MALHEUR NWR COMPREHENSIVE Conservation PLAN COLLABORATIVE

Implementation Progress Update 2021

This document is an implementation summary of the Collaborative Comprehensive Conservation Plan (CCP) between January 2013 and September of 2018. During this period significant effort was directed towards improving ecological function of aquatic systems, the highest CCP priority. Efforts were focused on Malheur Lake based on collaborative conversations and intercontinental importance to migratory birds. Resulting from extensive interactions it became clear Malheur Lake is both unique and a poorly understood ecosystem. With this as the bases to start from and through testing possible monitoring/ management techniques, it became clear a strategic ecological system approach was required. This resulted in beginning the development of a Malheur Lake systems model that would enable transfer of knowledge through time and test/inform future management decisions. Resources were also directed towards social and economic analysis to strengthen future management decisions and develop implementation resources.

The other major component of improving Refuge aquatic health was development of an integrated wetland/river plan. Advancing efforts on Malheur Lake required significant commitments of resources from the Refuge and partners. This necessary commitment of resources prevented work on integrated wetland/river planning and testing.

The Ecology Work Group (established in the CCP) focused on obtaining data in wet meadow habitats related to the grazing and haying program through independent third party monitoring. This collaborative effort recognized the need for developing a state and transition model. Due to habitat configurations it was found not possible to fully develop needed science on Refuge lands alone. The scientific effort was then expanded to other parts of the Basin with support from Refuge permittee resources. Through the coordinated effort of multiple partners, science based management strategies for wet meadows are now being developed at a landscape scale.

Malheur NWR was also the first Refuge in the U.S. Fish and Wildlife Service Pacific Region to develop a comprehensive Wildlife Inventory and Monitoring Plan. Both development and implementation of this plan were done with partners engaged in the collaborative Wildlife Working Group. Without direct partner engagement the Refuge would have had limited capacity to implement this plan.

Along with natural resources, the CCP also addressed cultural and historical resources. Burns Paiute cultural practices and resources continue to be a priority. The Refuge consulted with Burns Paiute to create and maintain mechanisms for law enforcement coordination between the Tribe and Refuge and develop a structured cultural site monitoring program. Burns Paiute is also involved in creation of interpretive displays and is completing a comprehensive inventory of artifacts housed at the Refuge. The Tribe also continues plant collections related to cultural practices and engages Tribal youth in Refuge educational programs. Efforts related to the historical resources have been limited to small scale restoration/stabilization of historical structures. Reduction in historical efforts is a result of reduction in Refuge staffing.

During this phase of CCP implementation it should be noted that Malheur NWR experienced an event that had not occurred anywhere before in the U.S., an armed occupation. This event was an impact to the Refuge, Burns Paiute, local community, collaborative partners, and parties at State, Regional/National levels. Large amounts of information contained in Refuge files was lost during the event and significant Refuge staffing changes occurred. It is also noteworthy that the positive relationships developed between

Federal agencies and communities, through collaborative conversations, is one of the primary factors causing failure of the occupation.

CCP success has expanded the need for High Desert Partnership services to support additional collaborative processes spanning forest restoration, large fire in sage brush steppe, wet meadow function, health of aquatic systems, community youth, and entrepreneurial business. There are also efforts advancing collaboration such as the Sage Grouse Candidate Conservation Agreements with Assurances and Community Based Water Planning. In addition to addressing ecological factors some collaboratives have started incorporating social and economic components for comprehensive solutions.

Incorporated into this document is the foreword to the CCP reminding us of how far we have come. What may be the greatest accomplishment of the CCP collaborative is demonstrating diverse interests can work together on complex issues. This has created a foundation for collaboration across a landscape vital to both wildlife and people.

Malheur National Wildlife Refuge Comprehensive Conservation Plan Foreword

Not many years ago it was hard to imagine that the process of developing a long-term management plan for Malheur National Wildlife Refuge (Refuge) would result in a broad spectrum of interests, including the local community, conservation organizations, and other government agencies, all working collaboratively together to craft the future direction of the Refuge. Today, after a three-year collaborative effort by dozens of stakeholders working closely with each other and with Refuge staff and experts, there is broad agreement on a comprehensive planning process that will restore the Refuge's aquatic health, enhance wildlife habitat, and revitalize relationships with stakeholders and the community. This process is laid out in the Comprehensive Conservation Plan (CCP) and the upcoming Inventory and Monitoring Plan, which describe priorities for the Refuge and how decisions will be made over the next 15 years.

The Refuge is a cherished place, widely embraced by all kinds of people for its ability to provide for wildlife, recreation, and support of local communities. However, it has also been a flashpoint for conflict and controversy over the past few decades. This controversy has created deep divisions and distrust between the Refuge and stakeholders as well as between the stakeholders themselves. In the meantime, the ecological health of the Refuge's waterways and wetlands—long recognized as some of North America's most important habitat for migratory birds—was in steep decline as common carp came to dominate most wet areas while other invasive non-native species spread throughout the Refuge.

This non-traditional and innovative collaborative planning process has helped rebuild the relationships and communication necessary to produce a remarkable consensus around the core principles embedded in the Refuge's 15-year CCP:

Ongoing collaborative approach to implementation, built around partnerships and a shared commitment to the long-term sustainability of the Refuge and the larger Harney Basin's wildlife, habitats, and human communities;

Commitment to science-based, active adaptive management, driven by monitoring and evaluation of results, with Refuge decision making that is transparent and informed by stakeholder involvement;

Focus on aquatic ecosystem health and the subsequent benefits to waterways, wetlands, and

upland habitats.

<u>At many different levels the challenges moving forward will be great.</u> although the stakeholder consensus achieved in developing this plan represents a significant achievement. We hope you will join us, the Malheur Refuge staff and the many participating stakeholders, to turn this vision into reality.

Colby Marshall, Bruce Taylor, and Matt Little
On behalf of the Collaborative Group

GOAL 1. Enhance aquatic health and habitat conditions essential to the conservation of the flora and fauna that depend on Malheur Lake and associated water bodies.

<u>Objective 1a. Lacustrine (Malheur and Mud lakes)</u>
Throughout the life of the CCP, enhance and maintain 500 to 110,000 acres for the health of the lake basin and associated terrestrial successional cycles of the lake systems on Malheur Refuge. American white pelican (*Pelecanus erythrorhynchos*), northern shoveler (*Anas clypeata*), canvasback (*Aythya valisineria*), and tui chub (*Gila bicolor*) will be used to evaluate habitat conditions that indicate ecosystem health for this unique marsh system.

- Waterfowl Breeding Pair Survey- ODFW run annual breeding waterfowl surveys across the lake during the summer time. Data is shared with the refuge and is stored in the Malheur NWR common drive and external wildlife hard drive.

Strategies Applied to Achieve Objective
Conduct baseline inventories of fish, wildlife, and vegetation to guide future management action.

- Waterfowl Aerial Surveys - five completed years (a total of eight survey season) between spring and fall migration aerial surveys on Malheur and Mud Lakes for species composition and general population trends of waterfowl. No analysis done at this moment. However, maps of waterfowl population have been created for each of the eight survey seasons. Data is stored in the Malheur NWR common drive.
- Shorebird Survey - complete six years of shore bird survey in October 2020. Half of the surveys in 2020 were not completed due to COVID-19. Migratory Bird Office will utilize data files to provide information needed for state/regional reporting purposes. A five year report of the data collected was created in early 2020 by FWS Zone biologist, Jenny Barnett. Data showing a higher concentration of shorebirds were found during fall migration. Possibly due to lower water allowing more shorebird habitat, such as, playas to appear. Data is save in the Malheur NWR common drive and external wildlife drive.
- Vegetation surveys have been completed on some lake units with the regional I&M program looking at submerged aquatic vegetation. The study is ongoing and we will complete more surveys in the future.
- A Systems Model was constructed for Malheur Lake. Submodels were constructed which include a Common Carp (Cyprinus carpio) Population Dynamics model (referred to throughout this document as CarpMOD), and a wind re-suspension model.
- CarpMOD incorporates key factors of the carp population (i.e. Recruitment, Growth, and Mortality) which enables us to better understand the dynamics of the carp population in Malheur Lake. CarpMOD incorporates: 1) a basic hydrology model (referred to as the Malheur Lake Hydrology Model) and 2) a bioenergetic model of the migratory avian piscivores that reside at Malheur Lake and eat Common carp.

- The wind re-suspension model helps us understand how variables (i.e. wind, wind fetch, wind direction, and solar radiation) affect the turbidity in Malheur Lake and how alternative restoration activities may reduce turbidity and promote favorable growing conditions for submerged aquatic vegetation (SAV) in Malheur Lake.

Continue to use opportunistic approaches to rapidly decrease and suppres the carp population.

- MNWR has utilized CarpMOD to investigate multiple different alternative restoration scenarios targeting the carp population in Malheur Lake. For instance, CarpMOD has enabled MNWR to determine the efficacy of control efforts targeted at multiple life stages (embryos, juveniles and adults) via both active and passive removal efforts (i.e. commercial harvest, juvenile trapping, embryo electroshocking, and increasing avian piscivore habitat). We further modified (CarpMOD) to incorporate hydrologic variability, which enabled us to simulate past and future hydrologic scenarios, thus enabling us to understand how lake fluctuations affects the carp population as well as our ability to effect the population via removal efforts. Furthermore, we have utilized CarpMOD and the hydrologic variably, we were able to test different removal schemes targeting low water years via commercial harvest or rotenone treatments during low water years.

Conduct research to understand carp population dynamics and seasonal movements.

- We are using CarpMod to investigate how fluctuations of carp via immigration and emigration will affect the overall carp population in Malheur Lake as well as our ability to maintain the population/biomass below our desired biomass threshold (100 pounds per acre as stated in the CCP)
- Based on CarpMOD outputs, the MNWR has launched the *Carp Radio Telemetry Project*, which is a collaborative effort with the USGS and HDP, with the overall goal of identifying vulnerabilities within the carp population that can be exploited via large scale removal actions. Researchers will implant and track (150) carp, setup/maintain stationary receivers (13-14) in a variety of environments (riverine/lacustrine), and conduct bi-weekly mobile tracking. Data collected will help infer population-level behavior (i.e. habitat utilization and aggregations) both spatially and temporally. Ultimately, this project will provide novel insight into the behavior of carp in Malheur Lake, which then will be utilized to increase removal efficiencies.
- Currently collecting data to determine population dynamics using otolith samples

Conduct research to understand relationships among water chemistry, lake levels, and habitat/migratory bird responses in lakes.

- Colonial water bird nesting survey draft protocol created in spring 2019, with the use of drones. Unfortunately, due to the shut down of drone technology throughout the Department of the Interior survey is on a hold. But can be done with a small motor boat when high water is available. We hope to use drones again once it is allowed to do so on the refuge.
- Corp of Engineers completed five years of annual flyovers on Tern Island study to see how Tern Island is affecting populations of Caspian Terns, Double Crested Cormorants, and American White Pelicans. Currently waiting on report from Corp of Engineers. Photos and data shared are store in the Malheur common drive and external wildlife hard drive.
- Water chemistry, lake stage, and other elements related to lake conditions are being studied to determine the relationship to the invasive common carp. The monitoring is ongoing but, is compiled annually to give a snapshot of the lake. Data analysis will be completed for FY18 by winter of 2019 and submitted to aquatic health biologist to be filed in the common drive.
- Regional USFWS employees are currently collecting lake level data in order to understand how the lake fluctuates on a daily basis (i.e. river discharge, evaporation, wind/wave action).

- USGS collected sediment data in Malheur Lake at two locations for four years (2017-2020). Nutrients were also collected at these two sites plus an extra site for two of the total four years (2019-2020).

Develop a model to predict habitat response based upon changes in biotic and abiotic factors in the lakes.

- As stated above, we have constructing a Systems Model, which thus far incorporates biotic (carp and avian piscivores) and abiotic (wind, solar radiation, temperature, sediment suspension) factors. The Systems Model is helping MNWR to determine what area of the lake may be able to support the growth of SAV based on the amount of solar radiation available throughout the germination and growing period for SAV.
- MNWR has utilized the wind resuspension submodel (spatially explicit one-dimensional wind resuspension model), to investigate variations in suspended sediment concentrations in response to environmental and morphological drivers (i.e. wind speed, wind fetch and water depths).
- The data necessary to add submodels to the overall systems model were collected by MNWR employees with assistance from our HDP and USGS collaborators over the last 4 years and will be slow added to the systems model to increase our understanding of Malheur Lake. For instance, in 2019 and 2020, nutrient data was collected in Malheur Lake, and as that data becomes available, MNWR will be able to add a nutrient submodel to the overall systems model.

Investigate and implement aggressive control strategies appropriate to the Refuge, based on assessment and research findings. Control strategies could include, but not be limited to, the application of piscicide, chemo-attractants, chemo-repellants, barriers, commercial harvest, angling, and water manipulation.

