

# City of Moses Lake Shoreline Master Program

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## Chapter 11 Shoreline Protection and Restoration

### Introduction

The City of Moses Lake's *Comprehensive Plan* includes a Vision Statement that addresses many facets of community life—social, economic, and land use components are all included. Among other things, the vision statement describes Moses Lake as “A progressive city that recognizes how the natural environment enhances the quality of life and the need to preserve and maintain environmentally sensitive areas.” This Vision Statement 2015 was created by a Citizen Advisory Committee in 1995 to describe a potential City of Moses Lake in the year 2015. This was done by obtaining citizen input and then translating individual concerns and ideas into a collective vision, interwoven with the underlying common goals of the citizenry.

The Vision Statement 2015 includes a specific vision for the environment which says “Environment is the sum of all external conditions and influences affecting the life, development, and ultimately the survival of an organism; we must protect the environment....In the year 2015...Residents have become dedicated to preserving the environment in its natural state by developing ways for humanity to live harmoniously with nature without further degradation.”

The *Comprehensive Plan* goes on to list Environment Goals, including:

- Promote the restoration of Moses Lake to a healthy state that supports natural habitat while providing recreational benefits to the community.
- Acknowledge the integral role of the natural environment to our quality of life.
- Increase public access to the lake.

The plan articulates other goals, as well—in the realms of land use, tourism, economic development, community values and character, and other matters that are important to the citizens of Moses Lake. It is clear that protection of the natural environment and the restoration of Moses Lake are important to the people of the city—and equally important that they must be undertaken in the context of a larger, complex vision.

The vision and goals articulated in the City's *Comprehensive Plan*, along with the findings of the *Shoreline Inventory and Characterization*, served as guidance for the objectives, strategies, actions, prioritization framework, and evaluation criteria in this protection and restoration plan. The City's shoreline restoration objectives are listed in the next section of the plan; the relationship between the objectives and the other parts of the plan is explained later in this section.

### Restoration Planning Requirements

Washington State's shoreline master program guidelines<sup>1</sup> require that each local government (city or county) include within its shoreline master program a “real and meaningful” strategy to address restoration of shorelines. The guidelines make “planning for and fostering restoration” an obligation of local government. They say, in part:

It is intended that local government, through the master program, along with other regulatory and nonregulatory programs, contribute to restoration by planning for and fostering restoration and that such restoration occur through a combination of public and private programs and actions. Local government should identify restoration opportunities through the shoreline inventory process and authorize, coordinate and facilitate appropriate publicly and privately initiated restoration projects within their master programs. The goal of this effort is master programs which include planning elements that, when implemented, serve to improve the overall condition of habitat and resources within the shoreline area of each city and county.<sup>2</sup>

Restoration means re-establishing or upgrading impaired shoreline ecological functions. Shoreline ecological functions are the work done or the role played by the various physical, chemical, and biological components of the shoreline ecosystem, such as filtering sediment and other pollutants and providing habitat for wildlife. Restoration includes a number of mechanisms—both structural ones, such as re-

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<sup>1</sup> Chapter 173.26 of the Washington Administrative Code (WAC)

<sup>2</sup> WAC 173.26.201(2)(c)

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vegetation and removal of intrusive shoreline structures, and non-structural ones such as development standards that decrease erosion and protect shoreline vegetation.

The restoration planning that must be completed during the process of amending a shoreline master program is not intended to directly mitigate past or future development impacts on the City's shorelines. It is intended to guide restoration that will improve overall environmental conditions as they exist at the time of the shoreline inventory. Restoration does not imply a requirement to return the shoreline area to aboriginal or pre-European settlement conditions.

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## How this plan is organized

The shoreline master program guidelines include six restoration planning steps. The State’s intent is that, by completing the six steps, the City will create a framework for restoring ecological functions that have been impaired as a result of past development of the shoreline. The table below lists the six steps, and will also tell you how and where each one has been addressed.

**Table 1—Restoration Planning Steps**

Restoration planning steps	How and where each step is addressed
Identify degraded areas, impaired ecological functions, and sites with potential for restoration	Degraded areas and impaired ecological functions are identified in the <i>Shoreline Inventory and Characterization</i> . Sites with potential for restoration are identified on the accompanying Restoration Potential map. They are included in the table of Restoration Opportunities below.
Establish overall goals and priorities for restoration of degraded areas and impaired ecological functions	The restoration goal was drawn from the City of Moses Lake’s <i>Comprehensive Plan</i> . (This restoration plan also includes objectives that are more specific about how the goal is to be achieved. Those objectives were drawn from the <i>Shoreline Inventory and Characterization</i> .) Both goal and objectives are detailed in the “Restoration Goal and Objectives” section of this restoration plan.  The plan also includes restoration strategies and actions, and prioritization criteria that reflect the City’s interests and will give the city a basis for deciding which actions to undertake or to support others in undertaking. The strategies and actions are listed in the “Restoration Opportunities” section of the plan. The criteria are listed in the section of the plan that addresses “The City’s Role.”
Identify existing and ongoing projects and programs that are currently being implemented, or are reasonably assured of being implemented (based on an evaluation of funding likely in the foreseeable future), which are designed to contribute to local restoration goals	The “Existing and Ongoing Programs” section of this plan includes things the City is already doing that contribute to restoration, or that could be modified so that they would contribute to restoration). It also includes programs like watershed planning and TMDL planning that address ecological functions in Moses Lake. It is based on an inventory of ongoing projects and programs.
Identify additional projects and programs needed to achieve local restoration goals, and implementation strategies including identifying prospective funding sources for those projects and programs	This restoration plan includes new projects and programs that could be initiated to contribute to restoration; existing projects and programs that may be able to contribute to restoration; organizations that may undertake, participate in, or contribute to restoration projects; and sources of funding for restoration. All are listed under the heading “Restoration Resources.”
Identify timelines and benchmarks for implementing restoration projects and programs and achieving local restoration goals	The section of this plan headed “Benchmarks and Timelines” includes general timelines for achieving the City’s restoration goal over a period of 50-60 years. It also includes benchmarks by which the City can measure progress toward each of its objectives by assessing the number of actions that have been completed and the effects of those actions.
Provide for mechanisms or strategies to ensure that restoration projects and programs will be implemented according to plans and to appropriately review the effectiveness of the projects and programs in meeting the overall restoration goals	The section of this plan on “The City’s Role” discusses project evaluation, monitoring, and adaptive management—tools for selecting projects, assessing their effects, and adapting the restoration plan to meet changing needs, conditions, and resources and to respond to new information.

