Mosier Watershed Council

Restoration Action Plan

Introduction

The Mosier Watershed Council developed an Action Plan in 2005 to describe its strategic mission over ten years. The Council's 2015 Action Plan updates the 2005 action plan with new goals, strategies, and actions. The Action Plan was developed in coordination with the other Wasco County Watershed Councils' and the Coordinating Board.

This plan is written to cover a five (5) year timeframe (2015 to 2020). The Mosier Watershed Council will also develop and adopt a series of biennial and annual Work Plans.

This document includes only a brief description of the watershed and the issues of concern. It does not include detailed descriptions of studies or conclusions, nor does it include technical references. For background and references, see the 2015 Wasco County Watershed Councils Action Plan. The Mosier Watershed Council webpage provides information and links to current studies, Council meeting minutes, and Council By-Laws:
http://wascoswcd.org/wcswcd_013.htm

Watershed Area and Land Use

The Mosier Watershed area covers approximately 49,725 acres. The watershed area encompasses all land drained by Mosier, Rock, and Rowena Creeks and their tributaries, all three of which discharge into the Columbia River. Associated lands which drain directly to the Columbia River are also included in the watershed area.

The Mosier Watershed area is located on the east slope and in the eastern foothills of the Cascade Range. Rowena Creek is a short, high gradient stream approximately five-mile long that flows west and then north from Oregon white oak-covered hills into the Columbia River near the community of Rowena (RM 182). This short stream drops approximately 2000 feet in elevation from headwaters to mouth. Rowena Creek is bounded on the south by Chenoweth Creek, on the east and north by the Columbia River, and on the west by Mosier Creek. Mosier Creek originates in the Mt. Hood National Forest near Gibson Prairie. It flows north out of mixed pine and fir forest and through fruit orchards, to enter the Columbia River at the town of Mosier (RM 176). The watershed is approximately ten miles long and two to eight miles wide. Elevation change from headwaters to mouth is approximately 3300 feet.

Mosier Creek is bounded on the south by Mill Creek, on the east by Chenoweth and Rowena Creeks, on the north by the Columbia River and on the west by Rock Creek and the Hood River sub-basin.

Rock Creek originates in mixed pine and fir forest and flows north to enter the Columbia River at the town of Mosier (RM 176). Rock Creek watershed is a much wetter, more west-side eco-type than the Mosier and Rowena Creek watersheds. Rock Creek watershed is approximately seven miles long and one to two miles wide, and drops approximately 2900 feet from headwaters to the mouth. It is bounded on the east by Mosier Creek, on the north by the Columbia River, and on the west and south by the Hood River basin.

Mosier Watershed is covered by coniferous forests at elevations above 2000 feet, giving way gradually to oak forests at lower elevations. Vegetation patterns are determined principally by precipitation, which varies from 60 inches per year in the headwaters, to as little as 17 inches per year on Sevenmile Hill.

Most of the land in the Mosier Watershed is privately owned (91%). The US Forest Service manages a small proportion (5.8%), primarily the upper portions of Mosier Creek and in the northeast portion of the watershed near the Columbia River. Forestry is the dominant land use in the upper two thirds of the watershed. At lower elevations, land uses transition into urban development, rural residential development, and fruit orchards. The City of Mosier, along the Columbia River, is the largest community center. Orchards cover about 1,400 acres. Small livestock operations (goats and horses) represent a minor land use.