- Utilizing Carp MOD in order to investigate multiple control strategies. These control strategies include: 1) commercial harvest, 2) juvenile fyke trapping, 3) embryo electroshocking, 4) rotenone (piscide) treatments, 5) water manipulation, and 6) avian piscivore population increase. The incorporation of the basic hydrology model is also enabling us to understand how these control strategies may be incorporated under lake level fluctuation scenarios (i.e. implementation of greater control effort during low water years when density dependent mortality within the carp population and removal efficiencies are at their greatest).
- The Carp Radio Telemetry Project will increase our knowledge of carp in Malheur Lake, as well as their possible migration into the upper portions of the Blitzen River. For instance, it is our working hypothesis that carp are limited to Malheur Lake and the lower portions of the Blitzen and Silvies Rivers because of fish trap operations and the fluctuating riverine environment (increased discharge and/or decreased temperatures). Therefore, this project will help us identify potential gaps in our carp management strategies and shift future management actions based on the findings from this radio telemetry project. Lastly, if carp do indeed get past the lowest fish trap in the Blitzen River system, this project may demonstrate carp movement (spatially and temporally) throughout the Blitzen River above Sod House Dam.

Consider the need for continued amendments to and the construction of additional strategically placed in-stream structures (i.e., traps, screens, and fish wheels) that address native fish passage issues and the prohibition of carp movement through the system.

- Fish traps, ladders, and screens are current and updated as needed. Additional needs have been addressed and are currently being planned for the future.
- The carp radio telemetry project planned to begin in spring 2021 has a main objective to identify vulnerabilities within the carp population that can be exploited via large scale carp removal action. The MNWR and Collaborators are also as a secondary objective collecting and tagging 25 Redband Trout. These Redband Trout will be used to 1)increase our knowledge of Redband habitat utilization and potential overlapping habitat with carp, which will help guide carp removal

actions that limit impacts to native Redband populations, and 2) determine if improvements in fish ladders on Busse and Grain Camp Dams have increased fish passage (mentioned as a concerns in the past).

Develop partnerships to address water quality, vegetation, and carp control issues within the Harney Basin.

- Through the Harney Basin Wetlands Initiative the Refuge has engaged with over 40 partners to address these issues throughout the Basin.
- Refuge grazing and haying permittees are partnering with OSU and The Wetlands Conservancy to conduct vegetation research beyond the Refuge boundaries to help answer plant community questions both on and off Refuge.
- Working with collaborators from the USGS Water Science Center in order to determine the current state of water quality (i.e. turbidity, conductivity, temperature, suspended sediment, nutrients) in Malheur Lake. These collaborators are also helping us incorporate their on the ground research and data collection into the wind re-suspension model.

Enhance emergent vegetation within the lake system via carp enclosures, wind breaks, etc.
Conduct surveys, inventories, and assessments of pre- and post-carp control effects on aquatic habitats.

- Pre-assessment of vegetation on Malheur Lake has been conducted; post SAV monitoring is planned as we move forward on carp control efforts.
- Researchers at LSU are currently working on a pilot restoration project focusing on Emergent Vegetation restoration and expansion. The final project proposal is currently being developed, with project implementation expected in spring 2021 (2 year project).

GOAL 2. Monitor, protect, maintain, and/or rehabilitate riverine habitats to conditions essential for the conservation of native fish and wildlife species.

Objective 2a. Riverine (rivers and associated tributaries terminating on the Refuge): Develop an Integrated Wetland/River Rehabilitation Plan and Associated NEPA Document with Partners
Throughout the life of the CCP, necessary information will be gathered to develop a comprehensive rehabilitation plan for targeted river systems and floodplain habitats. Information concerning biological, physical, and management attributes of these habitats will be gathered through specific assessments, pilot projects, and modeling (see Objectives 13b and 13c). This information will contribute to developing a decision support system that will allow comparisons among various alternatives in achieving management objectives and establish tools necessary to support development of a comprehensive riverine/wetland rehabilitation plan.

Strategies Applied to Achieve Objective
Initiate process necessary to complete wetland/riverine strategic plan and associated NEPA documentation.

- Resources were not available to address this strategy due to Malheur Lake requiring significant resources.

Objective 2b. Riverine
Throughout the life of the CCP, enhance and maintain the aquatic health of the riverine systems of Malheur Refuge for the benefit of redband trout and other priority resource species by doing inventory and monitoring of biotic and abiotic factors and conducting research pertaining to carp control.

Strategies Applied to Achieve Objective
Conduct baseline inventories of fish, wildlife, and vegetation to guide future management actions.

- Aquatic Health: mussel monitoring conducted 5 year intervals; no other species monitored at this time. A survey was completed the Summer 2018. Data filed in the common drive.
    - Annual baseline mussel inventories are being developed in 2021, with surveys officially beginning in 2022 (annual).
- Columbia Spotted Frog - believed to have 2 years of completed surveys but nothing current. Unable to continue the survey due to lack of knowledge of locations and survey needs. Received copy of survey from Chris Rombough. Hoping to survey sites in March 2021 for Columbia Spotted frogs as well as other amphibian species utilizing the refuge.

Conduct surveys, inventories, and assessments of pre- and post-carp control effects on aquatic habitats.

- No official surveys on aquatic habitats pre or post carp control were completed.

Conduct research to understand carp population dynamics and seasonal movements.

- Based on model outputs, the MNWR (OWEB Funds) has launched the *Carp Radio Telemetry Project*. The goal of this project is to identify vulnerabilities within the carp population that can be exploited via large scale removal actions. Spring 2021, researchers will implant and track (150) carp, setup/maintain stationary receivers (14) in a variety of environments (riverine/lacustrine), and conduct bi-weekly mobile tracking (airboat, trucks, airplanes). Data collected will help infer population-level behavior (i.e. habitat utilization and aggregations) both spatially and temporally. Ultimately, this project will provide novel insight into the behavior of carp in Malheur Lake, which then will be utilized to increase removal efficiencies.

Conduct research to understand relationships among water chemistry, water levels, and habitat/migratory bird responses in this habitat type.

- Little water chemistry or water level work has been done since the CCP. FWS Water Resources Division completed work in both of these areas prior to the CCP.
- USGS collected nutrient and sediment data from both the Blitzen and Silvies Rivers (2019-2020; Blitzen = Sodhouse; Silvies = Ruh Red Road). Researchers collected 10 samples annually at each location (20 total), with nutrient samples focused on high flow events. During two of the nutrient samples collected on the Blitzen River, researchers collected nutrients at two spatial disparate locations (Page Springs and Sodhouse).

GOAL 3. Protect, maintain, and rehabilitate riparian habitats to conditions essential for the conservation of wildlife species.

Objective 3a. Woody Riparian

Throughout the life of the CCP, enhance and maintain 1,000 to 1,500 acres of riparian shrub habitat on Malheur Refuge for the benefit of migratory land birds (e.g., yellow warbler (*Dendroica petechia*), willow flycatcher (*Empidonax traillii*)) and other wildlife.

- Wildlife: Landbird Point Count - Woody Riparian survey has completed its sixth year. This survey will asses trend in relative abundance and composition in land bird species in woody riparian habitats in Unit 12. Target species are Yellow Warbler and Willow flycatcher. Four year summary report was created by FWS Zone biologist, Jenny Barnett in early 2020. Report showed a slight decrease in yellow warbler abundance and a slight increase in abundance for willow flycatcher. Data is shared and save in Avian Knowledge Network database. Currently, the Klamath Bird Observatory is creating a more in depth analysis on the six years of data collected. In summer of 2020, a vegetation data was collected to helps correlate with the collected bird data. Another year of point count survey and vegetation data will be conducted in 2021 and added to the analysis prior to completing the final report in late 2021.

Strategies Applied to Achieve Objective
Improve native plant cover and distribution by active planting or seeding appropriate native species.

- Planted Red osier dogwood, Golden currant, and Wood's rose at Benson Pond with the help of Audubon volunteers and biologists in spring of 2021, or possibly 2022.
- Audubon work party checked on plants at Benson late summer 2018 and reported that most of the plants were doing well but might be overrun by willows that are coming in post fire.
- Working with Audubon biologist to complete future planting at Benson for 2019.

Exclude livestock from riparian habitats adjacent to meadow areas receiving grazing treatments (e.g., temporary or permanent fencing).

- Cattle are excluded from the Blitzen river, East and West canals, and Bridge Creek

Promote riparian shrub health (e.g., prescribed fire and mechanical removals to stimulate new growth and suckering), especially in decadent stands.

- 2014 treated 23 acres with prescribed fire within cottonwood pond, Knox fields, and Bridge Creek field.
- 2017 treated 2 acres within the Diamond Swamp prescribed fire unit.
- 2017 treated incidental stands of willow within Buena Vista ponds, and Suicide/Larson prescribed fire.
- 2018 treated incidental strips of willow along CPR road on Benson/S. White prescribed fire unit.

Permanently exclude grazing from streamside corridors (Appendix K).

- Cattle are excluded from the Blitzen river, East and West canals, and Bridge Creek

Manipulate soil moisture in riparian areas outside of the naturally occurring floodplain (e.g., flood irrigation associated with meadow management).

- Currently using water control structures to manipulate water levels throughout refuge
- Water was not manipulated beyond wet meadows and impoundments.

Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).

- Annual weed spraying program has been targeting invasive plants in willow understory along right of ways (i.e. CPR)

GOAL 4. Enhance, protect, and/or maintain primary habitats essential to the conservation of a diversity of aquatic and terrestrial wildlife species.

<u>Objective 4a. Palustrine Emergent (seasonally flooded wet meadow)</u>
Throughout the life of the CCP, enhance and maintain 22,000 to 27,000 acres of moist/wet meadow habitat on Malheur Refuge for the benefit of migratory birds (e.g., bobolink (*Dolichonyx oryzivorus*), sandhill crane (*Grus canadensis*), cinnamon teal (*Anas cyanoptera*)), and a diverse assemblage of other wildlife (e.g.,Columbia spotted frog (*Rana luteiventris*)).

Strategies Applied to Achieve Objective
Maintain/enhance management units within this habitat type through the use of prescribed fire, haying, rake-bunch grazing, and rest from defoliation.

- Haying and Rake-bunch Grazing: Used to remove litter during the dormant season
- Rest-rotation: Not being used at this time since there is not a habitat need
- Prescribed Fire (portion of the below units targeted the emergent plants, fields were previously treated through haying, leftover rake-bunch and stubble with-in fields did consume):

- 2020 - 1,700 acres in Willard, Hughett, Upper Swamp fields
- 2019 - 4,700 acres Bailey, Lincoln, W Swamp, N/S Jones, Faye, Baker fields
- 2018 - 335 acres in the Benson/S. White fields
- 2017 - 616 acres in suicide/Larson fields
- 2017 - 327 acres in Diamond Drain/Swamp fields
- 2015 - 6486 acres in South Malheur Lake
- 2014 - 1126 acres in North Deer Park (Cottonwood pond, Bridge Creek, Knox)
- 2013 - In South Malheur Lake Unit 7,631 acres prescribed fire was the only tool utilized

Maintain/enhance management units within this habitat type through the use of active successional vegetation management (e.g., seeding, disking, grazing, grain farming, etc.).

- Disking: 150 acres (2014)
- Pre/post CCP - Nothing to report (detailed records were kept on a hard drive that has been missing since the illegal occupation)

Use tolerance thresholds specific to each plant community as determined through the Malheur Refuge State-and-Transition Model (Appendix L) to influence management prescriptions to meet annual and long-term wet meadow habitat objectives.

- Data is being collected by both on and off the refuge in flood irrigated wet meadows for the State-and-Transition Model
- Off refuge, Harney Basin Wetlands is looking at plant communities and talking with landowners about management and shifting plant communities to get a sense of how management can/has lead to different plant communities
- EOARC is conducting research in treated vs non-treated in wet meadows. They have completed 6 years of observations and we have decided to keep the project going for at least another 3 years.
- The data shows that treatment is working at keeping invasive plants at low densities in the wet meadows

Use both winter and summer water rights in flood irrigation. Commencement and duration will depend on site-specific objectives.

- Winter and summer water was applied to wet meadow plant communities to meet habitat objectives

Modify dikes, ditches, and other infrastructure as needed to reclaim acres lost to cattail encroachment (e.g., Northwest Big Sagebrush field).

- Mow Dike Tops: Conducted annually in all substation management areas such as Double O, Buena Vista and P Ranch Units to prevent encroachment of cattails (ongoing)
- Ditch Cleaning: Diamond Drain, Skunk Farm, and S Sodhouse (2020)

Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).

- Chemical: Conducted annually with annual weed control program (ongoing)
- Mechanical: Conducted annually (2021)
- Horticultural: Conducted annually with volunteers and partners (ongoing)
- Biological: Nothing to report

Conduct baseline inventories of fish, wildlife, and vegetation to guide future management actions.

- Plant community data being collected for STM serves as baseline
- Columbia Spotted Frog - believed to have 2 years of completed surveys but nothing current. Received copy of survey from Chris Rombough. Continue survey in March 2021.

