | Develop cooperative upland, riparian, and wetland habitat improvement projects to plant vegetation, control noxious weeds, and manage livestock within riparian habitats on public and private lands | | |

| **WMA Priority: Upland Game Bird Habitat** | | | | | |
|---|---|---|---|---|---|
| ***Conservation Target: Ring-Necked Pheasant*** | | | | | |
| **Scope** | **Management Direction** | **Performance Target** | **Strategy** | **Metric** | **Compass Objective (Appendix I)** |
| Ring-Necked Pheasant Landscape (Figure 4) | Provide high quality, year-round habitat for Ring-Necked Pheasant | Annually, improve and/or actively manage 300 acres of pheasant breeding, nesting and brood-rearing habitat across the Ring-Necked Pheasant landscape | Work with private landowners and conservation partners, and government agencies to implement wet soil management practices that are beneficial to Pheasants across the landscape (i.e., brood strips, timely flooding of habitats) | Acres Improved | A, B, C, E, F, G, H, J, K |
| | | | Provide information to private landowners on the impacts of vegetation manipulation activities (i.e., mowing, burning, disking, herbicide application…) | | |
| | | | Work with the Department Farm Bill Coordinator to prioritize, identify, and implement CRP-SAFE, WRP and other applicable projects within the landscape | | |
| | | | Utilize data on Ring-necked Pheasant habitat needs to inform proposed public and State land projects | | |
| | | | Prioritize HIP projects within the Market Lake Habitat District on Ring-necked Pheasant habitat improvements in the landscape | | |
| | Increase our knowledge of Ring-necked Pheasant seasonal habitat requirements, movements, population dynamics, and the potential effects of human activity | In the next five years develop a plan to improve wild Ring-Necked Pheasant production | Expand pheasant population monitoring efforts across the Market Lake area | Plan Completed | A, B, C, E, F, H, J, K |
| | | | Conduct a project that examines the impacts of the Department's pheasant stocking program on existing wild pheasant populations and hunter crowding issues | | |
| | | | Develop and implement a study to examine the success of transplanting local wild pheasants to quality habitats across the landscape | | |
| **WMA Priority: Special Status Species Habitat** | | | | | |
| ***Conservation Target: White-faced Ibis*** | | | | | |
| **Scope** | **Management Direction** | **Performance Target** | **Strategy** | **Metric** | **Compass Objective (Appendix I)** |
| MKWMA | Maintain or increase the amount, quality, and security of nesting habitat (tall emergent marsh with stable water levels) and foraging habitat (shallowly flooded fields and wetlands)so as to maintain or increase the white-faced ibis population | Annually, maintain and/or improve, at least 36 acres of white-faced ibis nesting habitat by maximizing tall emergent marsh productivity and structure while maintaining stable water levels during nesting. | Use herbicide applications, mechanical treatments, and fire to rejuvenate stands of unproductive marsh vegetation | Acres improved | A, B, C, H, J, L |
| | | | Work with water users to eliminate fluctuations in water levels during nesting to minimize flooding of nests and maintain security from predators | | |
| | | Annually, reduce human disturbance during nesting in all wetlands susceptible to excess human activity | Maintain seasonal area closures to minimize disturbance to nesting ibis | Violations detected | |
| | | Annually, manage at least one large (200+ ac) shallow water marsh unit(s) and all agricultural fields with flood irrigation to maintain and/or improve quality foraging habitats for white-faced ibis | Maintain flood irrigation on agricultural fields across MKWMA to Provide forage resources for white-faced ibis | Acres provided | |
| | | | Maintain shallow flooding in at least one large (100 ac +) marsh unit(s) through summer each year | | |
| | | | Work with conservation partners, Diversity staff, & government agencies to develop management strategies that promote quality foraging habitats for white-faced ibis | | |
| | | By 2018, increase our knowledge of seasonal habitat requirements, movements, population dynamics, and effects of land management practices on white-faced ibis | With diversity staff lead, conduct and support research that documents movement, habitat use, and production in white-faced ibis populations | Monitoring and research projects developed/ implemented | |
| | | | Implement current recommendations from diversity staff to improve white-faced ibis habitat | Recommendations implemented | |

| **WMA Priority: Special Status Species Habitat** | | | | | |
|---|---|---|---|---|---|
| ***Conservation Target: White-faced Ibis*** | | | | | |
| **Scope** | **Management Direction** | **Performance Target** | **Strategy** | **Metric** | **Compass Objective (Appendix I)** |
| White-faced Ibis Landscape (Figure 3) | Maintain or increase the amount, quality, and security of nesting habitat (tall emergent marsh with stable water levels) and foraging habitat (shallowly flooded fields and wetlands) so as to maintain or increase the white-faced ibis | By 2018, implement the Regional Conservation Partnership Program (RCPP) grant to improve at least 4,000 acres for white-faced ibis within the landscape. | Seek to implement seasonal activity closures to minimize disturbance to nesting Ibis where appropriate. | Acres maintained | A, B, C, H, J, K, N |
| | | | Provide technical assistance on how and when to periodically drawdown flooded marshes and treat depauperate bulrush-cattail stands and increase duration of shallow flooding in marshes. | | |
| | | | Work with conservation partners, government agencies, politicians, and private landowners to identify programs or policies that expand or maintain flood irrigation practices across the landscape | | |
| | | | Work with conservation partners, government agencies, politicians, and private landowners to identify programs or policies that expand or maintain flood irrigation practices across the landscape. Conduct and support research that documents movement, habitat use, and production in white-faced ibis across landscape | Percent of flood land with flood irrigation in landscape | |
| | | By 2023, increase our knowledge of seasonal habitat requirements, movements, population dynamics, and effects of land management practices on white-faced ibis | With diversity staff lead, conduct and support research that documents movement, habitat use, and production in white-faced ibis populations | Research and monitoring implemented, publications, reports, etc. | |
| **WMA Priority: Wildlife-based Recreation and Education** | | | | | |
| **Scope** | **Management Direction** | **Performance Target** | **Strategy** | **Metric** | **Compass Objective (Appendix I)** |
| MKWMA | Provide opportunity for consumptive and non-consumptive wildlife-based recreation and education | Annually provide 16,100 recreational hunting, trapping and fishing user-days consistent with the MKWMA mission | Unless future data indicates a needed change to meet the MKWMA mission, maintain the current level of motorized access (outside of the winter road closure) to provide opportunity for motorized use and opportunity for non-motorized use away from open roads | User Days | E, F, G, H, I, N |
| | | | Increase MKWMA staff and IDFG law enforcement presence to curtail illegal activities (e.g., illegal harvest, illegal motor vehicle use, littering) that diminish the recreation of law abiding users | | |
| | | | Evaluate concerns and suggestions by pheasant hunters and Department staff to make the release pheasant program as efficient and productive as possible. | | |
| | | | Provide adequate lake access sites for public recreation | | |
| | | | Provide wildlife security areas where appropriate on MKWMA | | |
| | | Annually provide 12,600 non-consumptive wildlife-based recreation and education user-days consistent with the MKWMA mission | Maintain educational signage system along Sandy marsh and shelter belt on North end of MKWMA. | User Days | F, G, H, J, K, N |
| | | | Update the MKWMA bird list | | |
| | | | Evaluate the costs and benefits of a permanent photography blind, and if blind construction is deemed beneficial, evaluate if a reservation system or a "first come, first served" system will be used for access to the blind | | |
| | | | Provide wildlife security areas where appropriate on MKWMA | | |
| | | Maintain facilities, signage, and MKWMA-managed roads/trails to facilitate recreation and education | Provide improved maps, informational signage, and boundary markers | Facilities, Signage, or Roads/Trails Maintained or Improved | G, H, K, M, N |
| | | | Maintain MKWMA-managed roads in a useable but low maintenance state | | |
| | | | Improve signage on, and maintenance of, designated trails | | |
| | | During the next 10 years conduct 2 visitor use surveys to gather data and information to help guide MKWMA management | Every five years conduct a visitor use survey for MKWMA | Surveys conducted | |

| Conservation Needs Identified in Conservation Target Coverage Assessment (Table 2) | | | | | |
|---|---|---|---|---|---|
| **Scope** | **Management Direction** | **Performance Target** | **Strategy** | **Metric** | **Compass Objective (Appendix I)** |
| MKWMA | Develop strategies and/or action plan to address voids identified in the coverage assessment | Western burrowing owl | With Wildlife Diversity Program staff, develop a monitoring protocol to address burrowing owls on MKWMA | Plans completed | E, F, G, H, J, K, M |
| | | | Recruit volunteers to conduct monitoring of owl use according to protocols developed. | | |
| | | Raptor guild | With Diversity staff lead, develop a raptor monitoring protocol and organize volunteers to conduct raptor monitoring | | |
| | | Bat guild | With Diversity staff lead, develop a plan to ensure that management considers bat habitat requirements | | |
| | | | With Diversity staff lead, recruit volunteers to monitor bat populations and to develop a species list | | |
| | | | With Diversity staff lead, identify areas of high concentrations of bats and identify habitat use. | | |
| | | Riparian habitat for neotropical migrants/Yellow billed cuckoo | Maintain extent and complexity of riparian and non-native deciduous tree complexes (shelterbelts) throughout MKWMA. These areas should have native species comprising mid-story canopy levels to maximize the tangles for foraging and cover | Percent of riparian habitat and shelterbelt with midstory canopy | |
| Western burrowing owl landscape | Maintain and/or increase nesting burrows and quality foraging habitat. | Western burrowing owl | Work with BLM to re-introduce vegetation manipulation projects into the landscape | Acres maintained and improved | E, F, G, H, J, K, M |
| | | | Encourage protection of American badgers and the burrows they create where conflicts are minimal | Nesting burrows created | |
| | Reduce illegal shooting of Western burrowing owl | | Work with Conservation Officers to protect known Western burrowing owls | Violations detected | |

# Monitoring

Monitoring and reporting are critical for tracking accomplishment of performance targets identified in the MKWMA Management Program Table. Monitoring can be separated into three categories: compliance monitoring, biological monitoring and public use monitoring.

## Compliance Monitoring

Compliance monitoring documents the completion of regular management tasks that are essential to WMA operations. These include but are not limited to:

- Maintaining WMA facilities and access sites
- Maintaining infrastructure at ponds and wetlands
- Providing technical assistance to local agency staff and private landowners
- Maintaining public access sites

Compliance monitoring will be reported annually at work plan meetings between regional and headquarters staff.

## Biological Monitoring

Wildlife Management Areas across the state have a range of established biological monitoring programs and needs. Additional monitoring needs may have been identified during development of the MKWMA Management Program Table. Biological monitoring includes wildlife, vegetation, and habitat monitoring. It may also include assessing the effectiveness of management and restoration activities. Monitoring may occur at multiple spatial and temporal scales, depending on objectives.

Currently, MKWMA monitors habitat, habitat treatments, ungulate use, weed infestations, game bird habitat use, and production and harvest. In Table 3, future monitoring needs associated with performance targets and strategies identified in the MKWMA Management Program Table are summarized. The goal is to measure success or effectiveness of strategies that are implemented to reach performance targets. A detailed monitoring plan including specific techniques will be completed for MKWMA by December 31, 2014.

In 2010, the Department initiated a statewide, long-term habitat monitoring program for all WMAs. The goal of the program is to collect quantitative and comparable baseline data to monitor habitat change on all WMAs due to management actions or other causes. The baseline data collected will be specific to each WMA, based on the habitat types present and its unique management issues. Baseline data typically includes:

- Distribution and extent of cover types, including mapping of vegetation cover types
- Vegetation structure, composition, and condition

- Presence or abundance of noxious weeds and other invasive plants
- Riparian and wetland condition and function assessment
- Photo points

To date, this program has collected baseline data on five WMAs, with surveys of all 32 WMAs expected to be completed by 2019. This is a long-term program and will be repeated starting in 2020.

Table 3. Biological Monitoring for Market Lake WMA, 2014-2023.

| Performance Target | Survey Type | Survey Frequency |
|---|---|---|
| Enhance or restore 100 acres of seasonal pintail habitat through moist soil and shallow water management by 2023 | Vegetation transects as appropriate | Before project initiation and twice within five years after project |
| Create or enhance 200 acres of upland nesting habitat for waterfowl and pheasants | Vegetation transects as appropriate | Before project initiation and twice within five years after project |
| Experiment with different methods of converting crested wheat grass or undesirable grasses to native or functional species. Implement treatments on 20 acres by 2019. | Vegetation transects as appropriate | Before project initiation and twice within five years after project |
| Gather visitor use data and information to help guide MKWMA management | Visitor use surveys | Every five years |

*Note - This monitoring table focuses on conversion, restoration, or enhancement projects, not standard annual MKWMA management practices

## Public Use Monitoring

### Traffic counters

Traffic counters are located at different entry points on MKWMA. Monthly readings are taken during the spring-fall access period to establish traffic use patterns.

### User surveys

User survey forms were developed to establish public use trends. Market Lake WMA monitored public use intensively during 2012 and 2013 using personal contact surveys and internet surveys. Further in-depth public use monitoring will occur again in approximately three to five years. Please see Appendix IV for a summary of that monitoring effort.

# Habitat Monitoring

### Wetland Management

Market Lake WMA has abundant wetland management opportunity. Some ideas are mentioned in Appendix XVI. Monitoring and assessments of the wetlands on MKWMA will be completed in accordance to Department adopted and accepted methods. These could include but are not limited to the Wetland Ecosystem Services Protocol for the United States. This rapid assessment method estimates the functions, values, and condition of wetlands. Managed wetlands provide numerous functions beyond wildlife habitat (e.g., water quality improvement) that are potentially of high value to non-traditional user groups.

Water levels at MKWMA have been recorded bi-weekly from water control structures, staff gauges, and piezometers across the complex (Appendix XI). Monitoring of wetland vegetation and soils should be conducted to determine overall health and functionality of the system.

### Weed Monitoring Plots

Noxious weed populations are mapped and control methods implemented on MKWMA and surrounding lands (Appendix VIII). Monitor noxious weed species present, population trend, and effectiveness of control methods used on MKWMA. State law mandates control of noxious weeds. Noxious weeds are also controlled on the MKWMA to enhance and maintain wildlife habitat. Permanent transects and photo points have been established throughout MKWMA. Transects are monitored to determine percent cover of noxious weed. This measure assists in defining effectiveness of weed control efforts.

# Wildlife Monitoring

### Wildlife Population Surveys

Surveys are conducted annually for waterfowl, eagles, all big game, sandhill crane, greater sage-grouse, ring-necked pheasant, trumpeter swans, and American kestrel (nesting box) on the area. These surveys are conducted by the Habitat section of the Wildlife Bureau. In addition, surveys are conducted as resources and needs dictate for water and shorebirds, colony nesting waterbirds, and other nongame species.

