DRAFT FOR TECHNICAL ADVISORY GROUP REVIEW

Shoreline Inventory and Characterization Report

Shoreline Master Program Update
City of Dayton, Washington

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1. Introduction

Under the Washington State Shoreline Management Act (SMA), adopted in 1972, each local jurisdiction with "shorelines of the state" must adopt a Shoreline Master Program (SMP) that is based on state laws and rules but tailored to the specific geographic, economic, and environmental needs of the community. The City of Dayton, Washington (Appendix B, Figure 1) is in the process of updating its SMP. The SMP will provide a land use plan that coordinates development along the shoreline of the Touchet River, which is under the jurisdiction of the SMA.

This shoreline inventory and characterization report is part of the City of Dayton's SMP update. It establishes the baseline for "no net loss" of ecological conditions, provides information about the existing nature of areas along the banks of waterways under the jurisdiction of the SMA, and documents areas that are currently developed or are likely to become developed. It also rates the condition of the ecosystem functions and processes along the shoreline to determine overall stream health. This information provides the background for the required Cumulative Impacts Analysis, Restoration Plan, and the development of shoreline regulations. The final SMP should be able to demonstrate how shoreline development, recreation, and access improvements can be balanced with conservation and restoration measures that, together, maintain or improve the overall integrity and ecological functions of the State's waterways.

1.1 Goals and Purpose of the Inventory and Characterization Report

This Shoreline Inventory and Characterization report meets the requirements of WAC 173-26-201 (3) (c) and (d) and generally follows the requirements of Chapter 7—Inventory and Characterization—of the draft SMP Handbook, dated March 23, 2010. The following provides a summary of the information included with this report.

1.1.1 Goals of the Inventory

- Summarize regional context
- Identify and map areas influencing SMA shorelines
- Identify management issues of concern
- Map shoreline physical, biological, and cultural features
- Determine river study segment boundaries
- Detail indicators of ecological function by reach
- Summarize ecological functions and uses
- Summarize shoreline characterization
- Summarize and map protection/restoration opportunities

1.1.2 Purpose of the Characterization

- Characterize regional and local physical processes and ecological conditions so as to achieve a meaningful understanding of current shoreline ecological functions throughout the City's shoreline areas.

- Identify relatively high-quality/high-functioning shoreline areas with unique or sensitive attributes that should not be disturbed, damaged, or destroyed in order to conserve shoreline ecological functions.
- Characterize reasonably foreseeable uses and developments in the shoreline jurisdiction.
- Identify opportunities for restoration of shoreline resources and ecological functions.

1.2 SMA Jurisdiction within the City of Dayton

Under the SMA, all lands within 200 horizontal feet of the ordinary high water mark (OHWM) of the Touchet River are under the jurisdiction of the SMP. The OHWM is defined by the marking upon the shoreline created by regular seasonal high water events that occur at least once every 1.5 years (Olsen and Stockdale 2010); the OHWM is not defined by infrequent flood events. Shoreline jurisdiction can extend beyond the 200-foot buffer to encompass any critical areas (i.e., fish and wildlife habitat areas, floodways and associated wetlands, geologically hazardous areas) that are partially located within, and important to the protection of, the shoreline environment. Within Dayton, the SMA jurisdiction extends beyond 200 feet of the Touchet River at the south end of town to include the outer extent of wetland areas that are partially located within 200 feet of the Touchet River. Figure 2 in Appendix B shows the estimated OHWM and estimated shoreline jurisdiction for the City of Dayton. Table 1 includes physical data based upon the preliminary estimate of shoreline jurisdiction.

Table 1. Shoreline Master Program Jurisdiction

Water	Shoreline Length[1] (miles/ ft²)	Water within SMA (acres)	Shorelands within SMA (acres)	Wetlands within SMA[2] (acres)	Total Area within Shoreline Buffer (acres)
Touchet River	3.73/19,700	18.37	82.0	6.0	109.5

[1] Shoreline Length = length of east and west shoreline combined.

[2] Estimate based on field investigation.

2. Methodology

URS and the City worked collaboratively to acquire relevant baseline data that were reviewed and used to establish an inventory of available shoreline reference material. This data included geospatial/GIS data, existing reports, aerial photography, and input from local experts. In conjunction with the review of existing reports and data, URS conducted a brief field inventory of shoreline areas under the jurisdiction of the SMA on March 20, 2014. During the field inventory, existing data were verified or augmented by direct observations from an ecologist working to document natural resources and the condition of the built environment. A detailed description of the shoreline inventory and characterization methods is presented in the following sections.