- Bobolink Survey conducted through Friends of Malheur NWR. Annual survey to compare historic and current monitoring results to understand likely land management impacts on local bobolink populations. Provides an opportunity for interested public to participate in a walking survey in the southern Blitzen Valley. Jenny Barnett ran analysis on survey and showed bobolink populations are well represented in the Land Bird Point Count Survey - Wet Meadow where bobolinks are recorded as a target species. With that said, the bobolink survey will no longer be a high priority survey and was removed from the Malheur NWR wildlife survey list.
- Land Bird Point Count Survey - Wet Meadows completed its seventh year of surveys. This survey will asses trend in relative abundance and composition in land bird species in woody riparian habitats in Unit 12. Target species are bobolink, western meadowlark, and savannah sparrow. A five year report was completed by Zone biologist, Jenny Barnett in early 2020. Data is shared and save in Avian Knowledge Network database, Malheur common drive and wildlife external drive. Currently, the Klamath Bird Observatory is creating a more in depth analysis on the seven years of data collected. In summer of 2020, a vegetation data was collected to helps correlate with the collected bird data. Another year of point count survey and vegetation data will be conducted in 2021 and added to the analysis prior to completing the final report in late 2021.
- Sandhill Crane Pair count finished seven years of surveys. This survey is a long term survey to help estimate Refuge breeding population for long term understanding of the role of Malheur NWR relating to the Central Valley Population. Trend data and maps of pair distribution are in the process. Data is saved in both Malheur NWR common drive and external wildlife hard drive.

Conduct surveys, inventories, and assessments of pre- and post-carp control effects on aquatic habitats.

- Carp monitoring will continue indefinitely as management of carp is established. Annual habitat monitoring will be implemented annually which includes SAV monitoring which is already monitored on Malheur Lake

Conduct research to understand carp population dynamics and seasonal movements.

- While not the main focus, mobile tracking during the Carp Radio Telemetry project will help elucidate seasonal movement of carp into the palustrine environments on the MNWR.

Conduct research to understand relationships among water chemistry, water levels, and habitat/migratory bird responses in this habitat type.

- Columbia Spotted Frog - believed to have 2 years of completed surveys but nothing current. Received copy of survey from Chris Rombough. Continue survey in March 2021.
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- There have been issues with the wells breaking, looking at replacing all the piezometer wells with galvanized pipe to reduce the amount of breakage.

Develop a model to predict habitat response based upon changes in biotic and abiotic factors in the habitat type.

- State-and-Transition Model is currently being developed
- Piezometers have been installed in the meadows to monitor water levels to plug into model. There have been issues with the wells breaking, looking at replacing all the piezometer wells with galvanized pipe to reduce the amount of breakage.

Enhance water control structures to stop the influx of spawning carp and juvenile rearing.

- Mobile tracking during the Carp Radio Telemetry project will help elucidate seasonal movement of carp into the palustrine environments on the MNWR.
- Annual minnow trapping initiated in 2020, is meant to identify carp spawning areas.
- Minnow trapping in combination with radio tracking will help MNWR elucidate water control structures that should be prioritized for enhancement to deter carp spawning.

Objective 4b. Palustrine Emergent (seasonally flooded marsh associated with wet meadow)

Throughout the life of the CCP, enhance and/or maintain 15,000 to 16,000 acres of emergent marsh on Malheur Refuge (excluding marshes associated with Malheur Lake) for the benefit of migratory birds (e.g., yellow-headed blackbird, sandhill crane, redhead, bittern, mallard) and a diverse assemblage of other wetland-dependent wildlife (beaver, muskrat, native amphibians, and reptiles). Emergent marsh generally occurs within a mosaic of moist/wet meadows.

Strategies Applied to Achieve Objective

Reduce extensive emergent cover using prescribed fire, disking, herbicides, and mowing.

- Emergent vegetation adjacent to wet meadows targeted by prescribed fire:
    - 2020 - 1,700 acres Willard, Hughett, Upper Swamp fields
    - 2019 - 4,700 acres Bailey, Lincoln, W Swamp, N/S Jones, Faye, Baker fields
    - 2018 - 337 acres (Benson/S. White fields)
    - 2018 - 104 acres (Knox Swamp)
    - 2017 - 154 acres (Suicide/Larson fields)
    - 2017 - 2616 acres (Diamond Drain/Swamp fields)
    - 2015 - 1145 acres (South Malheur Lake)
    - 2014 - 668 acres in North Deer Park (Cottonwood pond, Bridge Creek, Knox)
- Mowing (associated with the haying and grazing): Conducted annually to keep emergent plant from encroaching into wet meadows (ongoing)
- Disking: 105 150 acres (2014)
- Pre/post CCP: Nothing to report (detailed records were kept on a hard drive that has been mossing since the illegal occupation)

Facilitate treatment of extensive emergent plants and/or carp control using periodic drawdowns.

- Draw down and prescribed fire on Knox Swamp in early 2018 to control emergent plants. Treatment went well and opened up a few areas, looking to add chemical treatment to open up the pond more to achieve a 1:1 open water to emergent ratio

- Extensive structures are being investigated in the long term to establish drawdown capabilities for Malheur lake. No anticipated date at this time.
- Draw down for Boca Lake in 2019 and 2020 in order to allow for submerge aquatic vegetation to grow as well as other native plants.

Ensure water delivery and management through maintenance or enhancement of infrastructure (e.g., delivery ditches, water control structure)

- Ditches/Infrastructures: Cleaned annually as needed (ongoing)
- Water Delivery: Manipulate water per the annual Water Management Plan (ongoing)

Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).

- Chemical: Conducted annually with annual weed control program (ongoing)
- Mechanical: Conducted annually (ongoing)
- Horticultural: (conducted annually with the help volunteers and partners (ongoing)
- Biological: Nothing to report
- P Ranch: Have shown a decline in weeds in the open areas showing that active treatments are working for weeds like perennial pepperweed and thistle (2018)
- Double O Area: More effort put into the weed suppression program due to infestation (2018)

Conduct baseline inventories of fish, wildlife, and vegetation to guide future management actions.

- Sandhill Crane Pair count finished seven years of surveys. This surveys is a long term survey to help estimate Refuge breeding population for long term understanding of the role of Malheur NWR relating to the Central Valley Population. Trend data and maps of pair distribution are in the process. Data is saved in both Malheur NWR common drive and external wildlife hard drive.
- Marshbird Survey completed five years of surveys. Conducted survey areas include Buena Vista and the Double 0. Purpose of the survey is to estimate focal marsh bird species, distribution and relative abundance. Three year report was created in early 2019 by FWS Zone biologist, Jenny Barnett. Report showed only 6 of the 11 species were present on the study area: American bittern (*Botaurus lentiginosus*), American coot (*Fulica americana*), pied-billed grebe (*Podilymbus podiceps*), sora (*Porzana carolina)*, Virginia rail (*Rallus limicola*), and Wilson's snipe (*Gallinago delicata*). Least bittern (*Ixobrychus exilis*), yellow rail (*Coturnicops noveboracensis*), black tern (*Chlidonias niger*), Clark's grebe (Aechmophorus clarkii), and eared grebe (*Podiceps nigricollis*) were not detected. Overall, sora, American coot, and Virginia rail were the most abundant. Full report is anticipated after a five year completion of survey. Data is shared and save in Avian Knowledge Network database.
- Baseline fish inventories will be conducted when carp management plan is completed. Anticipated by FY20.

Conduct surveys, inventories, and assessments of pre- and post-carp control effects on aquatic habitats.

- Control efforts are still being proposed. Surveys and inventories will be conducted when carp management plan is completed. Anticipated by FY20.

Conduct research to understand carp population dynamics and seasonal movements.

- While not the main focus, mobile tracking during the Carp Radio Telemetry project will help elucidate seasonal movement of carp into the palustrine environments on the MNWR.

Conduct research to understand relationships among water chemistry, water levels, and habitat/migratory bird responses in this habitat type.

- Marshbird Survey completed five years of surveys. Conducted survey areas include Buena Vista and the Double 0. Purpose of the survey is to estimate focal marsh bird species, distribution and relative abundance. Three year report was created in early 2019 by FWS Zone biologist, Jenny Barnett. Report showed only 6 of the 11 species were present on the study area: American bittern (*Botaurus lentiginosus*), American coot (*Fulica americana*), pied-billed grebe (*Podilymbus podiceps*), sora (*Porzana carolina)*, Virginia rail (*Rallus limicola*), and Wilson's snipe (*Gallinago delicata*). Least bittern (*Ixobrychus exilis*), yellow rail (*Coturnicops noveboracensis*), black tern (*Chlidonias niger*), Clark's grebe (Aechmophorus clarkii), and eared grebe (*Podiceps nigricollis*) were not detected. Overall, sora, American coot, and Virginia rail were the most abundant. Full report is anticipated after a five year completion of survey. Data is shared and save in Avian Knowledge Network database.
- Piezometers have been installed in adjacent wet meadows to monitor water levels

Develop a model to predict habitat response based upon changes in biotic and abiotic factors in the habitat type.

- There are a mosaic of these marshes in the wet meadows and some of these have fallen in survey points but these are not being actively targeted at this time since the higher priority lies in the wet meadows and reed canary grass encroachment

Enhance water control structures to stop the influx of spawning carp and juvenile rearing.

- Mobile tracking during the Carp Radio Telemetry project will help elucidate seasonal movement of carp into the palustrine environments on the MNWR.
- Annual minnow trapping initiated in 2020, is meant to identify carp spawning areas.
- Minnow trapping in combination with radio tracking will help MNWR elucidate water control structures that should be prioritized for enhancement to deter carp spawning.

Objective 4c. Palustrine Open Water/Emergent (semipermanently flooded wetland impoundment)

Throughout the life of the CCP, protect and maintain 2,200 to 2,800 acres of semipermanently flooded wetland impoundments on Malheur Refuge for the benefit of migratory birds (e.g., trumpeter swans, sandhill crane, redheads, mallards, soras, Virginia rails, colonial waterbirds) and other wetland-dependent species (beaver, muskrat, native amphibians and reptiles).

Strategies Applied to Achieve Objective

Deliver and manage water through maintenance or enhancement of infrastructure (e.g., delivery ditches, water control structure).

- Infrastructures: Annual maintenance such as fish screens, dams, fish ladders, etc. (ongoing)
- Water Delivery: Manipulate water per annual Water Management Plan (ongoing)
- Enhanced East Canal infrastructure to manage water in Benson Pond (2018)

Address needs associated with spotted frog refugia in identified areas (e.g., East Canal, Five Mile Spring within West Canal, etc.).

- Columbia Spotted Frog - believed to have 2 years of completed surveys but nothing current. Unable to continue the survey due to lack of knowledge of locations and survey needs. Received copy of survey from Chris Rombough. Hoping to survey sites in March 2021 for Columbia Spotted frogs as well as other amphibian species utilizing the refuge.

Use prescribed fire to remove extensive emergent cover.

- As a portion of an overall prescribed fire unit:
    - 2020 No prescribed fire

- 2019 No prescribed fire
- 2018 Benson Pond 250 acres
- 2017 East and West BV ponds 569 acres
- 2014 burned East and West Knox 550 acres

Use disking to remove extensive emergent cover.

- Disking: 150 acres (2014) *It is likely that the disking was completed either Wright's pond and/or Knox ponds. Since the water table sits high in the soil, disking in these areas appeared to accelerate cattail growth.
- Pre/Post CCP: Nothing to report (detailed records were kept on a hard drive that has been missing since the illegal occupation)

Use mowing to remove extensive emergent cover.

- Mowing: Found to slow down the expansion of emergent plants when treatments occur on edge of emergent plants (2018)

Apply herbicide(s) to control emergent plants.

- Buena Vista ponds: Helicopter treatment (2016)
- Planning to use chemical to open up new areas in Knox Swamp (2018)
- Have used herbicide to open up areas of heavy bulrush (2018)

Experiment with grazing as a tool in monotypic stands of emergent cover to set back succession.

- Ongoing project by OSU looking at grazing as a treatment in reed canary grass monocultures adjacent to impoundments wrapping up the 4th season. There were water management and communication issues with this project that reduced the value of data. Corrections have been made. (2018)

Manage water levels by flooding up and drawing down for habitat and carp management.

- Performed a multi season drawdown on the Knox ponds to reduce Tui chub populations creating turbid water
- Drawdown on Knox swamp for prescribed burn to reduce emergent plants
- Drawdown Boca Lake in 2019 and 2020 to increase vegetation productivity. One third of the impoundment will be filled in 2021.
- Extensive structures are being investigated in the long term to establish drawdown capabilities for Malheur lake. No anticipated date at this time.

Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).

- Gathering information for proposal on using multiple tools to control invasive plants in the impoundments (2018)

Conduct baseline inventories of fish, wildlife, and vegetation to guide future management actions.

- NABat Monitoring Program coordinated by Jenny Barnett, Zone biologist, in the I&M Program. Using acoustic bat detectors to monitor bat presence on the refuge. Twelve species of bats have been detected utilizing the refuge as a resource. Reports are saved under the Malheur NWR common drive and wildlife external hard drive.
- Duck banding with Oregon Department of Fish and Wildlife twice annually at Summer Lake Wildlife Area and Malheur NWR. Data is collected by ODFW. A copy is sent to the refuge and is stored in the common drive and external wildlife drive.