### Harvest Inventories

Hunter check stations are conducted annually to monitor hunter success and satisfaction. Wing barrels are used to establish grouse population composition and production trends. These activities are run by the Populations section of the Wildlife Bureau. In addition, MKWMA personnel and enforcement staff routinely conduct hunter check stations specifically targeting waterfowl hunters on MKWMA.

**Waterfowl Banding**

Waterfowl banding is conducted under the authority of the federal government. Federal permits, banding protocols, bands, and banding records are administered through the USFWS Office of Migratory Bird Management. Waterfowl banding has been conducted on MKWMA and will continue as banding is needed for state targets. Much of the banding is used for continental population and harvest estimates.

The history of Canada goose banding on MKWMA is minimal. In 1987, 119 Canada geese were banded on the South Fork and Market Lake on June 5. In 1991, 12 Canada geese were banded at Market Lake on July 2-3 (11) and August 3 (1). On June 26, 2013, 173 Canada geese were banded on MKWMA and 150 of these birds received a white marking leg band as well. All banding data are forwarded to the U.S. Geological Survey bird-banding laboratory and used for continental population management.

**Wildlife Disease**

Monitoring for signs (sick or dead birds) of avian cholera during spring waterfowl migration and avian botulism during summer months occurs on MKWMA. Control techniques are implemented when possible. Since new dikes were built and water management has adjusted, no major outbreaks of cholera or botulism have occurred on MKWMA. In Idaho, avian cholera typically occurs during the spring waterfowl migration. Cholera outbreaks can start in other areas of the Pacific Flyway and spread as infected waterfowl migrate. Avian botulism outbreaks have occurred in the Market Lake area since an unknown date. It is important that MKWMA continue to monitor for disease.

**Wood Duck Nest Box Surveys**

Artificial duck nest boxes are inspected each summer to assess species occurrence, nest success, and nest box use. All boxes on MKWMA are checked. Nest box inspections have been conducted on MKWMA since 1997.

**Reporting**

Market Lake WMA will produce a five-year report on implementation of this plan in 2019, including a summary of accomplishments and progress towards meeting performance targets. During the five-year review, WMA staff will determine whether modifications to the plan are needed to meet performance targets, to accommodate changing conditions and priorities, or to incorporate advancements in management knowledge and techniques.

**Future Needs and Monitoring**

Survey: Mist netting for bats.
Objective: Determine species of bats using the MKWMA.
Background: Bats use the MKWMA, however, the species are unknown.

Survey: Nesting by raptors and corvids (crows and magpies) on MKWMA.
Objective: Determine the number and success of nesting raptors and corvids. Use the information to determine if raptors and corvids are a hindrance to waterfowl and upland bird production on MKWMA.
Background: Volunteers will be requested to conduct this survey.

Survey: Presence or absence of reptiles and amphibians.
Objective: Determine the presence or absence of reptiles and amphibians. Data can be used to update MKWMA species list, and report rare species to conservation data center for inclusion in statewide databank.

Survey: Breeding songbird survey.
Objective: Determine species nesting trend on MKWMA. Information can be used as one criteria in determining if management changes for upland habitat and/or marsh habitat is necessary.
Background: Volunteers will be requested to conduct this survey.

Survey: Aquatic plants survey.
Objective: Identify aquatic plant species, especially species valuable to waterfowl, in the marshes. Information will be used to develop strategies to maintain or increase waterfowl valuable species, rare species, and other species considered valuable to wildlife.

Survey: Sharp-tailed grouse lek survey.
Objective: Determine if sharp-tailed grouse lek(s) occur on adjacent BLM property. Establish annual lek count if lek(s) occur.
Background: A minimum of 19 sharp-tailed grouse were seen on adjacent BLM property in December 1998. One grouse was observed on the MKWMA in December 1998 and November 2012.

Survey: Small mammal survey.
Objective: Determine species presence or absence on MKWMA. Information can be used as one criteria in determining if management changes for species specific habitat is necessary.
Background: Volunteers, graduate students, AmeriCorps and any interested parties will be requested to conduct this survey.

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# Appendices

# I. THE COMPASS – THE DEPARTMENT'S STRATEGIC PLAN

In 2006, the Department completed a strategic plan—*The Compass*—based on public input and legislative mandates. It continues to guide the Department in 2014 and is the primary guiding document for all other Department plans developed since 2006. The following table presents the goals, objectives, and strategies from *The Compass* that are most relevant to WMA management. *Compass* objectives are lettered on the left side for reference in the Management Program Table.

| ***The Compass*** |
|---|
| **GOAL—Fish, Wildlife, and Habitat** |
| **A.** Objective – Maintain or improve game populations to meet the demand for hunting, fishing, and trapping. |
| **B.** Objective – Ensure the long-term survival of native fish, wildlife, and plants. |
| **C.** Objective – Increase the capacity of habitat to support fish and wildlife. |
| **D.** Objective – Eliminate the impacts of fish and wildlife diseases on fish and wildlife populations, livestock, and humans. |
| **GOAL—Fish and Wildlife Recreation** |
| **E.** Objective – Maintain a diversity of fishing, hunting, and trapping opportunities. |
| **F.** Objective – Sustain fish and wildlife recreation on public lands. |
| **G.** Objective – Maintain broad public support for fish and wildlife recreation and management. |
| **H.** Objective – Increase opportunities for wildlife viewing and appreciation. |
| **I.** Objective – Increase the variety and distribution of access to private land for fish and wildlife recreation. |
| **GOAL—Working With Others** |
| **J.** Objective – Improve citizen involvement in the decision-making process. |
| **K.** Objective – Increase public knowledge and understanding of Idaho's fish and wildlife. |
| **GOAL—Management Support** |
| **L.** Objective – Attract and retain a diverse and professional workforce. |
| **M.** Objective – Provide equipment and facilities for excellent customer service and management effectiveness. |
| **N.** Objective – Improve funding to meet legal mandates and public expectations. |

# II. HISTORY

Prior to establishment, the lands that currently comprise MKWMA were under private ownership and were used for agriculture and range. The primary agriculture commodities were irrigated cereal grains, alfalfa hay, and cattle. The flat irrigated fields used to be an old lake bed known as Market Lake.

Market Lake was formed during the seasonal flooding of the Snake River as well as during spring runoff into the basin. In 1887, a new railroad grade blocked the over- flow channel leading from the river and the original lake disappeared. As agriculture developed and irrigation was brought to the area, seepage began to restore portions of the lake. What remains of Market Lake is now the MKWMA.

Development and management of MKWMA began in 1956 with the acquisition of 2,845 acres of farm land and pasture as well as numerous wetlands and marsh. Smaller land acquisitions took place for more than 30 years up until 1988, at which time MKWMA totals 5,067 acres (Appendix IX).

It has been challenging to manage water on MKWMA to the satisfaction of all affected parties. Litigation has occurred due to flooding and there are easements and agreements in place (Appendix IX). Agreements with neighboring landowners at time of purchase may also limit or constrain water management options in some years on MKWMA.

The Department has actively managed and improved the wildlife habitat value of MKWMA since its inception including: eight miles of maintained dikes, six miles of water channel, seven miles of ditches and water delivery system with 24 water control structures. Market Lake WMA established shelterbelts utilized by migrating songbirds as well as important wetlands where international migratory birds find a place to rest. Additionally, MKWMA provides various recreational opportunities for thousands of eastern Idaho citizens each year through maintenance of 2.5 miles of trails and 13 miles of Department-owned roads, installation and maintenance of information kiosks and signage, and access management.

# III. MANAGEMENT REQUIREMENTS AND AUTHORITIES

Federal funds, including those derived through the USFWS Federal Aid Program, have been used in part to acquire and manage MKWMA lands. Certain activities are prohibited from funding with Federal Aid funds, and all provisions of Federal Aid funding are adhered to.

Other federal and state laws also affect management of MKWMA. The Department has responsibility under provisions of the Endangered Species Act to ensure that management actions protect threatened and endangered species, and responsibility under the Clean Water Act to ensure that water quality standards and guidelines are in place on MKWMA lands and waters. Under the National Historic Preservation Act, the Department must ensure that historic properties are protected on the MKWMA.

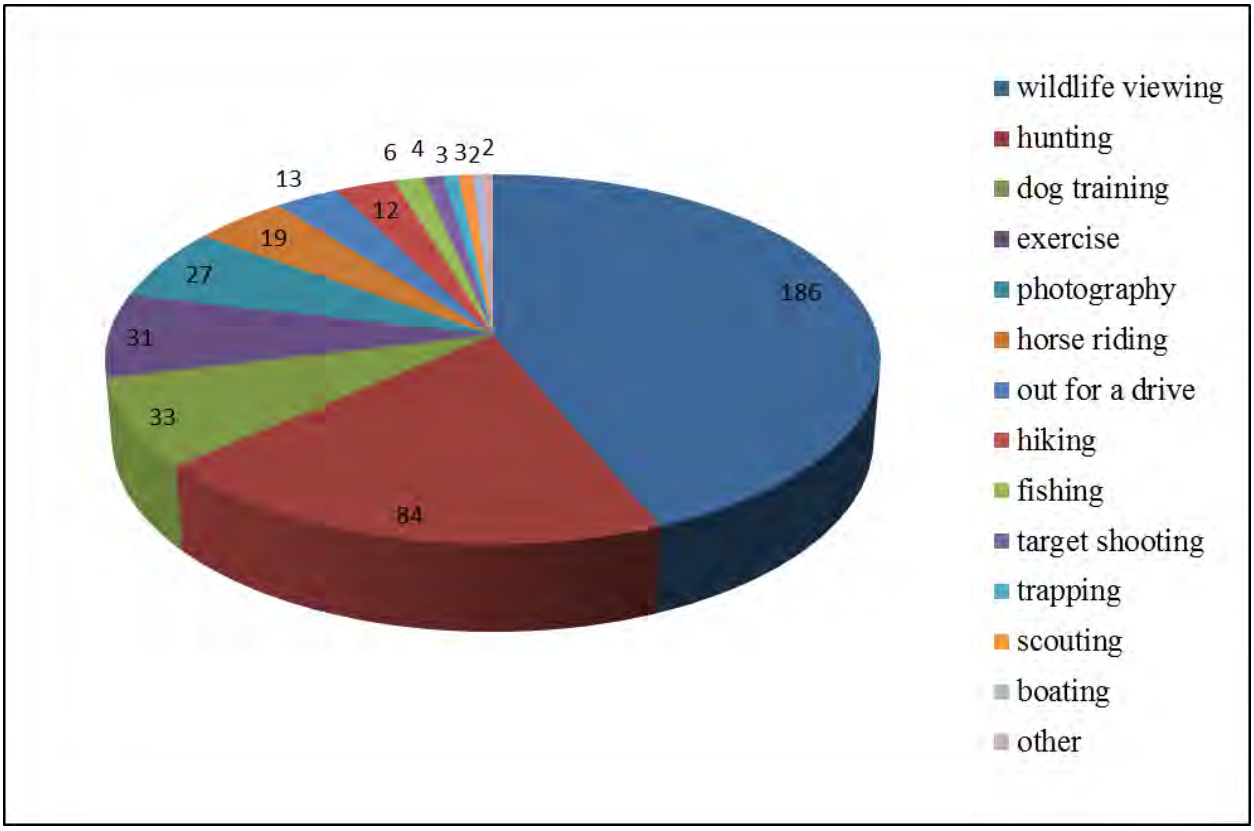
The Idaho Noxious Weed Law under Idaho Code 22-2405 requires all landowners to eradicate noxious weeds on their lands, except in special management zones. The counties are required to enforce the law and the State of Idaho is required to ensure the counties do so.

Consistent with Idaho Codes 38-101 and 38-111, and through a cooperative agreement with the Idaho Department of Lands, the Department is required to pay a fee for fire protection on all forest and some rangeland acreage it owns, and for residences in forest areas. Fees are submitted annually based on the number of qualified acres and residences owned by the Department.

The Department is required by Idaho Code 63-602A to pay a fee-in-lieu of taxes (FILT) for lands that are owned by the Department and meet certain code requirements. These fees are submitted annually to affected counties based on the number of qualifying acres and agricultural tax rates.

# IV. USER TRENDS FROM VISITOR USE SURVEYS

During July 2011-August 2012, MKWMA staff and the Idaho Falls Chapter of the Idaho Master Naturalists conducted visitor use surveys at MKWMA. These surveys included a number of questions to assess user demographics, the purpose of the user's visit, their satisfaction with the visit, and provided an opportunity for users to suggest ways to improve management of MKWMA. Random survey time periods, alternating between early and late in the day and between weekdays and weekends, were selected for each week. Surveys were delivered to users in person and were handed out opportunistically by MKWMA staff during non-designated survey times. We received 425 completed surveys from MKWMA users during this survey period. The pie chart below indicates what activities visitors came to MKWMA for:




Visitor activities on Market Lake WMA 2012.