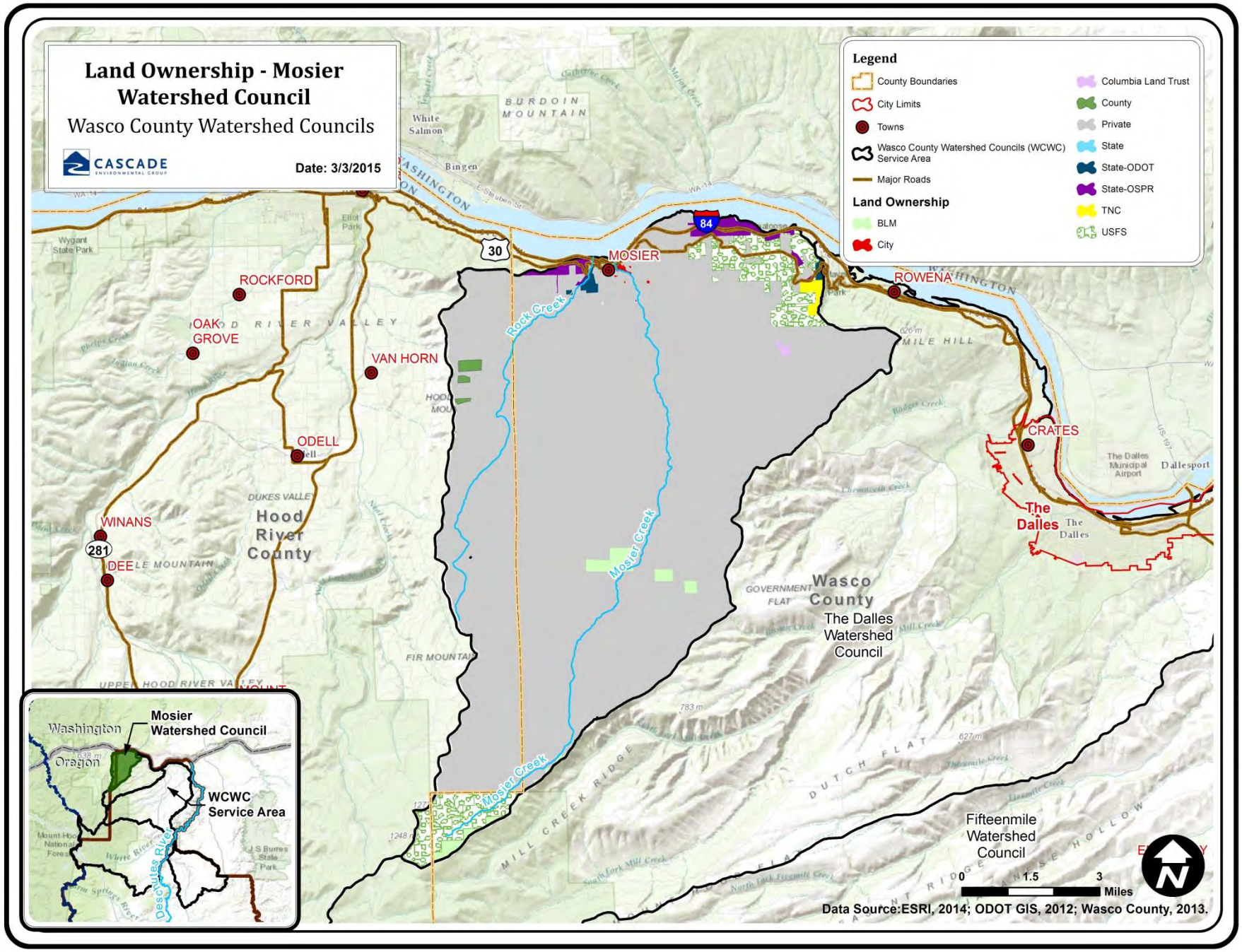
Stream hydrology is influenced by winter precipitation and groundwater interactions. Persistent winter snowpack is limited to areas above approximately 3,000 feet, less than 15% of the watershed. Lower in elevation, precipitation is a mixture of snow and rain, falling mostly in the winter. Groundwater provides a significant proportion of stream flow, particularly during low base flow periods in summer and late fall.