- Impoundment Bird Survey monitor waterfowl brood use and number in association with water management and drawdowns of impoundments. Completed seven years of surveys. A six year report was completed in early 2020 by Jenny Barnette, FWS Zone biologist. Report focused on seven impoundments located in the south end of the refuge. Waterfowl and coots were the most numerous groups, followed by shorebirds, wading birds and grebes. Overall, Boca had the highest in numbers due to the large area. With that said, looking at population density with overall pond size, Benson pond would have the highest number in count by ratio, followed by Boca and then Darnell. Main waterfowl observed were gadwall (*Mareca strepera*), mallard (*Anas platyrhynchos*), cinnamon teal (*Anas cyanopter*) and red heads (*Aythya americana*). In 2020, surveys were expanded to impoundments located at Buena Vista Unit as a pilot project to see waterfowl density and productivity. Due to deeper water a higher concentration on American coots (*Fulica americana*), red heads (*Aythya americana*), and ruddy ducks (*Oxyura jamaicensis*). In 2021, we hope to refine survey points on BV and continue expanding surveys. Data saved on an Access file in the Malheur NWR common drive and external wildlife drive.
- Trumpeter Swan - Pair Count long term survey to understand the distribution, abundance and reproductive success of trumpeter swans. Malheur NWR has two stable pairs. One on Benson and the other will be around Boca or Mud Creek pond. Benson pair has shown success in producing cygnets when resources are available. Collard swans Θ76, 2@1, and Θ64 have all been seen throughout the refuge. With that said, Θ64 mate has not been seen since summer of 2020. Θ76 has been seen at Summer Lake Wildlife Area, in Summer Lake, OR with a collard male. As of now we only have two collard females at MNWR.
- Trumpeter Swan - Production long term survey to monitor the status and success of the refuge nesting population of trumpeter swans.
- Trumpeter Swan - Winter Survey long term survey to inform a regional effort to estimate the distribution and total number of wintering swans in Western North America. Malheur NWR has a high concentration of migrating Trumpeter and Tundra Swans utilizing current established impoundments and Crane field. Number of swans seem to be higher when water levels on the refuge are higher.
- All Trumpeter Swan data is saved in the Malheur common drive and external wildlife drive.
- SAV work being done with I&M program is being plugged into STM for future use. 2020, six ponds were surveyed and data was entered into the Survey123 data base created by FWS.
- Baseline fish inventories will be conducted when carp management plan is completed. Anticipated by FY20.

Conduct surveys, inventories, and assessments of pre- and post-carp control effects on aquatic habitats.

- Control efforts are still being proposed. Surveys and inventories will be conducted when carp management plan is completed. Anticipated by FY20.

Conduct research to understand carp population dynamics and seasonal movements.

- While not the main focus, mobile tracking during the Carp Radio Telemetry project will help elucidate seasonal movement of carp into the palustrine environments on the MNWR.

Conduct research to understand relationships among water chemistry, water levels, and habitat/migratory bird responses in this habitat type.

- NABat Monitoring Program coordinated by Jenny Barnett, Zone biologist, in the I&M Program. Using acoustic bat detectors to monitor bat presence on the refuge. Twelve species of bats have been detected utilizing the refuge as a resource. Reports are saved under the Malheur NWR common drive and wildlife external hard drive.
- Impoundment Bird Survey monitor waterfowl brood use and number in association with water management and drawdowns of impoundments. Completed seven years of surveys. A six year

report was completed in early 2020 by Jenny Barnette, FWS Zone biologist. Report focused on seven impoundments located in the south end of the refuge. Waterfowl and coots were the most numerous groups, followed by shorebirds, wading birds and grebes. Overall, Boca had the highest in numbers due to the large area. With that said, looking at population density with overall pond size, Benson pond would have the highest number in count by ratio, followed by Boca and then Darnell. Main waterfowl observed were gadwall (*Mareca strepera*), mallard (*Anas platyrhynchos*), cinnamon teal (*Anas cyanopter*) and red heads (*Aythya americana*). In 2020, surveys were expanded to impoundments located at Buena Vista Unit as a pilot project to see waterfowl density and productivity. Due to deeper water a higher concentration on American coots (*Fulica americana*), red heads (*Aythya americana*), and ruddy ducks (*Oxyura jamaicensis*). In 2021, we hope to refine survey points on BV and continue expanding surveys into Double O. Data saved on an Access file in the Malheur NWR common drive and external wildlife drive.

- Water chemistry, lake stage, and other elements related to lake conditions are being studied to determine the relationship to the invasive common carp. The monitoring is ongoing but, is compiled annually to give a snapshot of the lake. Data analysis will be completed for FY18 by winter of 2019 and submitted to aquatic health biologist to be filed in the common drive.

Develop a model to predict habitat response based upon changes in biotic and abiotic factors in the habitat type.

- Regional I&M is working towards STM for SAV and emergent plantss in impoundments. STM was completed in early 2019. SAV surveys are continued in a three year cycle throughout MNWR. Six ponds were sampled in 2020 and data was entered in the Survey123 data base created by FWS.
- Surveys have been completed for 5 years, statistics currently being ran to test survey protocol. They are hoping to be able to get statistically significant results with a different protocol that will allow for more data collection each year.

Enhance water control structures to stop the influx of spawning carp and juvenile rearing.

- Mobile tracking during the Carp Radio Telemetry project will help elucidate seasonal movement of carp into the palustrine environments on the MNWR.
- Annual minnow trapping initiated in 2020, is meant to identify carp spawning areas.
- Minnow trapping in combination with radio tracking will help MNWR elucidate water control structures that should be prioritized for enhancement to deter carp spawning.

Objective 4d. Dry Meadow

Throughout the life of the CCP, enhance or maintain 4,500 to 5,000 acres of dry meadows on Malheur Refuge for the benefit of nesting migratory birds (e.g., cinnamon teal, northern pintail, savannah sparrow) and a diverse assemblage of other species (e.g., small mammals).

Strategies Applied to Achieve Objective

Use agricultural practices (e.g., haying, grazing) to maintain/enhance fields to meet the habitat objective. Treatments may be applied during the growing season or dormancy, depending on a science based rationale.

- Hay/Grazing: Used annually that are associated with wet meadows during the dormant season (ongoing)
- Dry meadows in Double O currently sitting idle but receive chemical treatment for pepperweed and thistle (2018)
- APHIS treated 3,750 acres of dry meadow around the north and east sides of Malheur Lake and near Mud Lake for grasshoppers (2017). The chemical used is called Dimilin and it targets chitin production and stops grasshoppers from growing new exoskeletons as they mature. The chemical

only targets chitin production and is safe to use around non-insects. Surveys were also completed by ODA for 4 months prior to application of pesticide to monitor grasshopper movement and concentrations. We looked at milkweed locations to ensure that we weren't impacting Monarchs and we put a half mile buffer around water.

Objective 4e. Salt Desert Scrub

Throughout the life of the CCP, protect and maintain 40,000 acres of salt desert scrub for the benefit of breeding migratory birds (e.g., sage thrasher, sage sparrow) and other native wildlife species (e.g., kangaroo rats (*Sorex preblei*), grasshopper mouse (*Onychomys leucogaster*)) on Malheur Refuge.

Strategies Applied to Achieve Objective

Protect existing sensitive sites with microbiotic crusts.

- Grazing is not allowed in these areas (ongoing)

Use prescribed fire depending on site-specific factors.

- 2014: North Deer Park RX unit of 2251 acres, an estimated 338 acres of Salt Desert Scrub was treated with fire (2014)
- 2015: South Malheur Lake RX of 7,631 acres, an estimated 200 acres of Salt was treated with fire

Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).

- There are higher priority areas to spray, the soil type keeps these areas less impacted by target weeds (2018)

Objective 4f. Sagebrush Lowland

Throughout the life of the CCP, protect and maintain 4,300 to 4,500 acres of lowland big sagebrush habitats (e.g., basin big sagebrush, Wyoming big sagebrush, basin wildrye, Indian ricegrass, Sandberg's bluegrass, bottlebrush squirreltail, etc.) for the benefit of ground nesting migratory birds (e.g., gadwall, short-eared owl, meadowlark) and a diverse assemblage of native species (e.g., small mammals).

Strategies Applied to Achieve Objective

Use prescribed fire.

- 2014: North Deer Park RX unit of 2251 acres, an estimated 68 acres of Sage Lowland was treated with fire

Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).

- Currently working with BLM through CWMA on a Medusa head rye project adjacent to the refuge to prevent spread on refuge lands (2018)

Objective 4g. Sagebrush Steppe

Throughout the life of the CCP, protect and maintain 15,500 acres of sagebrush steppe upland habitat on Malheur Refuge for the benefit of migratory landbirds (e.g., sage sparrow, brewer sparrow, sage thrasher) and a diverse assemblage of other sagebrush obligate species (e.g., jackrabbit, mule deer).

Strategies Applied to Achieve Objective

Add diversity to crested wheatgrass monocultures using best science practices (i.e., Krumbo research project).

- EOARC conducted study in crested seedings on the Refuge and study results show low probability of success and treatments are expensive (2018)

Mimic natural disturbance process in sagebrush communities using mechanical and chemical methods to promote bunchgrasses and forbs.

- No treatments have been completed to date (2018)
- Planning on working with previous refuge staff and EOARC to look at options for the future (2018)

Seed desirable grasses and forbs.

- No seedings done

Use prescribed fire, where appropriate, and based upon site-specific conditions.

- Prescribed Fire: 336 acres of hand and mechanical Western Juniper piles were burned in the Warmsprings area of Sagebrush Steppe on the South end of the Refuge (2015)

Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).

- Currently working with BLM through the CWMA on a Medusa head rye project adjacent to the refuge to prevent spread on refuge lands (2018)

Objective 4h. Dune

Throughout the life of the CCP, protect and maintain 6,300 acres of dune habitat on Malheur Refuge.

Strategies Applied to Achieve Objective

Protect dune areas from disturbance (e.g., well-maintained boundary fences).

- Dunes continue to be monitored for active archeological looting (ongoing)
- Funding received to address boundary fence/trespass livestock (2018)

Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).

- The dunes fall in a Wilderness Study Area and to minimize disturbance we do not treat unless absolutely necessary (ongoing)

Objective 4i. Playa

Throughout the life of the CCP, protect and maintain 29,000 acres of playa on Malheur Refuge for the benefit of migratory birds (e.g., snowy plover) and associated guilds.

- Snowy plover surveys were conducted on Stinking Lake and Harney lake in 2019. In 2020 only Stinking Lake was surveyed. Looking to continue survey in summer 2021. Possibly looking to collaborate with Charlie Bruce (retiree biologist for ODFW) to work on a state wide snowy plover survey. May occur in summer of 2021 or possibly in 2022.

Strategies Applied to Achieve Objective

Prevent freshwater irrigation from negatively impacting water chemistry.

- There hasn't been any changes to infrastructure in these areas and nothing has appeared to change that would suggest that the water chemistry has been altered (ongoing)

Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).

- To minimize disturbance there is no treatment unless absolutely needed (ongoing)

Objective 4j. Provide Agricultural Crops for Migratory Waterfowl and Sandhill Cranes

Strategies Applied to Achieve Objective
Use traditional agricultural practices (cultivating, seeding, fertilizing) to produce grain crops.

- Cultivated ~160 acres of triticale for Sandhill crane use
- Sandhill Crane utilization was minimal. Continuation of this program needs to be evaluated. Triticale is currently thriving with volunteer seeds. In fall of 2018 habitat biologists looked at adding plant diversity to the grain to both help replenish the soil and keep weed competition down.

Conduct cropland management through cooperative farming agreement and/or refuge staff.

- Refuge staff has been cultivating crop (2018)
- Farming program: Needs to be evaluated for continuation (ongoing)

Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).

- Chemical: Annually in areas of right-of ways next to fields and/or spot spraying near fields (ongoing)
- Mechanical: Nothing to report
- Horticultural: Nothing to report
- Biological: Nothing to report

GOAL 5. Enhance and maintain rare and unique habitats.

Objective 5a. Cold and Hot Springs
Throughout the life of the CCP, protect and maintain 230 to 250 acres of cold and hot springs, associated pools, and vegetative habitats on Malheur Refuge for the benefit of a diverse assemblage of native plants, fish, and wildlife species (e.g., Columbia spotted frog, endemic invertebrates).

Strategies Applied to Achieve Objective
Secure/adjudicate groundwater rights to protect cold and hot springs.

- The major springs on the Refuge occur in the Double O unit. These springs originate on and never leave the Refuge. The Refuge did file for water rights on these springs and has received a permit from Oregon Water Resources Department. Refuge is in process of proving up on the permit. (2018)

Protect spring habitat to provide a stable permanent water source for Columbian spotted frogs.

- Columbia Spotted Frog - believed to have 2 years of completed surveys but nothing current. Unable to continue the survey due to lack of knowledge of locations and survey needs. Received copy of survey from Chris Rombough. Hoping to survey sites in March 2021 for Columbia Spotted frogs as well as other amphibian species utilizing the refuge.

Protect spring habitat areas from undesirable, preventable disturbance (i.e., livestock grazing, traffic, etc.).

- Springs in the Double O unit are excluded from treatment (haying and grazing) (ongoing)

Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).

- Due to low density of invasive plants no need for treatment (ongoing)

Conduct baseline inventories of fish, wildlife, and vegetation to guide future management actions.