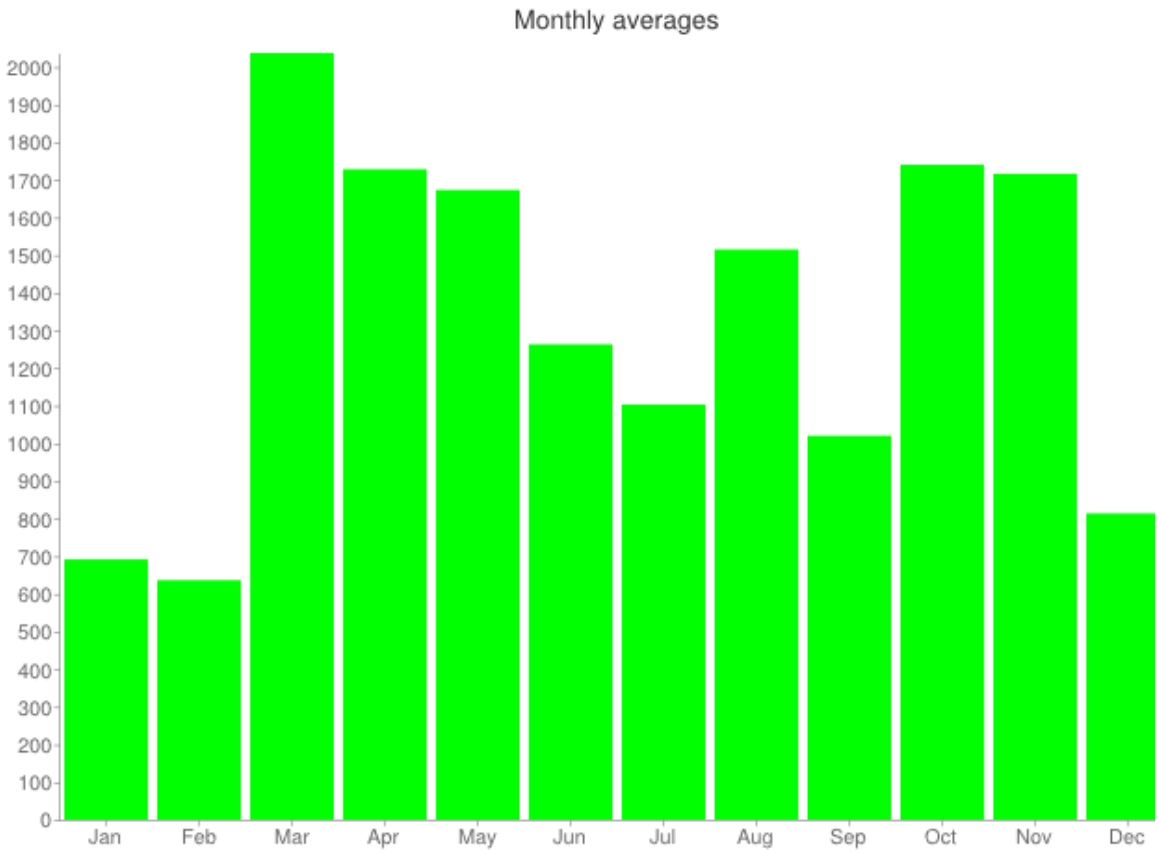
Users were not asked to rank their activities, rather to just state what activities they were there for. One survey may have included several activities. The three most popular activities were:

- 44% wildlife viewing
- 20% hunting
- 8% dog training

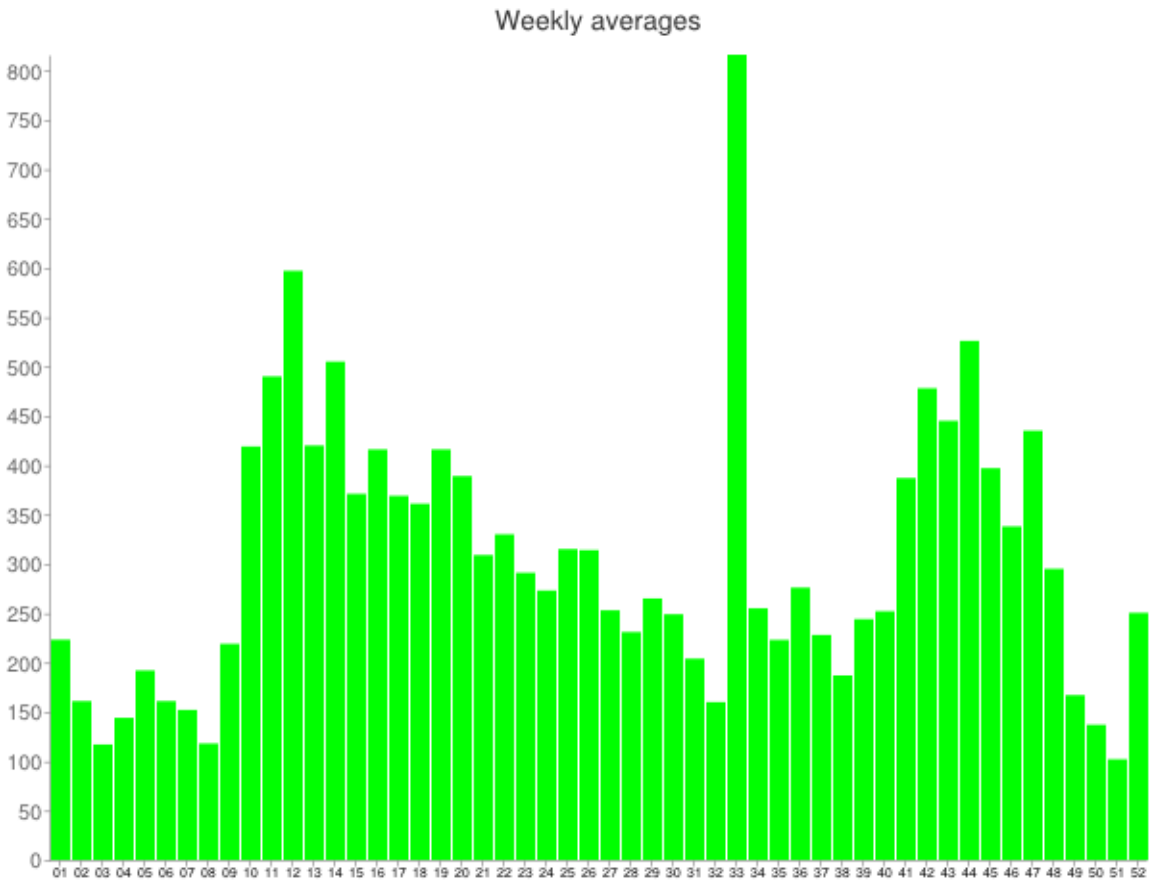
According to a survey conducted in 2012, traditional consumptive user groups (hunting, fishing, and trapping) accounted for 22% of use on MKWMA, an increase of 18% since estimates in the 1986-1990 management plan. Market Lake WMA also provides non-consumptive opportunity such as exercise, photography, horse riding, hiking, target shooting, and boating which account for 78% of the visitor use, an increase of 5%. The total amount of visitor use on MKWMA has increased by 7% since the 1986-1990 management plan was completed.

Market Lake WMA staff also use traffic counters to assess visitor use of MKWMA. Traffic counter data have been collected on MKWMA since 1990, but the reliability of the traffic counter equipment used prior to 2011 was questionable (e.g., frequent malfunctions). In the summer of 2011, the Department purchased TRAFx® vehicle counters which use an electromagnetic field to detect passing vehicles as opposed to the traditional pressure tubes buried in the roadway. This counter was installed on August 1, 2011 at the primary entrance location to MKWMA on the old highway south of the Sandy Parking Lot entrance.

The following graphs show the average number of vehicles/month (Monthly averages) and average of vehicles /week (Weekly averages) detected during January 1-December 31, 2012.




Average monthly vehicle use on Market Lake WMA 2012




Average weekly vehicle use on Market Lake WMA 2012

Market Lake WMA receives the greatest visitor use during spring (Mar-May). This reflects spring bird migrations in eastern Idaho and birding/wildlife viewing is the most popular activity on MKWMA at 44% of user days.

The second most popular activity on MKWMA is hunting, which is reflected in the October and November monthly averages. This user group accounted for 20% of visitors surveyed on MKWMA.

A spike on the Weekly averages occurs in week 33 which is mid-August. This is the week of Eastern Idaho Retriever Club Field Trials on MKWMA. This activity was the third most popular (8% of users) and also the most money attributed to dollars spent per visit. One person surveyed stated he spent $10,000 in relation to the dog training event held on MKWMA. The total vehicles during the week of dog trials averaged over 800. This is nearly double that of any other week counted in two years of traffic counter monitoring.

## Visitor Characteristics and Attitudes

Department lands are managed for various recreational uses including wildlife viewing, hunting and fishing access, hiking, photography, and other forms of outdoor recreation. This public use survey was designed to answer the following questions for MKWMA:

1. How many people use the MKWMA annually?
2. What activities did area users engage in during their visit?
3. How much effort was applied to hunting and fishing activities?
4. What is the proportion of resident to non-resident visitors?
5. Where do out of area visitors come from?
6. Are we serving primarily new users or repeat users?
7. How did users discover the area?
8. How many users are aware the area is owned/managed by the Department?
9. How much money did users spend as a result of their visit?
10. Do users want to be involved in management decisions and how can we contact them?
11. What is the funding source for state WMAs?
12. Would users (consumptive & non-consumptive) be willing to pay a user fee?

Below are the results of the MKWMA Public Use Survey Period: July 2011 through August 2012.

- Total annual MKWMA user visits = 16,161
- Visitor residency
    - 96% Idaho residents
    - 4% non-residents
- Idaho residents
    - 52% from Bonneville County
    - 35% from Jefferson County
    - 8% from Madison County
    - 3% from Bingham County
    - Remaining 2% included Ada, Bannock, Custer, Owyhee and Teton counties
- Non-resident states: Montana, Utah, Wyoming, and Texas
- 88% had visited MKWMA previously
- 86% of visitors stated that MKWMA was their primary trip destination
- 11% of visitors did not know that MKWMA was managed by the Department
- Belief on how MKWMA was primarily funded for operations & maintenance
    - 58% Department
    - 22% state taxes
    - 12% had no idea
    - 3% federal taxes
    - 2% donations
- How visitors “discovered” MKWMA
    - 41% word of mouth
    - 43% stated they lived in the area all their lives

  - 6% random exploration
  - 5% from the web
  - 2% from signs & information from Department regional office
- Eleven different MKWMA user activities were identified
- Top three annual user activities in order
  - Wildlife viewing
  - Hunting
  - Dog training

**Annual Economic Impact**

| | | |
|---|---|---|
| 77 people answered this question | average | $46.94 |
| 17 people spent $50 or more | average | $165.59 |
| 60 people spent < $50 | average | $13.32 |

Two people spent $1,000 and one spent $10,000 in relation to the dog training event held on MKWMA.

# V. 1999-2013 ACCOMPLISHMENTS

Since the MKWMA plan was revised in 1999, these accomplishments have occurred relative to the Goals and Objectives of the 1999 plan.

**Goal: Provide wildlife habitat that produces viable waterfowl and other wildlife populations.**

Objective: Provide resting and feeding habitat for spring migratory waterfowl.

*Accomplishments:*

- Agricultural fields have been planted (~200 acres/year) to annuals including winter and spring wheat, corn, sunflower, and millet on a rotational basis to provide nutritious spring forage for waterfowl.
- Deep water and shallow water feeding marshes have been provided during the spring waterfowl migration for swans, geese, and dabbling and diving ducks. Vegetation on these marshes has been manipulated (every 5-8 years) with prescribed fire, mowing, disking or haying.
- Over 10 acres of cereal grains are left annually for waterfowl migration.
- Areas mowed in the summer and fall and winter wheat fields provide at least 50 acres of grazing fields for spring migrating Canada geese and other waterbirds.
- Surveys were conducted for waterfowl food-producing plants available in the marshes. Management strategies were developed for waterfowl food plants.
- The North Agricultural fields have been leveled, and water management has been converted from pump to gravity feed. This has resulted in thousands of dollars in cost savings for MKWMA. Spring flooding has occurred on years with good water flows which in turn has attracted spring migrating waterfowl.
- Human entry closures were initiated on the marshes (opens Jul 15) to protect nesting waterfowl and waterbirds. This may be partially responsible for the success MKWMA has enjoyed in colony nesting birds and trumpeter swans.

Objective: Increase the current average nesting success of upland nesting ducks from 20% to a minimum of 30% in accordance with the Department's Waterfowl Management Plan 1991-1995.

*Accomplishments:*

- Nesting cover has been managed or improved using prescribed fire (every 3-5 years), haying, mowing, re-seeding, inter-seeding, forb stripping, noxious weed control, and fertilization.
- Chemical, mechanical, and/or biological control of noxious weeds has been conducted annually throughout MKWMA (up to 400 acres treated/year).
- The North Agricultural Fields and the South Agricultural Fields have had 50 acres and 30 acres, respectively, converted to nesting cover.

- Chain dragging has been conducted to determine nest density and success at Triangle Marsh, Jones Well, Marsh 3, along Railroad tracks near Twin Wells, and Old Van Leuven segment. The number of nests found did not equal a large enough sample size to determine production, predation or estimates. Therefore, nesting success has not been determined on MKWMA.
- We noted that tire tracks created from chain dragging allows for mammalian predators to seek out nests within 20 feet of new track. Most nests found next to tire tracks had been predated after chain drags were performed. Therefore we began to re-evaluate the value and need for nest surveys.
- Russian olive removal has been completed in large segments on MKWMA. This removal of overhead perching as well as magpie nesting habitat should result in higher nesting success of waterfowl and other birds.
- Closure of upland nesting areas to public use during duck nesting season (Apr 1-Jul 15) has been continued on MKWMA.

Objective: Maintain the three-year average spring goose pair count for the MKWMA to at least the minimum level in accordance with the Department's Waterfowl Management Plan 1991-1995.

*Accomplishments:*

- Monitoring during the past 10 years was too sporadic to determine if this objective was met or not. However, much work has been accomplished to fulfill this objective.
    - The Canada goose population is healthy and has increased in most flyways. Production on MKWMA is estimated to be over 300 Canada geese annually (2013 counts/observations).
- Most goose nesting platforms and islands are being utilized by nesting Canada geese. A few nest boxes are used by more than one pair during nesting season.
- Goose nesting boxes have been replaced and refurbished in certain areas with seasonal flooding, water fluctuations (irrigation), and high profile areas the public visits. Lack of nesting structures is not limiting Canada goose production, therefore they are no longer necessary to increase the population on MKWMA and will not be added.
- All roads, dikes, and some fields have been mowed annually to provide pasture for geese. Reseeding of dikes with small forbs to grass mix plantings has provided additional forage for geese.
- Closure of upland nesting areas to public use during nesting season (Apr 1-Jul 15) has been continued on MKWMA.

Objective: Provide pair, nesting, and brood-rearing habitat for over water nesting waterfowl (i.e., redhead duck, canvasback, ruddy duck, mallards, and trumpeter swans).

*Accomplishments:*

- Water levels are stabilized on the Main Marsh by April 15 to prevent flooding of over water nests. New infrastructure has been installed to allow for continued and stable water levels.
- Chemical treatment of cattails and hard stem bulrush has been completed with aerial application and airboat application. Prescribed fire, water level management, and mechanical manipulation has been completed to open up marshes with a greater than 60:40 ratio of emergent vegetation to open water.
- Trumpeter swans have been monitored and were considered to be self-replacing on MKWMA during the 2000s. Nesting occurs on Marsh 4 historically. In 2011, a cygnet and two adults were observed on Sandy Marsh. Market Lake WMA has fledged 16 cygnets in 31 years (1980-2011).
- Water levels in marshes have been managed in accordance with agreements with adjacent landowners. The sinkwells, pumping stations, and sloughs to the Snake River have been maintained and used to meet management goals for wildlife, recreational users, and terms of agreements.

Objective: Control avian botulism and cholera outbreaks on the MKWMA. Monitor for other die-offs.

*Accomplishments:*

- Chemical treatment of cattails and hard stem bulrush has been completed with aerial application and airboat application. Prescribed fire, water level management, and mechanical manipulation have been completed to open up marshes with a greater than 60:40 ratio of emergent vegetation to open water. This has helped reduce build-up of decaying aquatic vegetation that may cause conditions that could trigger avian botulism outbreaks.
- When possible, irrigation water has been stored in the marshes if conditions indicate a botulism outbreak could occur.
- Monitoring of the water bodies occurs during July, August, and early September and then again in March and April for botulism and avian cholera. Any dead birds found are removed from the system. A disease report is submitted and many birds have been sent in for necropsy to the Wildlife Health Laboratory in Caldwell, Idaho.
- Water structures have been replaced or added as needed and funded. This has allowed for optimal water level control in the marshes.