Mosier Watershed		
Ownership	**Acres**	**Percent**
Bureau of Land Management	535.1	1.1%
City	33.2	0.1%
Land Trust (CLT and TNC)*	170.3	0.3%
County	117.8	0.2%
Federal-Other	1.6	0.0%
Private	45,262.9	91.0%
OR Parks	573.3	1.2%
State (other, ODOT*, etc.)	133.6	0.3%
U.S. Forest Service	2,897.0	5.8%
TOTAL**	**49,725**	**100%**

*CLT = Columbia Land Trust; TNC = The Nature Conservancy;
ODOT = Oregon Department of Transportation
**Total acreage does not include areas classified as "water"

Fish Populations and Key Factors and Threats Limiting Watershed Health	Mosier Watershed
ESA-Listed, Sensitive, and other Key Fish Populations	
Mid-Columbia River Steelhead – ESA listed	● Lower portions Rock Creek
Pacific Lamprey – OR State Sensitive species	● Lower portions Rock Creek
Coastal Cutthroat Trout – OR and Federal Sensitive species	● Resident population above Mosier falls and Rock Creek
Redband Trout – noted declines	● Lower portions Rock Creek
Coho Salmon	● Lower portions Rock Creek
Water Quality Concerns	
Habitat Modification	●
Flow Modification	●
Temperature (temperature TMDL* for "Miles" watershed)	●
E. coli bacteria	● Data collection
Ground Water Concerns	
Declining groundwater levels	● **HIGH PRIORITY**
Aquifer commingling	**HIGH PRIORITY**
Drinking water – High nitrates	●
Community sustainability related to groundwater levels	● **HIGH PRIORITY**
General Habitat Factors that Limit the Viability of Steelhead and Other Fish Populations	
Degraded floodplain connectivity	●
Degraded channel structure and complexity	●
Degraded riparian areas and large wood recruitment	●
Altered stream low and high flows, including ground water levels	●
Degraded water quality, particularly temperature	●
Altered sediment routing	●
Impaired fish passage	●
Other Issues and Emerging Threats	
Forest health that includes past fire management regimes	●
Land use conversion from resource uses to developed land	●
Forest health, including wildfire threat	●
Invasive weeds	●
Rangeland health, including wildfire threat	●
Economic sustainability	●
Rare habitats – East Cascades Oak Woodlands	●
Soil quality and quantity	●
Landowner education and outreach	●
Climate change impacts on water supply, quality, and fish	●

*TMDL = Total Maximum Daily Load


Land Ownership - Mosier Watershed Council
Wasco County Watershed Councils
CASCADE ENVIRONMENTAL GROUP
Date: 3/3/2015
Legend
County Boundaries
City Limits
Towns
Wasco County Watershed Councils (WCWC) Service Area
Major Roads
Land Ownership
BLM
City
Columbia Land Trust
County
Private
State
State-ODOT
State-OSPR
TNC
USFS
MOSIER
ROWENA
ROCKFORD
OAK GROVE
VAN HORN
ODELL
CRATES
The Dalles
WINANS
DEE
Hood River County
Wasco County
The Dalles Watershed Council
Fifteenmile Watershed Council
Rock Creek
Mosier Creek
BURDOIN MOUNTAIN
MILE HILL
DUTCH FLAT
MILL CREEK RIDGE
FIR MOUNTAIN
Mosier Watershed Council
WCWC Service Area
Washington
Oregon
Deschutes River
0 1.5 3 Miles
Data Source:ESRI, 2014; ODOT GIS, 2012; Wasco County, 2013.

