Section 6
Implementation Area Strategies

Specific objectives and actions identified for each of the five implementation areas: Asotin Creek, Middle Snake River, Pataha Creek, Tucannon River and the Grande Ronde. These area-specific objectives and actions are based upon the existing conditions set forth in Section 3, input from the planning workshops, and consideration of basin-wide objectives described in Section 5.

Additional detail on the instream flow management recommendations and groundwater management recommendations are included in appendices because of the level of detail involved in developing the strategies. While the instream flow recommendations are implementation area-specific, the groundwater recommendations are generally applicable basin-wide. Nevertheless, the groundwater strategies play a direct role in the water quantity and instream flow strategies for each implementation area because of the direct contribution of groundwater to baseflows and the use of groundwater as water supply in each of the implementation areas. Recommendations for instream flow management are presented in Appendix C, while recommendations for groundwater management for the basin are presented in Appendix D. The implementation area action summary tables reference the two appendices where appropriate.

6.1 Asotin Creek Implementation Area Planning Objectives and Actions

The Asotin Creek Implementation area includes the City of Asotin and portions of rural Asotin and Garfield counties. Based on population projections, the implementation area will grow from approximately 2,486 (year 2000) to 2,680 (year 2020), with virtually all of the growth occurring in the City of Asotin, the urbanizing areas around Clarkston but in the County, and around Anatone. The City of Asotin's municipal, residential, and commercial water needs are estimated to increase by approximately 81 afy by the year 2020. Water use in the rural areas has been estimated to decrease by approximately 20 afy in Asotin County and increase slightly by 1 afy in Garfield County. Current agricultural water use is relatively small, consisting of an estimated 676 afy with the majority of the water used diverted from Asotin Creek. Most of the irrigated agricultural land is pasture used for livestock grazing. Agricultural water use is not projected to increase and the available water (based on water rights) is considered adequate to meet existing and future demands. Overall, approximately 43% of the Asotin Creek sub-basin is in pasture or rangeland, 26% is in cropland (primarily non-irrigated), and 30% is in forest.

Several aquatic habitat restoration and protection projects have already been implemented within this area by federal, state, tribal and local agencies and private organizations (see Exhibits in Section 3 by Implementation Area for projects completed by conservation districts). Projects, detailed in the Asotin Inventory used in developing the sub-basin plan, focused on several key issues: upland issues, riparian restoration projects, instream projects, and monitoring activities. The projects themselves involved a wide range of activities, including:

- Instream habitat construction/bioengineering
- Direct seeding
- Establishment of permanent grasses/pastures/haylands
- Sediment basin construction/maintenance
- Upland multi-purpose pond construction
- Terrace construction
- Reforestation/tree planting
- Spring development
- Erosion control (critical area planting, grassed waterways, conservation cover, noxious weed control)
- Pipeline installation
- Irrigation Efficiencies
- Riparian planting
- Riparian fencing
- Road decommissioning
- Decommissioned road restoration

Implementation of these and other similar types of projects by the participating agencies are expected to continue.

Specific objectives for the Asotin Creek Implementation Area are provided below. These are in addition to the Basin-wide objectives and actions described in Section 5. For convenience, objectives are numbered sequentially with the prefix AC (Asotin Creek). The numbers do not imply or assign any priority to the objectives.

AC1: Improve water delivery, reliability and efficiency of individual agricultural irrigation systems; and place water savings in trust to improve instream flows in Asotin Creek.

AC2: Develop and continue instream flow and water quality monitoring through permanent and seasonal gauges and monitoring stations to improve baseline data needed to evaluate instream flow enhancement efforts and facilitate future water management.

AC3: Recommend and establish minimum instream flow and stream closures where appropriate for priority habitat streams in Asotin Creek (refer to Appendix C).

AC4: Develop additional water supply of 81 afy to provide future needs of City of Asotin; ground water is the preferred source assuming sufficient ground water is available to provide a sustainable supply.

AC 5: Identify sources and reduce fecal coliform and TSS levels in Asotin Creek as measured at the mouth of Asotin Creek, Tenmile Creek and Couse Creek.

AC6: Increase base flows in Asotin Creek, Tenmile Creek and Couse Creek to improve aquatic habitat, through floodplain connectivity, to the extent not limited by natural hydrology.

AC7: Lower water temperatures in Lower George Creek, Upper Asotin Creek, Lower South Fork Asotin Creek, Tenmile Creek, and Couse Creek to the extent not limited by the natural hydrology to improve aquatic habitat and water quality.

AC8: Implement aquatic habitat restoration strategies/projects (Table 6-1) in the priority restoration areas identified in the April 2005 Draft Salmon Recovery Plan. Desired Future Conditions for Asotin Creek are to restore riparian function, restore floodplain connectivity, eliminate passage barriers, and increase instream flow. Priority locations include Upper Asotin Creek: Headgate Dam to the forks; Lower South Fork Asotin Creek; Lower North Fork Asotin Creek, Charlie Creek, and Lower George Creek. Implement passive restoration projects in the following SRP identified tributaries: Tenmile Creek (mouth to seasonally de-watered area, dewatered area to Middle Branch.[1]) and Couse Creek.

AC9: Implement aquatic habitat protection objectives/projects (Table 6-1) for areas of high quality habitat, including all priority restoration areas; Upper North Fork of Asotin Creek; Upper South Fork of Asotin Creek; Upper George Creek; Asotin Creek Headwaters areas in George Creek, Charlie Creek, North Fork and South Fork; Asotin Creek; North Fork of Asotin Creek tributaries: South Fork of North Fork Asotin Creek and Middle Branch.

AC10: Improve fish passage conditions through screening upgrades and the removal of fish passage barriers.

AC11: Encourage the reduction of fuels on federal and state forestlands, using tools such as managed grazing [grass banking], prescribed burns, and selected timber management.

AC12: Identify sediment sources in Asotin, Tenmile and Couse Creek drainages.

AC13: Continue to identify opportunities and funding for road decommissioning or realignment, noxious weed control and erosion control.

AC14: Explore the opportunities and funding potential for regionalizing wastewater treatment and connecting septic systems on fringe urban areas into existing systems. Identify appropriate funding sources for implementation.

AC15: Use CREP for riparian restoration and CRP for upland restoration of degraded environments

[1] (Passive restoration is defined as "any ordinance, contract, or project that significantly reduces the amount of disturbance in the riparian zone" (SRSRP 2006). It includes such measures as Conservation Reserve Enhancement Program riparian buffers, conservation easements, and, where appropriate, upland projects designed to reduce sediment delivery and increase filtration. Passive restoration can also be termed "natural healing.")

AC16: Develop a stormwater management plan

AC17: Landowner education on practical BMP's and the use of CREP/CRP and other programs

AC18: Develop alternative water sources for existing surface water diversions for irrigated agriculture and stock water.

The planning elements discussed in this document include:

- Water quantity management
- Water quality management
- Aquatic habitat enhancement
- Regulatory actions
- Miscellaneous studies

Where specific projects for each planning element are not identified, refer to the basin-wide management strategies for more general actions on what is intended for a given planning element in the implementation area. Exhibit 6-1 identifies some areas of known water quality and/or aquatic habitat issues where management actions should be targeted.

Specific projects, actions, and additional necessary studies are identified in Table 6-2. They are organized by planning element to meet the area-specific objectives described above, as well as the basin-wide objectives provided in Section 5.

Table 6-1

Desired Future Habitat Conditions for Asotin Creek Expressed in Percent Restoration of Historical Conditions (Final SRSRP, Dec. 2006)

Geographic Area	Fine Sediment	Substrate Embeddedness	Turbidity	Pools	Pool Tailouts	Backwater Pools	Carcass Loading[a]	Benthic Production[a]	Woody Debris	Riparian Function	Temperature Maximum	Bed Scour	Artificial Confinement	Low Flow	Minimum Channel Width
Lower North Fork	49%	49%	49%	51%	51%	27%	10%	10%	54%	42%	–	50%	25%		–
Lower South Fork	100%	100%	100%	29%	29%	13%	10%	10%	25%	25%	100%	–	25%	–	–
Upper Asotin	50%	50%	50%	67%	67%	11%	10%	10%	21%	25%	100%	–	33%	–	–
Charley Creek	55%	55%	55%	47%	47%	34%	10%	10%	69%	25%	100%	41%	31%	–	–
Middle Asotin[b]	25%	25%	25%	–	–	15%	10%	10%	29%	25%	83%	–	–	–	–
Lower Asotin[b]	50%	50%	50%	–	–	19%	10%	10%	38%	56%	83%	–	–	–	–
Lower George	81%	81%	81%	65%	54%	38%	10%	10%	75%	22%	100%	66%	17%	50%	75%

[a] LWD addition assumed to increase carcass retention, benthic production and area of backwater pools.

[b] Only LWD and Riparian actions target this area directly, but beneficial effects of upstream sediment loading and temperature reduction programs are assumed to propagate downstream.