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This plan lists restoration objectives, strategies, and actions, and potential restoration sites.

- The goal describes a condition the City wants to achieve
- An objective clarifies the actions needed to achieve the City's goal. This plan includes *protection* and *restoration* objectives
- A strategy is one possible means of achieving an objective
- Actions are specific steps that the City or others can take to implement the strategies in the plan

The objectives, strategies, and actions in this plan are based on the *Shoreline Inventory and Characterization*, which identifies three management issues and a number of measures to protect and restore ecosystem-wide processes. The management issues identified in the *Shoreline Inventory and Characterization* are:

- Alterations to hydrology
- Water quality and sediment
- Riparian and wetland habitat

The six objectives address protection and restoration as they relate to each of those issues. Many of the plan's strategies and actions are drawn from the management measures listed in the *Shoreline Inventory and Characterization*. Others have been added where more detail was needed to specify how the management measures would be put into effect, or as a means of implementing policies in other parts of the SMP.

The map portfolio that is part of the *Shoreline Inventory and Characterization* includes a map of restoration opportunities—sites at which some of the actions in this plan could be taken. Many of those sites are on public land or involve city infrastructure. For instance, several storm sewer outfalls have been identified for retrofitting to reduce pollution of the lake. Other sites are on private land. Generally, actions on private land will be voluntary. In some cases, the City may require restoration as a condition of development. Restoration actions will never be required for development of an individual single-family residence, or on land that has already been developed.

## Adaptive Management

This plan is based on the principle of Adaptive Management—that is, adapting strategies and actions in response to analysis of data gathered from ongoing monitoring of restoration projects and activities. The list of restoration opportunities in the plan is not exhaustive, and it can be expected to evolve over time as the City evaluates the results of completed projects and in response to opportunities and resources available.

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## Restoration Goal and Objectives

The goal of this protection and restoration plan is drawn directly from the City of Moses Lake's *Comprehensive Plan*: "Promote the restoration of Moses Lake to a healthy state that supports natural habitat while providing recreational benefits to the community."

The health of the lake depends in part on the health of the shoreline. Shoreline ecological functions affect water quality, hydrology (the movement of water throughout the watershed), and fish, bird, and wildlife habitat. Each of those things is important to the overall health of the lake, and also affects the community.

- Water quality affects fish and wildlife and their habitat, recreational use of the lake, and human health—water pollution can reach the aquifer, which is a source of drinking water
- Hydrology affects the availability of water for irrigation (landscape and agricultural), drinking, and recreation
- Habitat provides opportunities for recreation, including economic generators like hunting, fishing, and bird watching

By promoting and supporting restoration of shoreline areas, the City will be taking steps toward restoring the health of the lake as a whole.

The table below shows how the six objectives of the plan relate to the management issues identified in the *Shoreline Inventory and Characterization*.

**Table 2—Restoration Objectives**

Management Issue	Objective
Alterations to hydrology	Protect hydrologic processes from further degradation
	Restore altered hydrologic processes
Water quality and sediment	Protect water quality, native plant communities, and fish and wildlife habitat.
	Restore water quality, native plant communities, and fish and wildlife habitat.
Riparian and wetland habitat	Protect riparian habitat and migration corridors
	Restore riparian habitat and migration corridors

Strategies, actions, and potential restoration sites related to each objective are tabulated in the Restoration Opportunities section that follows.

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## Restoration Opportunities

The table below lists the City's six restoration objectives and outlines strategies and actions for each one. It also states where each action may be applied, including target reaches, where those have been identified in the *Shoreline Inventory and Characterization*. As noted in the paragraph on Adaptive Management above, the list of strategies and actions can be expected to evolve as projects are completed and their results evaluated, and as new opportunities arise. See Restoration Potential map in *Shoreline Inventory and Characterization* map portfolio

Objective	Strategy	Action	Target reaches*
Protect hydrologic processes from further degradation	Coordinate lake management with other jurisdictions, agencies, and irrigation districts, including the Moses Lake Irrigation and Rehabilitation District	Initial steps will depend on the City's existing relationships; see "Regional Coordination" under the heading "Restoration Resources" below	Ecosystem-wide
Protect water quality	Mitigate effects of upland sources of pollutants	Protect wetlands and riparian vegetation within shoreline areas to mitigate effects of upland sources. <ul style="list-style-type: none"> <li>• SMP regulations will provide some protection within the City</li> <li>• Use education to influence landowner decisions in the City and the UGA. See "Education Programs" under the heading "Restoration Resources" below</li> <li>• Use development regulations to eliminate or minimize runoff from upland areas, especially in high soil erosion areas with limited vegetation</li> </ul>	City-wide (education may also be undertaken within the UGA, if the City chooses)
		Provide education on fertilizer and pesticide impacts for shoreline residents	City-wide (and within the UGA, if the City chooses)
		Slow runoff from construction sites with proper erosion controls <ul style="list-style-type: none"> <li>• SMP regulations will provide some protection within the City's shoreline areas</li> <li>• Use development regulations to eliminate or minimize runoff from construction sites outside shoreline areas, especially in high soil erosion areas with limited vegetation</li> <li>• Educate landowners and developers about runoff management</li> <li>• Work with Grant County officials to decrease construction runoff in the City's UGA</li> <li>• Continue to implement NPDES Phase II Stormwater Regulations as they are modified</li> </ul>	22, 30 City-wide; throughout the UGA; education may also be undertaken within the City and also throughout the UGA, if the City chooses