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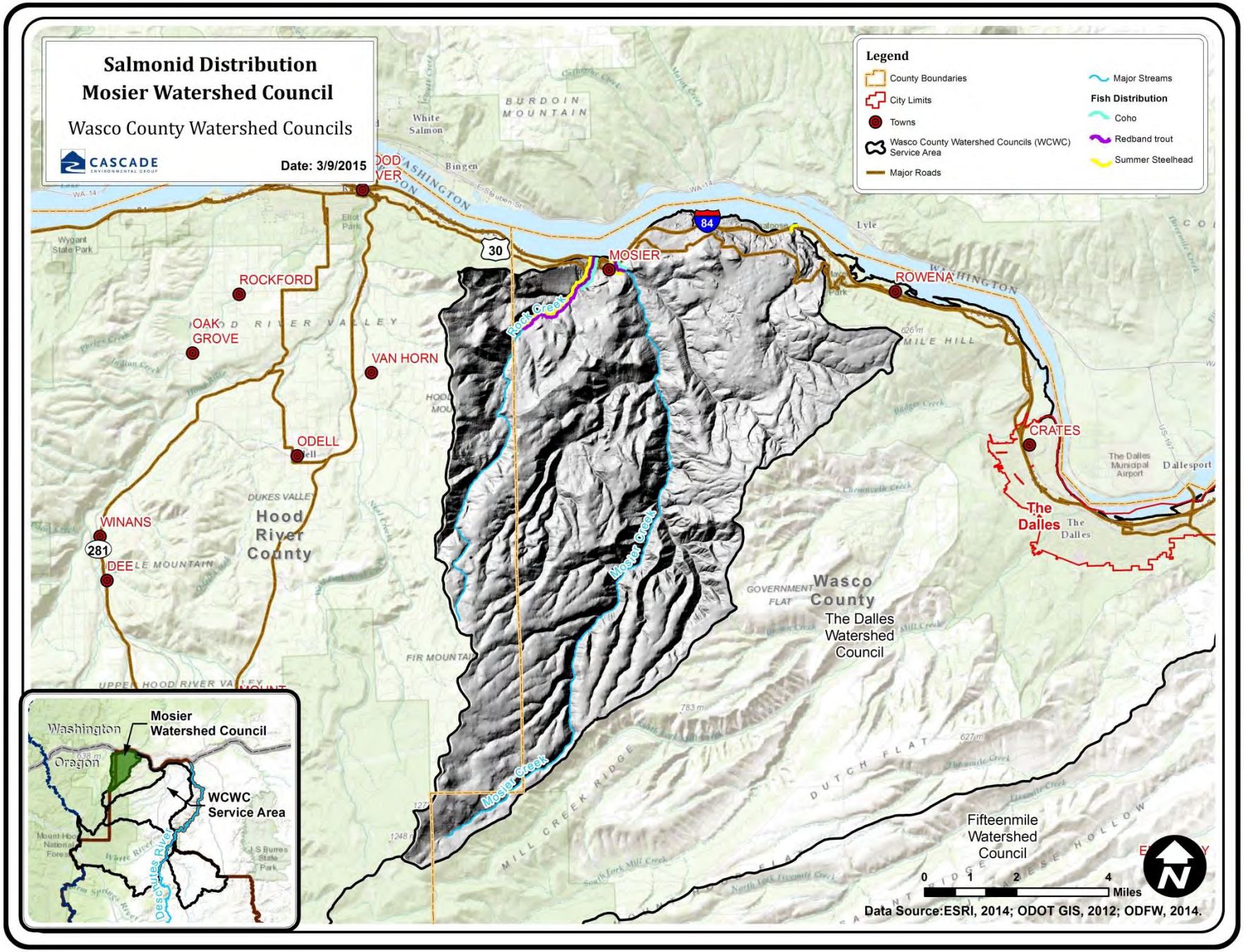
Salmonid Distribution
Mosier Watershed Council
Wasco County Watershed Councils
CASCADE
Date: 3/9/2015
Legend
County Boundaries
City Limits
Towns
Wasco County Watershed Councils (WCWC) Service Area
Major Roads
Major Streams
Fish Distribution
Coho
Redband trout
Summer Steelhead
MOSIER
ROWENA
ROCKFORD
OAK GROVE
VAN HORN
ODELL
WINANS
DEE
CRATES
The Dalles
Dallesport
Rock Creek
Mosier Creek
Hood River County
Wasco County
The Dalles Watershed Council
Fifteenmile Watershed Council
BURDOIN MOUNTAIN
MILE HILL
DUTCH FLAT
MILL CREEK RIDGE
FIR MOUNTAIN
Bingen
White Salmon
Lyle
Washington
Oregon
Mosier Watershed Council
WCWC Service Area
Deschutes River
0 1 2 4 Miles
Data Source:ESRI, 2014; ODOT GIS, 2012; ODFW, 2014.