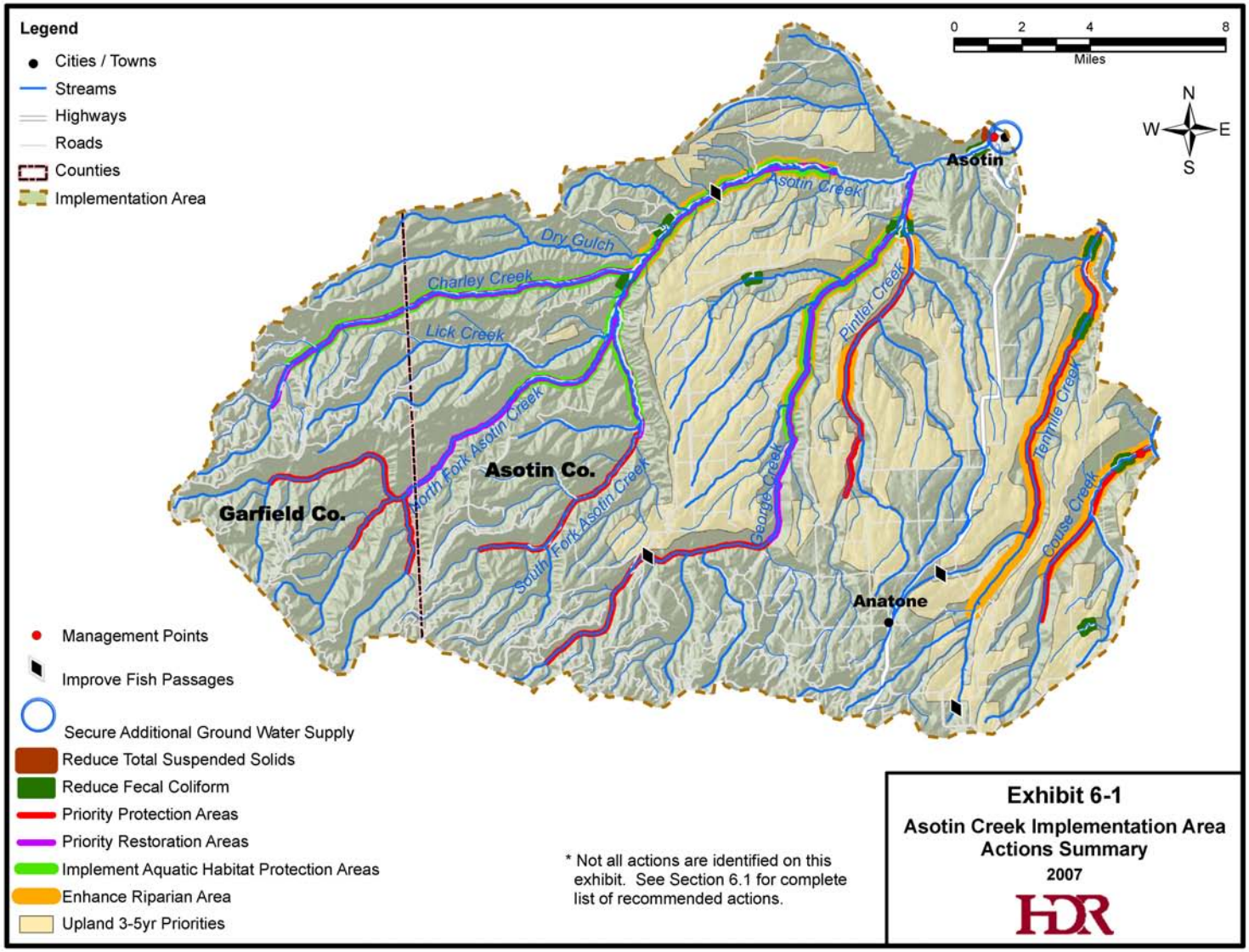

Legend
Cities / Towns
Streams
Highways
Roads
Counties
Implementation Area
0 2 4 8
Miles
N
W E
S
Asotin
Asotin Creek
Dry Gulch
Charley Creek
Lick Creek
North Fork Asotin Creek
Asotin Co.
Garfield Co.
South Fork Asotin Creek
George Creek
Pintler Creek
Tenmile Creek
Couse Creek
Anatone
Management Points
Improve Fish Passages
Secure Additional Ground Water Supply
Reduce Total Suspended Solids
Reduce Fecal Coliform
Priority Protection Areas
Priority Restoration Areas
Implement Aquatic Habitat Protection Areas
Enhance Riparian Area
Upland 3-5yr Priorities
* Not all actions are identified on this exhibit. See Section 6.1 for complete list of recommended actions.
Exhibit 6-1
Asotin Creek Implementation Area
Actions Summary
2007
HDR

Table 6-2
Asotin Creek Implementation Area Actions

Action (non-prioritized)	Supported Objectives	Location	Responsible Agency(ies)	Description	Schedule [1]	Cost [2]
Water Quantity Management						
1	AC1	Individual irrigators (throughout area)	ACCD	Improve irrigation efficiencies, including conveyance and application methods.	By 2010	Medium
2	AC1	Individual irrigators (throughout area)	ACCD	Upgrade diversions to include meters where required	By 2010	Medium
3	AC1	Owners/operators of Non-exempt wells throughout area	Ecology	Upgrade wells to include meters where required	By 2015	Medium
4	AC2	Asotin Creek	USGS, Ecology, Asotin PUD, and USFS	Continue instream flow monitoring through permanent and seasonal gauges on Asotin Creek.	Ongoing	Low
5	AC4	City of Asotin	City of Asotin	Characterize ground water conditions to determine if an additional 81 afy withdrawal from ground water is sustainable	By 2010	High
6	AC4	City of Asotin	City of Asotin	Seek additional water rights to develop additional water supply of 81 afy from ground water to provide future needs of City of Asotin, if study determines withdrawal is sustainable	By 2015	High
Water Quality Management						
7	AC5	Asotin Creek, Tenmile Creek, Couse Creek	Ecology, DOH, County Health, ACCD, Asotin County and USFS	Identify sources and implement the following strategies to reduce fecal coliform levels on Asotin Creek: 1. install BMPs for livestock 2. upgrade or connect septic to sewer 3. explore opportunities for regionalization of wastewater treatment plant 4. connect fringe rural areas to urban sewer systems	By 2010	Low

Table 6-2
Asotin Creek Implementation Area Actions

Action (non-prioritized)	Supported Objectives	Location	Responsible Agency(ies)	Description	Schedule [1]	Cost [2]
8	AC5 AC15	Asotin Creek		Implement the following strategies to reduce TSS levels at the mouth of Asotin Creek: 1. direct seed 2. upland management BMPs 3. riparian improvement 4. CRP 5. grassed waterways 6. sediment basins 7. weed control 8. grazing management 9. cross fencing 10. alternative water sources 11. manure management (livestock operations)	By 2010	Low
9	AC7	Lower George Creek, Upper Asotin Creek, Lower S Fork Asotin Creek, Tenmile and Couse Creek	WDFW/ACCD/Nez Perce Tribe, and USFS	Implement strategies to reduce water temperatures	By 2010	Medium
10	AC16	Drainage facilities on rural roads	Asotin and Garfield Counties	Adopt the Eastern Washington Stormwater manual and implement the following strategies to improve stormwater management and treatment and increase groundwater infiltration: 1. sediment basins 2. infiltration trenches 3. swales/wetlands 4. rural/urban drainage ditch upgrades and treatment	Plan by 2007 Implement by 2015	Medium
11	AC6	Entire IA	Asotin and Garfield Counties	Identify and designate aquifer recharge areas	Ongoing	Low
12	AC6	Entire IA	Asotin and Garfield Counties	Protect known aquifer recharge areas through critical area ordinances	Ongoing	Low

Table 6-2 Asotin Creek Implementation Area Actions						
Action (non-prioritized)	**Supported Objectives**	**Location**	**Responsible Agency(ies)**	**Description**	**Schedule [1]**	**Cost [2]**
13	AC17	Entire IA	NRCS, WSU Cooperative Extension, Ecology	Work with individual landowners to review pesticide and fertilizer use; and to implement the following best management practices to limit water quality impacts: 1. restore riparian areas 2 urban/rural education program 3 conservation tillage	Ongoing	Low
14	AC17	Entire IA	ACCD, PCD , NRCS, WDFW, USFS, and WSU Coop Extension	Establish and promote the following BMPs for erosion control for pasture and rangeland, cropland, and forest land: 1. maintain existing CRP acres (including exploring alternative funding) 2. conservation tillage 3 increase grassed waterways 4 buffers 5 strip cropping 6 improve riparian grazing management	Ongoing	Low
15	AC 14	Anatone	ACCD, Ecology	Design and construct sewer collection and treatment facility for Anatone.	By 2010	High

Table 6-2
Asotin Creek Implementation Area Actions

Action (non-Prioritized)	Supported Objectives	Location	Responsible Agency(ies)	Description	Schedule[1]	Cost[2]
Aquatic Habitat Enhancement						
16	AC8	Mouth to access limit, Tenmile Creek (mouth to seasonally de-watered area, dewatered area to Middle Branch.	WDFW/ACCD/Nez Perce Tribe	Implement passive restoration projects, including Conservation Reserve Expanded Program riparian buffers, conservation easements, and, where appropriate, upland projects designed to reduce sediment delivery and increase filtration	Ongoing	Medium
17	AC9	Upper North Fork of Asotin Creek; Upper South Fork of Asotin Creek; Upper George Creek; Asotin Creek Headwaters areas in George Creek, Charlie Creek, North Fork and South Fork; Asotin Creek; North Fork of Asotin Creek tributaries: South Fork of North Fork Asotin Creek and Middle Branch.	WDFW/ACCD/Nez Perce Tribe and USFS	Implement aquatic habitat protection plans, including list of prioritized projects 1.Enhancement/Restoration 2. Protection and Restoration of Asotin Creek 3. Asotin County Fish Screening 4. Riparian Buffers 5. Upland Sediment Reduction 6. Large Woody Debris Replenishment and Replacement/Enhancement	By 2010	Low
18	AC10	Entire IA	WDFW/ACCD/Nez Perce Tribe and USFS	Remove/modify the following fish passage obstructions:		
				Headgate Dam, Asotin Creek, river mile 9.1	Ongoing	Low
				Trent Grade culvert, George Creek, river mile 18.8	By 2010	Low
				Asotin Road culvert, Charley Creek, river mile 0.2	By 2010	Low
				Mill Creek Road culvert, Mill Creek, river mile 2.9	By 2010	Low
				Pond Dam, Tenmile Creek, river mile 15.3	By 2010	Med

Table 6-2 Asotin Creek Implementation Area Actions						
Action (non-Prioritized)	**Supported Objectives**	**Location**	**Responsible Agency(ies)**	**Description**	**Schedule[1]**	**Cost[2]**
19	AC10	Entire IA	WDFW/ACCD/Nez Perce Tribe	Conduct inventory and analysis of other fish passage barriers, and prioritize for removal	By 2010	Low
20	AC10	Lower Asotin Creek, Middle Asotin Creek, Upper Asotin Creek, Lower George Creek, and Charley Creek	WDFW/ACCD/Nez Perce Tribe	Evaluate fish screens on water diversions for adequacy. Replace inadequate screens as necessary.	By 2010	Med
21	AC7	Lower George Creek Upper Asotin Creek Lower South Fork Asotin Creek, Tenmile and Couse Creeks	Ecology, WDFW/ACCD/Nez Perce Tribe and USFS	Restore areas of degraded riparian vegetation on private and public land through activities such as CREP and CRP participation and site-specific BMPs (e.g. placement of large woody debris, long-term recruitment from riparian planting, restricting livestock access, etc.) with an early emphasis on the most degraded areas	By 2020	Medium
22	AC9	Upper reaches/headwater areas	USFS, ACCD, PCD, CDs	Work with private and public landowners to maintain and enhance pristine and other areas of the headwaters by encouraging application of BMPs	Ongoing	Low
Regulatory Actions						
23	AC3, AC6	Asotin Creek	Ecology, WDFW	Establish minimum instream flows for Asotin Creek (MP-12). **See Appendix C.**	By 2008	Medium
24	AC3	North Fork Asotin Creek, South Fork Asotin Creek (including Lick Creek) and Charley Creek	Ecology, WDFW	Establish year-round stream closures in North Fork Asotin Creek, South Fork Asotin Creek (including Lick Creek) and Charley Creek (from WDFW property boundary to headwaters). **See Appendix C.**	By 2008	Low
25	AC9	Entire IA	Asotin and Garfield Counties, WDFW, USFS	Implement/enforce federal, state and local land use regulations to protect critical areas and pristine areas of the implementation area.	Ongoing	Low

Table 6-2 Asotin Creek Implementation Area Actions						
Action (non-Prioritized)	**Supported Objectives**	**Location**	**Responsible Agency(ies)**	**Description**	**Schedule[1]**	**Cost[2]**
26	AC9	Entire IA	Asotin and Garfield Counties, WDFW, USFS	Review and update, as needed, best-available-science-based riparian buffer zones and critical areas regulations.	Ongoing	Low
27	AC1, AC2, AC6	Entire IA	Ecology	Establish rule for use of groundwater in the gravel aquifer and basalt aquifers, specifically for the development of rural ("Exempt") wells. **See Appendix D.**	By 2008	Low
Miscellaneous Studies						
28	AC4	Entire IA	City of Asotin, Ecology	Conduct detailed hydrogeology study to understand basalt and alluvial ground water resources and identify sustainable levels of ground water withdrawals to meet City of Asotin needs. **See Appendix D.**	By 2008	Medium
29	AC12	Entire IA	WDFW, CDs	Identify specific stream fords that could be eliminated by installing bridges or culverts. Pursue project funding	By 2020	Medium
30	AC1, AC2, AC6	Entire IA	Ecology	Monitor groundwater levels in basalt aquifer to assess potential impacts of additional groundwater use, primarily with rural ("exempt") wells. **See Appendix D.**	Ongoing	Medium
31	AC3	Charley Creek, George Creek Pintler Creek and Tenmile Creek	Ecology	Conduct instream flow studies and develop instream flow recommendations for Charley, George Pintler and Tenmile Creeks. **See Appendix C.**	By 2010	Medium

Notes:
1) Schedule: Suggested dates have been provided or a range, where: Near-term=0-3 years; Mid-term=3-10 years; Long-term=10 years or more beyond date of plan adoption.
2) Estimated costs have been provided where available from feasibility or other studies. Otherwise, a cost range is provided where: Low=<$100,000; Medium=$100,000-$500,000; High= >$500,000

6.2 Middle Snake River Implementation Area Planning Objectives and Actions

The Middle Snake River Implementation area drains the area between the City of Clarkston and Little Goose Dam (RM 70.3). Only a small amount of runoff occurs along the Middle Snake River downstream of the Clearwater River confluence. Other major tributaries to the Middle Snake River include Alkalai Flat Creek, Deadman Creek, and Alpowa Creek. The Middle Snake River implementation area is composed of portions of Columbia, Whitman, Garfield, and Asotin counties. The City of Clarkston and adjacent urban area is the largest population center in the watershed, with a population 18,661 in 2000. The Clarkston urban area includes the majority of residential, commercial and industrial development in the implementation area. Asotin PUD provides water service to the City of Clarkston and associated urban areas. Agriculture is the primary land use in the implementation area, and is dominated by non-irrigated farming in the uplands, small areas of irrigated farming in the lower valleys, and cattle ranching. Little forestry activity occurs in this area. Lands adjacent to the Lower Snake River are primarily privately owned; public lands adjacent to the reservoirs are managed by the USACE, with a few parcels owned by the State. Population within the implementation area is expected to grow by almost 4,000 in the year 2020, primarily in the Clarkston urban area. Projected increases in area water demands through the year 2020 (from a projected increased demand from the City of Clarkston and adjacent urban areas) are well within the current capacity of existing Asotin PUD water rights.