- Columbia Spotted Frog - believed to have 2 years of completed surveys but nothing current. Unable to continue the survey due to lack of knowledge of locations and survey needs. Received copy of survey from Chris Rombough. Hoping to survey sites in March 2021 for Columbia Spotted frogs as well as other amphibian species utilizing the refuge.
- No vegetation surveys are completed at this time, priority is currently in wet meadows and semi-permanent impoundments
- Baseline fish inventories will be conducted when carp management plan is completed. Anticipated by FY20.

Conduct surveys, inventories, and assessments of pre- and post-carp control effects on aquatic habitats.

- No work has been performed

Conduct research to understand carp population dynamics and seasonal movements.

- While not the main focus, mobile tracking during the Carp Radio Telemetry project will help elucidate seasonal movement of carp into the palustrine environments on the MNWR.

Conduct research to understand relationships among water chemistry, water levels, and habitat/migratory bird responses in this habitat type.

- Water chemistry analysis on some of the Double O springs was completed by FWS Water Resources. High mineral content could be limiting plant growth in the springs but has not been confirmed. Some additional information was also collected as part of the Oregon Water Resources Groundwater study.

Develop a model to predict habitat response based upon changes in biotic and abiotic factors in the habitat type.

- No work has been performed due to higher priorities

Objective 5b. Cliffs, Rimrock, and Lava Flows

Throughout the life of the CCP, protect and annually maintain cliff, rimrock, and lava flow habitats for the benefit of migratory birds (e.g., golden eagle, prairie falcon) and a diverse assemblage of native, cliff/canyon-dependent wildlife (e.g., bat species, marmot) on Malheur Refuge.

- Golden Eagle Nest Survey - Malheur NWR contributes observations to the current 10-year statewide Golden Eagle nest monitoring project conducted OEF. In addition, Malheur NWR is a priority area by USF WGET as a long-term density study area due to the comprehensive and long-term data set for this species. In 2017, we contributed monitoring observations from 19 current and historical territories on or near the refuge boundaries. Surveys continue to be conducted by partners.
- Mid-winter Bald Eagle Surveys is an annual survey collaborating with the US Forest Service to collect an estimate of migratory bald eagles in the Harney Basin. Data is collected and given to the USFS biologist, Roy Sutcliffe, for reporting. Surveys are located in historic areas where bald eagle numbers have been abundant, such as, Sodhouse Ranch, Head Quarters, and P-Ranch. In 2019 we have recorded first successful bald eagle nest at Sodhouse Ranch.
- NABat Monitoring Program coordinated by Jenny Barnett, Zone biologist, in the I&M Program. Using acoustic bat detectors to monitor bat presence on the refuge. Twelve species of bats have been detected utilizing the refuge as a resource. Reports are saved under the Malheur NWR common drive and wildlife external hard drive.
- Collaborate with ODFW to test for white-nose syndrome at known rookery sites. In the past three years, MNWR has tested negative.

Strategies Applied to Achieve Objective
Prohibit mining and rock removal, except by the Refuge and according to valid permits for use of existing gravel/rock pits.

- On-going (ongoing)

Prohibit rock climbing.

- In effect (ongoing)

GOAL 6. Welcome visitors and offer them a safe experience of the Refuge's outstanding features: diversity of wildlife, signs of earlier inhabitants, scenic landscapes, and solitude. As a result, visitors will leave the Refuge with a memorable experience that fosters a connection between themselves and nature, and with an appreciation of Malheur Refuge's unique resources.

Objective 6a. Provide Welcome and Orientation to Visitors

Strategies Applied to Achieve Objective
Continue to maintain and update existing modern and traditional media (website, brochures, Flickr account, etc.) to reach and orient visitors. Use other modern media as appropriate.

- General Brochure: In process of being reviewed for printing (2021)
- Refuge Tear Sheet: Updated (2021)
- Watchable Wildlife Brochure: Updated (2019)
- Blitzen Valley Auto Tour: Updated (2019)
- Blitzen Valley Auto Tour Podcast: Friends of Malheur National Wildlife maintains podcast (2014)
- Trail Brochure: Updated (2021)
- Fishing Brochure: In process of being reviewed for printing (2021)
- Hunting Brochure: Waiting to be revised with USFWS approval of proposal (2021)
- Website: Updated, but due to staffing reductions and lack of training the website is managed by Visitor Services in the Regional Office (2020)
- Facebook: Friends of Malheur National Wildlife Refuge maintains and updates account (ongoing)

Develop step-down plans for outdoor panels, facilities, and signs.

- Signage Step-down Plan (facility, roadside directional signs, trailheads, kiosks, and site orientation panels): Completed (2019)
- Interpretive Exhibits Step-down Plan (Visitor Center exterior and interior exhibits): Completed (2019)

Continue to maintain and update four existing outdoor panels to welcome and orient visitors at:
Narrows Pull-Out

- Under direction of the Signage Step-down Plan, a welcome and orientation panel is no longer needed at this location (2019)
- Refuge Headquarters
- Completed (2016)
- Buena Vista
- Completed (2016)
- Frenchglen

- Completed (2016)

Develop additional outdoor welcome and orientation panels at:
Krumbo Reservoir
- Completed (2016)

P Ranch
- Competed (2016)

Harney Lake
- Nothing to report

Double-O
- Nothing to report

Maintain existing developed sites with visitor amenities such as picnic tables, shelters, and vault toilets at:
Refuge Headquarters
- Picnic Tables: Eight recycled plastic picnic tables (3 ADA) located in three different locations, deck, lawn area, and at pavilion (ongoing)
- Replaced/upgraded sidewalks for ADA compliant access (2019)
- Shelters: A 20' x 28' pavilion built near Marshall Trail (2013)
- Public Restrooms: Remodeled (2016)

Buena Vista
- Vault Toilet: Replaced (2020)

Krumbo Reservoir
- Picnic Tables: Four aluminum picnic tables located near metal shelter at parking area (2013)
- Vault Toilets: Replaced two vault toilets (2020)

P Ranch
- Picnic Tables: One aluminum picnic table located near vault toilet (2013)
- Vault Toilets: Replaced (2020)

Provide additional developed sites:
Complete Developed Sites
Double-O
- Nothing to report

Vault Toilet Only
Sod House Ranch
- Nothing to report

Picnic Tables and Shelters Only
Refuge Headquarters (ADA-compliant)
- Picnic Tables: Three ADA compliant picnic tables locates in three different locations, deck, lawn area, and at pavilion (ongoing)
- Shelters: A 20' x 28' pavilion built near Marshall Trail (2013)

Buena Vista Overlook
- Nothing to report

P Ranch
- Nothing to report

Build an enlarged visitor contact station and gift shop at Refuge Headquarters.

- Nature Store was relocated to a separate building to allow larger space for both opportunities (2018)

Enhance George Benson Memorial Museum to meet ADA standards and meet preservation standards to protect specimens.

- Museum complaint with ADA standards (2008)
- Friends of Malheur National Wildlife Refuge: Lead on inventory and recording museum specimens and developing a Preservation Site Plan to incorporate an outreach program (2020)

Establish a seasonal contact station at P Ranch, and provide staffing as available with volunteers during spring, summer, and fall.

- Established a Roving Docent volunteer position that accesses public roads on the Refuge to welcome and orient visitors, which includes P Ranch (2013)

Continue to consider/participate in discussions for an interagency visitor facility off-refuge.

- Nothing to report

Objective 6b. Address Transportation Issues and Concerns

Develop a transportation plan for existing and needed roads, bridges, pull-outs, access points, parking areas, trails, and other elements of transportation infrastructure that support public uses and refuge management needs as identified within other CCP objectives.

Strategies Applied to Achieve Objective

Continue to maintain existing refuge public roads:

42-mile Blitzen Valley auto tour route (Center Patrol Road)

- Maintained twice a year, or as needed (ongoing)

Krumbo Reservoir

- Maintained twice a year, or as needed (ongoing)

P Lane

- Maintained twice a year, or as needed (ongoing)

Enhance the following refuge public roads:

Boating Landing Road

- No longer a public access road due to Site Security Plan/Employee Safety (2016)

East Canal Road to the confluence of Bridge Creek

- Maintained twice a year, or as needed (ongoing)
- Replaced Bridge Creek Bridge with temporary structure (2019)

Double-O

- Maintained twice a year, or as needed (ongoing)

Saddle Butte hunt access

- Road work completed (2014)
- Step-down Plan being developed to improve road access (2021)

Continue to maintain a variety of vehicle pull-offs (one or two vehicle lengths) on the 42-mile Blitzen Valley auto tour route (Center Patrol Road) and develop the following additional vehicle pull-offs to assist with wildlife observation and wildlife/nature photography, hunting, and fishing programs:

Boating Landing Road

- No longer a public access road due to Site Security Plan/Employee Safety (2016)

East Canal Road to the confluence of Bridge Creek

- Developed several vehicle pull-offs (2016)

- Maintained twice a year, or as needed (ongoing)

Maintain existing parking areas and develop the following parking areas to assist with wildlife observation and wildlife/nature photography, hunting, and fishing programs:
Bridge on Boat Landing Road
- No longer a public access road due to Site Security Plan/Employee Safety (2016)

Airboat launch site (to ADA standards)
- No longer a public access road due to Site Security Plan/Employee Safety (2016)

East Canal at the confluence of Bridge Creek
- Parking area developed at the confluence of Bridge Creek (2016)
- Maintained twice a year, or as needed (ongoing)

Work with local and State governments to identify alternative funding sources and cost-sharing opportunities for maintenance of and improvements to the transportation system to and through the Refuge.
- Submitted a Federal Lands Access Program grant application to construct improvements on State Highway 205 (2018)
- Coordinating recent efforts for improvements (ongoing)

Partner with the Federal Highway Administration, ODOT, local county road departments, and others to develop the transportation plan and safety audit.
- The Refuge does not have the capacity to accomplish this strategy due to staff reductions (2016)

GOAL 7. Connect the hearts and minds of visitors with the places and resources the Refuge protects, and enlighten visitors' experiences with an understanding of, appreciation for, and knowledge about historic and natural resources, and the importance of conservation and stewardship.

Objective 7a. Provide Wildlife Observation and Wildlife/Nature Photography Opportunities to the Casual Visitor and Beginning to Moderate Birders

Strategies Applied to Achieve Objective

Continue to provide docent-led tours in conjunction with the annual John Scharff Migratory Bird Festival.
- Friends of Malheur National Wildlife Refuge: Annually (2013-2021)
- Portland Audubon: Annually (2014-2021)

Advertise and provide docent-led tours, approximately monthly, to a variety of audiences for the purposes of viewing wildlife and habitats at different locations on the Refuge. Tours may include kayaking or canoeing on Malheur Lake. Encourage advanced birders to volunteer to lead docent-led tours for the general public and groups.
- Friends of Malheur National Wildlife Refuge: Yearly (2013-2021)
- Portland Audubon: Yearly (2014-2021)
- Kayaking or Canoeing Tours on Malheur Lake: Been visited several times to discuss if this opportunity is viable due to visitors safety, equipment, time, etc. (2013)

Continue to maintain existing refuge public roads on the 42-mile auto tour route (Center Patrol Road), Krumbo Reservoir, and P Lane.
- Maintained twice a year, or as needed (ongoing)

Provide additional vehicle access year-round, except when road conditions are hazardous, at Boat Landing Road, Krumbo Reservoir, and East Canal Road to confluence of Bridge Creek.

- Krumbo Reservoir (2013)
- East Canal Road (2016)

Participate in Basin and Range Birding Trail on-refuge with Harney County Chamber of Commerce and other partners.

- Nothing to report

Provide trails listed below. Mark all existing and new trailheads with trail signs (e.g., TAI).

Spur Trail

Frenchglen to Barnes Springs Footpath

- Completed (2019)

Loop Trails (≥1 mile)

Refuge Headquarters along the Blitzen River and Display Pond (Headquarters Loop Trail)

- Marshall Trail developed (2012)
- Loop Trail: Listed on Friends of Malheur National Wildlife Refuge annual work plan (2019)

Connect Bridge Creek Trail, River Trail, and East Canal Trail with pedestrian crossings and Boardwalks

- Friends of Malheur National Wildlife Refuge: Discussed to be considered as part of their annual work plan (2018)
- ONDA: Trail designer has been discussed to evaluate this area (2020)

ADA-compliant Trails

Sections of Headquarters Loop Trail

- Marshall Trail developed (2012)
- ADA-compliant (2019)

Sod House Ranch (upgrade to ADA standards)

- Nothing to report

Benson Pond

- Portland Audubon: Discussed resurfacing the trail with weed cloth and gravel (2016)

P Ranch

- Friends of Malheur National Wildlife Refuge: Listed on Friends of Malheur National Wildlife Refuge annual work plan (2019)

Propose alternative route to enhance the Desert Trail and post appropriate Desert Trail signs at logical Locations.

- Desert Trail Association no longer exist (2020)
- ONDA: Responsible for trail and work is on hold (2020)

Observation and Photography Features

Provide viewing features listed below and develop step-down plans for viewing overlooks and platforms.

Viewing Overlooks

Krumbo Reservoir (ADA-compliant)

- Nothing to report

Elevated Viewing Platforms

Historic CCC lookout tower at Refuge Headquarters

- Nothing to report

Malheur Lake at airboat launch site

- This site is located on the Boat Landing Road, which is no longer a public access road due to Site Security Plan/Employee Safety (2016)

Harney Lake

- Nothing to report

Double-O

- Nothing to report

Restore historic Audubon photography blind at Refuge Headquarters Display Pond.