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Mosier: Watershed Restoration Action Plan

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
Goal 1: Maintain high quality aquatic and floodplain habitats and their productive capacity to support healthy fish and wildlife populations, enhance watershed health, sustain agricultural production and the local economy, and foster thriving communities	**Strategy 1-A: Protect and conserve natural aquatic and floodplain-related ecological processes and habitats**	1-A-1. Protect the highest quality aquatic and riparian habitats, particularly rare and unique habitats, through easements, acquisition, or other conservation measures	
		1-A-2. Consistently apply BMPs to protect and conserve aquatic and riparian habitats and ecological processes	Focus Area: All lands Action: Apply aquatic/ riparian BMPs

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
<u>Goal 2</u>: Improve aquatic/riparian habitats, hydrologic processes, and stream connectivity to support healthy fish and wildlife populations, enhance watershed health, sustain agricultural production and the local economy, and foster thriving communities	**<u>Strategy 2-A</u>: Restore fish passage and connectivity to habitats blocked or impaired by artificial barriers and maintain passage and connectivity**	2-A-1. Provide fish screening at irrigation diversions and replace those that do not meet criteria	<u>Focus Area</u>: All lands

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
		2-A-2. Replace barriers blocking passage including dams, road culverts, and irrigation structures	Action: Early planning stages – Rock Creek area.
	Strategy 2-B: Restore floodplain connectivity and function	2-B-1. Reconnect floodplains to channels, including reconnecting side channels and off-channel habitats	Action: Early planning stages – Rock Creek area.
		2-B-2. Promote the maintenance and creation of beaver dams to restore their role in natural ecological processes	Focus Area: All lands

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
	Strategy 2-C: Restore and enhance channel structure and complexity	2-C-1. Restore natural channel form	Action: Reconnect Rock Creek to West Lake and enhance lake to improve juvenile salmon outmigration habitat. Early in the planning stages.
		2-C-2. Increase role and abundance of wood in streams and floodplains	Action: Rock Creek RM 0.4--add large wood.
		2-C-3. Stabilize streambanks	Focus Area: Rock Creek – Mosier Quarry.
		2-C-4. Increase instream habitat through manual placement of structures	
	Strategy 2-D: Restore riparian and wetland habitats	2-D-1. Eradicate invasive plant species from riparian areas, particularly blackberry, false indigo, reed canary grass, poison hemlock, and rush skeleton weed	Focus Area: Lower Rock Creek and lower Mosier Creek

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
		2-D-2. Install off-stream livestock watering	
		2-D-3. Restore natural riparian vegetative communities, including removing invasive species and planting native vegetation	Focus Area: All riparian areas Action: Mosier and Rock Creek – Treat Himalayan blackberry and false indigo and re-establish native vegetation throughout Mosier Waterfront Park, along riparian area of Mosier Creek, Rock Creek/adjacent wetlands, and Harmony Lake. Action: Mosier Creek – Plant 0.7 mile of riparian area.
		2-D-4. Implement grazing strategies that promote riparian recovery	

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
		2-D-5. Install/ maintain fencing to exclude livestock from riparian areas	Focus Area: All riparian areas
		2-D-6. Prevent invasion of feral pigs into new areas	N/A
	Strategy 2-E: Restore stream flow to provide sustainable water sources	2-E-1. Implement agricultural water conservation measures, including improving irrigation conveyance and efficiency to improve stream flows	Focus Area: All agricultural lands
		2-E-2. Lease or purchase water rights and convert to instream	Focus Area: All private lands
		2-E-3. Implement voluntary monitoring of water withdrawals	Focus Area: All agricultural lands
		2-E-4. Implement urban water conservation measures	Focus Area: City of Mosier
	Strategy 2-F: Improve and maintain water quality	2-F-1. Implement riparian restoration improvement strategies to improve water temperatures	Focus Area: All riparian areas Action: All lands through application of BMPs.