Several aquatic habitat restoration and protection projects have already been implemented within this area by federal, state, tribal and local agencies and private organizations. Since 1996, projects implemented within the sub-basin have focused mainly on improving agricultural practices to limit impacts on water quality and quantity. The projects themselves involved a wide range of activities, including:

- Two Pass seeding
- Direct seeding
- Fencing
- Grasses and legumes in rotation
- No-till seeding
- Pasture and hay land planting
- Sediment basins
- Strip cropping
- Subsoiling
- Terraces
- Grassed waterways

Specific objectives for the Middle Snake River Implementation Area are provided below. These are in addition to the Basin-wide objectives and actions described in Section 5. For convenience,

objectives are numbered sequentially with the prefix MS (Middle Snake). The numbers do not imply or assign any priority to the objectives.

MS1: Develop and continue instream flow and water quality monitoring through permanent and seasonal gauges and monitoring stations to improve baseline data needed to evaluate instream flow enhancement efforts and facilitate future water management.on Alkali Flat Creek, Alpowa Creek, Deadman Creek, Meadow Gulch Creek, Penawawa Creek, South Meadow Creek, and Wawawai Creek.

MS2: Reduce sediment, fecal coliform, TSS, temperature and increase dissolved oxygen levels in Alkali Flat Creek, Alpowa Creek, Deadman Creek, Meadow Gulch Creek, Penawawa Creek, South Meadow Creek, and Wawawai Creek to improve aquatic habitat.

MS3: Implement aquatic habitat restoration strategies/projects (Table 6-3) in the following priority restoration areas identified in the April 2005 Draft Salmon Recovery Plan: Deadman /Meadow Creek, Penawawa Creek, and Alkali Flat Creek. Implement passive restoration projects in the following SRP identified tributaries: Deadman, Ping Creek to Lynn Gulch Creek; Deadman, Lynn Gulch to forks; and South Fork Deadman, mouth to access limit.

MS4: Implement aquatic habitat protection objectives/projects (Table 6-3) for areas of high quality habitat, including all priority restoration areas listed in MS4.[2]

MS5: Address imminent threats to steelhead including passage barriers/obstructions, inadequate fish screens, and areas of streams that seasonally go dry).

MS6: Develop alternative water sources for existing surface water diversions for irrigated agriculture and stock water.

MS7: Continue to enhance riparian areas through Middle Snake River subbasin.

MS8: Conduct groundwater hydrology studies west of Alpowa grade to determine if additional withdrawal would be sufficient and sustainable to meet current and future demand, including irrigation.

MS9: Develop stormwater management plan.

MS10: Develop designated aquifer recharge areas.

MS11: Use CREP for riparian restoration and CRP for upland restoration of degraded environments.

[2] Other priority areas may be identified as more habitat and demographic information on steelhead populations becomes available.

MS12: Establish stream closures and/or minimum instream flows where appropriate at high priority habitat areas.

MS13: Educate public landowners concerning BMPs.

Specific projects, actions and additional studies are identified in Table 6-4 organized by planning elements, to meet the area-specific objectives described above and basin-wide objectives provided in Section 5. Where specific projects for each planning element are not identified, refer to the basin-wide management strategies for more general actions on what is intended for a given planning element in the implementation area. Exhibit 6-2 identifies some areas of known water quality and/or aquatic habitat issues where management actions should be targeted.

Table 6-3

Desired Future Habitat Conditions for Deadman Creek (within the Middle Snake Implementation Area) Expressed in Percent Restoration of Historical Conditions (Final SRSRP, Dec. 2006)

Reach	Fines	Embeddedness	Turbidity	Riparian Function	Woody Debris	Pools	Temperature
Deadman Creek embayment	–	–	–	–	14%	–	–
Deadman Creek, embayment to Willow Gulch Creek	–	–	–	–	14%	–	–
Deadman Creek, Willow Gulch Creek to Ping Gulch Creek	–	–	–	–	14%	–	–
Ping Gulch Creek, mouth to bridge at Leonard property	–	–	–	–	14%	–	–
Deadman Creek, Ping Gulch Creek to Lynn Gulch Creek	35%	35%	35%	17%	14%	14%	100%
Lynn Gulch Creek, mouth to perched culvert near mouth	–	–	–	–	14%	–	–
Lynn Gulch Creek, culvert to historical access limit at confluence of East. Lynn Gulch Creek	–	–	–	–	14%	–	–
Deadman Creek, Lynn Gulch Creek to confluence of NF and SF Deadman	27%	27%	27%	25%	14%	14%	–
NF Deadman Creek, mouth to current access limit at intermittent zone	–	–	–	–	14%	–	–
NF Deadman Creek, end of current access zone to historical access limit at forks of NF	–	–	–	–	14%	–	–
SF Deadman Creek, mouth to access limit at confluence of SF Deadman Gulch	50%	50%	50%	–	14%	14%	–

Table 6-4
Middle Snake River Implementation Area Actions

Action (non-prioritized)	Supported Objectives	Location	Responsible Agency(ies)	Description	Schedule [1]	Cost [2]
Water Quantity Management						
1	MS1	Alkali Flat Creek, Alpowa Creek, Deadman Creek, Meadow Gulch Creek, Penawawa Creek, South Meadow Creek, Wawawai Creek	USGS, Ecology, and Asotin PUD	Continue instream flow monitoring through permanent and seasonal gauges.	Ongoing	Low
2	MS8	Entire IA	USGS, Ecology	Characterize basalt groundwater sources, availability and sustainability near Snake River and below, where basalt is connected to Snake River	By 2015	Med
3	MS8	Entire IA	USGS, Ecology	Sole source aquifer study	By 2015	Med
4	MS8	Entire IA	Ecology, irrigators	Characterize ground water conditions to determine if additional withdrawals to replace some of the existing surface water withdrawals for irrigation is possible and sustainable	By 2010	High
5	MS8	Entire IA	Ecology, irrigators	Seek additional water rights to develop additional water supply from ground water to replace surface water withdrawals for irrigation if study determines withdrawal is sustainable	By 2015	High
Water Quality Management						
6	MS2	Alpowa Creek	Ecology, CD	Investigate sources and implement appropriate strategies to reduce fecal coliform levels on Alpowa Creek.	By 2010	Low
7	MS1	Entire IA	Ecology	Continue water quality monitoring for temperature, fecal coliform, dissolved oxygen, sediment and TSS.	Ongoing	Low

Table 6-4 Middle Snake River Implementation Area Actions						
Action (non-prioritized)	**Supported Objectives**	**Location**	**Responsible Agency(ies)**	**Description**	**Schedule [1]**	**Cost [2]**
8	MS9	Drainage facilities on roads	Asotin and Garfield Counties, WSDOT	Implement the following strategies to improve stormwater management and treatment and increase groundwater infiltration: 1. BMPs for road construction and maintenance 2. Shaping/grading during reconstruction 3. mowing vs. spraying	Plan by 2007 Implement by 2015	Medium
9	MS10	Entire IA	Asotin and Garfield Counties	Identify and designate aquifer recharge areas	Ongoing	Low
10	MS10 MS4	Entire IA, City of Clarkston	Asotin and Garfield Counties	Protect known aquifer recharge areas through critical area ordinances	Ongoing	Low
11	MS13	Entire IA	WSU Cooperative Extension, Ecology	Work with individual landowners to review pesticide and fertilizer use; and to implement the following best management practices to limit water quality impacts: 1. restore riparian areas 2 urban/rural education program 3 conservation tillage	Ongoing	Low
12	MS13	Entire IA, with early emphasis on Steptoe Creek	Asotin and Garfield Counties, NRCS, and WSU Coop Extension	Establish and promote the following BMPs for erosion control for pasture and rangeland, cropland, and forest land: 1. noxious weed control 2. maintain existing CRP acres (including exploring alternative funding) 3. conservation tillage 4. increase grassed waterways 5. buffers 6. strip cropping 7. improve riparian grazing management	Ongoing	Low