Objective: Provide secure habitat, thermal cover, and natural forage for 300 wintering elk and 20 resident deer on the MKWMA.

*Accomplishments:*

- Wintering elk on MKWMA have become less common since mid-2000s due to habitat changes on the migration route, hunting pressure, and large area closures. Much of the

land surrounding Hamer, Idaho has been converted from sagebrush to agriculture. The elk that migrate from the high country in the Island Park hunting zone (GMU 62A, 61, 60, 60A) traditionally followed a southwest direction towards MKWMA. As snow increased, the animals moved further down in elevation. The increase in agriculture has created less security cover as well as increased forage availability in some areas. Hunting seasons change to manage the elk herd and this in turn affects elk movements. The Egin-Hamer closure area has been implemented since 2000 and keeps all human entry off the Sand Creek desert. This provides a refuge for elk. Due to the above mentioned changes, elk are not as common on MKWMA in winter months.

- Fences have been removed or re-built for safe passage for migrating big game animals.
- Crops are left in fields and grass/forb mixes are planted where re-seeding occurs. Cattails and other heavy cover are left in large segments for security and forage.
- Hay has been stored under the hay shed on Market Lake. Much of the hay is produced on MKWMA agriculture fields.
- Some areas are closed to motorized travel to provide secure winter and summer areas for big game.

Objective: Provide nesting, brood-rearing and winter habitat for upland game (sage-grouse, pheasant, gray partridge, mourning dove, and cottontail rabbits).

*Accomplishments:*

- Over 150 acres have been planted into permanent nesting cover across MKWMA.
- The Department has aggressively controlled noxious weeds in upland nesting habitat.
- Cereal grain crops have been planted as winter food for pheasants and partridge.
- Monitoring of the local sage-grouse population by conducting a lek route on MKWMA and adjacent public land has been completed. There has been a documented decrease of greater sage-grouse use on MKWMA and lek numbers have been declining and some leks have disappeared altogether.
- Pheasant populations have been monitored using crow counts on MKWMA (Figure 4). Numbers of birds have fluctuated and a trend has not been established.

Objective: Provide migratory, breeding and/or winter habitat for species with special designations such as threatened and endangered species, and species of special concern.

*Accomplishments:*

- The peregrine falcon hack tower is functional and has been maintained annually.
- Existing cottonwood, willow, and poplar trees on MKWMA have been maintained and monitored for wintering and migrating bald eagles.
- Stabilization of the main marsh water levels by April 15 has encouraged nesting by trumpeter swans. Market Lake WMA has fledged 16 cygnets in 31 years.
- Over 500 acres of flooded marshes are available for white pelicans which are observed daily on MKWMA.

Objective: Provide migratory, breeding, and winter habitat for nongame species.

*Accomplishments:*

- Market Lake WMA staff focus on providing migratory, breeding, and winter habitat for nongame species in the form of: seasonal flooding of shallow wetland habitats, moist soil management in appropriate areas, mechanical manipulation of habitats to provide exposed soils for foraging areas, flood irrigation of forage resources, maintaining food plots that benefit nongame species, seasonal closures in breeding habitats, security area delineations, and other management efforts.
- Shelterbelts of conifers and fruit bearing trees and shrubs in the north and south agricultural fields have been maintained. These provide migratory, nesting and winter cover for songbirds.
- Market Lake WMA provides habitat for one of the largest nesting colonies of white-faced ibis and Franklin's gull.
- Seasonal closures provide nesting security for many species of wildlife on MKWMA.

**Goal: Provide a diversity of high quality recreational opportunities on the MKWMA consistent with the MKWMA mission statement.**

Objective: Provide boat and foot access to the Main Marsh cells by September 1999 to increase access to the marsh for MKWMA personnel use and public use.

*Accomplishments:*

- Boat ramps are available on Marshes 2, 3, and 4. Foot access is also available on the dikes from old highway as well as the east side of the marsh system coming off the desert.

Objective: Provide flooded marshes for waterfowl hunting.

*Accomplishments:*

- Water bodies on MKWMA are filled during the winter and spring but can go practically dry during hot, dry summers. Marsh cells are flooded as water supplies allow.
- Prescribed fire, herbicides, and/or mechanical methods have been used to open up marshes with greater than 60:40 ratio of emergent cover to open water as indicated by monitoring methods.

Objective: Monitor harvest and hunter satisfaction during waterfowl and upland bird seasons.

*Accomplishments:*

- Public access to available hunting habitat is maintained across MKWMA

- Market Lake WMA attempts to balance hunter desires, access, and security areas for migrating birds across the area.
- Market Lake WMA offers important foraging opportunities to waterfowl in the form of food plots and flooded fields; these activities offer hunting opportunities for the public.

Objective: Promote hunting and wildlife appreciation through education, information, and workshops.

*Accomplishments:*

- International Migratory Bird Day events have been held on MKWMA. The event is rotated between Camas NWR and MKWMA. There is cooperation and support of the local Audubon Club, state and federal agencies, local businesses and communities, and volunteers.
- Youth hunting areas have been established on MKWMA. A youth hunt event, with the cooperation and support of the local Pheasants Forever chapter, local businesses, local communities and volunteers, has taken place on MKWMA.
- An information kiosk has been installed on MKWMA to provide for self-guided tours.
- The local retriever dog club (Eastern Idaho Retriever Club) utilizes MKWMA every August. This is the busiest week for visitor days on MKWMA.
- Tours of MKWMA are provided to scout, school, church, and civic groups, as available labor allows without interfering with higher-ranked management priorities.
- Market Lake WMA staff continues to use reservists, volunteers, Adopt-a-Wetland groups, scouts, and community service personnel to accomplish work on the MKWMA.
- Wildlife viewing opportunities have been provided along roadways on MKWMA. Non-consumptive users represent the highest percentage of visitors to MKWMA at 44%.

Objective: Continue to provide furbearer trapping opportunity on the MKWMA.

*Accomplishments:*

- Market Lake WMA management provides for widespread trapping opportunities across the area. Access is provided during trapping seasons. Trapping by licensed trappers is encouraged across MKWMA.

Objective: Maintain existing fishing opportunity on the MKWMA.

*Accomplishments:*

- Market Lake WMA staff, in cooperation with the Access and Fisheries Sections of the Department, try to maintain a wide variety of fishing access opportunities for anglers on MKWMA.
- Three motorized watercraft boat ramps are maintained on MKWMA and multiple non-motored launch sites are available for anglers as well.

- Fishing access along the Snake River bordering the MKWMA has been maintained and consistent.

**Goal: Promote MKWMA activities that can have benefits to local communities.**

Objective: Invite local businesses to participate in planned public activity events on the MKWMA.

Objective: Continue to purchase materials and supplies from local businesses when economically possible, and as state purchasing code allows.

Objective: Continue to inform adjacent landowners of management activities on the MKWMA.

Objective: Maintain working relationships with the local fire department, Sheriff's office, and emergency medical services.

*Accomplishments:*

- Market Lake WMA provides numerous events that support the local community. From International Migratory Bird Day, Eastern Idaho Retrievers dog trials, and annual fall ring-necked pheasant hunting; MKWMA provides over 16,000 visitor days to the Roberts, Idaho area.
- Market Lake WMA staff supports the local community. They purchase food from local restaurants for work days, supplies from stores, and fuel from gas stations.

**Goal: Maintain MKWMA facilities for the propagation of wildlife and enjoyment and safety of the public and working personnel.**

Objective: Maintain roads for seasonal use by public vehicles.

*Accomplishments:*

- Roads (paved and unpaved) are maintained on MKWMA as funding allows. The old highway is in need of major repair but costs have prohibited improvement beyond routine maintenance. This road is still unimproved for non-winter use. The North Agriculture road to Jones Well road loop, Twin Wells road, and East Springs road are maintained as primitive status for dry season use. No roads are maintained during winter months.
- Roads are closed as needed to maintain their integrity, protect MKWMA equipment from vandalism and theft, protect wildlife and their habitat, prevent wild fires, control hunter congestion, and as deemed necessary by MKWMA management staff. Any change or closure is posted for public information.

Objective: Maintain parking areas as day use only areas.

*Accomplishments:*

- Parking areas are mowed, bladed, improved with gravel, and signed annually. No camping or fires are allowed in any of the designated parking areas on MKWMA.

Objective: Minimize littering and vandalism on the MKWMA.

*Accomplishments:*

- The Adopt-A-Wetland program currently has one member, Veterans Car Club of America. This club voluntarily picks up trash on the old highway and parking lots on MKWMA annually. Other volunteers are encouraged to continue trash cleanup.
- Camping is not allowed and camp fires are prohibited. Law enforcement patrols have occurred to inhibit illegal activities. Jefferson County Sheriff's office is contacted and updated on anything MKWMA staff may be doing that could cause concern (i.e., spotlight surveys) and a relationship has been established with the staff.

Objective: Maintain and/or construct wildlife and user friendly fences where fences are necessary.

*Accomplishments:*

- Fences have been removed or built for safe wildlife passage for migrating big game animals. All non-essential fences have been removed from MKWMA. Fence crossing styles have been installed at heavy traffic areas.

Objective: Maintain the MKWMA residences, office, shops, out buildings, and compound in a safe and professional manner for the public and MKWMA staff.

*Accomplishments:*

- All structures on MKWMA have passed annual State Safety Inspections. If there is an issue, it is addressed. A new bunkhouse has been built and is being managed for seasonal employment housing.
- A safety zone has been established around the MKWMA compound.

Objective: Control the spread of noxious and undesirable weeds.

*Accomplishments:*

- Permanent cover has been managed or improved using prescribed fire (every 3-5 years), haying, mowing, re-seeding, inter-seeding, forb stripping, noxious weed control, and fertilization.
- Chemical, mechanical, and/or biological control of noxious weeds has been conducted annually throughout MKWMA (up to 400 acres treated/year).

- The North Agricultural Fields and the South Agricultural Fields receive annual weed control.
- An annual weed report is submitted.

Objective: Prevent the spread of wildfire.

*Accomplishments:*

- Parking areas are mowed, bladed, improved with gravel, and signed annually.
- No camping or fires are allowed on MKWMA.
- Prescribed fire has been implemented for habitat improvement and to decrease the likelihood of wildfires.

**Goal: Fulfill the Department agreement with the City of Idaho Falls to assist them in meeting their obligation to mitigate for wetland/riparian losses on Gem State WHA.**

Objective: Maintain a positive working relationship with the City by keeping them informed of Department activities and management actions so the City can ensure the area is being managed to mitigate for losses.

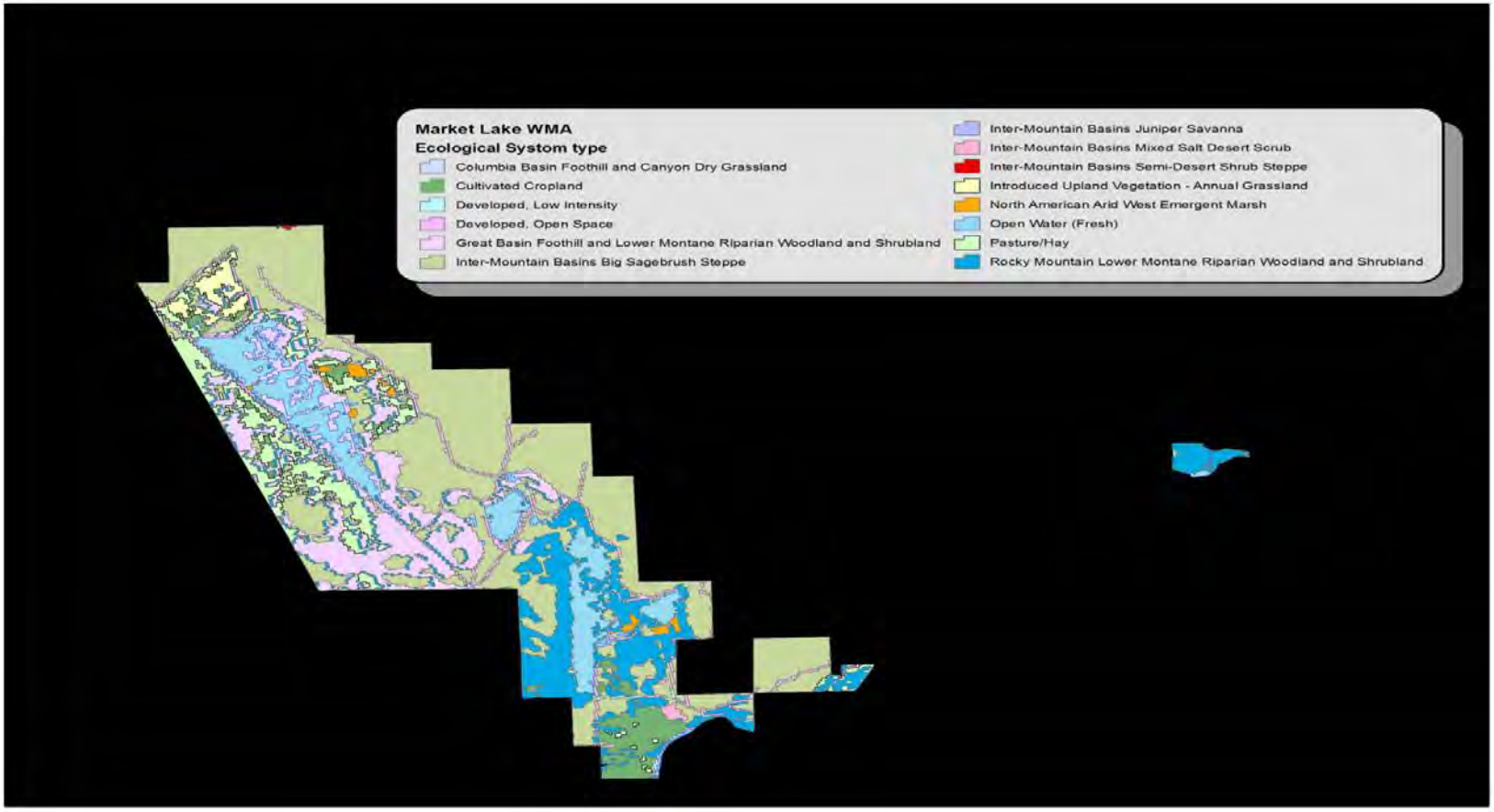
*Accomplishments:*

Reports have been submitted to the City to inform them of management activities such as improvements, maintenance, weed control, etc. Reports of the results obtained from monitoring activities conducted by the Department have been shared with the City of Idaho Falls.