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
		2-F-2. Implement stream flow improvement strategies to improve water temperatures	
		2-F-3. Apply BMPs to improve water quality	Focus Area: All lands Action: National Forest lands in upper Mosier Creek – apply BMPs to activities, including salvage logging Action: Apply BMPs to all private lands
		2-F-4. Reduce chemical pollution inputs	Focus Area: All lands
		2-F-5. Develop and adopt Integrated Fruit Production (IFP) or Selective Spray Systems	Focus Area: All orchards
		2-F-6. Implement Agricultural Water Quality Management Program	Focus Area: All private agricultural lands

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
		2-F-7. Manage flows, including irrigation return flows, to reduce extreme stream temperatures	
Goal 3: Protect, conserve, and restore groundwater function and levels to support healthy fish and wildlife populations, enhance watershed health, sustain agricultural production and the local economy, and foster thriving communities	**Strategy 3-A: Conserve groundwater through appropriate actions and technologies on agricultural lands**	3-A-1. Promote and apply groundwater conservation actions	Focus Area: Mosier Watershed
	Strategy 3-B: Prevent artificial aquifer commingling	3-B-1. Identify and quantify where wells are creating artificial commingling of aquifers	Focus Area: Mosier Watershed
		3-B-2. Work with OWRD to develop and enact a special well construction standard	Focus Area: Mosier Watershed
		3-B-3. Encourage installation of cisterns	Focus Area: All private lands
	Strategy 3-C: Repair artificial aquifer commingling	3-C-1. Work with Wasco SWCD on well repair actions where issues have been identified	Focus Area: All private lands
	Strategy 3-D: Identify and implement actions to address stabilizing aquifers	3-D-1. Implement a specific set of actions capable of stabilizing the aquifers	Focus Area: All private lands

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
	Strategy 3-E: Study ground- and surface-water interactions	3-E-1. Fund and implement studies that examine ground- and surface-water interactions	Focus Area: Mosier Watershed
Goal 4: Maintain high quality upland habitats and their productive capacity to support healthy fish and wildlife populations, enhance watershed health, sustain agricultural production and the local economy, and foster thriving communities	**Strategy 4-A: Protect and conserve natural upland ecological processes and habitats**	4-A-1. Protect the highest quality upland habitats, particularly rare and unique functioning habitats, through acquisition, easements, or other conservation measures	Focus Area: All lands
		4-A-2. Consistently apply BMPs to protect and conserve natural upland ecological processes	Focus Area: All private lands Action: Implement East Cascades Oak Woodlands FIP proposal.
Goal 5: Improve upland ecosystem and hydrologic processes to support healthy fish and wildlife populations, enhance watershed health, sustain agricultural	**Strategy 5-A: Restore upland ecological processes and habitats**	5-A-1. Restore native upland habitats and remove noxious weeds, including yellow star thistle, medusahead, Scotch and Canada thistle, Dalmatian toadflax, spotted, diffuse and Russian knapweed, whitetop, rush skeletonweed, kochia; and teasel	Focus Area: All lands

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
production and the local economy, and foster thriving communities		5-A-2. Improve and restore oak woodland habitats	Focus Area: Oak woodlands Action: Implement East Cascades Oak Woodlands FIP proposal.
		5-A-3. Develop grazing strategies that promote upland habitat recovery	Focus Area: All lands
		5-A-4. Implement uplands fuel management	Focus Area: All forest lands
		5-A-5. Identify areas of dangerous fuels buildup and develop plans or programs to systematically address them	Focus Area: All forest lands

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
		5-A-6. Apply BMPs to restore natural upland ecological processes	Focus Area: All lands
	Strategy 5-B: Establish a Community Collaborative with the USFS	5-B-1. Restore upland areas on National Forest Lands throughout Wasco County	Focus Area: National Forest Lands
	Strategy 5-C: Restore degraded areas and maintain upland processes to maximize soil productivity and minimize unnatural rates of erosion and runoff	5-C-1. Continue to promote no-till and other seeding techniques that reduce erosion where site conditions are suitable	
		5-C-2. Maintain or improve soil quality and quantity through the implementation of BMPs and USFS standards	Focus Area: All lands Action: Agricultural acres in Mosier Watershed farmed under management plans that maintain or increase organic matter.