Table 6-4
Middle Snake River Implementation Area Actions

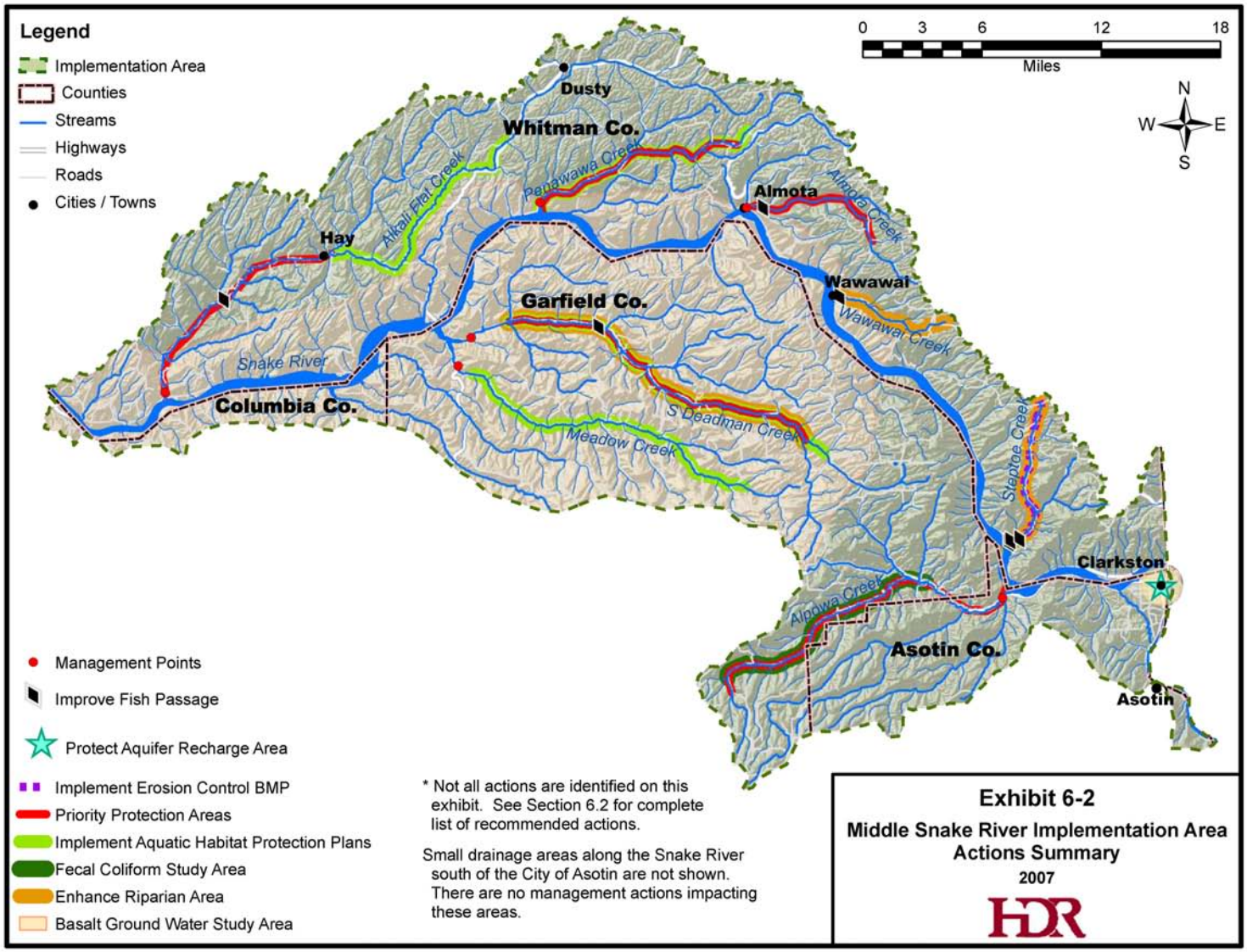
Action (non-prioritized)	Supported Objectives	Location	Responsible Agency(ies)	Description	Schedule[1]	Cost[2]
Aquatic Habitat Enhancement						
13	MS4	Deadman /Meadow Creek, Penawawa Creek, and Alkali Flat Creek.	WDFW, CDs and Tribes	Implement aquatic habitat protection plans, including list of prioritized projects	By 2010	Low
14	MS3	Deadman, Ping Creek to Lynn Gulch Creek; Deadman, Lynn Gulch to forks; and South Fork Deadman, mouth to access limit.	WDFW, CDs, Tribes	Implement passive restoration projects, including Conservation Reserve Enhancement Program riparian buffers, conservation easements, and, where appropriate, upland projects designed to reduce sediment delivery and increase filtration	By 2010	Low
15	MS5	Entire IA	WDFW and CD	Remove the following fish passage obstructions:		
				Headcut, Almota Creek, river mile 1.1	Ongoing	Low
				Lynn Gulch culvert, Deadman Creek, river mile 0.4	By 2010	Low
				Perched culvert, Wawawai Creek, river mile 0.1	By 2010, or sooner	Low
				Sediment deposition in delta, Steptoe Creek, river mile 0.0	By 2010, or sooner	Low
				1st road crossing culvert, Steptoe Creek, river mile 0.2	By 2010, or sooner	Med
				2nd road crossing culvert, Steptoe Creek, river mile 0.8	By 2010	Med
				Headcut falls, Alkali Flat Creek, river mile 7.0	By 2010	Low
16	MS12	Entire IA	WDFW and CDs	Conduct inventory and analysis of other fish passage barriers, and prioritize for removal	By 2010	Low
17	MS5	Deadman Creek	WDFW and CDs	Evaluate fish screens on water diversions for adequacy. Replace inadequate screens as necessary.	By 2010	Low

Table 6-4 Middle Snake River Implementation Area Actions						
Action (non-prioritized)	**Supported Objectives**	**Location**	**Responsible Agency(ies)**	**Description**	**Schedule[1]**	**Cost[2]**
18	MS11	Deadman Creek Steptoe Creek Wawawai Creek	Ecology, WDFW, CDs, and NRCS	Restore areas of degraded riparian vegetation on private and public land through activities such as CREP, CRP participation and site-specific BMPs (e.g. placement of large woody debris, long-term recruitment from riparian planting, restricting livestock access, etc.) with an early emphasis on the most degraded areas.	By 2020	Medium
Regulatory Actions						
19	MS4	Entire IA	Asotin, Garfield, Columbia and Whitman Counties, WDFW, USFS	Implement/enforce federal, state and local land use regulations to protect critical areas and pristine areas of the implementation area.	Ongoing	Low
20	MS4	Entire IA	Asotin, Garfield, Columbia and Whitman Counties, WDFW	Review and update, as needed, best-available-science-based riparian buffer zones and critical areas regulations.	Ongoing	Low
21	MS1, MS6	Entire IA	Ecology	Establish rule for use of groundwater in the gravel aquifer and basalt aquifers, specifically for the development of rural ("Exempt") wells. **See Appendix D.**	By 2008	Low
Miscellaneous Studies						
22	MS1, MS6	Entire IA	Ecology	Conduct detailed hydrogeology study to understand basalt and alluvial ground water resources and identify sustainable levels of ground water withdrawals to meet rural development needs and assess impacts to streamflows. **See Appendix D.**	By 2008	Medium
23	MS2 MS3	Entire IA	WDFW, Asotin, Whitman, Garfield and Columbia Counties	Identify specific stream fords that could be eliminated by installing bridges or culverts.	By 2020	Medium
24	MS1, MS6	Entire IA	Ecology	Monitor groundwater levels in basalt aquifer to assess potential impacts of additional groundwater use, primarily with rural ("exempt") wells. **See Appendix D.**	Ongoing	Medium

Table 6-4
Middle Snake River Implementation Area Actions

Action (non-prioritized)	Supported Objectives	Location	Responsible Agency(ies)	Description	Schedule[1]	Cost[2]
25	MS1, MS12	Alpowa Creek, Almota Creek, Meadow, Deadman, Alkali Flat and Penewawa	Ecology	Conduct instream flow studies and develop instream flow recommendations for Alpowa Creek, Almota Creek, Meadow, Deadman, Alkali Flat and Penewawa. **See Appendix C.**	By 2010	Medium

Notes:
1) Schedule: Suggested dates have been provided or a range, where: Near-term=0-3 years; Mid-term=3-10 years; Long-term=10 years or more beyond date of plan adoption.
2) Estimated costs have been provided where available from feasibility or other studies. Otherwise, a cost range is provided where: Low=<$100,000; Medium=$100,000-$500,000; High= >$500,000


Legend
Implementation Area
Counties
Streams
Highways
Roads
Cities / Towns
Management Points
Improve Fish Passage
Protect Aquifer Recharge Area
Implement Erosion Control BMP
Priority Protection Areas
Implement Aquatic Habitat Protection Plans
Fecal Coliform Study Area
Enhance Riparian Area
Basalt Ground Water Study Area
0 3 6 12 18
Miles
N
W
E
S
Dusty
Whitman Co.
Pedawawa Creek
Almota
Almota Creek
Alkali Flat Creek
Hay
Wawawai
Wawawai Creek
Garfield Co.
Snake River
Columbia Co.
S Deadman Creek
Meadow Creek
Steptoe Creek
Clarkston
Alpowa Creek
Asotin Co.
Asotin
* Not all actions are identified on this exhibit. See Section 6.2 for complete list of recommended actions.
Small drainage areas along the Snake River south of the City of Asotin are not shown. There are no management actions impacting these areas.
Exhibit 6-2
Middle Snake River Implementation Area Actions Summary
2007
HDR

6.3 Pataha Creek Implementation Area Planning Objectives and Actions

The Pataha Creek sub-basin drains into the Tucannon River at River Mile 11.2. Although in other studies it has been included as part of the Tucannon River sub-basin, it is described as a separate implementation area because of unique characteristics that differentiate it from the rest of the Tucannon sub-basin. Pataha Creek drains 114,166 acres (185 sq. mi.). Major tributaries of Pataha Creek are seasonal streams that include Dry Pataha Creek, Sweeney Gulch, Bahmaier Gulch, Linville Creek, Tatman Gulch, and Dry Hollow. The Pataha Creek subbasin encompasses portions of Columbia and Garfield Counties. The primary land use is agriculture, mainly non-irrigated cropland farming and livestock production. The primary city is the City of Pomeroy, located on Pataha Creek in the northeastern portion of the subbasin. The City of Pomeroy had a population of 1,517 in 2000. Population in the basin is projected to grow by less than 200, with most or all of the growth occurring in the City of Pomeroy.

Several aquatic habitat restoration and protection projects have already been implemented within this area by federal, state, tribal and local agencies and private organizations. Since 1996, projects implemented within the Tucannon River sub-basin (inclusive of the Pataha Creek sub-basin) have focused mainly on upland issues, riparian restoration, instream habitat enhancement and CRP/CREP.

Specific objectives for the Pataha Creek Implementation Area are provided below. These are in addition to the Basin-wide objectives and actions described in Section 5. For convenience, objectives are numbered sequentially with the prefix PC (Pataha Creek). The numbers do not imply or assign any priority to the objectives.

PC1: Develop and continue instream flow and water quality monitoring through permanent and seasonal gauges and monitoring stations to improve baseline data needed to evaluate instream flow enhancement efforts and facilitate future water management.

PC2: Provide for additional water supply to meet estimated future demand increases of City of Pomeroy; existing City water rights are the preferred source assuming sufficient ground water is available to provide a sustainable supply.

PC3: Reduce sediment, fecal coliform, temperature, and pH levels in lower and middle Pataha Creek to improve aquatic habitat.

PC4: Develop salmonid aquatic habitat restoration and/or protection strategies / objectives for Pataha Creek – no priority areas identified in April 2005 Draft Salmon Recovery Plan.

PC5: Improve fish passage conditions through screening upgrades and the removal of fish passage barriers.

PC6: Encourage beaver activity in the Lower Pataha (from Dodge downstream) for multi-purpose storage (through dams, wetlands and water retention)

PC7: Develop groundwater rights to supplant surface water rights that are currently being used for irrigation

PC8: Improve water delivery, reliability and efficiency of individual agricultural irrigation systems; and place water savings in trust to improve instream flows.

PC9: Protect aquifer recharge areas, as well as other critical or pristine areas.

PC10: Educate public landowners concerning BMP's.

PC11: Restore areas or degraded riparian vegetation on public and private lands.

PC12: Develop additional water sources to accommodate future growth.

PC13: Develop alternative water sources for existing surface water diversions for irrigated agriculture and stock water.

Specific projects, actions and additional studies are identified in Table 6-5 organized by planning elements, to meet the area-specific objectives described above and basin-wide objectives provided in Section 5. Where specific projects for each planning element are not identified, refer to the basin-wide management strategies for more general actions on what is intended for a given planning element in the implementation area. Exhibit 6-3 identifies some areas of known water quality and/or aquatic habitat issues where management actions should be targeted.