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Objective	Strategy	Action	Target reaches*
Protect water quality ( <i>continued</i> )	Mitigate effects of upland sources of pollutants ( <i>continued</i> )	Avoid development on hydric or highly erodible soils (word as an action) <ul style="list-style-type: none"> <li>• SMP regulations will provide some protection within the City</li> <li>• Use development regulations to protect vulnerable soils outside shoreline areas</li> <li>• Work with the NRCS to educate landowners and developers about soils that are vulnerable to erosion</li> <li>• Work with Grant County officials to protect soils in the City's UGA</li> </ul>	City-wide (some steps may also be taken within the UGA, if the City chooses)
	Mitigate stormwater flows	Use development standards to mitigate stormwater flows <ul style="list-style-type: none"> <li>• Continue to implement the Department of Ecology's <i>Stormwater Management Manual for Eastern Washington</i></li> <li>• Educate landowners and developers about stormwater management and the reasons for the development standards</li> </ul>	City-wide; education can also be undertaken within the UGA, if the City chooses
		Shoreline setbacks will provide some protection within the City	City-wide
Coordinate water quality management with neighboring jurisdictions		Identify neighboring jurisdictions for coordination of water quality management plans; see "Regional Coordination" under the heading "Restoration Resources" below	Ecosystem-wide
Protect vegetative cover on areas prone to high soil erosion		<ul style="list-style-type: none"> <li>• Use development regulations to protect vegetative cover on areas prone to high soil erosion outside shoreline areas</li> <li>• Educate landowners and developers about protecting vegetative cover on areas prone to high soil erosion</li> <li>• Work with Grant County officials to protect vegetative cover in the City's UGA</li> </ul>	23 Education and working with Grant County have the potential to be effective throughout the City and its UGA
Maintain the natural value of wetlands to control and filter storm water runoff		<ul style="list-style-type: none"> <li>• SMP regulations will provide protection in shoreline areas within the City</li> <li>• Strictly enforce the City's CAO and SMP</li> <li>• Educate landowners and developers about wetland functions, values, and protection</li> </ul> Work with Grant County officials to protect wetlands and their buffers in the City's UGA	City-wide (some steps may also be taken within the UGA, if the City chooses)

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Objective	Strategy	Action	Target reaches*
Protect riparian habitat and migration corridors	Regulate new development to ensure protection of riparian habitat and migration corridors	<ul style="list-style-type: none"> <li>• SMP regulations, including buffer and setback requirements, will provide protection in shoreline areas within the City</li> <li>• Educate landowners about riparian habitat and migration corridors and their protection to improve protection of already-developed areas. See “Education Programs” under the heading “Restoration Resources” below for ideas</li> <li>• Work with Grant County officials to protect riparian habitat and migration corridors in the City’s UGA</li> </ul>	City-wide (some steps may also be taken within the UGA, if the City chooses)
	Protect riparian, emergent, aquatic, and wetland vegetation within SMP jurisdiction to mitigate effects of upland nonpoint pollution sources	<p>Protect shoreline and aquatic vegetation near docks, residential areas, and public access areas</p> <ul style="list-style-type: none"> <li>• SMP regulations will provide protection in shoreline areas within the City</li> <li>• Educate landowners and the general public (including out-of-town recreational users) about the functions of shoreline and aquatic vegetation and how to protect it; and about aquatic weeds and how to prevent their spread. See “Education Programs” under the heading “Restoration Resources” below for ideas</li> <li>• Work with Grant County officials to protect shoreline and aquatic vegetation in the City’s UGA</li> </ul>	2-4, 6, 8, 15-17, 19, 22-24, 26, 27, 29 City-wide and throughout the UGA
		<p>Protect vegetative buffer on residential and agricultural land</p> <ul style="list-style-type: none"> <li>• SMP regulations will provide protection in shoreline areas within the City</li> <li>• Educate residential landowners about the functions of shoreline vegetation and how to protect it. See “Education Programs” under the heading “Restoration Resources” below for ideas</li> <li>• Educate owners and managers of agricultural land about the functions of shoreline vegetation and how to protect it. See “Education Programs” under the heading “Restoration Resources” below for ideas</li> <li>• Work with Grant County officials to protect vegetative buffers on developed and developing residential land in the City’s UGA</li> <li>• Work with Grant County, NRCS, conservation district to protect vegetative buffers on agricultural land throughout the subbasin</li> <li>• Develop an incentive program to encourage protection of vegetative buffers on agricultural land throughout the subbasin, perhaps in partnership with other organizations</li> </ul>	<ul style="list-style-type: none"> <li>• 1, 2, 3, 15, 21, 26, 29, 30</li> <li>• Throughout the City, the UGA, and the subbasin</li> </ul>

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Objective	Strategy	Action	Target reaches*
Protect riparian habitat and migration corridors ( <i>continued</i> )	Protect riparian, emergent, aquatic, and wetland vegetation within SMP jurisdiction to mitigate effects of upland nonpoint pollution sources ( <i>continued</i> )	Work with conservation and irrigation districts, including the Moses Lake Irrigation and Rehabilitation District, to implement recognized Best Management Practices along riparian areas throughout the subbasin	Ecosystem-wide
		Protect existing wetlands from encroachment by light industrial development <ul style="list-style-type: none"> <li>• SMP regulations prohibiting new industrial development will provide protection in shoreline areas within the City</li> <li>• Use education and outreach to prevent encroachment by existing light industrial developments in the City and its UGA</li> <li>• Work with Grant County officials to prevent encroachment on wetlands on developed and developing land in the City's UGA</li> </ul>	12, 13 City-wide (some steps may also be taken within the UGA, if the City chooses)
		Protect existing wetlands from encroachment by residential development <ul style="list-style-type: none"> <li>• SMP regulations will provide some protection in shoreline areas within the City</li> <li>• Educate landowners about wetlands and how to protect them. See "Education Programs" below for ideas</li> <li>• Work with Grant County officials to protect wetlands on developed and developing land in the City's UGA</li> </ul>	2, 4-6, 9-11, 14, 21, 22, 24-28, 30 City-wide (some steps may also be taken within the UGA, if the City chooses)
		Protect existing wetlands from encroachment by recreational development <ul style="list-style-type: none"> <li>• SMP regulations will provide some protection in shoreline areas within the City.</li> <li>• Educate landowners about wetlands and how to protect them. See "Education Programs" under the heading "Restoration Resources" below for ideas</li> <li>• Work with Grant County officials to protect wetlands on developed and developing land in the City's UGA</li> </ul>	30 City-wide (some steps may also be taken within the UGA, if the City chooses)
	Protect important habitat areas	Protect priority habitat identified by WDFW <ul style="list-style-type: none"> <li>• SMP regulations will provide some protection in shoreline areas within the City</li> <li>• Work in partnership with WDFW &amp; other resource agencies (see restoration resources, below) to educate landowners and developers in the City and the UGA</li> <li>• Communicate with WDFW about new priority habitat areas, priority habitat issues, etc.</li> </ul>	1-6, 10, 16, 17, 20-22, 26-29 Throughout the City, the UGA, and the ecosystem