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
		5-C-3. Forest harvest operations will follow plans to minimize erosion and sedimentation	Focus Area: All forest lands
		5-C-4. Convert to perennial crops/vegetation (CRP)	Focus Area: Private upland areas
		5-C-5. Remove junipers	N/A
		5-C-6. Employ BMPs to minimize unnatural rates of erosion	Focus Area: All lands
		5-C-7. Upgrade or remove problem forest roads	Focus Area: All forest lands
Goal 6: Work collaboratively with organizations and residents on watershed restoration, research, education and outreach, and monitoring to promote understanding of watershed conditions, foster support for	**Strategy 6-A: Recruit landowners for demonstration projects**	6-A-1. Initiate and promote upland improvement demonstration projects	Focus Area: All private lands
		6-A-2. Initiate and promote demonstration projects to restore forest health and resilience to wildfire	Focus Area: All forest lands
		6-A-3. Develop and fund a demonstration program with a set of irrigators willing to adopt and use state-of-the-art irrigation systems	Action: Work with OSU Extension Service.

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
Local Watershed Council activities, and ensure active and growing participation in actions to support healthy fish and wildlife populations, enhance watershed health, sustain agricultural production and the local economy, and foster thriving communities		6-A-4. Host a series of field tours in order to encourage other growers to adopt water use efficiency practices	
		6-A-5. Promote and initiate demonstration projects in orchards that improve soils, increase pollinator habitat, and reduce chemical inputs	Focus Area: Orchards
	Strategy 6-B: Provide landowners and others with information on BMPs and watershed health issues	6-B-1. Prevent invasion of new noxious weeds through education, reporting, and quick response	Focus Area: All lands
		6-B-2. Develop educational material for landowners	Action: Develop educational materials for landowners about drilling wells; document cistern installation/setup; conduct community outreach; and educate landowners about well construction options. Action: Develop a water use efficiency program for residents of the City of Mosier and rural residents.
		6-B-3. Promote uplands fuel management	Focus Area: All uplands
		6-B-4. Promote off-stream water storage for irrigation	

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
		6-B-5. Promote the IFP program	Focus Area: All producers
		6-B-6. Develop and distribute noxious weed "wanted" posters, encouraging people to contact the weed master's office if they see the species of concern	Focus Area: All lands
		6-B-7. Encourage the retention and restoration of pine/oak habitat	Focus Area: Oak woodlands and pine habitats
		6-B-8. Actively promote the CREP and CRP programs	Focus Area: Agricultural lands
		6-B-9. Actively promote appropriate spray buffers as an option on agricultural lands	Focus Area: Agricultural lands
		6-B-10. Work with USFS to develop off-highway vehicle (OHV) public outreach plan for National Forest areas	
	Strategy 6-C: Provide educational materials, workshops, and other forms of outreach and collaboration with landowners and organizations	6-C-1. Provide education opportunities to ranchers in Wasco County on methods to improve ecological health of range lands	Focus Area: All private pasture lands
		6-C-2. Educate streamside homeowners about the benefits of healthy riparian habitats and methods for maintaining them	Focus Area: All streamside landowners

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
		6-C-3. Develop brochures and other educational materials for private landowners describing mixed conifer values and management strategies to provide habitat for land birds and other wildlife	
		6-C-4. Develop educational materials to foster an appreciation of oak woodlands and pine forests that will assist landowners in management and restoration	
		6-C-5. Develop and release news articles on Council activities or educational topics on roughly a semi-annual basis	
		6-C-6. Attend city council meetings to inform city councils what the watershed councils are proposing and implementing	
		6-C-7. Hold educational workshops on BMPs and restoration approaches	