Table 6-5
Pataha Creek Implementation Area Actions

Action (non-prioritized)	Supported Objectives	Location	Responsible Agency(ies)	Description	Schedule [1]	Cost [2]
Water Quantity Management						
1	PC1	Pataha Creek	USGS and Ecology	Continue/expand instream flow monitoring through permanent and seasonal gauges on Pataha Creek.	Ongoing	Low
2	PC2	City of Pomeroy	City of Pomeroy, Ecology	Characterize ground water conditions to determine if current and additional ground water withdrawal, are sustainable	By 2010	High
3	PC2	City of Pomeroy	City of Pomeroy, Ecology	Develop additional water supply from ground water to provide future needs of City of Pomeroy if study determines withdrawal is sustainable	By 2015	High
4	PC2	Pataha IA	Ecology, irrigators, PCD, CCD	Characterize ground water conditions to determine if additional withdrawals to replace some of the existing surface water withdrawals for irrigation is possible and sustainable	By 2010	High
5	PC7	Pataha IA	Ecology, irrigators, PCD, CCD	Seek additional water rights to develop additional water supply from ground water to replace surface water withdrawals for irrigation if study determines withdrawal is sustainable	By 2015	High
6	PC8	Pataha IA	Irrigators, PCD, CCD, WDFW, Ecology	Identify and implement opportunities for irrigation efficiency	By 2010	Low
7	PC6	Lower Pataha	WDFW, PCD, CCD, Ecology	Implement pilot project to encourage beaver activity for multi-purpose storage through dams, wetlands and water retention	By 2010	Low
Water Quality Management						
8	PC6	Pataha IA	Ecology, PCD, CCD, Garfield County	Implement the following strategies to reduce fecal coliform levels in Pataha Creek: 1. identify failing septic systems 2. Restore riparian buffers 3. Manage grazing in riparian areas	By 2010	Low

Table 6-5
Pataha Creek Implementation Area Actions

Action (non-prioritized)	Supported Objectives	Location	Responsible Agency(ies)	Description	Schedule [1]	Cost [2]
9	PC3	Lower & middle Pataha Creek	Ecology, PCD, CCD, individual landowners	Implement the following strategies to reduce TSS levels in Pataha Creek by reducing the sediment load entering the creek: 1. CRP 2. conservation tillage 3. increase grassed waterways 4. buffers 5. strip cropping 6. improve riparian grazing management	By 2010	Low
10	PC3	Lower & middle Pataha Creek	Ecology, PCD, CCD	Implement the following strategies to reduce water temperatures: 1. riparian enhancement 2. channel reconstruction where feasible	By 2010	Medium
11	PC9	Entire IA	Garfield County	Protect known aquifer recharge areas through critical area ordinances; include areas necessary to protect City of Pomeroy's water source (spring).	Ongoing	Low
12	PC10	Entire IA	WSU Cooperative Extension, Ecology, NRCS	Work with individual landowners to review pesticide and fertilizer use; and to implement best management practices to limit water quality impacts: 1. restore riparian areas 2. urban/rural education program 3. conservation tillage	Ongoing	Low
13	PC10	Entire IA	PCD, CCD, NRCS, WDFW, USFS, and WSU Coop Extension	Promote the following BMPs for erosion control for pasture and rangeland, cropland, and forest land: 1. conservation tillage 2. increase grassed waterways 3. buffers 4. strip cropping 5. improve riparian grazing management	Ongoing	Low

Table 6-5
Pataha Creek Implementation Area Actions

Action (non-prioritized)	Supported Objectives	Location	Responsible Agency(ies)	Description	Schedule [1]	Cost [2]
Aquatic Habitat Enhancement						
14	PC5	Entire IA	WDFW and CDs	Conduct inventory and analysis of fish passage barriers, and prioritize for removal	By 2010	Low
15	PC5	Pataha Creek	WDFW and CDs	Evaluate fish screens on water diversions for adequacy. Replace inadequate screens as necessary.	By 2010	Med
16	PC4 PC11	Entire IA	USFS, WDFW, Ecology and CD's	Restore areas of degraded riparian vegetation on private and public land through activities such as CREP, CRP participation and site-specific BMPs (e.g. placement of large woody debris, long-term recruitment from riparian planting, restricting livestock access, etc.) with an early emphasis on the most degraded areas.	By 2020	Medium
17	PC11	Entire IA	WDFW and CD's	Restore areas of degraded riparian vegetation on private and public land through conservation easements with an early emphasis on the most degraded areas.	By 2020	Medium
18	PC10	Entire IA	USFS, Garfield County	Work with private and public landowners to use best management practices to maintain and enhance pristine and other areas of the headwaters by applying BMPs	Ongoing	Low
19	PC5	See project descriptions	PCD, CCD , WSDOT, Garfield County, City of Pomeroy and WDFW	Remove fish passage obstructions		
				Highway 261 Culvert at Delaney, Pataha Creek, river mile 1.3	By 2007	Medium
				Dodge Bridge, Pataha Creek, river mile 10.8	By 2007	High
				20th St Sewer Line (City of Pomeroy), Pataha Creek, river mile 25.7	By 2007	Medium
				Rock Shelf, Pataha Creek, river mile 35.2	By 2010	Low

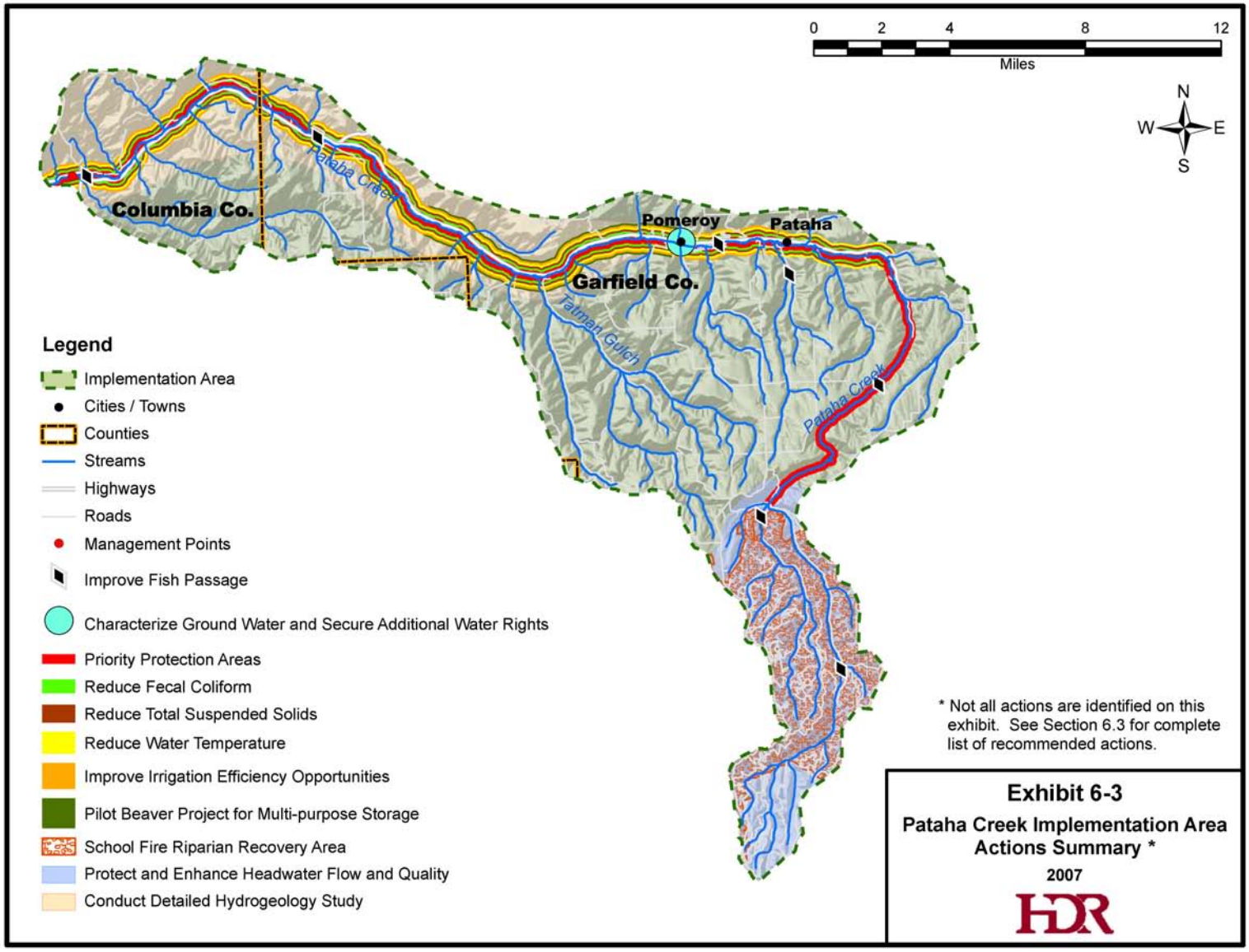
Table 6-5
Pataha Creek Implementation Area Actions

Action (non-prioritized)	Supported Objectives	Location	Responsible Agency(ies)	Description	Schedule [1]	Cost [2]
				Old Bihmaier Dam, Bihmaier Gulch Creek, river mile 1.1	By 2010	Medium
				Steven's Ridge Culvert, Pataha Creek, river mile 43.8	By 2010	Medium
				Dry Pataha Dam, Dry Pataha Creek, river mile 0.4	By 2010	Medium
Regulatory Actions						
20	PC9	Entire IA	Garfield County, WDFW, USFS	Update, implement/enforce federal, state and local land use regulations to protect critical areas and pristine areas of the implementation area.	Ongoing	Low
21	PC7	Entire IA	Ecology	Establish rule for use of groundwater in the gravel aquifer and basalt aquifers, specifically for the development of rural ("Exempt") wells. **See Appendix D.**	By 2008	Low
Miscellaneous Studies						
22	PC2, PC7	Lower Pataha	Garfield County, Ecology	Conduct detailed hydrogeology study to understand basalt and alluvial ground water resources and identify sustainable levels of ground water withdrawals to meet needs. **See Appendix D.**	By 2008	Medium
23	PC1, PC7	Entire IA	Ecology	Monitor groundwater levels in basalt aquifer to assess potential impacts of additional groundwater use, primarily with rural ("exempt") wells. **See Appendix D.**	Ongoing	Medium
24	PC4	Entire IA	WDFW and CD	Identify specific stream fords that could be eliminated by installing bridges or culverts.	By 2020	Medium
25	PC1	Garfield County	Ecology	Identify number of water users and amount of water involved with 1913 Garfield County Adjudication	By 2015	Low

Table 6-5
Pataha Creek Implementation Area Actions

Action (non-prioritized)	Supported Objectives	Location	Responsible Agency(ies)	Description	Schedule [1]	Cost [2]
26	PC12	Pomeroy	Garfield County	Review permitting and managed growth practices in lieu of future water needs, public health, and post-fire redevelopment activities (including identification of non-permitted diversions and discharges; permitted structures; growth management issues; water supply and public health issues)	By 2008	Low
27	PC1	Pataha Creek	Ecology	Conduct instream flow studies and develop instream flow recommendations for Pataha Creek. **See Appendix C.**	By 2010	Medium

Notes:
1) Schedule: Suggested dates have been provided or a range, where: Near-term=0-3 years; Mid-term=3-10 years; Long-term=10 years or more beyond date of plan adoption.
2) Estimated costs have been provided where available from feasibility or other studies. Otherwise, a cost range is provided where: Low=<$100,000; Medium=$100,000-$500,000; High= >$500,000


0 2 4 8 12
Miles
N
W E
S
Columbia Co.
Pataha Creek
Pomeroy
Pataha
Garfield Co.
Tatman Gulch
Pataha Creek
Legend
Implementation Area
Cities / Towns
Counties
Streams
Highways
Roads
Management Points
Improve Fish Passage
Characterize Ground Water and Secure Additional Water Rights
Priority Protection Areas
Reduce Fecal Coliform
Reduce Total Suspended Solids
Reduce Water Temperature
Improve Irrigation Efficiency Opportunities
Pilot Beaver Project for Multi-purpose Storage
School Fire Riparian Recovery Area
Protect and Enhance Headwater Flow and Quality
Conduct Detailed Hydrogeology Study
* Not all actions are identified on this exhibit. See Section 6.3 for complete list of recommended actions.
Exhibit 6-3
Pataha Creek Implementation Area Actions Summary *
2007
HDR

6.4 Tucannon River Implementation Area Planning Objectives and Actions

The Tucannon River Implementation area is formed by the drainage from the Tucannon River mainstem. The Pataha Creek is the Tucannon River's major tributary, and is addressed as a separate implementation area. The mainstem drains 318 square miles, and enters the Snake River at RM 62.2. Most of the Tucannon River Implementation Area is within Columbia County, with a small portion in Garfield County. The area is also within the Nez Perce Tribe and CTUIR treaty territory. The Tucannon River Implementation Area is rural, with a 2000 population of approximately 1,459. Of these, approximately 165 live in the City of Starbuck, the area's only semi-urban area. Population is projected to remain relatively constant through 2020. Vegetation in the basin is characterized by grasslands and agricultural lands at lower elevations and forests at higher elevations. Agricultural lands are the major land use: cropland, forest, rangeland, pasture, and hay production account for more than 90 percent of the land within the area. Most of the basin (75%) is in private ownership, with most of the privately-held land in the lower portion of the basin. Non-agricultural water use is approximately 144 afy, with about 10 % (14.4 afy) estimated to come from surface water diversions. Agricultural water use is approximately 4,426 afy, used to irrigate 1,602 acres. Surface water supplies approximately 82% or about 3629 afy of the agricultural demand, while ground water supplies approximately 18% or about 797 afy of the agricultural water demand. Current base flow of the Tucannon River provides an adequate supply for most water uses, including aquatic habitat. However, increasing the base flow would enhance the value of the aquatic habitat.