- Completed (2012)
- Friends of Malheur National Wildlife Refuge: Improved with modifications (2021)

Provide two ADA-compliant, first-come/first-served permanent photography blinds for high-quality wildlife photography at appropriate locations.

- Nothing to report

Allow boating use (non-motorized or electric boats, kayaks, canoes, etc.) that is not directly supporting fishing at Krumbo Reservoir year-round, except when reservoir begins to ice over.

- Completed (2013)

Require a yearly special use permit for for-profit commercial wildlife guiding and commercial photography uses on the Refuge.

- Nothing to report

Objective 7b. Provide Opportunities to View Rare and Incidental Species to Advanced Birders

Provide advanced birders with continued opportunities to enjoy sightings of rare and incidental birds, particularly passerines.

Strategies Applied to Achieve Objective

Participate in and promote real-time rare bird alerts utilizing modern media.

- Friends of Malheur National Wildlife Refuge: Purchased two eBird tracker kiosks; Located at the Friends of Malheur Refuge Nature Store at Refuge Headquarters and at the Harney County Chamber of Commerce

Prepare and implement a site plan for Refuge Headquarters that incorporates birders' concerns, such as maintaining cottonwood trees, other non-endemic trees, and shrubs.

- Friends of Malheur National Wildlife Refuge: Completing a Tree Management Plan (2021)

Prepare and implement site plans to maintain cottonwood trees, other non-endemic trees, and shrubs at Sod House Ranch, Benson Pond, Witzel Field, Barnes Springs, and P Ranch.

- Friends of Malheur National Wildlife Refuge: Completing a Tree Management Plan (2021)

Conduct vegetation management of invasive species in ways that do not interfere with the ability of the identified sites to host rare and incidental species.

- Friends of Malheur National Wildlife Refuge: Discussed to be considered in their annual work plan (2018)

Integrate vegetation management and access at the identified sites with appropriate cultural resource protection and interpretation (see Goal 10).

- Herbicide Treatments: On-going
- Benson Pond: Portland Audubon coordinates efforts with mechanical and horticultural treatments (2018-2019)

Continue to maintain seasonal closure at Sod House Ranch to protect heron rookery.

- Still an effect (ongoing)

Objective 7c. Provide Interpretive Opportunities of Key Resources and Issues

Strategies Applied to Achieve Objective

Regularly maintain and update information on key interpretive themes via a variety of media such as websites and brochures.

- Website: Updated, but due to staffing reductions and lack of training the website is managed by Visitor Services in the Regional Office (ongoing)
- Brochures: Maintained and updated yearly (ongoing)

Make greater use of modern media such as CDs, podcasts, social media, etc.

- Social Media: Friends of Malheur National Wildlife Refuge manages social media (ongoing)
- CDs: Blitzen Valley Auto Tour developed (2014)
- Podcasts: Blitzen Valley Auto Tour developed (2014)

Provide new interior panels in the George Benson Memorial Museum to connect visitors with places and the resources the Refuge protects.

- Banners: Aquatic health
- Displays: History of the Refuge and native pollinators developed

Continue to maintain five existing outdoor interpretive panels at Narrows Pull-out, Refuge Headquarters, Sod House Ranch, Buena Vista Overlook, and P Ranch. Provide additional outdoor interpretive panels at key field sites to appropriately implement key interpretive themes, and focus on aquatic health and associated management activities and weaving historic events and ecology of the Refuge.

- Completed (2019)

Participate in local events, on- and off-refuge, providing docent-led activities and visits to specified sites with booths and educational materials as appropriate:

John Scharff Migratory Bird Festival (April)

- On-going

Free Fishing Day (June)

- On-going

Invasive Carp Awareness (August)

- Friends of Malheur National Wildlife Refuge: Coordinating event (2013-2019)

Harney County Fair (September)

- On-going

International Migratory Bird Day (May)

- Posters provided annually (2020)
- Friends of Malheur National Wildlife Refuge: Guided tours provided (2019)
- Portland Audubon: Guided tours provided (2019)

Ranching Heritage Day combined with Invasive Carp Awareness (August)

- No longer an event

National Wildlife Refuge Week (October)

- If Refuge staff and help from partners are available, guided tours are provided (2019)

Continue to provide public presentations by refuge staff and volunteers at least monthly. Advertise and share presentations by utilizing modern media.

- Public presentations are provided regularly (ongoing)

Objective 7d. Support and Provide Environmental Education Programs

Strategies Applied to Achieve Objective

Continue to conduct existing environmental education program and ongoing collaboration with environmental education initiatives.

- Artist Residency Program: Over 600 local students reached annually (ongoing)
- Harney County Migratory Bird Festival: One day educational annual event (ongoing)
- Portland Audubon: Coordinates an annual environmental education program with the Paiute Tribe during the summer months (2017-2019)

When refuge staff and volunteers are available, use and implement existing curricula, and national and regional environmental education modules, such as Junior Duck Stamp Program, International Migratory Bird Day, etc., on- and off-refuge.

- As requested (ongoing)

Coordinate and assist with local environmental education initiatives upon request.

- As requested (ongoing)

Review and revise as needed the Cooperative Agreement between the Great Basin Society/Malheur Field Station and the Refuge.

- Reviewed/revised 1 year prior to agreement expiration in 2023

Build an outdoor shelter at Refuge Headquarters where environmental education activities can be conducted during periods of inclement weather.

- Completed, an 20'x28' pavilion near Marshall Trail (2013)

Provide an outdoor learning area at Refuge Headquarters to assist with existing environmental education program and efforts with other environmental education initiatives.

- As requested (ongoing)

Require a yearly special use permit for non-profit groups and educational institutions engaging in EE programs on the Refuge.

- Nothing to report

GOAL 8. Provide reasonable challenges and opportunities, and provide uncrowded conditions for the hunting and fishing public.

Objective 8a. Provide Hunting Opportunities for Upland Game

Strategies Applied to Achieve Objective

Update existing hunting brochure and website to explain upland game hunting opportunities and regulations; update Code of Federal Regulations [CFRs] per revised Hunt Plan (Appendix P).

- Refuge participated in the Service's national review of hunting and fishing regulations across all Service lands and waters to determine if the Refuge is aligned with State regulations and to

determine if any opportunities to expand current hunting and fishing programs on the Refuge are compatible (2018)
- Final proposed changes to hunting drafted (2020) and forwarded for publication in the Federal Register (2021)
- Hunting Brochure: Waiting to be revised with USFWS approval of proposal (2021)
- Website: Waiting to be revised with USWS approval of proposal (2021)

Malheur Lake Hunt Unit
Maintain hunt program under current regulations, except drop rabbit from the list of allowable species. Improve Saddle Butte access on north side of Malheur Lake Hunt Unit (see Appendix P).
- Maintained under current regulations and is in process of being assessed (2021)
- Saddle Butte Access: Step-down Site plan being developed to improve road access (2021)

Buena Vista Hunt Unit
Maintain hunt program under current regulations, except drop rabbit from the list of allowable species and extend season opener from the fourth Saturday of October to the end of the State pheasant season (see Appendix P).
- Maintained under current regulations and is in process of being assessed (2021)

Boundary Hunt Unit
Manage hunt program as described in Hunt Plan (Appendix P).
- Maintained under current regulations and is in process of being assessed (2021)

Objective 8b. Provide Hunting Opportunities for Waterfowl
Strategies Applied to Achieve Objective
Update existing hunting brochure, website, and CFRs to explain waterfowl hunting opportunities and regulations.
- Refuge participated in the Service's national review of hunting and fishing regulations across all Service lands and waters to determine if the Refuge is aligned with State regulations and to determine if any opportunities to expand current hunting and fishing programs on the Refuge are compatible (2018)
- Hunting Brochure: Waiting to be revised with USFWS approval of proposal (2021)
- Website: Waiting to be revised with USFWS approval of proposal (2021)

Malheur Lake Hunt Unit
Manage the waterfowl/migratory bird hunt on Malheur Lake Unit as described in Appendix P.
- Maintained under current regulations and is in process of being assessed (2021)

Promote waterfowl youth hunt opportunity on State-designated weekend in the northern Malheur Lake Hunt Unit.
- Completed (2013)

Improve Saddle Butte access on north side of Malheur Lake Hunt Unit.
- Step-down Plan being developed to improve road access (2021)

Expand allowable boundary to include south-central area of Malheur Lake with special date regulations of the fourth Saturday of October to the end of the State waterfowl season.
- Completed (2013)

Open new boat access for non-motorized or electric boats on Malheur Lake at the airboat launch site near Refuge Headquarters with expanded parking and a boat launch (ADA standards). Opening date for the access will be the on the fourth Saturday of October to the end of the State waterfowl season.
Malheur National Wildlife Refuge Comprehensive Conservation Plan

- This site is located on the Boat Landing Road, which is no longer a public access road due to Safety Security Plan/Employee Safety (2016)

At low water (<10,000 acres), close Malheur Lake to waterfowl hunting.

- Still an effect (ongoing)

The new Caspian tern island in the South Malheur Lake Unit will be permanently closed to hunting.

- Still an effect (ongoing)

Buena Vista Hunt Unit

Open Buena Vista Hunt Unit to waterfowl hunting with special date regulations, from the fourth Saturday of October to the end of the State pheasant season. Boats will not be permitted. See Appendix P for details.

- Maintained under current regulations (ongoing)

Support reasonable waterfowl hunting opportunities that comply with the ADA in partnerships with potential users.

- Nothing to report

Boundary Hunt Unit

Continue to allow waterfowl/migratory bird hunting within the Boundary Hunt Unit under existing regulations (see Appendix P).

- Maintained under current regulations (ongoing)

Objective 8c. Provide Stream Fisheries Aimed at Experienced Fly-fishers and Other Anglers

Strategies Applied to Achieve Objective

Continue to allow fishing opportunities in the areas identified in this objective's other strategies and under regulations currently in place and specified.

- Refuge participated in the Service's national review of hunting and fishing regulations across all Service lands and waters to determine if the Refuge is aligned with State regulations and to determine if any opportunities to expand current hunting and fishing program on the Refuge are compatible (2018)

Allow drive-in access on East Canal Road to the confluence of Bridge Creek with access to Granddad Reservoir (BLM), except when road conditions are hazardous.

- Completed (2016)

Build a new pedestrian crossing and boardwalks at Bridge Creek to access a portion of the fishable area west of East Canal to its confluence of Bridge Creek with the Blitzen River.

- Friends of Malheur National Wildlife Refuge: This project has been discussed to be considered as part of their annual work plan (2018)
- ONDA: Trail designer has been discussed to evaluate this area (2020)

Open new seasonal bank fishing opportunity from Sodhouse Lane to the bridge on the Boat Landing Road, part of the Headquarters Loop Trail. Dates for fishing access will be August 1 to September 15.

- Completed (2013)

Develop five outdoor panels with maps, brochures, regulations, and additional information at main entrance points, such as the East Canal, P Ranch, Bridge Creek, Sodhouse Lane, and the bridge on the Boat Landing Road, and provide additional signing.

- Boat Landing Road: No longer a public access road due to Security Safety Plan/Employee Safety (2016)

Objective 8d. Provide a Reservoir Fishery Aimed at Successful Take for Casual Anglers
Strategies Applied to Achieve Objective
Develop fishing brochure to explain fishing opportunities and regulations, and update existing website.

- Fishing Brochure: In process of being reviewed for printing (2021)
- Website: Waiting to be revised after fishing brochure reviewed (2021)

Continue coordination with ODFW and stocking of Krumbo Reservoir with triploid rainbow trout with steps to undertake genetic introgression study on redband trout (See Objective 13d).

- On-going

Open Krumbo Reservoir to fishing year- round with drive-in access, except when road conditions are hazardous. For safety reasons, ice fishing or non motorized or electric boats will not be permitted when the reservoir begins to ice over.

- Completed (2013)

Develop one panel with maps, brochures, regulations, and additional information at the main parking area.

- Nothing to report

GOAL 9. Enhance Refuge Programs, Partnerships and Public Outreach

Objective 9a. Enhance Refuge Programs, Partnerships and Public Outreach with Volunteer Opportunities
Strategies Applied to Achieve Objective
Continue to conduct existing volunteer program and ongoing collaboration with Malheur Wildlife Associates (refer to now as Friends of Malheur National Wildlife Refuge), including assisting with building their capacity.

- On-going

Establish a full-time volunteer coordinator position that will focus specifically on improving the volunteer program, such as by increasing recruitment, retention, and return rate of volunteers and expanding the program for efficient use of facilities and Refuge staff. The position will also focus on building partnerships and increasing public outreach.

- Nothing to report

Objective 9b. Maintain an Effective Law Enforcement Presence
Establish and maintain an effective, professional, and courteous law enforcement presence to discourage unauthorized uses and maintain reported incidents at a flat or declining trend over a 15- year period.

Strategies Applied to Achieve Objective
In connection with Objective 6a, improve posting of regulations at key welcome and orientation sites, as well as locations where fishing and hunting uses predominate (Krumbo Reservoir, Malheur Lake, Buena Vista Unit, etc.).