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Objective	Strategy	Action	Target reaches*
Protect riparian habitat and migration corridors (continued)	Protect important habitat areas	Protect spawning and rearing habitat for fish and wildlife <ul style="list-style-type: none"> <li>• SMP regulations will provide some protection in shoreline areas within the City</li> <li>• Work in partnership with WDFW &amp; other resource agencies (see restoration resources, below) to educate landowners and developers in the City and the UGA</li> </ul>	14
		Protect vegetation and habitat in dune areas <ul style="list-style-type: none"> <li>• Study dune ecosystem to provide a scientific basis for regulating uses in the dunes area.</li> <li>• Work in partnership with recreation user groups, WDFW, &amp; other resource agencies (see restoration resources, below) to educate landowners and developers in the City and the UGA</li> </ul>	25
	Limit hardening of shoreline structures	<ul style="list-style-type: none"> <li>• SMP regulations will provide protection in shoreline areas within the City</li> <li>• Educate landowners and developers throughout the City and the UGA about shoreline stabilization. See “Education Programs” under the heading “Restoration Resources” below for ideas</li> </ul>	City-wide and throughout the UGA
	Limit increase in the number of bulkheads on the shoreline	<ul style="list-style-type: none"> <li>• SMP regulations will provide protection in shoreline areas within the City</li> <li>• Educate landowners and developers throughout the UGA about shoreline stabilization. See “Education Programs” under the heading “Restoration Resources” below for ideas</li> <li>• Work with Grant County officials to limit new bulkheads in the City’s UGA</li> </ul>	1-6, 8, 15, 16, 18, 19, 26, 28-30 Throughout the City and the UGA
	Maintain the biological and physical functions and values of wetlands	Provide for reasonable buffers around wetlands in order to provide a local habitat for wetland plant and animal communities, and to reduce or minimize intrusions from humans and domestic animals <ul style="list-style-type: none"> <li>• SMP regulations will provide protection in shoreline areas within the City</li> <li>• Educate landowners and developers throughout the City and the UGA about wetland functions and values. See “Education Programs” under the heading “Restoration Resources” below for ideas</li> <li>• Work with Grant County officials to protect wetlands in the City’s UGA</li> </ul>	Throughout the City and the UGA

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Objective	Strategy	Action	Target reaches*
Protect riparian habitat and migration corridors (continued)	Maintain the biological and physical functions and values of wetlands (continued)	Provide for reasonable buffers around wetlands in order to provide a local habitat for wetland plant and animal communities, and to reduce or minimize intrusions from humans and domestic animals (continued) <ul style="list-style-type: none"> <li>• Educate owners and managers of agricultural land about wetland functions and values and how to protect them. See “Education Programs” under the heading “Restoration Resources” below for ideas</li> <li>• Work with Grant County, NRCS, conservation district to protect wetland functions and values on agricultural land throughout the subbasin</li> <li>• Develop an incentive program to encourage protection of wetlands on agricultural land throughout the subbasin, perhaps in partnership with other organizations</li> <li>• Encourage good stewardship by all residents and users of shoreline areas</li> </ul>	Throughout the City and the UGA
Restore altered hydrologic processes	Work with Bureau of Reclamation and the Moses Lake Irrigation and Rehabilitation District to alter dam and irrigation operations, such as timing drawdown to limit impacts to aquatic vegetation	Initial steps will depend on the City’s existing relationships; see “Regional Coordination” under the heading “Restoration Resources” below	Ecosystem-wide
Restore water quality	Reduce impacts of stormwater runoff on water quality throughout the subbasin	<ul style="list-style-type: none"> <li>• Highlight locations for most effective stormwater retrofitting</li> <li>• Retrofit storm sewer outfalls to limit pollution loading to the lake</li> </ul>	8 (2 sites); 9 (1 site); 12 (1 site); 13 (2 sites); 15 (1 site); 16 (4 sites); 19 (5 sites); 20 (3 sites); 21 (3 sites); 26 (6 sites); 28 (1 site)
	Reduce/prevent runoff from parking areas	Develop vegetative buffers around parking areas on public land, as well as direct overland flow away from lake	City-wide

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Objective	Strategy	Action	Target reaches*
Restore water quality (continued)	Reduce/prevent runoff from parking areas (continued)	On public land, move parking areas out of the SMP jurisdiction or set them back from the shoreline or convert to pervious paving	6 (Cascade Park), 17 (Lower Peninsula Boat Launch), 22 (Montlake Park)
		Provide incentives for landowners to develop vegetative buffers around parking areas, as well as direct overland flow away from lake, on sites already developed. Initial steps could include: <ul style="list-style-type: none"> <li>• Secure funding and program sponsor (unless city is to sponsor/manage the program)</li> <li>• Develop educational materials; communicate with landowners</li> </ul>	14, 15, 24
	Reduce impacts of agriculture and development on water quality	Work with conservation districts and irrigation districts, including the Moses Lake Irrigation and Rehabilitation District, to institute BMPs for agriculture, including efficient use of irrigation water and fertilizer, control of animal waste and sediment, as well as livestock fencing along riparian areas	Throughout the City, the UGA, and the subbasin
		Develop public education programs to reduce fertilizer use on residential land near the shoreline	City-wide (and within the UGA, if the City chooses)
		Use education and incentives to encourage restoration of vegetative buffers on developed parcels and in agricultural areas. Initial steps could include: secure funding and program sponsor (unless city is to sponsor/manage the program), develop educational materials; communicate with landowners	1-4, 6, 7, 9, 15, 19-21, 23, 26, 28, 29
		Restore vegetative cover and riparian buffer on areas prone to high soil erosion. Initial steps could include: <ul style="list-style-type: none"> <li>• Identify target parcels</li> <li>• Develop an incentive program</li> <li>• Work with NRCS, conservation district, WDFW, or other entities to secure funding and program sponsor (unless city is to sponsor/manage the program)</li> <li>• Develop educational materials</li> <li>• Communicate with landowners. Distribute materials; assess willingness to participate</li> </ul>	23