Several aquatic habitat restoration and protection projects have already been implemented or are ongoing within this area, led by federal, state, tribal and local agencies and private organizations. These projects, described in the Tucannon Subbasin Plan, are focused on several key issues: upland issues, riparian restoration projects, instream projects, and CRP/CREP. Projects implemented within the Tucannon sub-basin have included:

- Dike removal/modification
- Direct seeding
- Erosion control (critical area planting, grassed waterways, conservation cover)
- Exclosures/fencing
- Fish screen installation
- Irrigation Efficiencies
- Forest/riparian buffers
- Instream habitat construction
- Pond construction
- Establishment of permanent grasses/pastures/haylands
- Forest pest management
- Pipeline installation
- Reforestation/tree planting
- Sediment basin construction/repair/maintenance

- Spring development
- Woody debris addition
- Road decommissioning and restoration

It is recommended that implementation of these and other habitat restoration projects continue.

Specific objectives for the Tucannon Implementation Area are provided below. These are in addition to the Basin-wide objectives and actions described in Section 5. For convenience, objectives are numbered sequentially with the prefix TR (Tucannon River). The numbers do not imply or assign any priority to the objectives.

TR1: Improve water delivery, reliability and efficiency of individual agricultural irrigation systems; and place water savings in trust to improve instream flows in Tucannon River.

TR2: Develop and continue instream flow and water quality monitoring through permanent and seasonal gauges and monitoring stations to improve baseline data needed to evaluate instream flow enhancement efforts and facilitate future water management.

TR3: Set minimum instream flows for Tucannon River at mouth (MP-1a), Territorial Road (MP-1b) and Marengo (MP3) gauge stations.

TR4: Develop additional water supply/rights from ground water to provide future needs of area (including replacing surface waters currently diverted for agricultural irrigation), assuming sufficient ground water is physically and legally available to provide a sustainable supply.

TR5: Continue to reduce fecal coliform, temperature, pH and TSS levels, to the extent not limited by the natural hydrology, at the mouth of Tucannon River.

TR6: Continue to increase base flows in Tucannon River to enhance aquatic habitat.

TR8: Implement aquatic habitat restoration objectives/projects (Table 6-6) for the Tucannon River reaches including Pataha-Marengo, Marengo-Tumalum, *Tumalum-Hatchery, Hatchery-Little Tucannon* [designated priority projects in the Salmon Recovery Plan, after the 2005 School Fire], and the Mountain Tucannon (Tucannon River, Little Tucannon River to Bear Creek access limit)

TR9: Implement aquatic habitat protection objectives/projects (Table 6-6) for areas of high quality habitat including Tucannon River: (Pataha to Marengo; Marengo to Tumalum; Tumalum to Hatchery; Hatchery to Little Tucannon; "Mountain Tucannon": Tucannon River, Little Tucannon River to Bear Creek access limit; Panjab Creek drainage; Cummings Creek drainage; Lower Tucannon River; Headwaters of the Tucannon River (includes Hixon Creek) including limited maintenance to reduce potential impacts from flooding.

TR10: Continue to restore areas of degraded riparian vegetation on private and public land through activities such as CREP/CRP and conservation easements participation with an early emphasis on the most degraded areas (Tucannon River from Pataha to Little Tucannon.

TR11: Continue to improve fish passage conditions through screening upgrades and the removal of fish passage barriers.

TR12: Conduct groundwater hydrology study to determine if additional withdrawal would be sustainable as a replacement for current surface water usage and future demand without impacting instream flow.

TR13: Conduct aquifer recharge projects to enhance instream flows and improve water quality.

TR14: Complete a water quality study for the Tucannon River and develop TMDLs.

TR15: Educate public landowners concerning BMP's.

TR16: Provide effective administration of "School Fire" restoration funds.

TR17: Protect critical and pristine area

TR18: Develop alternative water sources for existing surface water diversions for irrigated agriculture and stock water.

Specific projects, actions and additional studies are identified in Table 6-7 organized by planning elements, to meet the area-specific objectives described above and basin-wide objectives provided in Section 5. Where specific projects for each planning element are not identified, refer to the basin-wide management strategies for more general actions on what is intended for a given planning element in the implementation area. Exhibit 6-4 identifies some areas of known water quality and/or aquatic habitat issues where management actions should be targeted.

Table 6-6

Desired Future Habitat Conditions for the Tucannon River Expressed in Percent Restoration of Historical Conditions (Final SRSRP, Dec. 2006)

Geographic Area	Fine Sediment	Substrate Embeddedness	Turbidity	Pools	Pool Tailouts	Backwater Pools[a]	Carcass Loading[a]	Benthic Production[a]	Woody Debris	Riparian Function	Temperature Maximum	Bed Scour	Artificial Confinement
Mouth Tucannon[a]	11%	11%	11%	–	–	–	–	–	–	–	3%	–	–
Lower Tucannon[a]	11%	11%	11%	–	–	–	–	–	–	–	46%	–	–
Tucannon River, Pataha Creek to Marengo	56%	56%	56%	39%	39%	22%	9%	22%	43%	31%	100%	100%	9%
Tucannon River, Maregno to Tumalum Creek	–	–	–	38%	38%	–	–	–	–	–	63%	100%	9%
Tucannon River, Tumalum Creek to Hatchery	–	–	–	33%	36%	11%	5%	11%	23%	29%	40%	–	–
Tucannon River, Hatchery to Little Tucannon River	–	–	–	24%	24%	21%	8%	21%	42%	22%	–	–	20%
Mountain Tucannon	–	–	–	28%	28%	10%	8%	10%	20%	27%	–	–	20%

[a] LWD addition assumed to increase carcass retention, benthic production and area of backwater pools.

Table 6-7
Tucannon River Implementation Area Actions

Action (non-prioritized)	Supported Objectives	Location	Responsible Agency(ies)	Description	Schedule [1]	Cost [2]
Water Quantity Management						
1	TR2	Tucannon River	USGS and Ecology	Implement instream flow monitoring through permanent and seasonal gauges on Tucannon River.	Ongoing	Low
2	TR12	Entire IA	Ecology, irrigators	Characterize ground water conditions to determine if additional withdrawals from ground water is sustainable	By 2010	High
3	TR13	Entire IA	Ecology, irrigators,	Replace surface water withdrawals for agricultural irrigation with ground water sources if study determines withdrawal is sustainable, practical, and will not impair existing water rights.	By 2015	High
4	TR12	Entire IA	Columbia County, Ecology	Conduct detailed hydrogeology study to understand basalt and alluvial ground water resources and identify sustainable levels of ground water withdrawals that could potentially replace surface water diversions.	By 2007	Med
5	TR13	Entire IA	Ecology, WDFW, and CD	Identify wetland storage projects	By 2015	Med
6	TR17	Entire IA	WDFW, Ecology, and CCD	Explore opportunities for water right leases and/or acquisitions through the WDOE Trust Water Program and/or water banking.	By 2010	Low

Table 6-7
Tucannon River Implementation Area Actions

Action (non-prioritized)	Supported Objectives	Location	Responsible Agency(ies)	Description	Schedule [1]	Cost [2]
Water Quality Management						
7	TR14	Tucannon River	CCD, Ecology	Conduct a study to current condition and sources of water quality including: • Determining if the inputs of the Pataha River are impacting water quality in the Tucannon River. • Identifying sources of fecal coliform • Determining the natural temperature ranges for the Tucannon River • Collecting data in accordance with Ecology standards for use in developing state-required TMDLs	By 2010	Low
8	TR5	Tucannon River	Ecology, Columbia County	Implement the following strategies to reduce fecal coliform levels at mouth of Tucannon River: 1. septic system repair and/or upgrade 2. livestock BMPs 3. regulation of point sources 4. restore riparian buffers 5. manage grazing in riparian areas	By 2010	Low
9	TR5	Tucannon River Uplands	Ecology, Columbia County, individual landowners, CCD	Implement the following strategies to reduce TSS levels by reducing the sediment load entering the River: 1. conservation tillage 2. grassed waterways 3. sediment basins improve riparian function 5. reduce erosion from public and private roads (via maintenance or non-dirt materials)	By 2010	Low
10	TR5	Entire IA	CD, NRCS	Identify opportunities for funding for landowners to reduce sediment from private roads	By 2015	Low

Table 6-7 Tucannon River Implementation Area Actions						
Action (non-prioritized)	**Supported Objectives**	**Location**	**Responsible Agency(ies)**	**Description**	**Schedule [1]**	**Cost [2]**
11	TR15	Tucannon River	Ecology, Columbia County	Continue ongoing strategies to reduce water temperatures: 1. BMPs	By 2010	Medium
12	TR15	Entire IA	WSU Cooperative Extension, Ecology, WADOT	Work with individual landowners to review pesticide and fertilizer use; and to implement the following best management practices to limit water quality impacts: 1. non-chemical weed control practices (mowing, etc) of ditches and ROWs 2. restore riparian areas 3. urban/rural education program 4. conservation tillage	Ongoing	Low
13	TR15	Entire IA	Columbia County, NRCS, WDFW, USFS, CCD and WSU Coop Extension	Establish and promote the following BMPs for erosion control for pasture and rangeland, cropland, and forest land: 1. creation and maintenance of county ROW buffers 2. agricultural BMPs to buffer agricultural feeds next to roadways 3. conservation tillage 4. increase grassed waterways 5. buffers 6. strip cropping	Ongoing	Low
Aquatic Habitat Enhancement						
14	TR16	Fire Boundaries	WDFW, USFS	Prioritize funds for post-fire restoration (School Fire) on public lands	Ongoing	Med

Table 6-7
Tucannon River Implementation Area Actions

Action (non-prioritized)	Supported Objectives	Location	Responsible Agency(ies)	Description	Schedule [1]	Cost [2]
15	TR8, TR9	Tucannon River reaches including Pataha-Marengo, Marengo-Tumalum, *Tumalum-Hatchery, Hatchery-Little Tucannon* [designated priority projects in the Salmon Recovery Plan, after the 2005 School Fire], and the Mountain Tucannon (Tucannon River, Little Tucannon River to Bear Creek access limit)	WDFW, USFS, CCD, Tribes, and County Weed Board	Implement aquatic habitat protection and restoration plans; including the following priority projects: 1. Curl Lake Intake Improvement 2. Sediment reduction 3. Enhancement of habitat in riparian zones for Fall Chinook/Steelhead 4. Control of noxious weeds 5. Planting of native vegetation 6. Hartsock Creek Retention Pond 7. School Fire Riparian Recovery 8. Tucannon Steelhead Captive Brood Program 9. Tucannon Spring Chinook Hatchery Supplementation 10. Road decommissioning and restoration	Ongoing	Low-High
16	TR10	Entire IA	Ecology, WDFW, USDA, WSCC, and CCD	Restore areas of degraded riparian vegetation on private and public land through ongoing activities such as CREP and CRP participation and site-specific BMPs (e.g. placement of large woody debris, long-term recruitment from riparian planting, restricting livestock access, etc.) with an early emphasis on the most degraded areas.	By 2020	Medium
17	TR10	Entire IA	WSCC, and CCD	Develop a pilot project to restore areas of degraded riparian vegetation on private and public land through conservation easements with an early emphasis on the most degraded areas and provide education/outreach on the potential use of easements as a watershed tool	By 2020	Medium