# VI. VEGETATION

Northwest GAP Analysis Project Land Cover, version 2.0 spatial data (U.S. Geological Survey, Gap Analysis Program, Moscow, Idaho; http://gapanalysis.usgs.gov) was used to estimate the ecological system type composition of MKWMA.

| Ecological System | Acres | Percentage |
|---|---|---|
| Intermountain basins big sagebrush steppe | 2,171.4 | 42% |
| Rocky Mountain lower montane riparian woodland and shrubland | 789.0 | 15% |
| Great Basin foothill and lower montane riparian woodland and shrubland | 727.8 | 14% |
| Open water (fresh) | 517.9 | 10% |
| Pasture/hay | 378.2 | 7% |
| Cultivated cropland | 213.1 | 4% |
| Developed, open space | 178.9 | 3% |
| Introduced upland vegetation - annual grassland | 77.4 | 2% |
| North American arid west emergent marsh | 38.2 | 1% |
| Intermountain basins mixed salt desert scrub | 16.5 | <1% |
| Columbia Basin foothill and canyon dry grassland | 10.0 | <1% |
| Developed, low intensity | 9.1 | <1% |
| Intermountain basins juniper savanna | 6.4 | <1% |
| Intermountain basins semi-desert shrub steppe | 1.8 | <1% |




Map of ecological system type composition of Market Lake WMA.

# VII. WILDLIFE AND FISH SPECIES LIST

Relative abundance of species found on the MKWMA during the spring (Mar-May), summer (Jun-Aug), fall (Sep-Nov), and winter (Dec-Feb) seasons.

1. A – Abundant, a species which is very numerous.
2. C – Common, certain to be seen or heard in suitable habitat.
3. U – Uncommon, present but not certain to be seen.
4. O – Occasional, seen only a few times during the season.
5. R – Rare, seen at intervals of two to five years.
6. N – Not present.

*Selected Common Species; additional information available at www.idfg.idaho.gov)*

| | Relative Abundance | | | |
|---|---|---|---|---|
| **Species** | **Spring** | **Summer** | **Fall** | **Winter** |
| ***Mammals*** | | | | |
| American Badger | U | U | U | U |
| Beaver | O | O | O | O |
| Black-tailed jackrabbit | A | A | A | A |
| Bobcat | R | R | R | R |
| Bushy-tailed wood rat | R | R | R | R |
| Coyote | C | C | C | C |
| Deer mouse | A | A | A | A |
| Eastern fox squirrel | R | R | R | N |
| Elk | U | O | O | C |
| Great basin pocket mouse | A | A | A | A |
| Least chipmunk | R | R | R | R |
| Mink | R | R | R | R |
| Moose | O | O | O | U |
| Mountain cottontail | A | A | A | A |
| Mule deer | C | C | C | C |
| Muskrat | A | A | A | A |
| Northern pocket gopher | A | A | A | A |
| Piute ground squirrel | U | U | U | U |
| Porcupine | U | U | U | U |
| Prong-horned antelope | R | R | R | R |
| Raccoon | U | U | U | U |
| Red fox | C | C | C | C |
| River otter | R | R | R | R |
| Spotted skunk | R | R | R | R |
| Striped skunk | U | U | U | U |
| Weasel | U | U | U | U |
| White-tailed deer | C | C | C | C |
| White-tailed jackrabbit | R | R | R | R |
| Yellow-bellied marmot | N | C | U | N |

| | Relative Abundance | | | |
|---|---|---|---|---|
| **Species** | **Spring** | **Summer** | **Fall** | **Winter** |
| ***Amphibians & Reptiles*** | | | | |
| Blotched tiger salamander | U | U | U | U |
| Northern leopard frog | U | U | U | U |
| Common garter snake | A | A | A | N |
| Great Basin gopher snake | U | U | U | N |
| Great Basin rattlesnake | R | R | R | N |
| Racer | U | U | U | N |
| Western terrestrial garter snake | C | C | C | N |
| Sagebrush lizard | U | U | U | U |
| Short-horned lizard | U | U | U | U |
| Painted turtle | C | C | C | N |
| ***Birds*** | | | | |
| American avocet | A | A | C | N |
| American bittern | O | O | O | N |
| American coot | A | A | A | R |
| American crow | C | C | C | N |
| American goldfinch | C | C | C | N |
| American kestrel | C | C | C | N |
| American robin | A | A | A | N |
| American tree sparrow | N | N | N | R |
| American white pelican | U | A | C | N |
| American widgeon | A | A | A | N |
| Audubon's warbler | R | R | N | N |
| Baird's sparrow | N | U | N | N |
| Bald eagle | U | R | U | C |
| Bank swallow | C | C | U | N |
| Barn owl | R | N | R | R |
| Barn swallow | O | O | U | N |
| Barrow's goldeneye | U | N | U | R |
| Belted kingfisher | U | O | U | N |
| Black tern | C | C | U | N |
| Black-bellied plover | R | N | R | N |
| Black-billed magpie | A | A | A | A |
| Black-capped chickadee | C | C | C | C |
| Black-crowned night heron | A | A | A | N |
| Black-headed grosbeak | R | R | N | N |
| Black-necked stilt | C | U | O | N |
| Blue jay | N | R | N | N |
| Blue-gray gnatcatcher | O | R | N | N |
| Blue-winged teal | U | U | A | N |
| Bobolink | N | R | N | N |
| Bohemian waxwing | C | N | O | C |
| Brewer's blackbird | C | C | C | N |
| Brewer's sparrow | N | R | N | N |

| | Relative Abundance | | | |
|---|---|---|---|---|
| **Species** | **Spring** | **Summer** | **Fall** | **Winter** |
| ***Birds (cont.)*** | | | | |
| Broad-tailed hummingbird | N | N | R | N |
| Brown-headed cowbird | C | C | U | N |
| Bufflehead | C | U | U | R |
| Burrowing owl | R | R | O | N |
| California gull | A | A | U | N |
| Canada goose | A | A | A | R |
| Canvasback | O | C | C | N |
| Caspian tern | R | N | N | N |
| Catbird | R | O | N | N |
| Cattle egret | U | U | U | N |
| Cedar waxwing | U | O | C | C |
| Chipping sparrow | R | R | R | R |
| Cinnamon teal | A | O | C | R |
| Clark's grebe | N | C | C | U |
| Clay-colored sparrow | R | N | N | R |
| Cliff swallow | C | C | U | N |
| Common bushtit | R | R | R | R |
| Common goldeneye | U | O | U | U |
| Common grackle | R | R | R | N |
| Common merganser | U | R | U | N |
| Common nighthawk | U | C | N | N |
| Common raven | U | U | U | R |
| Common snipe | U | U | U | R |
| Common tern | O | R | O | N |
| Cooper's hawk | O | R | O | N |
| Double-crested cormorant | N | A | A | N |
| Downy woodpecker | R | R | R | R |
| Dunlin | R | N | N | N |
| Eared grebe | A | A | A | N |
| Eastern kingbird | R | R | N | N |
| Eurasian collared-dove | C | C | C | R |
| European Starling | A | A | A | C |
| Evening grosbeak | C | O | C | R |
| Ferruginous hawk | O | O | R | N |
| Forster's tern | U | O | U | N |
| Franklin's gull | A | A | U | N |
| Gadwall | A | C | A | R |
| Golden eagle | U | U | U | U |
| Great blue heron | A | A | A | N |
| Great egret | U | U | U | N |
| Great horned owl | C | C | C | C |
| Greater sage-grouse | U | U | U | O |
| Greater scaup | R | R | R | N |

| | Relative Abundance | | | |
|---|---|---|---|---|
| **Species** | **Spring** | **Summer** | **Fall** | **Winter** |
| ***Birds (cont.)*** | | | | |
| Greater yellowlegs | O | R | O | N |
| Green heron | R | R | N | N |
| Green-winged teal | A | C | A | R |
| Harris's sparrow | N | N | N | R |
| Hermit thrush | R | N | N | N |
| Herring gull | R | R | R | N |
| Hooded merganser | R | N | R | N |
| Horned grebe | U | R | R | N |
| Horned lark | C | C | C | C |
| House sparrow | A | A | A | C |
| House wren | U | U | O | N |
| Hungarian partridge | U | U | U | U |
| Killdeer | C | C | C | N |
| Lark bunting | N | R | N | N |
| Lazuli bunting | U | O | O | N |
| Least sandpiper | U | R | C | N |
| Lesser scaup | C | C | C | N |
| Lesser yellowlegs | O | N | O | N |
| Lewis's woodpecker | R | N | N | N |
| Loggerhead shrike | C | C | U | R |
| Long-billed curlew | C | C | U | N |
| Long-billed dowitcher | U | R | U | N |
| Long-billed marsh wren | C | C | C | N |
| Long-eared owl | O | O | N | N |
| Mallard | A | A | A | O |
| Marbled godwit | R | R | N | N |
| Mockingbird | R | R | N | N |
| Mountain bluebird | U | U | O | N |
| Mourning dove | C | C | O | N |
| Northern flicker | A | A | A | R |
| Northern goshawk | R | R | R | R |
| Northern harrier | A | A | A | A |
| Northern oriole | C | C | U | N |
| Northern pintail | A | O | C | R |
| Northern shrike | O | N | O | R |
| Dark-eyed junco | N | R | N | N |
| Osprey | U | U | U | N |
| Peregrine falcon | U | R | R | N |
| Pied-billed grebe | A | A | A | N |
| Prairie falcon | U | U | U | N |
| Red-breasted merganser | U | R | U | N |
| Red-breasted nuthatch | O | R | N | N |
| Redhead | C | C | C | N |

| | Relative Abundance | | | |
|---|---|---|---|---|
| **Species** | **Spring** | **Summer** | **Fall** | **Winter** |
| ***Birds (cont.)*** | | | | |
| Red-necked phalarope | O | O | O | N |
| Red-tailed hawk | C | C | U | U |
| Red-winged blackbird | A | A | C | N |
| Ring-billed gull | A | A | U | N |
| Ring-necked duck | R | C | C | N |
| Ring-necked pheasant | U | U | U | U |
| Rock dove | O | C | C | R |
| Rough-legged hawk | U | R | C | R |
| Rough-winged swallow | U | U | U | N |
| Ruby-crowned kinglet | R | R | N | N |
| Ruddy duck | A | A | A | R |
| Sage sparrow | U | U | O | N |
| Sage thrasher | C | C | O | N |
| Sanderling | R | R | N | N |
| Sandhill crane | C | U | C | U |
| Savannah sparrow | C | C | C | N |
| Semi-palmated plover | R | N | N | N |
| Semi-palmated sandpiper | R | R | R | N |
| Sharp-shinned hawk | O | R | O | N |
| Short-eared owl | O | O | R | N |
| Shoveler | A | A | A | N |
| Slate-colored junco | N | R | N | N |
| Snow bunting | N | N | N | O |
| Snow goose | A | R | U | N |
| Snowy egret | A | A | A | N |
| Snowy owl | N | N | R | R |
| Song sparrow | N | U | U | U |
| Sora | U | U | U | N |
| Spotted sandpiper | U | U | R | N |
| Swainson’s hawk | C | C | C | N |
| Townsend’s solitaire | U | U | N | N |
| Tree swallow | C | C | U | N |
| Trumpeter swan | C | O | C | N |
| Tundra swan | C | N | C | N |
| Turkey vulture | O | O | O | N |
| Vesper sparrow | C | C | U | N |
| Violet-green swallow | C | C | U | N |
| Virginia rail | U | U | U | N |
| Warbling vireo | U | U | U | R |
| Water pipit | R | R | N | N |
| Western flycatcher | R | U | N | N |
| Western grebe | A | A | A | N |
| Western kingbird | R | U | N | N |

| | Relative Abundance | | | |
|---|---|---|---|---|
| **Species** | **Spring** | **Summer** | **Fall** | **Winter** |
| ***Birds (cont.)*** | | | | |
| Western meadowlark | A | A | A | R |
| Western sandpiper | U | R | C | N |
| Western tanager | C | C | U | N |
| Western wood pewee | U | U | N | N |
| White-breasted nuthatch | R | R | N | N |
| White-crowned sparrow | U | C | C | R |
| White-faced ibis | A | A | A | N |
| White-fronted goose | R | N | R | N |
| White-winged scoter | R | N | N | N |
| Willet | C | U | R | N |
| Willow flycatcher | O | U | O | N |
| Wilson's phalarope | O | C | U | N |
| Wilson's warbler | R | R | N | N |
| Wood Duck | R | R | R | N |
| Yellow warbler | R | U | N | N |
| Yellow-bellied sapsucker | N | N | R | N |
| Yellow-billed cuckoo | R | R | R | N |
| Yellow-headed blackbird | A | A | C | N |
| ***Fish*** | | | | |
| Bullhead catfish | U | U | U | U |
| Utah chubs | C | C | C | C |
| Yellow perch | C | C | C | C |
| ***Accidentals*** | | | | |
| American dipper | | | | |
| Black-throated blue warbler | | | | |
| Brown pelican | | | | |
| Harlequin duck | | | | |
| Purple martin | | | | |
| Sharp-tailed grouse[a] | | | | |
| Surf scoter | | | | |
| Tri-colored heron | | | | |
| Western gull | | | | |

[a] Sharp-tailed grouse have been observed on MKWMA in December 1998 and November 2012.

# VIII. NOXIOUS WEED CONTROL

Noxious weeds have been under active control on MKWMA since its acquisition in 1957. Control measures include proper land use practices, mechanical control, chemical control, and biological control. The three main weed species being controlled are Russian knapweed (*Acroptilon repens*), musk thistle (*Carduus nutans*), and whitetop (*Cardaria draba*). Canada thistle (*Cirsium arvense*) and leafy spurge (*Euphorbia esula*) have been identified and treated on the area, but are not as abundant. Kochia (*Kochia scoparia*), field bindweed (*Convolvulus arvensis*), and common burdock (*Arctium minus*) are not classified as noxious weeds but are invasive and controlled on MKWMA.

Biological control was initiated in the early 1990s by the Department with the release of musk thistle seed head weevil, *Rhinocyllis conicus*. This agent is present on the area and has been effective in reducing seed head production within isolated infestations of musk thistle. In 1995, 200 gall flies, *urophora cardui*, and 200 seed head weevils, *Larinus planus*, were released in two areas to help control Canada thistle. Leafy spurge flea beetles, *Aphthona* spp., have also been released on MKWMA from 2001-2010 as available.