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Objective	Strategy	Action	Target reaches*
Restore riparian habitat and migration corridors	Restore native terrestrial and emergent vegetation in shoreline areas	Develop a demonstration project on public lands using “soft” structural stabilization, vegetative stabilization, or a combination of an upland retaining wall with vegetation restoration	Is there a site that might work well? None of the sites identified in the inventory and characterization is on public land. Are there any bulkheads on public land?
		Where landowners are interested, replace bulkheads and other shore protection structures with bioengineered (biotechnical or biostructural) stabilization, or upland retaining walls and riparian and emergent vegetation; and restore terrestrial and emergent vegetation. Initial steps could include: develop educational materials; assess landowner willingness—maybe find a champion; secure funding and leadership/sponsorship for project; develop and implement a pilot project	1-8, 15, 16, 18, 19, 26, 28-30
		Restore riparian and emergent vegetation on publicly owned land	Cascade Park (Reach 6)
		On publicly owned land, manage areas of emergent vegetation to support healthy ecological processes and functions	Cascade Park (Reach 6)
		Provide public access at the railroad grade in Neppel Park and restore emergent vegetation and vegetative buffer	Neppel Park (Reach 13)
		Educate landowners about shoreline vegetation restoration	City-wide (and within the UGA, if the City chooses)
		Encourage landowners to restore shoreline vegetation	City-wide (and within the UGA, if the City chooses)
		Enhance wetlands to increase biological and physical functions and values	Educate landowners about wetlands enhancement
	Encourage landowners to enhance wetlands		City-wide (and within the UGA, if the City chooses)

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## Existing and Ongoing Programs

### Restoration Resources

**Potential mechanisms** for actions that are not currently being implemented or for which funding is not anticipated.

#### Regional Coordination

Some of the City's restoration objectives depend on coordination with other entities. Others can be furthered by coordination, and will achieve much better results than if protection and restoration efforts are limited to shoreline areas within the City. The city can foster shoreline ecological function by building relationships, and exploring opportunities for coordination, with governments and other agencies involved in land and water management, including:

- Moses Lake Conservation District
- Grant Conservation District
- Irrigation Districts, including the Moses Lake Irrigation and Rehabilitation District
- Grant County
- The Washington Department of Fish and Wildlife
- The Washington Department of Ecology
- Washington State University's Grant and Adams Counties Extension
- The Bureau of Reclamation
- The Natural Resource Conservation Service
- The Upper Crab Creek/Wilson Creek Watershed Planning Unit

Where working relationships are not already in place, establishing them as soon as possible will lay the groundwork for joint planning, and is likely to be more effective than seeking to enlist support at the stage of implementation.

Possibilities include:

- Convening a forum to discuss the existing situation and each party's needs and interests
- Meeting individually with representatives of other organizations interested in lake management
- Working through channels that have already been established

Some of the agencies listed above offer technical and funding resources that may be available to supports shoreline protection and restoration. Coordination with those agencies will help City staff understand what resources are available and plan projects to take best advantage of them—including working effectively with funding cycles.

### Education Programs

Education programs offer effective means of contacting large numbers of people and encouraging voluntary action, as well as informing members of the public of local, state, and federal regulations and their responsibilities as landowners and resource users. Possibilities include:

- Develop a Good Neighbor Handbook; distribute to all shoreline landowners; work with Real Estate agents, Audubon, Master Gardeners to distribute; mail to all purchasers of shoreline property
- Educate Master Gardeners
- Hold shoreline landscaping classes—to teach landowners how to minimize runoff and delivery of pollutants to the lake, minimize chemical use, use any chemicals correctly, work with existing vegetation, enhance shoreline resources, protect and enhance habitat, watch wildlife without disturbance, etc.
- Develop brochures; distribute as part of the development process and through other channels—garden centers, cooperative extension, etc.

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- Use the City's website to link residents to information about shoreline issues such as vegetation conservation
- Place interpretive signs at public access areas
- Develop a display and exhibit it at City Hall, the County Fair, local home shows, and other venues.
- Develop educational materials about shoreline stabilization methods; distribute as part of the development process
- Work with the Conservation District to hold a shoreline stabilization seminar, and perhaps a tour of bulkhead alternatives, for developers and interested landowners.
- Develop educational materials about important fish species, their habitat, and how to protect them; distribute at fishing days, Cast for Kids, bait and tackle dealers, etc.
- Distribute the Department of Ecology's "Lake-Friendly Landscaping" focus sheet, and place a link to it on the City's web site

## **Parks Management**

The City will develop a parks management plan that details strategies and actions for improving the ecological function of shorelines in the City's parks. Choices about design (particularly where people will access the water for boating, swimming, etc.), plant materials, planting methods, and maintenance can all be tailored to support both recreation and shoreline objectives.

## **Capital Facilities Program**

The City can further a number of its objectives by planning and implementing public works projects. Amending the Capital Facilities element of the City's *Comprehensive Plan* will provide a mechanism for prioritizing and funding certain restoration strategies. Actions to consider in amending the element include:

- Retrofit storm sewer outfalls to limit pollution loading to the lake (Municipal Facilities section)
- Develop vegetative buffers around parking areas on public land, as well as direct overland flow away from lake (Municipal Facilities and/or Parks and Recreation Facilities section)
- On public land, move parking areas out of the SMP jurisdiction or set them back from the shoreline (Municipal Facilities and/or Parks and Recreation Facilities section)
- Develop a demonstration project on public lands using "soft" structural stabilization, vegetative stabilization, or a combination of an upland retaining wall with vegetation restoration (Municipal Facilities or Parks and Recreation Facilities section, depending on demonstration project location)
- Restore emergent vegetation on publicly owned land (Municipal Facilities and/or Parks and Recreation Facilities section)
- Provide public access at the railroad grade in Neppel Park and restore emergent vegetation and vegetative buffer (Parks and Recreation Facilities section)

## **Development Opportunities**

The City may have opportunities to work with shoreline developers to complete restoration actions in addition to minimum mitigation requirements. Possibilities include:

- Establishing a Shoreline Restoration Bank—a list of restoration projects that would further the City's restoration objectives and that might not otherwise be completed. Where on-site mitigation opportunities are limited by building site constraints, limited potential ecological gains, or other site-specific factors, and where the proposed development is consistent with the City's Comprehensive Plan and meets an identified need, the requirement for onsite mitigation might be waived in exchange for completion by the developer of a high-priority restoration project on another site. The City would probably want to require that the off-site restoration provide a gain in shoreline ecological functions

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(i.e., the off-site project would have to exceed the “no net loss” standard—it would have to go beyond resulting in no net loss and enhance shoreline ecological function).

- Serving as liaison between developers interested in restoration and organizations that can provide technical expertise and funding for projects that will advance the City’s restoration objectives. Regional Coordination, if undertaken, will make the City a valuable clearinghouse for restoration information and a good link between developers and restoration opportunities.