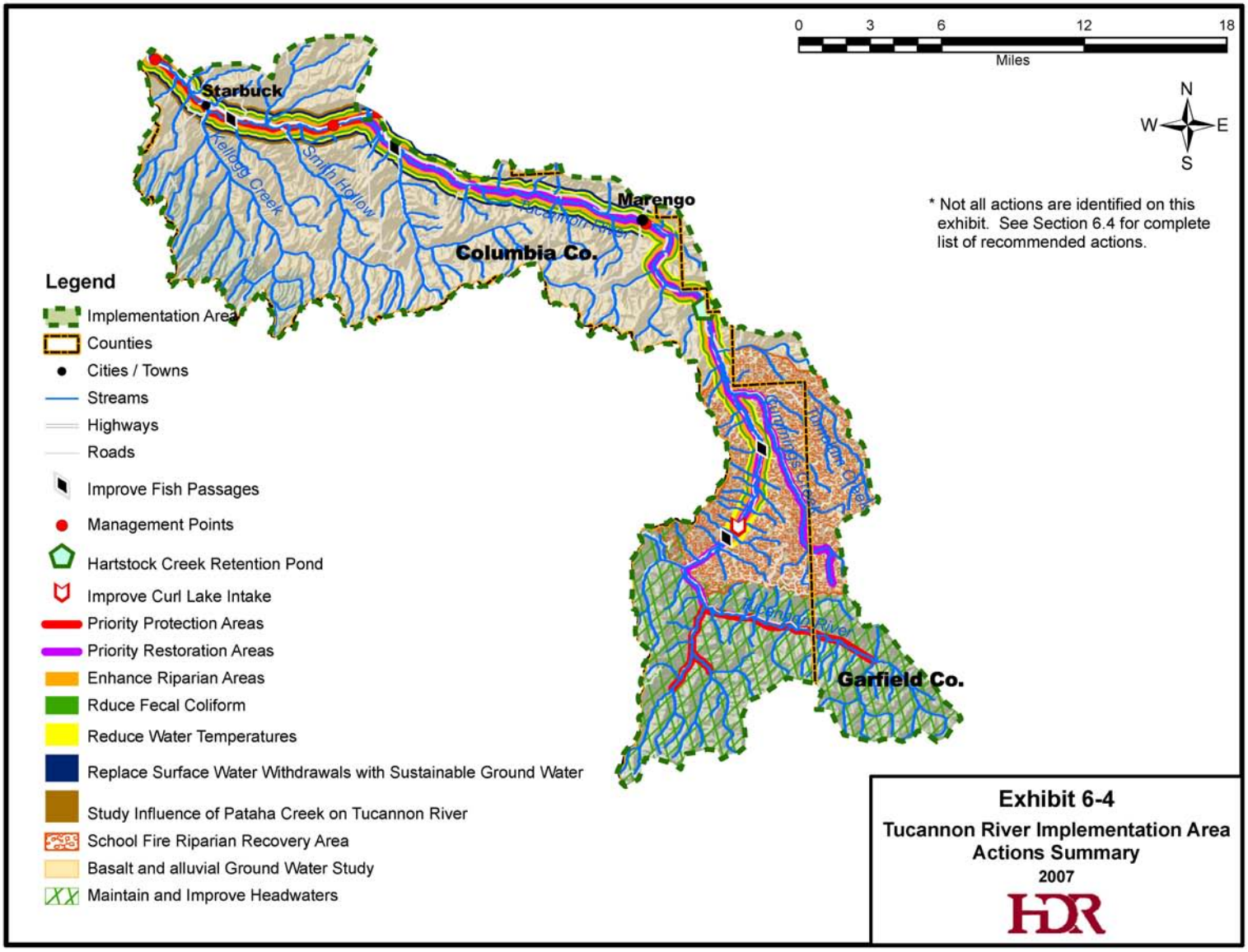
Table 6-7
Tucannon River Implementation Area Actions

Action (non-prioritized)	Supported Objectives	Location	Responsible Agency(ies)	Description	Schedule [1]	Cost [2]
18	TR9	Entire IA	WDFW, USFS, Columbia County	Work with public land and wildlife management agencies to maintain and enhance pristine and other areas of the headwaters, with specific focus on the post-School Fire recovery area, by applying BMPs.	Ongoing	Low
19	TR11	Entire IA	WDFW, Conservation District, and City of Starbuck	Remove fish passage obstructions, including:	2007 to 2010	Low to Medium
				Tucannon River, Starbuck Dam (RM 5.5) [improve function of existing ladder]	2007	Medium
				Tucannon River, Irrigation Weir (RM 13.5)	2007	Medium
				Tucannon River, Hatchery Dam (RM 38.4)	2010	Medium
				Tucannon River, Curl Lake Weir (RM 43)	2010	Medium
20	TR11	Tucannon River, Marengo-Tumalum	WDFW and Conservation District	Continue to provide surface water diversions with effective fish screens and identify if additional screens are needed within the subbasin	2007	Medium

Table 6-7
Tucannon River Implementation Area Actions

Action (non-prioritized)	Supported Objectives	Location	Responsible Agency(ies)	Description	Schedule [1]	Cost [2]
Regulatory Actions						
21	TR3	Tucannon River	Ecology, WDFW	Establish minimum instream flows for Tucannon River at Lower Tucannon River and Marengo gauge sites. **See Appendix C.**	By 2008	Medium
22	TR17	Entire IA	Columbia County, WDFW, USFS	Implement/enforce federal, state and local land use regulations to protect critical areas and pristine areas of the implementation area.	Ongoing	Low
23	TR1, TR4	Entire IA	Ecology	Establish rule for use of groundwater in the gravel aquifer and basalt aquifers, specifically for the development of rural ("Exempt") wells. **See Appendix D.**	By 2008	Low
Miscellaneous Studies						
24	TR8	Entire IA Tributaries to the Tucannon River	WDFW, CCD and Columbia County	Identify specific stream fords that could be eliminated by installing bridges or culverts. Pursue project funding.	By 2020	Medium
25	TR12	Entire IA	Columbia County, Ecology	Conduct detailed hydrogeology study to understand basalt and alluvial ground water resources and identify sustainable levels of ground water withdrawals to meet needs. **See Appendix D.**	By 2008	Medium
26	TR1, TR2, TR12	Entire IA	Columbia County, Ecology	Monitor groundwater levels in basalt aquifer to assess potential impacts of additional groundwater use, primarily with rural ("exempt") wells. **See Appendix D.**	Ongoing	Medium

Notes:
1) Schedule: Suggested dates have been provided or a range, where: Near-term=0-3 years; Mid-term=3-10 years; Long-term=10 years or more beyond date of plan adoption.
2) Estimated costs have been provided where available from feasibility or other studies. Otherwise, a cost range is provided where: Low=<$100,000; Medium=$100,000-$500,000; High= >$500,000


0 3 6 12 18
Miles
N
W E
S
Starbuck
Marengo
Columbia Co.
Garfield Co.
Kellogg Creek
Smith Hollow
Tucannon River
Curl Lake Creek
Turner Creek
* Not all actions are identified on this exhibit. See Section 6.4 for complete list of recommended actions.
Legend
Implementation Area
Counties
Cities / Towns
Streams
Highways
Roads
Improve Fish Passages
Management Points
Hartstock Creek Retention Pond
Improve Curl Lake Intake
Priority Protection Areas
Priority Restoration Areas
Enhance Riparian Areas
Rduce Fecal Coliform
Reduce Water Temperatures
Replace Surface Water Withdrawals with Sustainable Ground Water
Study Influence of Pataha Creek on Tucannon River
School Fire Riparian Recovery Area
Basalt and alluvial Ground Water Study
Maintain and Improve Headwaters
Exhibit 6-4
Tucannon River Implementation Area
Actions Summary
2007
HDR

6.5 Grande Ronde Implementation Area Planning Objectives and Actions

The Grande Ronde subbasin encompasses an area of about 4,000 square miles primarily in northeast Oregon but also including 341 square miles of southeast Washington. The southeast portion of the subbasin within Washington is the implementation area for this plan, and includes portions of Asotin, Columbia, and Garfield counties. The Grande Ronde River flows generally northeast for 212 miles from its origin in Oregon to join the Snake River at river mile (RM) 169 near the city of Asotin, and is the largest waterbody in the IA.

The Grande Ronde is a rural area with no urban centers. Current population (2005) is estimated at approximately 558 in the Washington portion. The population is expected to remain relatively constant or decline slowly through 2025. Because there are no urban centers within the area, all of the water use in the Grande Ronde IA is assumed to be rural residential or agricultural.

Annual rural residential water use was estimated to be approximately 154 afy in 2005. Rural residential water rights account for roughly 13% of all water rights in the area. Agricultural water rights make up about 87% of all water rights in the Grande Ronde IA. Year 2005 actual agricultural demands are not known; however, they are believed to range from 875 to 1,250 afy and are used to irrigate approximately 300 acres. Based on water rights, it is estimated that 93% of all available water in the area comes from surface water diversions. Most surface water diversions are located on the Grande Ronde River mainstem and Joseph Creek, a tributary to the Grande Ronde River. These sources currently supply most water uses, including aquatic habitat. However, increased summer base flows would enhance habitat values for aquatic species.

Vegetation in the area may be generally characterized by forest at higher elevations and shrub-steppe or grassland at lower elevations. In general, 46% of land use in the Grande Ronde IA is forest, 52% is shrub-steppe or grassland, and approximately 2% of land use is devoted to agriculture.

Major watershed management issues within the IA are detailed in the WRIA 35 Level I Assessment (2005) and focus on three main areas:

- Inadequate water quality and water quantity baseline data
- Irrigation efficiency
- Aquatic habitat

Specific objectives that address the above major issues for the Grande Ronde Implementation Area are provided below. These are in addition to the Basin-wide objectives and actions described in Section 5. For convenience, objectives are numbered sequentially with the prefix GR (Grande Ronde). The numbers do not imply or assign any priority to the objectives.

GR1: Continue to measure, record, and report annual agricultural water use as per Chapter 90.03 RCW by installing water meters for all agricultural water users (surface and groundwater diversions) (Grande Ronde Level I 2005).

GR2: Improve water delivery, reliability and efficiency of individual agricultural irrigation systems; and place water savings in trust to improve instream flows.

- Replacing low efficiency hand and wheel lines
- Change irrigation timing or use of storage to augment water supply during dry summer months

GR3: Develop and continue instream flow and water quality monitoring through permanent and seasonal gauges and monitoring stations to improve baseline data needed to evaluate instream flow enhancement efforts and facilitate future water management.

GR 4: Reduce high instream temperatures in the lower Grande Ronde mainstem and tributaries.

GR5: Identify and develop aquatic habitat protection strategies for areas of existing high quality habitat.