Chemical control is primarily used on infestations found along roadways, heavily used areas, and new infestations. Milestone ® (Aminopyralid) and Telar® (Chlorsulfuron) are the most commonly used herbicide on MKWMA, although other chemicals (Escort®, Roundup®) are also used for specific applications when corresponding land management agency regulations allow. Herbicides are applied with a blue dye and delivered with a 200-gallon sprayer, 20-gallon ATV sprayer, or three-gallon backpack sprayers. Rapid revegetation of disturbed soil prior to noxious weed infestation is the preferred management option at MKWMA. Establishment of desirable plants minimizes weed control naturally.

The most common methods of weed movement onto and within MKWMA are vehicles, animal movements (e.g., wildlife and trespass cattle), Snake River via irrigation canals, the Union Pacific Railroad, and public road systems as well as wind/water borne seed. Weed monitoring plots have been established throughout the area for permanent monitoring of infestations. Stem counts are conducted annually to determine effectiveness of control measures.

# IX. LAND ACQUISITIONS AND AGREEMENTS

Market Lake WMA (T5N.,R36E., Sections 01 & 12; T5N.,R37E., Sections 05-08, 12, 16-18, 20-22, & 28; T5N., R38E., Section 07 and T6N.,R36E., Sections 35 & 36)

| ***Land Acquisitions*** | | | |
|---|---|---|---|
| **Year** | **FUNDS** | **Acres** | **Acquired From** |
| 03/27/1956 | Pittman/Robertson | 2,845.01 | L. Poitevin |
| 10/25/1956 | Pittman/Robertson | 903.52 | Delmoe Cook |
| 05/18/1957 | None | 50.00 | Wilford Taylor |
| 05/18/1957 | Pittman/Robertson | 43.15 | Wilford Taylor |
| 02/13/1958 | Exchange | 55.32 | IDOT |
| 09/19/1960 | Pittman/Robertson | 214.48 | O.W. Robison |
| 10/10/1960 | Pittman/Robertson | 527.98 | Joe Tomchak |
| 08/06/1962 | Pittman/Robertson | 80.00 | Leona Van-Leuven |
| 05/10/1963 | Pittman/Robertson | 179.00 | Albert S. Harris |
| 03/20/1964 | Pittman/Robertson | 24.92 | BLM |
| 07/28/1988 | Teton Mitigation | 101.90 | Lavern Tomchak |
| 12/31/1991 | Gift | .50 | IDOT |
| 1994 | Dept. of Fish and Game | 5.20 | Lula May Green |
| | *Subtotal* | 5,000.98 | |

| ***Cooperative Agreements*** | | | |
|---|---|---|---|
| **Year** | **Segment** | **Acres** | **Cooperator** |
| 09/09/1988 (until June 30, 2033-renewable) | Gem State WHA (City of Idaho Falls) | 46.5 | City of Idaho Falls |
| 1988 (open term-verbal) | Gem State WHA (BLM) | 19.0 | BLM |
| | *Subtotal* | 65.5 | |
| | ***WMA Total*** | **5,066.48** | |

# EASEMENT AND RIGHT-OF-WAYS

There are highway, railroad, irrigation canal, and drainage ditch rights-of-ways granted by easement on MKWMA.

- Thirty acres consisting of a strip of land 10 rods wide and parallel to the property boundary with Idaho Department of Lands property in Section 16 of T5N, R37E. The easement was acquired on March 27, 1956, from the Department of Lands.
- The Union Pacific Railroad has a right-of-way for the railroad track going across Department property.
- The Department has a culvert crossing under the Union Pacific Railroad.
- The agreement for the ditch on the east side of Union Pacific Railroad was cancelled upon mutual consent in March 2013. The original agreement was from 1934 between Oregon Short Line Railroad Company and Butte and Market Lake Canal.
- Jefferson County has a right of way for the graveled county road starting at the intersection of 2900 East and 800 North and going north for approximately 0.5 miles, then east for approximately 0.5 miles, and then continuing in an easterly direction across T5N, R37E, Section 21, SE 1/4 and then northeasterly across the T5N, R37E, Section 22, NW 1/4, where it leaves Department property.
- The property known as the Tomchak property (101.9 acres) south of the MKWMA headquarters has two agreements:
    - Lavern Tomchak (seller) has a life estate in and to the residence, outbuildings, and approximately two acres on the described premises. The Department and Lavern Tomchak entered a Memorandum of Agreement in 1988 that states Lavern will live at the house on this property for all of her life.
    - The slough on the north end of this property (Van Leuven Slough) will remain available for the Northwest Flood Control Cooperative. Water levels are to remain at least three feet below grade measured at the east side of the roadway at the culvert on the property.
- The Department has agreed not to put water into the Triangle Marsh during the winter before February 1 during low snow years. The Department has agreed not to put water into the Triangle Marsh during the winter and spring during high snow years. High snow years are considered to be similar to the amount of snow received in the Roberts area during the 1992-1993 winter. There is no definition of how much this. The above agreement is stated in a letter to the Northwest Flood Control Cooperative members, dated May 19, 1993.
- Fee title acquisition deed from O.W. Robison dated September 19, 1960. The deed says the Department will maintain water levels in a drainage ditch (Interstate drain) on the acquired property two feet below the level of the sellers' land west of the Interstate. The effect of the deed is the Department must pump water from the ditch and some marshes to the desert via a pipeline in the winter and/or spring during some years. If the seller no longer has land on the west side, or if the seller voluntarily dropped the level of his land (for the construction of the Interstate) this may not be applicable anymore.

# X. INFRASTRUCTURE

**Building/structures**
3 houses
1 office facility
1 mixing shed/spray storage
4 shops/sheds/outbuildings

**Earth structures**
8 miles of dike

**Water control**
35 water control structures
6 miles of channel

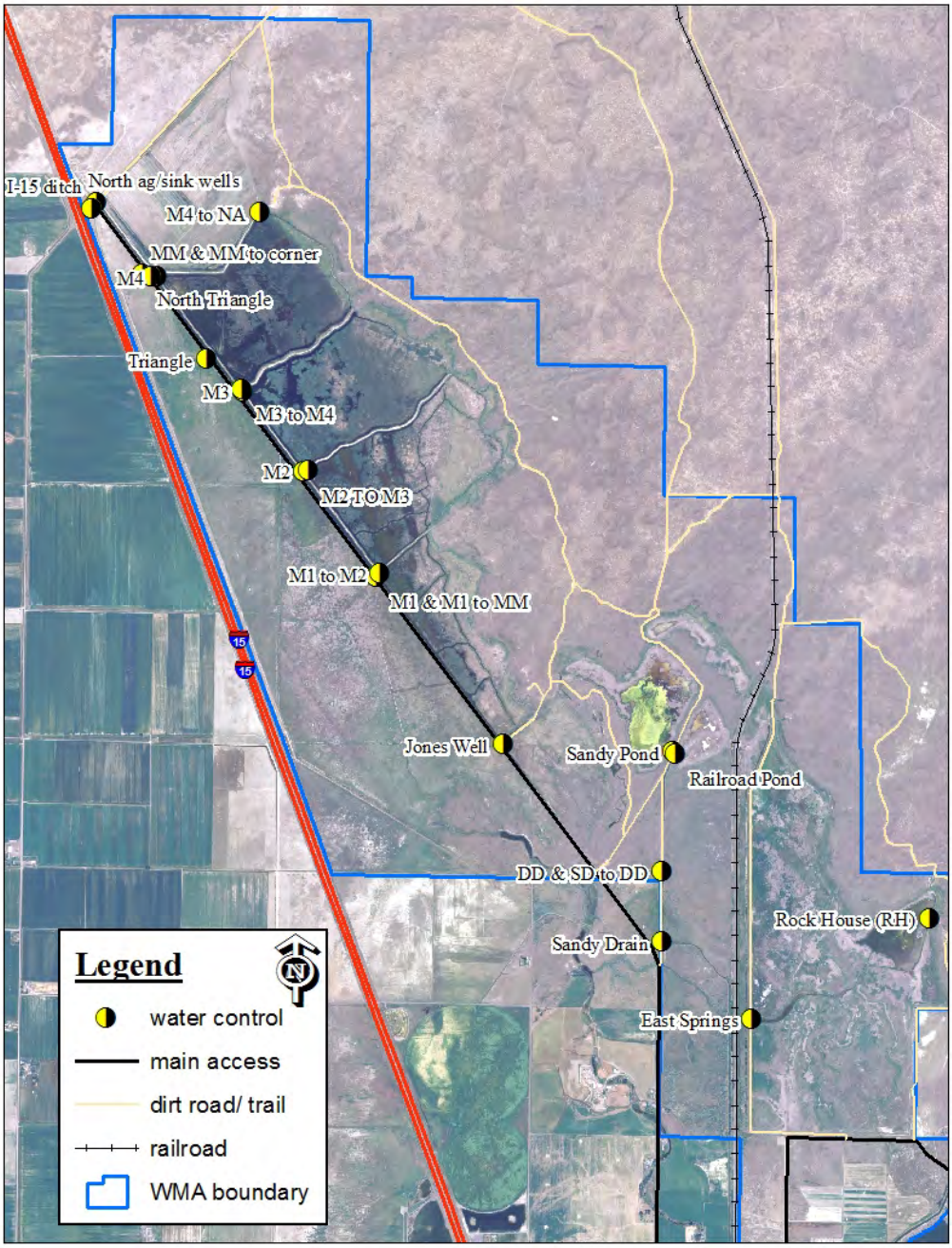
**Roads and trails**
5 graveled parking lots
2.5 miles of trail
3.5 miles of improved roads
9.5 miles of unimproved roads

**Fences**
35 miles of permanent fence

# XI. WATER AND HYRDROLOGY IN THE MARKET LAKE AREA

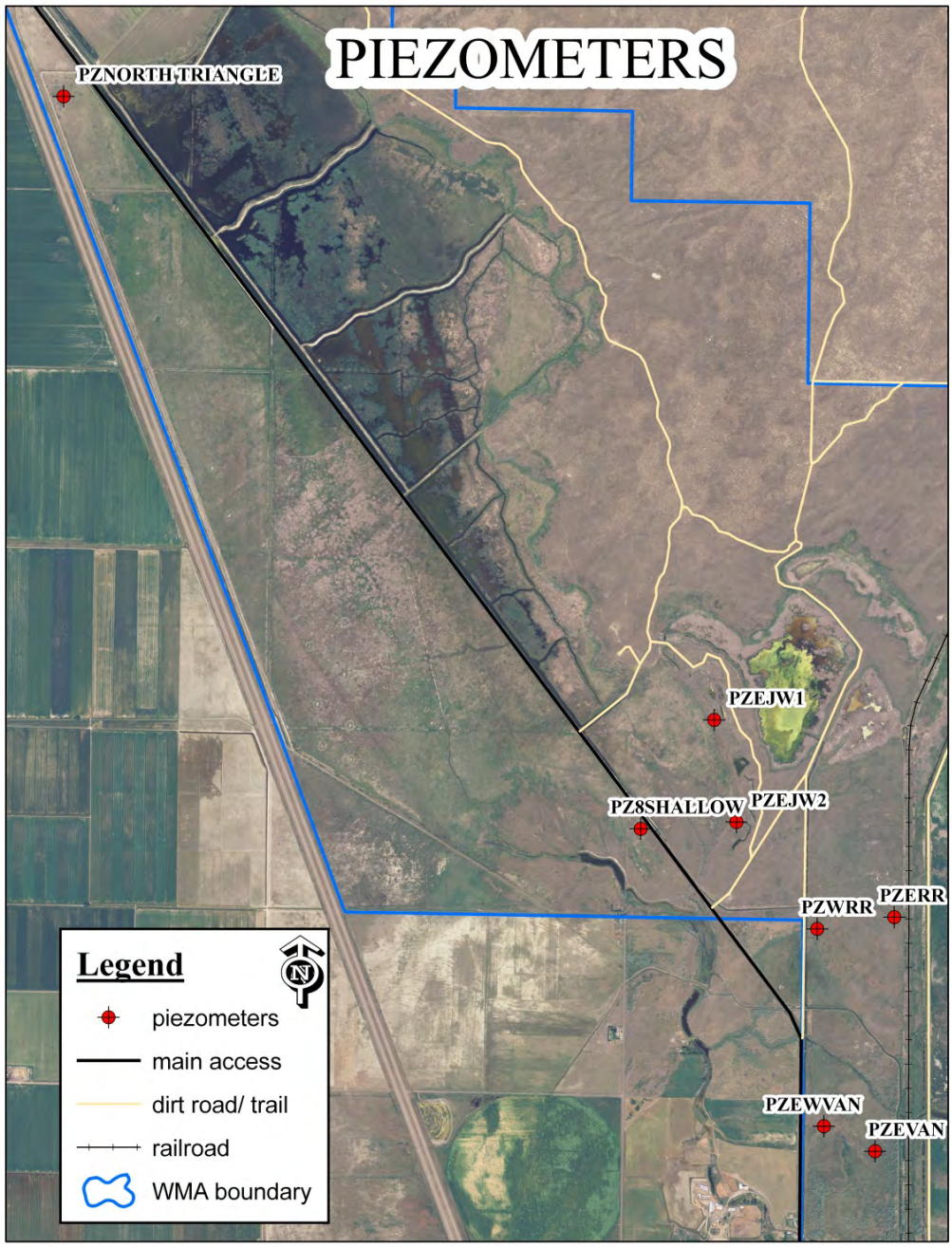
Market Lake and the MKWMA lie on the northernmost part of the Snake River Plain aquifer. The MKWMA is maintained solely by natural groundwater inflow. Most cultivated land in the area around Market Lake is irrigated with water pumped from wells completed in the eastern Snake River Plain aquifer. Groundwater development between the late 1970s and 1989 increased withdrawals from about 240,000 acre-feet in 1983 to about 370,000 acre-feet in 1990 (Spinazola 1993). Concurrent with groundwater development, change from sub-irrigation to sprinkler irrigation has reduced recharge into the aquifer.

Water levels at MKWMA have been measured for many decades. Starting in the 1970s, basic marsh levels were monitored and water levels at water control structures were recorded. In the mid-1990s, more measurements were recorded as new dikes and infrastructure were installed.