## Development Incentives

Development incentives might include waiving some or all development application fees or waiving city-required infrastructure improvement fees for developers, landowners, and agricultural land managers willing to take protection and restoration actions in addition to those required by the SMP.

## Tax Relief System

The City may want to consider a tax system to encourage shoreline restoration measures. Possibilities include:

- Working with Grant County to craft a preferential tax incentive through the Public Benefit Rating System administered by the County under the Open Space Taxation Act (RCW 84.34), to encourage private landowners to preserve natural shore-zone features for "open space" tax relief. The Department of Ecology has published a technical guidance document for local governments that wish to improve landowner stewardship of natural resources. More information about the program can be found at <http://www.ecy.wa.gov/biblio/99108.html>. The guidance document provides "technically based property selection criteria designed to augment existing open space efforts with protection of key natural resource features which directly benefit the watershed. Communities can choose to use any portion, or all, of these criteria when tailoring a Public Benefit Rating System to address the specific watershed issues they are facing."

## Fee System

The City may want to consider a fee system to directly fund shoreline restoration measures. Possibilities include:

- Establishing a Shoreline Restoration Fund. A chief limitation to implementing restoration is local funding, which is often required as a match for state and federal grant sources. To foster ecological restoration of the City’s shorelines, the City could establish an account that may serve as a source of local match monies for non-profit organizations implementing restoration of the City’s shorelines. The fund could be administered by the Shorelines Administrator and supported by a levy on new shoreline development proportional to the size or cost of the new development project. Monies drawn from the fund would be used as a local match for restoration grant funds.

## Resource Directories

For landowners: A resource directory will help property owners who are interested in restoration to identify sources of technical and financial assistance.

For City staff: a directory will help City staff to identify and coordinate shoreline restoration opportunities. The focus might be somewhat different than in a directory designed for landowners; for instance, the staff directory might include descriptions of shoreline-related programs of different City departments so that staff can more easily coordinate resources and funding within the organization.

**Resources** for actions that are not currently being implemented or for which funding is not anticipated

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## Programs and Organizations

Existing programs and organizations offer a wealth of resources to support the City in implementing its protection and restoration plan, and to help local citizens undertake protection and restoration projects—either on their own land or as sponsors of larger projects. They include:

- [Central Basin Audubon Society](#). According to its web site, the local chapter of the Audubon Society works to promote environmental education, including presenting programs on conservation and wildlife protection; and works on wildlife protection projects; assists in creating backyard wildlife habitats; works to identify wildlife habitat around the Columbia Basin, and protect and enhance it; and is working to develop community partnerships.
- Moses Lake Conservation District
- [Grant Conservation District](#). The Conservation District “identifies challenges and guides solutions voluntarily.” Its Water on Wheels program offers free workshops on watersheds, soils, groundwater, and resource conservation, for both students and adults.
- [Natural Resources Conservation Service](#). The NRCS's natural resources conservation programs help people reduce soil erosion, enhance water supplies, improve water quality, and increase wildlife habitat. The NRCS offers a wealth of resources, including several of the funding programs listed below, and sponsors the [Big Bend Resource Conservation and Development Council](#). The RC&D works as a “catalyst” to create partnerships that will successfully achieve economic and natural resource development while maintaining an environmental ethic, and has completed a number of projects, including the Coulee Corridor Consortium, the Columbia Basin Water Initiative, a Shrub-Steppe Demonstration Planting, and a Leafy Spurge Management Project.
- The [Washington Department of Ecology](#). Ecology’s mission is to protect, preserve and enhance Washington’s environment, and promote the wise management of our air, land and water; its goals are to prevent pollution, clean up pollution, and support sustainable communities and natural resources. The agency offers many programs and resources to support local communities in advancing those goals, addressing subjects such as stormwater management, aquatic plant management, lake stewardship, and wetland stewardship that are relevant to Moses Lake’s restoration efforts.
- The [Washington Department of Fish and Wildlife](#). The WDFW’s mission is to provide sound stewardship of fish and wildlife. The agency offers many programs and resources to support management of fish and wildlife species based on the best available science, including the Backyard Sanctuary Program (a wildlife stewardship program for homeowners), resources for habitat and wildlife stewardship, information about Priority Habitats and Species, technical assistance for habitat protection and restoration, and funding programs (see below).
- The [U. S. Fish and Wildlife Service](#). The mission of the USFWS is “working with others to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.” The service offers a number of programs related to fish and wildlife habitat conservation, including administrating the Migratory Bird Treaty Act of 1916 to conserve migratory bird populations and their habitats and sponsoring National Fishing and Boating Week. The service also administers grant programs, with funding available to individuals, local governments, and conservation groups (see below).
- WSU Grant-Adams Master Gardeners. Master Gardeners promote environmentally-sound gardening by providing public education on topics such as plants, pests, and water conservation, and water quality. The local Master Gardeners researched the issue and created a Power Point presentation and tri-fold brochure about shoreline stabilization for Moses Lake. These were presented at a well-attended public meeting in May, 2009, at Big Bend Community College.
- Moses Lake Irrigation & Rehabilitation District (MLIRD). MLIRD’s mission has three parks: Irrigation, recreation, and rehabilitation. The rehabilitation portion deals with improving water quality in the lake, including aquatic weed abatement and sediment removal. The efforts of this agency should be considered when looking at overall lake restoration possibilities.

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## Sources of funding

Listed below are some potential sources of grant funding for restoration projects in the City's shoreline areas. Funding programs change frequently, and the list will need to be updated at least once a year to stay current. Other grants may be available in addition to the ones listed below. The list here is intended to give a sense of the range of funding sources available and the types of projects that may be fundable.