GR6: Implement aquatic habitat restoration objectives/projects for the lower Grande Ronde mainstem and tributary reaches that address the following prioritized objectives (Grande Ronde Subbasin Plan 2004):

- Fish passage: Identify, prioritize, and modify barriers to fish passage
- Low flows: Enhance existing hydrograph to match the natural hydrograph to the extent possible in the lower Grande Ronde mainstem and tributaries.
- Channel conditions (including instream habitat): Improve and enhance channel and instream habitat conditions to a historic state to the extent possible
- Riparian conditions: Achieve the size, structure, and distribution of riparian vegetation that is appropriate for the ecoregion. Restore areas of degraded riparian vegetation through activities such as CREP and conservation easements with an emphasis on the most degraded areas.

GR7: Set minimum instream flows and target flows for the Grande Ronde mainstem and significant tributaries within Washington.

GR8: Increase the amount of available data and periods of record pertaining to the Washington portion of the Grande Ronde subbasin in the areas of:

- Water quality
- Water quantity
- Land use (Grande Ronde Level I 2005)

GR9: Improve water quality in the Grande Ronde River and tributaries.

GR10: Develop alternative water sources for existing surface water diversions for irrigated agriculture and stock water.

Specific projects, actions, and additional necessary studies are identified in Table 6-8. They are organized by planning element to meet the area-specific objectives described above, as well as the basin-wide objectives provided in Section 5. Where specific projects for each planning element are not identified, refer to the basin-wide management strategies for more general actions on what is intended for a given planning element in the implementation area. Exhibit 6-5 identifies some areas of known water quality and/or aquatic habitat issues where management actions should be targeted.

Table 6-8
Grande Ronde Implementation Area Actions

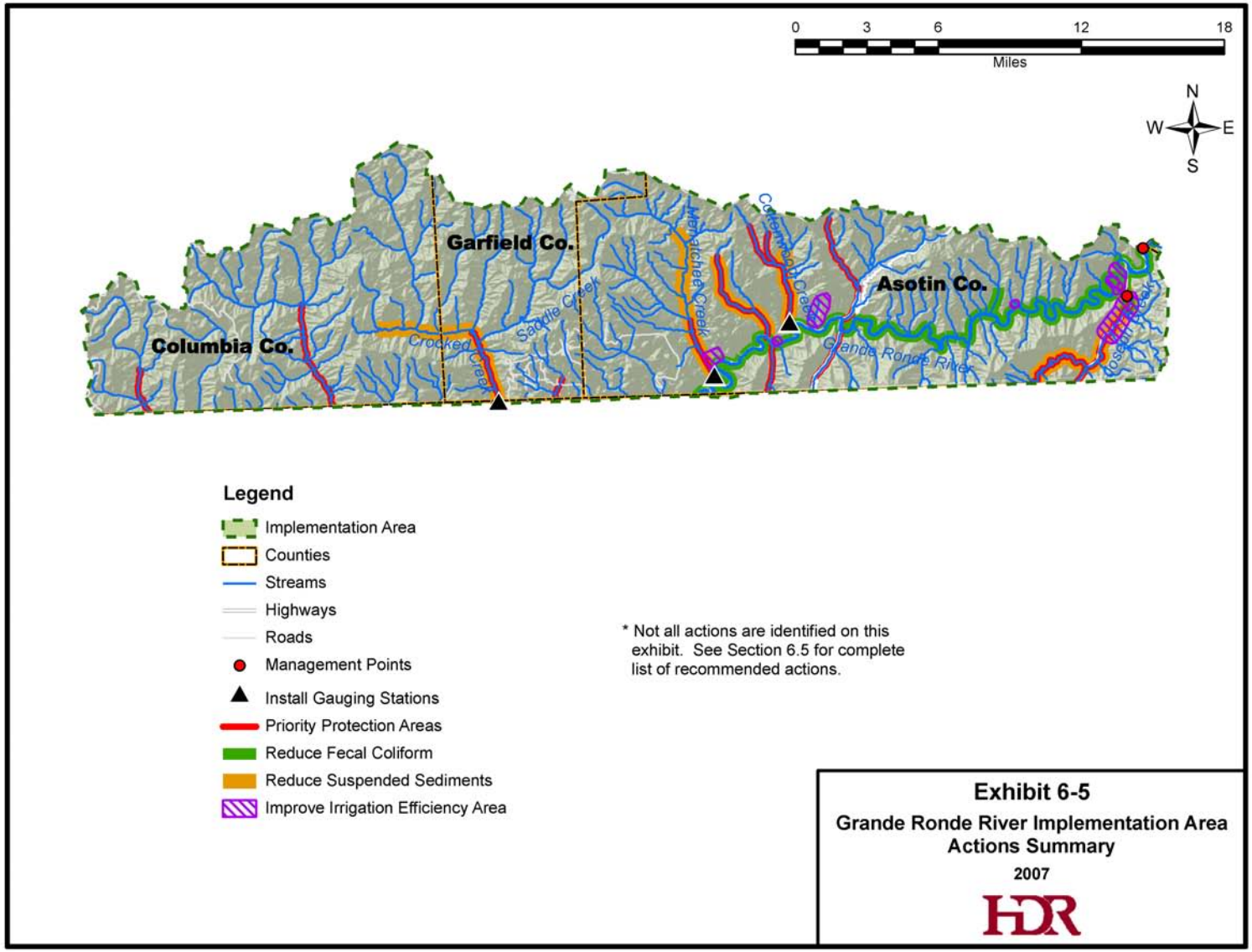
Action (non-prioritized)	Supported Objectives	Location	Responsible Agency(ies)	Description	Schedule [1]	Cost [2]
Water Quantity Management						
1	GR3	Rattlesnake Creek Cottonwood Creek Cougar Creek Menatchee Creek Wenaha River	USGS, Ecology	Installation of additional instream flow gauges with focus on perennial streams with potential fish habitat.	By 2010	Low
2	GR8	USGS 13334000 USGS 13333000 Ecology 35G060	USGS, Ecology	Continued instream flow monitoring at seasonal and permanent gauging locations.	By 2010	Low
3	GR3	Area-wide	WDFW, ACCD, Nez Perce	Modify surface water diversions to meet NOAA fish passage standards where required.	By 2015	Med
4	GR1	Area-wide	Ecology	Continue installing water use meters to surface water and groundwater diversions where required.	Ongoing	Low
5	GR2	Grande Ronde mainstem Joseph Creek	Irrigators, ACCD, DOE, and Ecology	Ensure adequate water supply for irrigation by: 1. Upgrading low efficiency systems 2. Changes in irrigation timing 3. Storage for periods of low availability	Ongoing	Med
Water Quality Management						
6	GR8	Rattlesnake Creek Cottonwood Creek Cougar Creek Menatchee Creek Crooked Creek Butte Creek North Fork Wenaha River Joseph Creek Lower Grande Ronde River	USFS, Ecology, ACCD, NPT	Implement a regular water quality monitoring program that will identify contributions to high instream temperatures, fecal coliform and sediment delivery from tributaries	By 2010	Low
7	GR3	USGS 13334000 Ecology 35C070	USGS, Ecology	Continued water quality monitoring at existing locations.	Ongoing	Low
8	GR6	Rattlesnake Creek Cottonwood Creek Cougar Creek Menatchee Creek Crooked Creek Butte Creek	ACCD, USFS, Landowners	Implement the following actions to reduce suspended sediments from tributary streams: 1. no till 2. increase grassed waterways 3. buffers 4. strip cropping	By 2010	Low

Table 6-8 Grande Ronde Implementation Area Actions						
Action (non-prioritized)	**Supported Objectives**	**Location**	**Responsible Agency(ies)**	**Description**	**Schedule [1]**	**Cost [2]**
		North Fork Wenaha River Joseph Creek Lower Grande Ronde River		5. riparian restoration		
9	GR9	Grande Ronde River	ACCD, Landowners, Ecology, Asotin County, NPT	Implement the following actions to reduce fecal coliform levels on the Grande Ronde: 1. manure management 2. riparian enhancement 3. improve/encourage grazing management for operations adjacent to streams 4. septic system inventory / management/straight pipes 5. reduce or eliminate combined sewage overflows 6. inventory / dye testing of septic systems adjacent to floodplains and waterways 7. other applicable BMPs	By 2015	Low
Aquatic Habitat Enhancement						
10	GR9 GR4	Rattlesnake Creek Cottonwood Creek Cougar Creek Menatchee Creek Lower Wenaha Joseph Creek Lower Grande Ronde River	ACCD, Landowners, Ecology, NPT, USFWS	Implement actions to reduce instream temperatures within Grande Ronde mainstem and tributaries	By 2015	Low
11	GR6, GR5	Area-wide	WDFW, USFWS, ACCD, NPT	Develop aquatic habitat restoration and protection plans; including the following prioritized projects 1. Bull trout monitoring 2. Grande Ronde Supplementation Program Monitoring and Evaluation 3. Life Studies of spring and fall Chinook	Ongoing	High
12	GR6	Entire IA	ACCD	Restore areas of degraded riparian area through CREP or permanent conservation easements	By 2010	Med
13	GR6	Entire IA	WDFW, ACCD, NPT, USFWS	Address barriers to fish passage such as; 1. Improperly screened diversions 2. Inadequate culvert modifications	By 2010	Low

Table 6-8
Grande Ronde Implementation Area Actions

Action (non-prioritized)	Supported Objectives	Location	Responsible Agency(ies)	Description	Schedule [1]	Cost [2]
14	GR6	Entire IA	ACCD	Improve degraded channel conditions where necessary	By 2015	Low
Regulatory Actions						
15	GR8	Entire IA	Ecology	Establish rule for use of groundwater in the gravel aquifer and basalt aquifers, specifically for the development of rural ("Exempt") wells. **See Appendix D.**	By 2008	Low
16	GR8	Grande Ronde mainstem, Joseph Creek	Ecology, WDFW	Establish instream flows for Grande Ronde and Joseph Creek after additional study	By 2017	Medium
Miscellaneous Studies						
17	GR8	Grande Ronde mainstem and tributary riparian zones	Planning Unit Asotin County	Develop a more complete knowledge of land uses that impact water quality, water quantity, and aquatic habitat	By 2015	Low
18	GR8	Entire IA	Ecology	Conduct detailed hydrogeology study to understand basalt and alluvial ground water resources and identify sustainable levels of ground water withdrawals to meet needs. **See Appendix D.**	By 2007	Medium
19	GR3, GR8	Entire IA	Ecology	Monitor groundwater levels in basalt aquifer to assess potential impacts of additional groundwater use, primarily with rural ("exempt") wells. **See Appendix D.**	Ongoing	Medium
20	GR7	Joseph Creek	Ecology	Conduct instream flow studies and develop instream flow recommendations for Joseph Creek. **See Appendix C.**	By 2010	Medium

Notes:
1) Schedule: Suggested dates have been provided or a range, where: Near-term=0-3 years; Mid-term=3-10 years; Long-term=10 years or more beyond date of plan adoption.
2) Estimated costs have been provided where available from feasibility or other studies. Otherwise, a cost range is provided where: Low=<$100,000; Medium=$100,000-$500,000; High= >$500,000


0 3 6 12 18
Miles
N
W E
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Garfield Co.
Columbia Co.
Asotin Co.
Crocked Creek
Saddle Creek
Meadow Creek
Grande Ronde River
Joseph Creek
Legend
Implementation Area
Counties
Streams
Highways
Roads
Management Points
Install Gauging Stations
Priority Protection Areas
Reduce Fecal Coliform
Reduce Suspended Sediments
Improve Irrigation Efficiency Area
* Not all actions are identified on this exhibit. See Section 6.5 for complete list of recommended actions.
Exhibit 6-5
Grande Ronde River Implementation Area Actions Summary
2007
HDR