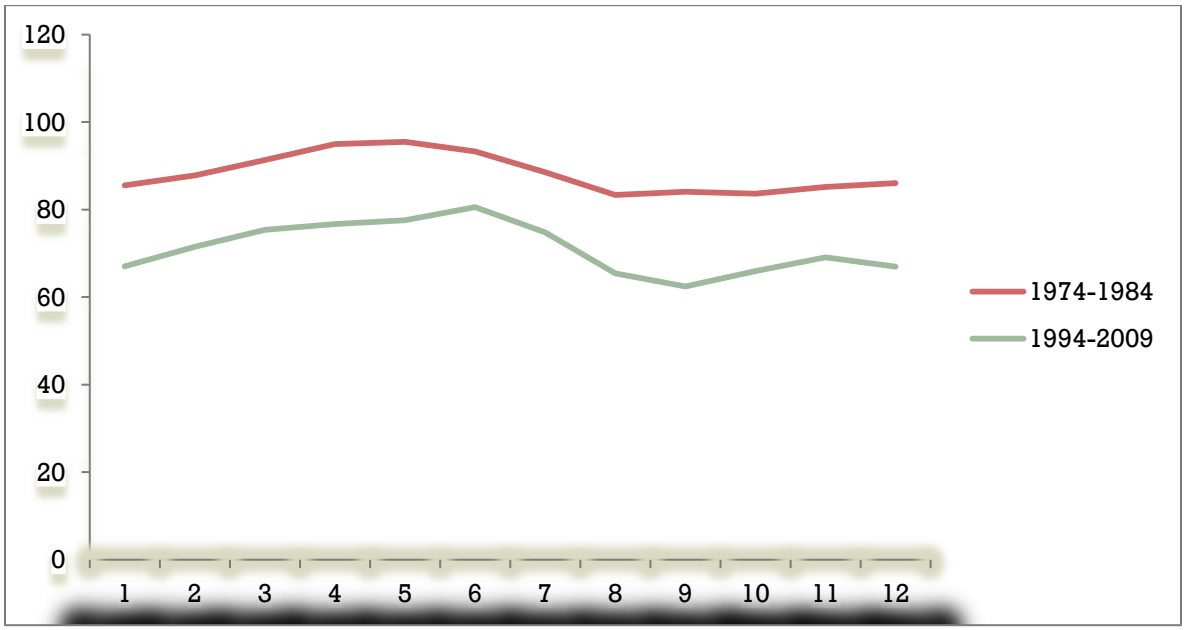

Water control and infrastructure at Market Lake WMA.

In addition to surface water measurements, groundwater has been monitored beginning in 2009. This monitoring is done with piezometers, a device which measures the pressure (more precisely, the piezometric head) of groundwater at a specific point. The Department and Ducks Unlimited established 15 piezometer stations with a shallow well casing on MKWMA. Seven of the 15 are read by automated peizometers with one-time daily downloads as needed. All other stations are measured manually a minimum of two times monthly.




Piezometers at Market Lake WMA.

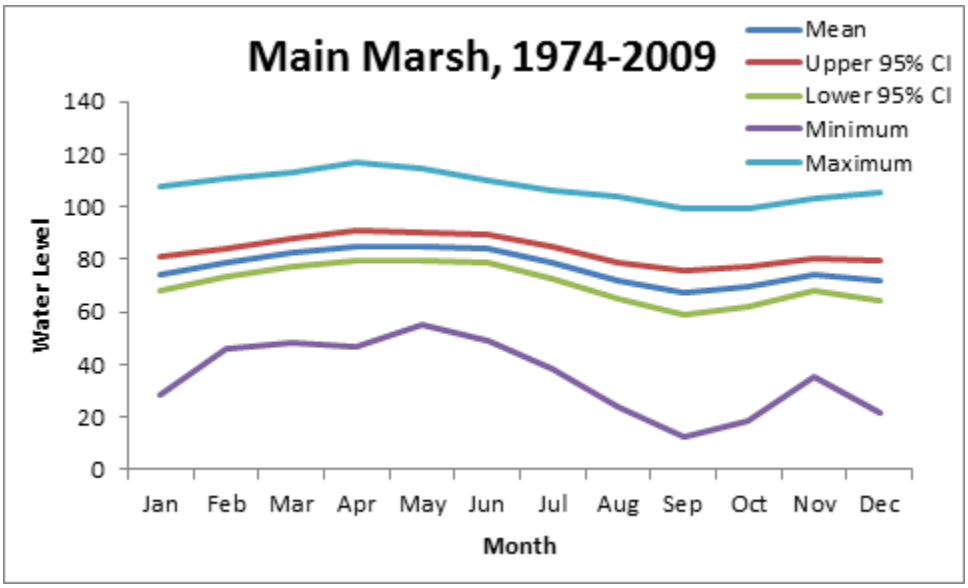
There has been a considerable decline in surface water on the entire complex since 1974. There are 35 water control structures with measurements taken at each at least every other week. Surface water measurements have been taken at the Main Marsh at MKWMA since 1974. The following chart is an example of change in water levels on the Main Marsh over a 38-year period.




Main Marsh water measurements. This graph represents the water change from 1974-1984 vs. 1994-2009. There is up to a 22-inch change on the Main Marsh. The Y-Axis is inches on surface of marsh and X-axis is month (1=Jan, 2=Feb, etc.).

| Main Marsh | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Change in inches from 1974-2009 | -19 | -16 | -16 | -18 | -18 | -13 | -14 | -18 | -22 | -18 | -16 | -19 |

Water table change from January-December in 45 years (1974-2009).




Water levels on 45-year average in Main Marsh. April-May has the highest water levels and September has the lowest. In spring, water peaks and begins to drop with summer and irrigation season. Levels begin to rise again during fall and winter months (Oct to mid-Nov).

# WATER RIGHTS

Water rights consist of 46.6692 shares of Butte and Market Lake Canal Company stock. NOTE: one share of stock = 10 inches of water. Acquired on 1/1/68 from Idaho Dept. of Transportation and Lowell Moore. Decree dates are October 16, 1890, for 344.39 inches, June 1, 1894 for 2.302 inches, and April 1, 1939 for 120.00 inches. There is a delivery right in the Roscoe Lateral Ditch, Inc. for 155 miner's inches of flow from the above named canal to the Department's diversion structure. In addition, the following water licenses and rights exist.

| License Number | Priority Date | Amount | Purpose |
|---|---|---|---|
| 35-0204 | 05/25/1934 | 4.100 cfs | Irrigation and incidental wildlife use |
| 5-02050 | 05/23/1934 | 9.500 cfs | Wildlife, fish propagation and recreation |
| 35-02054A | 04/08/1940 | 1.500 cfs | Wildlife and recreation |
| 35-02890 | 05/15/1921 | 2.500 cfs | Wildlife, fish propagation and recreation |
| 35-04253 | 08/01/1956 | 329 acre/ft. | Wildlife and recreation storage at Sandy Marsh |
| 35-04254 | 10/01/1965 | 1,216 acre/ft. | Wildlife and recreation storage at Triangle Marsh |
| 35-04255 | 04/01/1970 | 1,057 acre/ft. | Wildlife and recreation storage at East Springs Marsh |
| 35-04256 | 09/19/1960 | 1,225 acre/ft. | Wildlife and recreation use at Main Marsh |
| 35-12859 | 01/18/1973 | 0.04 cfs | Domestic use, one home, residence number 2 |
| 35-12860 | 07/01/1961 | 0.04 cfs | Domestic use, one home, residence number 1 |
| 35-12861 | 12/31/1957 | 0.04 cfs | Domestic use, one home, Van-Leuven |
| 35-12862 | 12/31/1944 | 0.04 cfs | Domestic use, one home, Tomchak |

# XII. SUMMARY OF PUBLIC COMMENTS

| Management Action | Comment | Total |
|---|---|---|
| Access | Make more bridges over waterways/ditches | 3 |
| | Maps of area | 5 |
| | Birding area map | 1 |
| | Display info for types of vehicles for different roads | 1 |
| | More/improved/legible signs | 2 |
| | Better parking areas | 3 |
| | More access sites to Snake river | 1 |
| | Enlarge WMA/Increase acquisition | 6 |
| | Fix/improve Boat Ramps | 3 |
| | Provide Photo blinds | 2 |
| | Increase access to the lake | 2 |
| | Don’t change anything | 15 |
| | Make at least one person in a group of users/family have a license | 3 |
| | Drop the cables/road closures | 3 |
| | Improve handicapped access sites | 1 |
| | Restrict boat motors to five horse power or less | 1 |
| | Restrict boats to non-gas powered | 1 |
| | More Camping Areas | 1 |
| | Make picnic area | 1 |
| | More walking access along levees | 2 |
| | Restrict access during spring nesting season | 4 |
| | Charge non-consumptive users | 4 |
| | Designate dog training areas | 1 |
| | Restrict dogs | 2 |
| | Reduce amount of users. Too crowded | 3 |
| | More wildlife viewing access sites/blinds | 2 |
| | Reduce vehicle access | 4 |
| | Keep walk-in access | 2 |
| | More enforcement for litter/shooting and illegal activities | 13 |
| | Horse friendly gates | 1 |
| | Restrict horse users | 2 |
| | Patch bullet holes at bathroom/ more bathrooms | 4 |
| | Provide trash cans | 2 |
| | Fix/improve roads | 5 |
| | Pave/improvement road to main marsh | 10 |
| | Post Speed Limit signs | 2 |

| Management Action | Comment | Total |
|---|---|---|
| Habitat | Restoration more habitat improvements | 4 |
| | Manage WMA solely for wildlife habitat not recreation/public use | 3 |
| | Food plots for doves | 1 |
| | Continue with cattail management | 2 |
| | Manage wetlands with wet and dry cycles | 1 |
| | Manage for wild upland birds/nesting cover | 2 |
| | Manage for native habitat | 2 |
| | Selective shrub/weed removal | 2 |
| | Keep as is. Maintain habitat | 12 |
| | Work with all grazing around WMA to provide better habitat | 1 |
| | Improve habitat | 6 |
| | Increase funds for habitat improvement | 1 |
| | Increase pheasant habitat | 1 |
| | More agriculture for white tails | 1 |
| | Hire more personnel to better manage lands | 2 |
| | More foods plot | 3 |
| | | |
| Pheasant Stocking | Plant more birds | 6 |
| | Do something about how birds are planted for those not able to be there at release/bird behavior | 6 |
| | Stop the Stocking Program | 6 |
| | Keep the Stocking program | 1 |
| | Stock other species of upland birds | 3 |
| | Increase cost of pheasant permit | 4 |
| | Implement surrogators | 1 |
| | Control road hunters/safety concerns | 3 |
| | Open pheasant season to Dec 31 | 4 |
| | Adjust youth area to allow seniors/others on weekdays | 2 |
| | Get rid of Youth Pheasant Area | 1 |
| | | |
| Wildlife | Have a bounty on predators/go after predators | 2 |
| | Manage for wildlife first | 3 |
| | List quality of hunting for species | 1 |
| | More Deer | 2 |
| | Manage for more nongame | 2 |
| | More upland game birds | 2 |
| | Gather data on big game numbers on WMA | 1 |

| Management Action | Comment | Total |
|---|---|---|
| Trapping | Keep areas open year-round for trapping | 1 |
| | Close trapping on WMA | 1 |
| | | |
| Fishing | Improve Fishing for game fish | 2 |
| | Improve fishing piers | 1 |
| | Provide maps for fishing | 1 |
| | | |
| Hunting restrictions | Restrict waterfowl hunting methods | 1 |
| | Stop waterfowl hunting at 13:00 or 14:00 of refuge | 1 |
| | Restrict use of high technology game taking devices | 1 |
| | Ensure hunting future on WMA, not opposed to non-consumptives, but not at cost to hunters and anglers | 4 |
| | Provide areas of refuge | 6 |
| | Require use of non-toxic shot for all bird hunting | 5 |
| | | |
| Water Level Management | Maintain More Water In marsh | 1 |
| | Connect to butte market canal to flood during high water years | 1 |
| | Put water into east springs | 2 |
| | Manage water levels to maintain bird populations | 1 |
| | Retain more water | 1 |
| | More open water | 2 |
| | | |
| Public Outreach and Education | Organize and publicize work service days | 2 |
| | Implement/enhance adopt-a-wetland or adopt wild area | 2 |
| | Provide list of things to do for boy scouts/volunteers | 3 |
| | Work with NGOs (DU, PF, etc.) | 2 |
| | Maintain good relationship with neighbors | 1 |
| | Use volunteers to collect donations | 1 |
| | Improve information about youth hunting | 1 |
| | Provide educational trails and exhibits and history | 4 |
| | More Outreach discussing value of WMA and highlighting what WMA offers | 2 |
| | Create citizens advisory group/committee | 1 |
| | Keep WMA wildlife focused | 3 |
| | Don’t promote WMA | 1 |
| | **TOTAL COMMENTS** | **267** |

# XIII. SOIL TYPES

Soil types found at MKWMA with the approximate acres of each.

| Soil Type | Acres |
|---|---|
| Annis silty clay loam, strongly saline-alkali | 53 |
| Fluvaquents, nearly level | 2,518 |
| Hovey stony loam | 37 |
| Levelton clay loam, moderately saline-alkali | 617 |
| Minnewaukin | 224 |
| Modkin-Bondranch complex | 1,291 |
| Modkin-Rock outcrop complex | 125 |
| Wolverine sand, 0 to 30% slopes | 206 |

**Soil Descriptions are from**: Soil Survey of Jefferson County, Idaho. 1975. USDA, Soil Conservation Service in cooperation with University of Idaho, College of Agriculture and Idaho Agricultural Experiment Station; Jefferson County Board of Commissioners; and the BLM.

**Annis silty clay loam, strongly saline-alkali**
These soils are very deep, moderately well drained, and strongly saline-alkali affected soils on river flood plains. The slope consists of 0 to 1%, permeability is moderately slow, available water capacity is very high, and the surface runoff is very slow. Good soil for irrigated hay pasture.

**Fluvaquents, nearly level**
These soils are very deep and very poorly drained soils of old lakebeds. They are in marsh areas that are inundated most of the year and provide an ideal situation for waterfowl habitat. The primary vegetation is cattails and other water loving plants.

**Hovey stony loam**
These soils are very deep, somewhat poorly drained old lakebeds. This soil formed in lacustrine and alluvial material derived from mixed sources. The slope is 0 to 1%, permeability is moderately slow, and available water capacity is high. This soil is best used for native pasture, wildlife habitat and recreation. The dominant plants are alkali sacaton, saltgrass, and Russian olive.

**Levelton clay loam, moderately saline-alkali**

This soil is very deep, very poorly drained soil of old lakebeds and river terraces. It formed in alluvium and lacustrine sediment. The slope is 0 to 1%, permeability is slow, available water capacity is high, surface runoff is ponded, and the hazard of erosion is slight. This soil has the potential for providing habitat for wildlife. The dominant plants are alkali sacaton and inland saltgrass.

**Minnewaukin**
These very deep, poorly drained soils are on river terraces. They formed in alluvium derived from mixed sources. The slopes are 0 to 1%, permeability is rapid, available water capacity is low, and the hazard of erosion is low. These soils are best suited for pasture and wildlife habitat. The dominant plants consist of sedges, wheatgrass, foxtail barley, and alkali sacaton.