- Regulatory signage changes are coordinated with welcoming/orienting changes. Some changes have been made but additional changes remain. Annual hunting signage is installed and removed each year.

Maintain current law enforcement staffing (one dedicated law enforcement officer).

- As a result of the occupation an additional officer was identified for Malheur. Attempts to fill the position through the mandatory national hiring process failed on two attempts. An officer is currently selected but still in training. Due to staffing shortages Malheur has also assumed responsibility for Sheldon and Hart Mountain Refuges.

Continue cooperative relationships and agreements with Oregon State Police and Harney County Sheriff's office.

- In addition to routine coordination with State and local law enforcement there is an elevated level of coordination as a result of the occupation. This type of coordination remains at an elevated level.

Continue to emphasize information, education, and a friendly presence in the field during key seasons. Improve fencing in certain refuge boundary areas to minimize trespass cattle.

- Refuge officers first and desired form of operations is one of information and education. This results in the vast majority of contacts in resulting in citations. Law enforcement works closely with the Refuge Habitat Ecologist to address fencing issues throughout the Refuge.

Objective 9c. Engage Partners and Stakeholders in Adaptive Management

Strategies Applied to Achieve Objective

Via the Ecology Work Group, develop the Malheur Refuge State-and-Transition Model (STM) (see Appendix L).

- Data is being collected by the Harney Basin Wetlands on and off refuge using both observations and talking with landowners about historic plant communities on ranches for the State-and-Transition Model.
- OSU is looking at trends in wet meadows with treatment vs non treatment, data of trend of non-treated areas will be useful in tracking transition in areas where active treatment is stopped

Implement use of the Malheur Refuge STM.

- Model still in development by The Harney Basin Wetlands.

Use the Malheur Refuge STM as a framework for presenting results of management activities to partners and stakeholders.

- Model still in development by The Harney Basin Wetlands.

Via the Aquatic Health Coalition's workgroups (control, assessment, and partnership and funding) develop grant proposals and conduct research to adaptively manage aquatic health. Communicate via the Aquatic Health Coalition list serve.

- Listserv has been updated and is being maintained by the High Desert Partnership in BaseCamp. Communication is passed to the communication specialist from the aquatic health biologist at least twice a year to be posted on the site.

GOAL 10. Manage prehistoric and historic cultural resources for their educational, scientific, and cultural values for the benefit of present and future generations of refuge users and for the communities that are connected to these resources.

Objective 10a. Identify and Protect Prehistoric and Historic Archaeological Resources

Strategies Applied to Achieve Objective

Continue to identify archaeological sites and historic structures that coincide with existing and planned

roads, facilities, public use areas, habitat restoration, and research projects. Prepare and implement activities to mitigate impacts to sites as necessary.

- As projects are identified for both maintenance and new construction resources necessary to mitigate impacts are identified.

Implement a program to evaluate eligibility for listing on the NRHP for those archaeological sites and historic structures that may be impacted by Service undertakings, management activities, erosion, or neglect.

- Refuge no longer has capacity to accomplish due to staffing reductions. Limited capacity may exist with the Refuge Zone Archeologist.

Develop a historical buildings management plan with list of maintenance and restoration needs by structure. Prioritize the list by structure and include estimated repair costs. Actively seek funding and develop partnerships to maintain and protect structures.

- Refuge no longer has capacity to accomplish due to staffing reductions.

Coordinate with the Tribe on cultural resources inventory, evaluation, and project monitoring, consistent with the regulations of the NHPA. Protect all identifiable archaeological sites by avoiding disturbance within the area.

- The Refuge Law Enforcement program coordinated with the Burns Paiute the development of a comprehensive monitoring program for all known archaeological sites.

Develop and strengthen partnerships with educational and historic institutions for the interpretation and Malheur National Wildlife Refuge Comprehensive Conservation Plan 2-58 Chapter 2. Management Direction protection of cultural resources at the Refuge.

- Reduction in Refuge staffing impacted this program. The Refuge Zone Archeologist based in Boise Idaho does coordinate with both the Refuge and Tribe for protection of cultural resources.

Facilitate partnerships with other appropriate Federal and State agencies, professional archaeologists, descendants of early settlers, and the general public to aid in the management of cultural resources.

- Refuge no longer has capacity to accomplish due to staffing reductions.

Objective 10b. Provide Interpretation of Cultural Resources

Strategies Applied to Achieve Objective

Prepare interpretive media (e.g., pamphlets, signs, exhibits) that communicate cultural resources information and Native American perspectives to visitors.

- Buena Vista Overlook: Interpretive panels completed (2019)

Develop interpretive media (e.g., pamphlets, signs, exhibits) that describes the history of Euro-American settlement and use of the Refuge.

- George Benson Memorial Museum: Interpretive exhibits completed (2013)
- French-Glenn Livestock Company Empire Brochure: Completed (2017)
- Historic Sod House Ranch/P Ranch: Interpretive panels completed (2019)

Prepare environmental/cultural education materials for use by local schools concerning cultural resources, the discipline of archaeology, the perspectives of Native Americans, the history of the area, and conservation of natural and cultural resources. These materials could include an artifact replica kit with hands-on activities and curriculum prepared in consultation with the local school district, the historical society, and the Tribe.

- Nothing to report

Consult with the Tribe and other preservation partners to identify the type of cultural resources information appropriate for public interpretation.

- On-going

Develop an outreach program and materials so that the cultural resource messages become part of cultural events in the area, including the State's Archaeology Month, National Wildlife Refuge Week, and local festivals (see Objective 7c).

- Nothing to report

Develop museum property inventory for the George Benson Memorial Museum. Create storage and use plans for museum property as part of the outreach program.

- Friends of Malheur National Wildlife Refuge: Lead o inventory and recording museum specimens and developing a Preservation Site plan (2020)

Promote reuse of existing historic structures (e.g., for environmental education, interpretive programs, storage).

- On-going

Develop and implement interpretive plans for the Headquarters CCC site, Sod House Ranch, Benson Pond CCC site, P Ranch, and Double-O Ranch.

- Historic Sod House Ranch/P Ranch: Completed (2019)

Continue working with the Tribe on the collection of native plant materials where compatible.

- On-going through Special Use Permits

Objective 10c. Consultation on Cultural Resources

Increase coordination and consultation with the Burns Paiute Tribe for prehistoric resources and important native plants and wildlife on the Refuge.

Strategies Applied to Achieve Objective

Continue consulting and coordinating with the Tribe on refuge projects that may affect prehistoric sites, native plants, or wildlife important to the Tribe. Meet with the Tribal Council at least three times a year to review upcoming refuge projects.

- In addition to routine consultation the occupation created the need for increased communication with the Tribal Council. Interactions with Council focused on law enforcement coordination, inventory of artifacts, and participation in implementation of the CCP.

Continue working with the Burns Paiute Tribe on the collection of native plant materials where compatible and the inclusion of important traditional plants in riparian or other habitat restoration projects.

- On-going through Special Use Permits
- No significant habitat restoration projects occurred during this time period

Objective 10d. Establish Site Significance Factors

Identify criteria that allow us to determine what cultural resource sites, site types, and data from sites are important and need preservation or analysis to address specific research questions.

Strategies Applied to Achieve Objective

Develop a model identifying the sensitivity of various habitat types for the presence of cultural

resources. Link these to specific layers in a GIS database.

- There is general knowledge within the staff at Malheur of which habitat types are likely to contain cultural resources. Refuge no longer has capacity to formally accomplish due to staffing reductions.

Perform an archaeological analysis of the Refuge and the surrounding area to formulate a short list of information and research needs for cultural resources and their management.

- Refuge no longer has capacity to accomplish due to staffing reductions.

GOAL 11. Identify and protect prehistoric and historic resources on the Refuge that are eligible for or listed on the National Register of Historic Places.

Objective 11a. Increase Management Efforts for Historic Sites Listed on or Eligible for Listing on the NRHP Identify, stabilize, and restore eligible historic resources from the homestead, ranching, and CCC eras.

Strategies Applied to Achieve Objective

Perform an inventory and assessment of historic sites to determine NRHP eligibility. As part of this inventory, identify specific stabilization and restoration costs. This should include prioritization of the most critical needs for each site and structure.

- Although a full inventory and assessment has not been completed due to the transfer of the Refuge Archeologist, site specific assessments identified critical needs..
- Working with a Zone Archeologist, the P Ranch barn doors were stabilized in place.
- A contract was awarded in 2018 for the restoration of the P Ranch Beef Wheel and restoration of the Sodhouse Ranch barn doors.
- A need has been identified in 2018 to stabilize the Sodhouse barn.

Develop partnerships (University of Oregon, National Park Service, etc.) to assist in the stabilization and restoration of historic sites and structures.

- Partnerships have not been established due to the transfer of the Refuge Archeologist.

Objective 11b. Increase Management Efforts for Prehistoric Sites Listed on or Eligible for Listing on the NRHP

Strategies Applied to Achieve Objective

Identify archaeological sites that coincide with existing and planned roads, facilities, public use areas, and habitat projects. Evaluate threatened and impacted sites for eligibility to the NRHP. Prepare and implement activities to mitigate impacts to sites as necessary.

- Refuge no longer has capacity to fully implement due to staffing reductions. Refuge will continue to mitigate impacts as projects are funded. Limited capacity to expand beyond this level of effort may exist with the Refuge Zone Archeologist.

Implement a program to evaluate eligibility to the NRHP for those archaeological sites that may be impacted by Service undertakings, management activities, erosion, or neglect.

- Refuge will continue to work with the Refuge Zone Archeologist to advance with limited capacity.

Develop a GIS layer for cultural resources that can be used with other GIS layers for the Refuge yet contains appropriate locks to protect sensitive information.

- Working with the former Refuge Archeologist Refuge LE developed a GIS layer for all cultural sites. All sites are physically inspected on a scheduled bases and surface conditions documented. Only FWS Archeologist and Refuge Officers at Malheur have access to this information.

GOAL 12. Manage the Refuge's paleontological resources for their educational and scientific values for the benefit of present and future generations of refuge users.

Objective 12a. Protect Paleontological Resources
Increase monitoring and protection of paleontological resources on the Refuge.

Strategies Applied to Achieve Objective
Continue to identify paleontological sites that coincide with existing and planned roads, facilities, public use areas, habitat restoration, and research projects. Prepare and implement activities to mitigate impacts to sites as necessary.

- Refuge no longer has capacity to accomplish due to staffing reductions.

Objective 12b. Provide Interpretation of Paleontological Resources
Provide interpretation to instill appreciation for the Refuge's paleontological resources and the valuable information they can yield about past environments.

Strategies Applied to Achieve Objective
Provide interpretation of paleontological resources at Refuge Headquarters using static displays, brochures, etc.

- Refuge no longer has capacity to accomplish due to staffing reductions. A limited about of this work will be accomplished through the visitor services program.

Partner with National Park Service staff from the John Day Fossil Beds National Monument on the development of interpretive and educational materials about the Refuge's paleontological resources.

- Refuge no longer has capacity to accomplish due to staffing reductions.

GOAL 13. Gather scientific information (surveys, research, and assessments) to support adaptive management decisions.

Objective 13a. Inventory and Monitoring (Surveys)
Strategies Applied to Achieve Objective
The following is a list of survey activities to support resource management decisions on the Refuge.
Aquatic inventory and monitoring associated with highest priority habitat objectives.

- The ecosystems model will help define aquatic inventory and monitoring needs as we move forward. Anticipated to be completed by FY20. An inventory plan will be constructed at that time.

Terrestrial inventory and monitoring associated with highest priority habitat objectives.

- Talking with EOARC about collecting soil samples to test for nutrients in fields that are hay only vs rake bunch graze to monitor if there are low or excessive nutrient loads in either of these.

Wildlife inventory and monitoring associated with highest priority habitat objectives.

- Follow surveys given through the Wildlife I&M Plan partnered with the Wildlife Working Group.

Habitat inventory and monitoring associated with highest priority habitat objectives.

- Submerged Aquatic Vegetation surveys through I&M program performed since 2013, state-and-transition model has been created. Survey sites are rotated within a three year time frame, to indicated how SAV growth is around the refuge.
- The Harney Basin Wetlands is collecting data for wet meadow State-and-Transition Model that will be used to direct management in these areas.
- OSU monitoring treated vs untreated areas in wet meadows looking at what the trend is in these meadows if treatment is stopped in these areas.
- OSU studying effects of different treatments in reed canary grass monocultures to see if standing grazing may be a viable option to slow or stop reed canary grass expansion in areas where we cannot get equipment in to perform treatments

Objective 13b. Assessment of Hydrological Features Associated with Riverine Systems and Associated Wetlands (i.e., Blitzen River)

Strategies Applied to Achieve Objective

Historic channel/floodplain geometry (e.g., historic aerial photo analysis, transport measurements).

- Lidar was completed for the entire Refuge and can be used for current and historical channel/floodplain analysis.

Sediment flux (sediment/hydraulic modeling).

- Nothing to report

Water allocation (water budget, habitat use, and availability surveys).

- Water available for habitat management is influenced by soil moisture, snowpack, spring temperatures, and other factors outside of human control. As the Community Based Water Planning conversations evolve, beyond the current planning effort, a comprehensive water budget for the basin will need to be developed.