1. Ducks Unlimited
  - a. Matching Aid to Restore States Habitat (MARSH)—matching funds to help states acquire and enhance wetland habitat
2. FishAmerica Foundation
  - a. FishAmerica Grant Program—funding for hands-on, action-oriented projects that directly enhance water quality, habitat and/or sport fish populations
3. National Fish and Wildlife Foundation
  - a. Bring Back the Natives—funding for on-the-ground efforts to restore native aquatic species to their historic range that initiate partnerships with private landowners, demonstrate successful collaborative efforts, address watershed health issues that would lead to restoring habitats and are key to restoring native aquatic species and their migration corridors, and promote stewardship on private lands
  - b. Native Plant Conservation Initiative (with federal agencies) —funding for "on-the-ground" projects that involve local communities and citizen volunteers in the restoration of native plant communities
4. [Natural Resource Conservation Service](#)
  - a. Environmental Quality Incentive Program (EQIP) —provides technical, financial, and educational assistance to farmers and ranchers to address livestock-related natural resource concerns and other, more general conservation priorities
  - b. Wildlife Habitat Improvement Program (WHIP)— technical and cost-share assistance to establish and improve fish and wildlife habitat on private land
5. U.S. Army Corps of Engineers
  - a. Basinwide Restoration New Starts General Investigation—cost-share funding for basin restoration projects and research
  - b. Section 204: Environmental Restoration Projects in Connection with Dredging—funding for projects to restore, protect, and create aquatic and wetland habitats in connection with construction or maintenance dredging of an authorized project
  - c. Section 206: Aquatic Ecosystem Restoration Program funding for projects to restore aquatic ecosystems
6. U.S. Bureau of Reclamation
  - a. Planning/Technical Assistance Program—assistance with data collection and analysis related to water supply and water quality, engineering, hydrologic studies, sedimentation, and water resources planning
7. U.S. Environmental Protection Agency
  - a. Five-Star Restoration Program—challenge grants, technical support and opportunities for information exchange to enable community-based wetland and stream restoration projects
  - b. Wetland Protection, Restoration, and Stewardship Discretionary Funding—support for studies and activities related to implementation of Section 404 of the Clean Water Act for

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both wetlands and sediment management. Projects can support regulatory, planning, restoration or outreach issues

8. U.S. Fish & Wildlife Service
  - a. North American Wetlands Conservation Act Grants Program— funding assistance to promote conservation of wetlands and associated habitats for migratory birds and other wildlife
  - b. Partners for Fish and Wildlife—a voluntary partnership program that helps private landowners restore wetlands and other important fish and wildlife habitats on their own lands
  - c. Cooperative Conservation Initiative —grants to restore natural resources and establish or expand wildlife habitat
9. Washington Department of Ecology (with U.S. EPA)
  - a. Nonpoint Source Implementation Grant (319) Program—grants to support activities including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and monitoring to assess the success of specific nonpoint source implementation projects
10. Washington Department of Fish and Wildlife
  - a. Landowner Incentive Program (LIP) —a competitive grant program to provide financial assistance to private individual landowners for the protection, enhancement, or restoration of habitat to benefit species-at-risk on privately owned lands
11. Washington Department of Natural Resources
  - a. Aquatic Lands Enhancement Account—grant-in-aid support for the purchase, improvement, or protection of aquatic lands for public purposes, and for providing and improving access to such lands

## The City's Role

The City of Moses Lake is likely to have a number of different roles in implementing this restoration plan. The City may undertake some activities itself, such as retrofitting storm sewer outlets, modifying park management to support shoreline ecological functions, and educating residents. The City may assist in moving other projects forward by participating in regional coordination. And, in some instances, the City may support a project undertaken by others, or champion a project while seeking an individual or organization to carry it out. For instance, the City might seek an organization to develop a brochure on a specific topic, which the City would then distribute to shoreline landowners. Or, the City might write a letter of support for an organization seeking funding to complete a project that will advance the City's restoration objectives.

The City will also need to evaluate progress toward its restoration goal, and make changes to keep its restoration strategies up to date.

## Prioritization

The City will need to make decisions about what projects to undertake, what projects to support, and what projects to promote. When evaluating projects in which it has a role or in which a role is proposed for it, the City will use the following criteria to establish priorities:

- Availability of adequate funding to complete the project on schedule, maintain the completed project, and monitor outcomes
- Feasibility. Components of feasibility include, but are not limited to:
  - Landowner willingness
  - Public support

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- Preference should be given to projects that will:
  - Further the goals of this protection and restoration plan. When all other factors are equal, preference should be given to projects that will address more than one objective
  - Employ one or more of the strategies in this protection and restoration plan
  - In the case of restoration projects, address a known degraded condition
  - Address a worsening situation (as opposed to one that is stable)
  - Be consistent with other restoration and management plans
- Preference should be given to projects that will not cause damage to adjacent properties or shoreline areas

This plan includes a list of prioritization criteria, rather than restoration priorities, to give the City flexibility in evaluating projects that are not included in the plan and to allow for adaptive management. First, the plan does not list all possible projects. If projects that are not part of the plan are proposed, the criteria will allow the City to evaluate them.

## **Monitoring and Adaptive Management**

The City will use monitoring and adaptive management to ensure continued progress toward its restoration goal.

- The City will monitor progress toward each of its restoration objectives using metrics appropriate to the objective. The metrics do not need to involve complicated ecological evaluations, although it will be useful to incorporate available data, such as water quality information gathered as part of TMDL work. The City can use simple quantitative measures such as number of storm sewer outfalls retrofitted, number of bulkheads replaced, changes in wetland ratings, changes in water quality, and number of hits on a City shoreline restoration website. It can also use qualitative assessments of its progress on strategies that involve, for instance, regional coordination and landowner education. The information generated will help the City to see which strategies and actions are working well and which may need to be refined (which will inform adaptive management) as well as gauge progress toward the objectives. As more data become available and the City is able to quantify restoration needs, it may choose to use more precise metrics.
- The City will use adaptive management, regularly reviewing its objectives, assessing progress, and updating its strategies and actions in response to its findings. Adaptive management means adapting the restoration plan to meet changing needs, conditions, and resources; and to respond to new information. As restoration work is completed, some approaches may cease to be applicable. Other approaches may prove unpopular or be impractical due to lack of funding or coordination challenges. In addition, new possibilities may present themselves as regional coordination bears fruit or as new data become available. Adaptive management will allow the City to keep the restoration plan fresh and relevant as it makes progress and learns does and doesn't work well under the specific circumstances operating in Moses Lake.

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## Benchmarks and Timelines

The table below outlines The City’s shoreline restoration benchmarks and its timeline for meeting those benchmarks.

A benchmark is a point of reference against which progress toward the City’s restoration goal (“Promote the restoration of Moses Lake to a healthy state that supports natural habitat while providing recreational benefits to the community”) can be measured. Benchmarks make it easier to assess results, even when those results don’t involve physical changes that are easy to see.