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
		6-C-8. Cooperate with teachers to provide watershed education to students and involve students with stream monitoring	
		6-C-9. Develop outreach materials (or utilize existing materials) regarding protection of surface waters for streamside homeowners	Focus Area: All streamside landowners
		6-C-10. Report Local Council accomplishments annually to County Commission	
Goal 7: Organize the Local Councils and the Coordinating Board to support full implementation of the Action Plan, increase organizational capacity, and improve and expand partnerships to	**Strategy 7-A: Evaluate and improve the Local Councils' and Coordinating Board's capacity to implement the Action Plan**		
		7-A-1. Evaluate Local Councils' and Coordinating Board's staffing and budgeting to foster effective implementation of the Action Plan and adjust staff levels, and increase	

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
support healthy fish and wildlife populations, enhance watershed health, sustain agricultural production and the local economy, and foster thriving communities		funding, if necessary	
		7-A-2. Evaluate Local Councils' and Coordinating Board's organizational and fiscal structure to improve implementation of the Action Plan and adjust organizational structures, if necessary	
		7-A-3. Evaluate Local Councils' and Coordinating Board's funding sources and explore alternative sources of funds to improve Local Councils' and the Coordinating Board's capacity and ability to implement the Action Plan	
	<u>Strategy 7-B</u>: Improve the Local Councils' and Coordinating Board's capacity to implement the Action Plan through partnerships and collaboration	7-B-1. Foster technical review of restoration project proposals by appropriate state and federal agencies	
		7-B-2. Strengthen existing partnerships by defining roles for the implementation of the Action Plan and seek new partnerships where there are gaps	

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
		7-B-3. Foster partnerships that assist with implementation of the East Cascades Oak Woodlands FIP	
		7-B-4. Foster partnerships that assist with the implementation of the Lower Deschutes River FIP	
		7-B-5. Foster partnerships that assist with the establishment of a USFS Community Collaborative	
		7-B-6. Foster partnerships that assist with monitoring and assessment	
Goal 8: Track and examine watershed conditions, assess restoration opportunities, and evaluate restoration	**Strategy 8-A: Assess, monitor, track, and report on watershed conditions, including surface water and**	8-A-1. Inventory and evaluate stream and watershed conditions to identify restoration opportunities and actions	Focus Area: All lands

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
outcomes through monitoring and assessment to determine if activities are achieving the goal of supporting healthy fish and wildlife populations, enhancing watershed health, sustaining agricultural production and the local economy, and fostering thriving communities	**groundwater quality and quantity, fish populations, stream habitat, and riparian vegetation**	8-A-2.Convene monitoring subcommittee to coordinate efforts with landowners and agencies; compile available monitoring efforts; identify information gaps; and define roles and plan for monitoring implementation strategy	Focus Area: All lands
		8-A-3. Monitor and track the populations of fish and other aquatic organisms	
		8-A-4. Monitor and track stream flows	Focus Area: Mosier Creek
		8-A-5. Monitor and track groundwater levels	Focus Area: Mosier Watershed

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
		8-A-6. Continue water temperature TMDL monitoring and conduct other water temperature monitoring where needed	Focus Area: All streams
		8-A-7. Continue to participate in the PSP	
	Strategy 8-B: Evaluate restoration projects and programs	8-B-1. Monitor the effectiveness of restoration actions and programs	Action: Monitor effectiveness of Rock Creek enhancement project.
		8-B-2. Establish photo point monitoring stations at a subset of riparian projects to track success	
		8-B-3. Continue to monitor for E.coli to evaluate management practices	

Goals	Strategies	Actions	Mosier Action Plan Focus Areas and Actions
		8-B-4. Monitor Mosier aquifer for impact of well repairs	Focus Area: Mosier Watershed
	Strategy 8-C: Report on watershed monitoring results and restoration activities	8-C-1. Produce periodic "State of the Watersheds" report that documents projects and synthesizes water quality and quantity, habitat, and fish population status and trends	
		8-C-2. Track project implementation and monitoring activities in a comprehensive spatial database	