**Modkin-Bondranch complex**
This complex is on basalt plains and slopes range from 4 to 20%. Modkin sandy loam makes up approximately 45% of the complex, Bondranch very stony sandy loam makes up 20%, rock outcrops make up approximately 20%, and Mathon sandy loam makes up the rest of the complex. Dominant plants include bluebunch wheatgrass, big sagebrush, and sedges.

**Wolverine sand, 0 to 30% slopes**
This very deep, excessively drained soil is on terraces. It formed in wind-laid and alluvial sand derived from mixed sources. Permeability is very rapid, surface runoff is slow, and the hazard of erosion is slight. However, the hazard of soil blowing is very high. This soil is used for range, for wildlife habitat, and recreation. The dominant plants include needle and thread grass, big sagebrush, Indian ricegrass, and sand dropseed.

# XIV. IDAHO DEPARTMENT OF FISH AND GAME LANDS AND ACCESS AREAS PUBLIC USE RULES

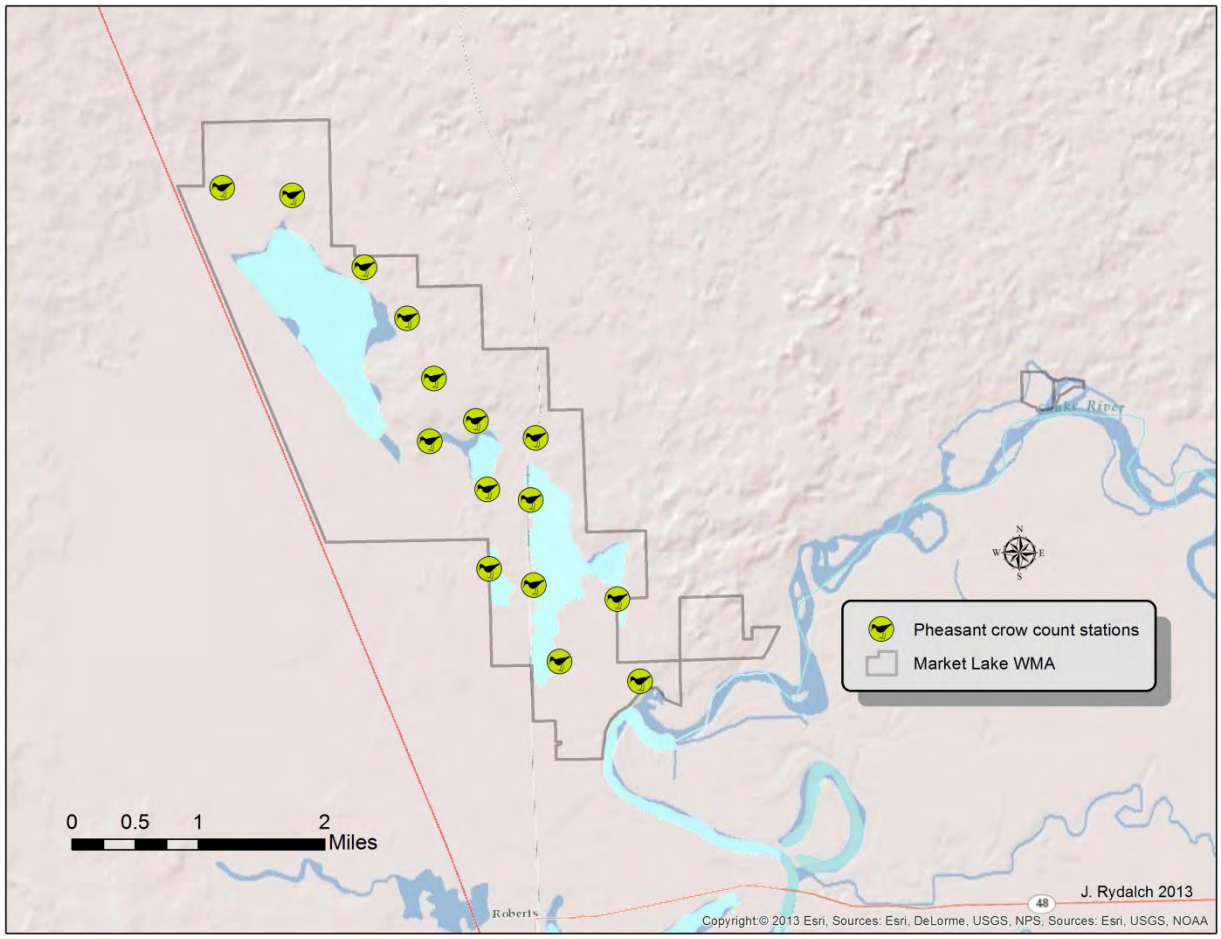
**13.01.03 – Public Use of Lands Owned or Controlled by Idaho Fish and Game**
**000. Legal Authority.**
The Idaho Fish and Game Commission is authorized under Sections 36-104(b), Idaho Code, to adopt rules concerning the public use of lands owned or controlled by the Department of Fish and Game.

**010. Definitions.**
1. Aircraft. Every description of aircraft that is capable of being used as a means of transportation on or in the air.
2. Commercial Use. Any use or activity which is related to a business venture or for which a fee is charged, or where the primary purpose is the sale or barter of goods or services, regardless of whether the use or activity is intended to produce a profit.
3. Department Lands and Access Areas. Real property, which is owned or controlled by the Idaho Department of Fish and Game, which is managed for public recreation and for the protection, maintenance, and enhancement of fish and wildlife.
4. Designated Roads and Trails. All roads and trails posted as open and/or included on travel plan maps provided by the Department. Roads and trails not posted as open and/or included on travel plan maps are closed to motorized vehicles.
5. Motorized Vehicle. Every vehicle that is self-propelled except vehicles that are moved solely by human power.
6. Safety Zone. A posted area established for the safety and protection of persons, equipment, structures, or livestock, where no shooting is permitted into, across, or within.
7. Snow Machine. Any self-propelled vehicle designed primarily for travel on snow which is steered by skis and propelled by tracks.
8. Unattended. As it pertains to decoys shall mean to be over one hundred (100) yards from the decoys for a period of more than one-half (1/2) hour. As it pertains to campfires shall mean not within twenty (20) yards.
9. Watercraft. Any vessel that is capable of being used as a means of transportation on or in the water.

**100. Public Use Restrictions.**
Activities Prohibited Without Director Authorization. Unless specifically authorized by the Commission or under lease, permit, contract, or agreement issued by the Director, Regional Supervisor, or other authorized agent, the following activities are prohibited:
1. To enter, use, or occupy lands or water when said lands are posted against such entry, use, or occupancy.
2. To camp, park a vehicle and/or a trailer in any area posted against such use or to leave unattended a camp, vehicle, and/or trailer for more than forty-eight (48) hours or to camp or park a vehicle and/or trailer for more than ten (10) consecutive days in any thirty (30) day period in any one designated area.
3. To operate any motorized vehicles, including snow machines, except on designated roads and trails. Designated roads and trails are posted as open and/or included on travel plan maps provided by the Department.
4. To use watercraft on any waters which are posted against such use.

5. To start a fire without taking necessary measures to prevent its spreading or to leave a fire unattended. All fires are prohibited in areas posted against their use.
6. To use any form of fireworks or explosives at any time.
7. To permit dogs or other domestic animals to run at large when the owner or guardian is not present to control or care for them or to permit dogs to be off leash or conduct dog training when prohibited by posted notice.
8. To conduct dog field trials of any type during the period October 1 through July 31. All dog field trials and dog training with the use of artificially propagated game birds between August 1 and September 30 will be under Department permit as authorized by the director under the rules set forth in IDAPA 13.01.15, "Rules Governing the Use of Dogs," Section 300.
9. To construct blinds, pits, platforms, or tree stands where the soil is disturbed, trees are cut or altered, and artificial fasteners, such as wire, rope, or nails are used. All blinds shall be available to the public on a "first-come - first served" basis. Portable manufactured blinds and tree stands are allowed but may not be left overnight.
10. To release or abandon any domestic or exotic fish, birds, mammals, amphibians, or reptiles.
11. To adjust, open, close, tamper with, or manipulate in any manner, any diversion structure, headgate, flume, recorded or flow dock or any device for water control. This shall not be construed as limiting the powers of other agencies or irrigation districts as provided by statutory law or rule.
12. To discard dead fish, birds, animals, or parts or remains thereof, waste water, metallic cans, bottles, plastic or paper cartons, shotgun shell casings, yard and agricultural wastes, garbage, machines, appliances, or other litter on or in any lands or waters.
13.To remove, destroy, mutilate, modify, or deface any building or other structure, water control device, fence, gate, poster, notice, sign, survey or section marker, or any object of archaeological, geological, or historical value or interest.
14. To shoot within, across, or into posted safety zones.
15. To leave decoys unattended. Decoys cannot be put in place any earlier than two (2) hours prior to official shooting hours for waterfowl and all decoys must be picked up and removed from the hunting site no later than two (2) hours after official shooting hours for waterfowl that particular day.
16. To discharge any paintball guns.
17. To disturb or remove any soils, gravel, or minerals.
18. To turn domestic livestock into, or allow said animals to graze or trail on or across Department lands, except riding and pack animals may be used in association with hunting and for recreational uses or as posted.
19. To cut, dig, or remove any crops, trees, shrubs, grasses, forbs, logs, or fuel wood.
20. To place, maintain, or store any beehives or bee boards.
21. To use lands for any commercial purpose.
22. To place a geo-cache.
23. To use for group events of over fifteen (15) people.
24. To land or launch aircraft except on public airstrips.
25. To use or transport any hay, straw or mulch that is not weed seed free certified.

# XV. PHEASANT CROW COUNT STATIONS




Market Lake WMA pheasant crow count stations

**Pheasant Crow Count Route**

| Station # | Longitude | Latitude |
|---|---|---|
| 1 | 112.1735784 | 43.8046668 |
| 2 | 112.1625388 | 43.8036013 |
| 3 | 112.1513578 | 43.7952020 |
| 4 | 112.1407793 | 43.7823022 |
| 5 | 112.1416158 | 43.7750966 |
| 6 | 112.1447647 | 43.7892531 |
| 7 | 112.1327244 | 43.7603575 |
| 8 | 112.1327176 | 43.7694426 |
| 9 | 112.1342808 | 43.7773316 |
| 10 | 112.1248737 | 43.7752228 |
| 11 | 112.1258617 | 43.7681308 |
| 12 | 112.1257372 | 43.7583772 |
| 13 | 112.1219069 | 43.7495400 |
| 14 | 112.1092367 | 43.7470875 |
| 15 | 112.1125547 | 43.7565608 |

All locations are recorded in WGS 84 Datum.

# XVI. WATER LEVEL MANAGEMENT

Market Lake WMA water levels have been managed to maximize wildlife production and public recreation. Water level management has changed through time with an average annual variation of less than one foot in elevation from high spring elevations to low fall elevations. Greater variation is believed to have helped to diversify and expand emergent plant occurrence on the wetland perimeter. More recently, stable, yearlong water levels have been avoided as this could reduce wetland and associated wetland vegetation productivity, which in turn, reduces benefits provided to wildlife over time.

Water levels at MKWMA have been recorded bi-weekly from water control structures, staff gauges, and piezometers across the complex (Appendix XI). Water levels on MKWMA are managed to mimic natural floodplain hydrology similar to wetlands across the region with high spring levels, declining summer elevations, and stabilized or recovering fall and winter elevations. Generally, this means high spring water levels that peak in May, receding summer water levels, and naturally recovering fall/winter water levels. Advantages to this hydrology include facilitated nutrient cycling and establishment of diverse emergent plant assemblages which results in productive habitat for waterfowl, shorebirds, and other wildlife.

Periodic wetland drawdowns that expose bottom substrates during the growing season are important to improve wetland habitat conditions. The combined benefits associated with accelerated nutrient cycling and emergent plant establishment make periodic drawdown an effective wetland management tool. Research regarding wetland drawdown supports using this measure every five to 10 years.

During prolonged wetland inundation, anoxic conditions prevent complete decomposition of organic material. Consequently, nutrients are stored in partially decomposed bottom sediments unavailable to plants and animals for growth and energy. Periodic drawdowns allow oxygen to reach organic sediments for complete decomposition, and mineralization of essential nutrients, such as nitrogen, and render them available for plant uptake. Drawdowns also facilitate movement of nutrients from the sediment nutrient pool to the macrophyte nutrient pool so they can be cycled through the wetland food web. Accelerated nutrient cycling stimulates wetland ecosystem productivity including vertebrate (e.g., ducks, etc.) production.

While mature emergent vegetation has adaptations for gas exchange (e.g., *Aerenchyma*, etc.), seeds do not. Consequently, most seeds do not germinate under water due to a lack of oxygen. Drawdowns allow seeds from emergent plants to germinate on exposed wetland substrates. Short-term benefits accrue due to abundant seed production from moist-soil annuals. Longer term benefits include expansion and diversification of the area occupied by perennial emergent macrophytes increasing habitat quality, quantity, and complexity. An additional value of periodic drawdown is consolidation of bottom substrate for better vegetation establishment.

Drawdowns were conducted at MKWMA in 1993-1994 for dike building and avian botulism management. On dry years, the marshes recede but are not completely dry due to groundwater and connectivity to adjacent units. For example, if Marsh 2 needs to be dried up, it is difficult

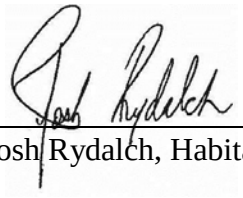
due to water infiltration from dikes of Marsh 1 and Marsh 3. Drawdowns do occur as much as possible for prescribed fire, infrastructure management, and water movement.

# MARKET LAKE

# WILDLIFE MANAGEMENT AREA PLAN

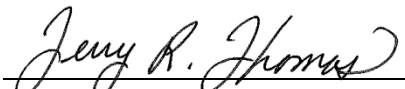
## Approval

**Submitted by:**

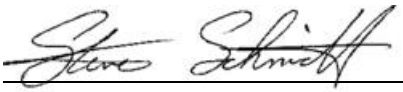


Josh Rydalch, Habitat Biologist

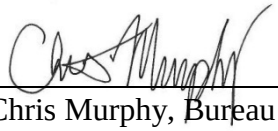
**Reviewed by:**



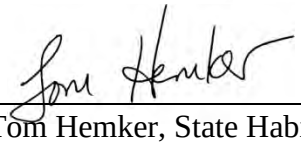
Terry Thomas, Regional Habitat Manager



Steve Schmidt, Regional Supervisor

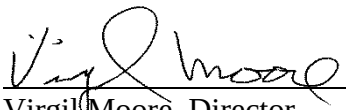


Chris Murphy, Bureau of Wildlife



Tom Hemker, State Habitat Manager

**Approved by:**



Virgil Moore, Director