Life history/habitat needs of aquatic species (population modeling, literature review, aerial photos).

- Lidar was completed for the entire Refuge and is now available for use in various riverine analysis.

Bank erosion and incision rates (e.g., erosion pins, channel surveys).

- Nothing to report

Channel morphology surveys (e.g., sediment budget).

- Nothing to report

Sediment transport measurements (e.g., channel change).

- Nothing to report

Continued gauging of flows (water supply, potential climate change, channel and floodplain change).

- Water flows have been continually gauged at the Page Springs weir, Page Springs dam, and Sodhouse dam. USGS is working on system sensitivity to climate change in the upper Blitzen watershed on BLM lands and groundwater throughout the entire Harney Basin.

Ongoing aerial photo collection and analysis (bank erosion rates, extent of floodplain inundation).

- Lidar was completed for the entire Refuge and is available for future analysis.

Riparian plant surveys (composition/distribution of riparian vegetation).

- Nothing to report

Habitat availability surveys for focal species (condition of in-stream habitat).

- Nothing to report

Habitat use surveys for focal/invasive species (physical factors affecting aquatic species).

- Extensive work done in Malheur Lake for carp but not in rivers/wetlands

Investigate bed erosion associated with in-stream structures.

- No formal work completed but staff observations find no erosion.

Objective 13c. Implement Riverine Pilot Projects to Assess River and Wetland Response to Rehabilitation Efforts

Strategies Applied to Achieve Objective

Study response of wetland habitats to the cessation of flood irrigation.

- No pilot projects completed due to resources dedicated to Malheur Lake.

Initiate small in-stream rehabilitation pilot projects in tributaries or reaches of the Blitzen River in response to assessment results.

- No pilot projects completed due to resources dedicated to Malheur Lake.

Objective 13d. Research

Throughout the life of the CCP, conduct high-priority research projects that provide the best science for habitat and wildlife management on and off the Refuge.

The following is a prioritized list of research projects to support resource management decisions on the Refuge.

Conduct research to gather scientific data to further carp control efforts.

- Carp Population Modeling:
    - Simulations focused on controlling carp via removal efforts aimed at suppressing carp biomass below the desired 50 kg/ha threshold. These simulations indicated that individual carp removal actions would likely fail due to compensatory density dependent responses (recruitment, mortality, growth) within the carp population. Simulations further demonstrated that combinations of two or all three active removal methods could reduce the biomass below the desired threshold, however the carp reduction rate would have to be maintained ≈40% at each life-stage, in perpetuity. Furthermore, adding environmental fluctuations into the carp population model ultimately demonstrated that lake area fluctuations strongly influenced carp populations and the efficacy of carp control actions. Modeled carp biomass peaked when the lake transitioned from high to low levels, and carp biomass declined when lake area transitioned from low-to-high. Removing carp during low water periods—when fish were concentrated into a smaller area—reduced carp populations almost as much as removing carp every year. Furthermore, the effectiveness of control efforts increased with the prevalence and severity of low lake conditions (longer durations of very low lake area). These simulations suggest that a drier climate may naturally decrease carp populations and make them easier to control. These models demonstrate that carp suppression efforts should: 1) target multiple life stages, 2) exploit natural mortality imposed by lake fluctuations, and 3) identify vulnerabilities to increase removal efficiencies. Collectively, the carp population modeling demonstrated that due to the high

variability in the carp population and uncertainty of future climatic conditions, focusing management actions solely on the reduction of carp would likely be ineffective, and thus investigations of other mechanisms helping to maintain the turbid state was necessary.

- Systems Modeling:
    - The systems model was used to investigate the deleterious effects of the wind and wave energy, with simulations ultimately demonstrating that the wind-wave energy is a major driver of the turbid state, and that restoration efforts in the form of wave reduction barriers may be used to decrease the suspended sediment concentrations and increase the water clarity. Furthermore, these model outputs helped research identify the need to better understand emergent vegetation in Malheur Lake, and the potential for emergent vegetation to act as natural wave reduction barriers (EV- reduces wave height and decreases sediment resuspension). Collectively, simulation results reinforce the notion that future restoration actions in Malheur Lake must be more broadly focused (i.e. systems perspective) and guided by the principles of the alternative stable state theory.

- Common Carp - Redband Trout Radio Telemetry:
    - Common Carp:
        - Based on carp population model outputs, the MNWR has launched the Carp Radio Telemetry Project, which is a collaborative effort with the USGS. The overall goal of this project is to utilize technology to investigate the movement of individual carp in order to infer population-level behavior, such as habitat use and aggregations both spatially and temporally. This project will ultimately provide novel insight into the behavior of invasive carp, which then will be utilized by managers at the MNWR to exploit identified vulnerabilities within the carp population to increase removal efficiencies, thus decreasing the deleterious effects of carp on the aquatic ecosystem and promoting long-term ecological recovery.
    - Redband Trout:
        - The MNWR and collaborators have added Redband Trout (25) to the Carp Radio Telemetry Project to investigate potential overlapping habitat between the Redband Trout and Common carp. This research is essential to ensuring that carp removal actions do not cause undue harm to the native Redband trout population. Furthermore, the addition of Redband tout will enable MNWR to evaluate how improvements in fish ladders on Busse and Grain Camp Dams have effected overall Redband trout passage (mentioned as a concerns in the past).

- Water Quality Mesocosm:
    - The goals of the project are to 1) determine which factor, or combination of factors, can be manipulated or controlled to substantially reduce the turbidity in the water column, and 2) determine if that reduction in turbidity allows emergent and/or submerged vegetation to survive. Results will be used to inform the potential to reduce water-column turbidity and increase emergent and submergent plant survival.

- Emergent Vegetation Expansion:
    - The once robust stands of emergent vegetation is now limited to remnant stands due to the 1980's floods, therefore current research is focused on identifying what (carp, muskrat, wind resuspension, water birds, etc..) is suppressing the EV expansion.

- Utilize what is learned to expand the emergent vegetation into the open water areas to not only increase the avian habitat, but also decrease the effective wind fetch and thus facilitate the conditions necessary for submergent vegetation growth in Malheur Lake.

Determine management action responses by native fish and wildlife resources.

- Follow surveys given through the Wildlife I&M Plan partnered with the Wildlife Working Group.
- Redband trout was monitored by the Oregon Department of Fish and Wildlife as part of their management strategy for native sportfish

Identify methods for restoration of crested wheatgrass plantings and cheatgrass-dominated areas to native sagebrush steppe communities.

- Based on research conducted by EOARC shifting plant communities will be limited by current technology

Monitor the effect of seasonal water table depths on plant communities along hydrological gradients in emergent marsh and wet and dry meadow habitats in select areas.

- Piezometers have been installed in fields to tie in water level/management with wet meadow vegetation trends

Identify strategies for diversifying plant communities (e.g., reed canarygrass and other introduced grass monocultures) where appropriate.

- Reed canary grass study in progress with The Wetlands Conservancy and OSU looking at different treatment options and how reed canary grass responds

Objective 13e. Scientific Assessments

Throughout the life of the CCP, conduct scientific assessments to provide baseline information to Malheur National Wildlife Refuge Comprehensive Conservation Plan

The following is a prioritized list of scientific assessments to support resource management decisions on the Refuge.

Conduct aquatic health assessment of Malheur Lake pertaining to fish, macroinvertebrates, water, and plants.

Assess avian predation on carp.

- Colonial water bird nesting survey draft protocol created in spring 2019, with the use of drones. Unfortunately, due to the shut down of drone technology throughout the Department of the Interior survey is on a hold. But can be done with a small motor boat when high water is available. We hope to use drones again once it is allowed to do so on the refuge.
- Corp of Engineers completed five years of annual flyovers on Tern Island study to see how Tern Island is affecting populations of Caspian Terns, Double Crested Cormorants, and American White Pelicans. Currently waiting on report from Corp of Engineers. Photos and data shared are store in the Malheur common drive and external wildlife hard drive.
- Waiting on ecosystems model to be completed before new control structures are proposed. May tie into population density of piscivore birds found in colonial nesters utilized carp as a source of food resource.
- Dr. Lyons (Bird Research Northwest, 2013-2015) investigated the size and diet composition of the Caspian Tern colony at Malheur Lake and helped MNWR construct and incorporate an avian piscivore bioenergetics model in CarpMOD. Fish eating birds will have minimal impact to overall carp populations.

Assess carp control study areas before and after treatment.

- Monitoring strategies will be developed concurrently with development of carp control.

Objective 13f. Monitor Public Use Programs

Monitor public use programs to meet the needs and desires of refuge visitors, and to ensure visitor satisfaction with wildlife-dependent recreational opportunities. The program will use visitor satisfaction surveys or other instruments to help define and evaluate wildlife-dependent recreational opportunities.

Program Indicator Method Frequency Locations Partners

Overall use: Visitation numbers

- Visitor Center: Self-registration booklet (ongoing)

Traffic counters: Checked monthly at entrances of Headquarters parking area and P Lane

- Nothing to report

Site visits: Number of visitors at key sites by door counter, headcount and self-registration and checked monthly at Visitor Center, trail heads, and fishing areas

- Visitor Center: Self-registration booklet (ongoing)

Facility conditions: Visual/site condition form checked quarterly including signs, trails, interpretive panels, etc.

- Completed annually with the help of volunteers (ongoing)

Welcome and orientation: Number of users and user satisfaction comment cards and checked monthly at Visitor Center and key sites

- Visitor Center: Self-registration booklet (ongoing)

Wildlife observation: Number of users and user self-registration and checked monthly at Visitor Center and key sites

- Visitor Center: Self-registration booklet (ongoing)

Wildlife/nature photography: Number of users and user satisfaction self-registration and checked monthly at Visitor Center and key sites

- Visitor Center: Self-registration booklet (ongoing)

Interpretation: Number of users and user satisfaction self-registration and checked monthly at Visitor Center and key sites

- Visitor Center: Self-registration booklet (ongoing)

Environmental education: Number of users and user satisfaction feedback forms per scheduled programs

- Scheduled Programs: Number of users are collected events

Hunting: Number of users and user satisfaction verbal communication during hunting seasons at all hunt units

- Law Enforcement: Verbal communication (ongoing)

Fishing: Number of users and user satisfaction self-registration and checked monthly at entrances to fishing areas

- Law Enforcement: Verbal communications (ongoing)

Volunteers and partnerships: Number of users and user satisfaction feedback forms and verbal communication at end of volunteer tour of duty or opportunity for all volunteers; partners at biannual intervals

- On-going through exiting procedures

GOAL 14. Integrate our conservation-based mission with the best available science and become a leader in advancing best practices for the design and management of innovative, sustainable refuge and community development opportunities.

Objective 14a. By 2020, Achieve Carbon Neutrality (striving for carbon negative), Meeting and Exceeding All Energy and Material Efficiency and Effectiveness as Defined by 565 FW 1 and Executive Order 13514 for All Facets of Refuge Management and Operations

Strategies Applied to Achieve Objective

Establish performance benchmarks within Environmental Management System (515 DM 4) as the critical first step, then create metrics and benchmarks for all other sustainability-based practices (environmental, social, economic, and community).

- The Refuge no longer has the capacity to fully implement this strategy due to staff reductions.
- Refuge will continue to implement sustainability-based practices on an opportunistic basis but with limited capacity.

Complete audits for energy and material use, carbon footprint, and biomass-based carbon sequestration.

- The Refuge no longer has the capacity to implement this strategy due to staff reductions.

Integrate sustainability-based approaches into partnerships, contracts, and other external stakeholder efforts.

- Materials recycling program ongoing.

Provide staff and external stakeholder training for sustainability-based principles and practices, social justice/equity, community development, and partnership performance standards.

- Employees, volunteers, and partners trained on materials recycling program.
- Refuge will continue to implement sustainability-based practices on an opportunistic basis but with limited capacity.

Develop projects to refit and right-size facilities, infrastructure, and vehicle fleet to maximize energy efficiency and production. Seek funding through Refuge Operations Needs and Deferred Maintenance databases, and other opportunistic and entrepreneurial funding sources.

- Fire program facility replaced in 2016 with energy efficient building.
- Funding requested for removal of former fire program facility.
- Biological personnel co-located in 2017.
- Former aquatic health program office and lab restored in 2017 for use as a Refuge quarters.
- Administrative personnel co-located in main office in 2018.
- Previous Administrative office space now used as new conference room.
- Former Conference Room building now serving to house the Friends of Malheur Refuge Nature Store/Center and offices.
- In partnership with the Pacific Region Regional Office, an appropriate refuge vehicle and heavy equipment fleet has been identified. Reduction is occurring to right-size the vehicle and equipment fleet, greater sharing of vehicles and equipment has been implemented, and the fleet is in the process of being modernized as funding allows to achieve greater energy and economic efficiencies.
- Central air systems in three buildings have been replaced with updated energy efficient units.

- Energy retrofit upgrades to building heating and cooling systems have been identified and funding has been requested.
- Refuge will continue to implement energy efficiencies as funding is available.

Malheur National Wildlife Refuge Comprehensive Conservation Plan collaborative is a working group convened and supported by High Desert Partnership.