Both the benchmarks and the timeline are based on the City’s current perception of restoration needs and resources available to meet those needs. They can be expected to evolve over time. As work is completed, the City will have a better sense of what needs to be done and what it can reasonably expect to accomplish given its resources and the constraints on those resources—both of which will be dynamic, always changing as the city grows and the needs of its citizens change. The City will also gain a growing understanding of how each restoration strategy is working and where resources will best be invested to achieve its restoration objectives and meets its goal.

Year	Benchmark
2009	<ul style="list-style-type: none"> <li>• The City adopted the <i>Stormwater Management Manual for Eastern Washington</i></li> </ul>
2012	<ul style="list-style-type: none"> <li>• First replacement of a failing bulkhead with biotechnical stabilization by a private property owner</li> </ul>
2014	<ul style="list-style-type: none"> <li>• The City has adopted an updated SMP</li> <li>• The City has amended its Critical Areas Ordinance to increase wetland buffer widths outside of shoreline areas and to ensure adequate protection of wetlands and their buffers</li> </ul>
2015	<ul style="list-style-type: none"> <li>• The City is administering its SMP and CAO effectively</li> <li>• The City uses staff contact and educational materials to encourage landowners to restore shoreline vegetation and enhance wetlands</li> <li>• City departments and programs all support healthy shoreline ecological function, through mechanisms such as parks management, code administration, and development regulations</li> <li>• The City has identified target parcels for restoration of vegetative cover and riparian buffers in areas prone to high soil erosion</li> <li>• The City has evaluated its progress toward the goal of shoreline restoration and has instituted a program of regular evaluation and adaptive management to ensure continued progress</li> <li>• The City has developed an incentive program for restoration of vegetative cover and riparian buffers in areas prone to high soil erosion</li> <li>• The City is actively involved in educating landowners, developers, recreationists, and other users of the lake about shoreline ecological functions at ways of protecting and restoring them. (The City’s role may be as a coordinator.)</li> <li>• The City uses incentives, as well as staff contact and educational materials, to encourage landowners to restore shoreline vegetation and enhance wetlands</li> </ul>
2020	<ul style="list-style-type: none"> <li>• The City has highlighted locations for most efficient and effective stormwater retrofitting</li> <li>• The City enjoys good working relationships with other local governments and with resource agencies, and works in partnership with them to protect and restore shoreline ecological functions at the ecosystem level</li> <li>• The City has provided public access at the railroad grade in Neppel Park and restored the emergent vegetation and vegetative buffer</li> <li>• On at least one City-owned site, the City has developed vegetative buffers around parking areas and directed overland flow away from the lake</li> <li>• The City has updated its development regulations to manage runoff from upland areas and to protect vulnerable soils outside of shoreline areas</li> <li>• An incentive program to encourage protection of wetlands on agricultural land is in place and available to landowners throughout the subbasin, and the City and its partners are actively promoting participation</li> <li>• An incentive program to encourage protection of vegetative buffers on agricultural land is in place and available to landowners throughout the subbasin, and the City and its partners are</li> </ul>

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Year	Benchmark
	<p>actively promoting participation</p> <ul style="list-style-type: none"> <li>• The City enjoys good working relationships with recreation user groups, and works in partnership with them to protect and restore shoreline ecological functions at the ecosystem level</li> <li>• At least 75% of construction sites in the City use proper erosion controls</li> <li>• The City has completed a bulkhead replacement demonstration project</li> <li>• A program for restoration of vegetative cover and riparian buffers in areas prone to high soil erosion is underway, with funding and a project sponsor</li> <li>• A comprehensive outreach and education program ensures that at least 75% of landowners, local lake users, developers, real estate agents, and managers of agricultural lands understand the effects of their decisions on water quality and on riparian habitat and migration corridors; the reasons for development regulations that protect shoreline ecological functions; and, where applicable, the incentive programs available to them</li> <li>• The City actively promotes shoreline incentive programs, including developing and distributing educational materials, communicating with landowners, and working to develop funding (possibly in partnerships with other project sponsors)</li> </ul>
2025	<ul style="list-style-type: none"> <li>• The dune ecosystem is adequately understood to provide a scientific basis for regulating uses in dune areas</li> <li>• The City has retrofitted 10% of the storm sewer outfall identified in the <i>Shoreline Inventory and Characterization</i></li> <li>• The City has assessed landowner willingness to restore vegetative cover and riparian buffers in areas prone to high soil erosion</li> <li>• At least 10% of agricultural uses in the subbasin have taken action to protect vegetative buffers</li> <li>• A comprehensive outreach and education program ensures that at least 50% of out-of-town recreational lake users understand the effects of their decisions on water quality and on riparian habitat and migration corridors</li> <li>• The City provides incentives for landowners to develop vegetative buffers around parking areas and direct overland flow away from the lake on sites that have already been developed</li> </ul>
2030	<ul style="list-style-type: none"> <li>• The City has retrofitted 25% of the storm sewer outfall identified in the <i>Shoreline Inventory and Characterization</i></li> <li>• The City has completed all needed vegetation restoration projects on City-owned land, and has a program in place to maintain shoreline vegetation, including re-planting heavily used areas (e.g., areas around boat launches and fishing and swimming access points) as needed</li> <li>• All remaining agricultural uses in the City and its UGA have taken action to protect wetlands, vegetative buffers, and shoreline ecological functions, including fencing riparian areas to exclude livestock and employing Best Management Practices</li> <li>• The number of bulkheads has been reduced by 10%</li> <li>• Vegetative cover and riparian buffers have been restored on at least 25% of the land prone to high soil erosion in Reach 23</li> </ul>
2040	<ul style="list-style-type: none"> <li>• The City has retrofitted 50% of the storm sewer outfall identified in the <i>Shoreline Inventory and Characterization</i></li> <li>• On 50% of its shoreline sites, the City has developed vegetative buffers around parking areas and directed overland flow away from the lake</li> </ul>
2050	<ul style="list-style-type: none"> <li>• The City has retrofitted all of the storm sewer outfall identified in the <i>Shoreline Inventory and Characterization</i></li> </ul>
2060	<ul style="list-style-type: none"> <li>• On all of its shoreline sites, the City has developed vegetative buffers around parking areas and directed overland flow away from the lake</li> <li>• On 50% of its shoreline sites, the City has moved parking areas out of shoreline jurisdiction or set them back so that they have little or no impact on shoreline ecological functions</li> <li>• The number of bulkheads has been reduced by 25%</li> </ul>