2.1 Existing Baseline Data Collection

WAC 173-26-201(3)(c) addresses the requirements of a shoreline inventory conducted for a new or amended SMP. The rule specifies that the local government collect the following information provided it is relevant and reasonably available:

- Shoreline, adjacent land use patterns, transportation and utility facilities:
  - Extent of existing structures
  - Impervious surfaces
  - Vegetation and shoreline modifications
  - Water-oriented uses
- Critical areas:
  - Wetlands
  - Aquifer recharge areas
  - Fish and wildlife habitat conservation areas
  - Geologically hazardous areas
- Frequently flooded areas
- Degraded areas and sites with ecological restoration potential
- Areas of special interest:
  - Priority habitats
  - Developing or redeveloping harbors and waterfronts
  - Previously identified toxic or hazardous material clean-up sites
  - Dredged material disposal sites
  - Eroding shorelines
- Conditions and regulations in shoreland and adjacent areas that affect shorelines:
  - Surface water management
  - Land use regulations
- Existing and potential shoreline public access sites:
  - Public access sites
  - Public rights-of-way
  - Utility corridors
- Channel migration zones and floodplains
- Data gaps
- Land use changes relative to cumulative impacts
- Archaeological and historic resources

URS was able to collect most of the data identified above via GIS sources, input from local agencies, input from local experts, and existing reports. A summary of the documents and resources reviewed is included in Appendix A of this report. In general, URS determined that available geospatial data resulting from the Touchet River Geomorphic Assessment (GeoEngineers 2011) provided an excellent resource for existing topography, channel features, and restoration opportunities near town. Data gaps included poor wetland mapping coverage available from the National Wetland Inventory (NWI). This was augmented through the field inventory.

2.2 Field Inventory

After reviewing reports and base maps created from existing data and speaking with local agencies and experts, URS conducted a field inventory to collect additional data, which included a precise demarcation of the OHWM, an estimate of adjacent wetland areas, an inventory of the built environment, and information on the vegetation communities present, areas affected by noxious weeds, areas of high wildlife use, and areas suitable for restoration or preservation.

Shoreline jurisdiction is based on evidence of the OHWM, which is identified by examining the bed and banks of the water along the shore to determine where action of the water has created a distinct mark upon the soil with respect to upland vegetation. In general, the OHWM was observed at the base of the existing levees. Representative points were collected along the river to note the OHWM during the field inventory. Upon returning to the office, these points were compared with available high-resolution topographic light detection and ranging (LiDAR) data and high quality aerial photography to create a reliable estimate of the Touchet River OHWM. Using GIS, the OHWM was then offset 200 feet landward to determine the City's shoreline jurisdiction. Existing GIS data layers for wetlands and critical areas were then evaluated to identify associated wetlands and to determine if the shoreline jurisdiction had to be extended to include any critical areas (fish and wildlife habitat areas, frequently flooded areas, and geologically hazardous areas).

During the field inventory a general assessment of riparian characteristics was collected. Riparian vegetation characteristics indicate what types of wildlife are likely to use the shoreline areas. These characteristics also indicate the quality of riparian corridors for the migration of wildlife through the City. Documentation of the riparian vegetation was conducted to inform the SMP update but also to set a benchmark for the future evaluation of "no net loss of shoreline ecological function."

2.3 Analysis of Collected Data

Documents and GIS data were selected for review from the comprehensive list of resources that addressed specific inventory elements. A review of each significant resource was completed, and relevant data is summarized in the following sections.

Data analysis included an interpretation of findings with regard to historical conditions and disturbances as well as regional processes to determine which shoreline factors are controllable at the local level and which are the result of a historical alteration or regional process that is not under local control. For example, the levees are a historic alteration beyond the control of the City.

However, a wetland, noxious weed population, recreational access need, or wildlife habitat area is relevant to reach-specific planning.

3. Ecosystem-wide Characterization

Ecosystem-wide processes "…are the suite of naturally occurring physical and geologic processes of erosion, transport, delivery, and deposition; and specific chemical processes that shape landforms within a specific shoreline ecosystem and determine both the types of habitat and the associated ecological functions" (WAC 173-26-020-12). Identifying ecosystem-wide processes that affect the shoreline is part of the comprehensive process of amending a SMP. Ecosystem-wide processes are influenced by several variables, including the geology, climate, land cover, and land use of the region. Understanding what processes and variables are at play helps shoreline planners understand how shorelines function within the context of regional forces. This section provides some regional context, identifies the variables contributing to ecosystem-wide processes, and provides a summary of regional processes, including human-induced processes, which may affect the functions provided by shorelines within the City.

3.1 Regional Context

3.1.1 Watershed Overview

The City of Dayton lies entirely within the Touchet River Subbasin, situated near the boundary of the Columbia Basin and Blue Mountain physiographic provinces of southeastern Washington. The subbasin is part of Walla Walla Water Resource Inventory Area [WRIA] 32, which includes three major river systems: the Touchet and Walla Walla rivers, and Mill Creek. The Touchet River Subbasin drains about 470,000 acres and includes the approximately 55-mile mainstem Touchet River and its tributaries (Wiseman et al. 2010). The primary headwaters of the Touchet originate in the Blue Mountains south of Dayton and flow generally northwest, where they converge to become the Touchet mainstem just south of Dayton city limits. In downtown Dayton, the river flows west and then south to its confluence with the Walla Walla River. Hofer Dam is downstream of Dayton at river mile 5.0 and regulates flow in the lower reaches of the Touchet. Numerous gravel private (or "push-up") dams are present both upstream and downstream of Dayton.

3.1.2 Geology and Topography

Dayton is situated within the Columbia Plateau physiographic province, which is characterized by the Columbia River Basalt Group (CRBG), a deep, volcanic basalt plateau formed by multiple, massive lava flows that that occurred during the Miocene period. The CRBG ranges in thickness from 600 to over 1,500 meters and covers over 500,000 square kilometers in Washington, Oregon, and Idaho (Franklin and Dyrness 1973). During the Pleistocene period, the basalt was overlain by fine-grained, loess soils. In the upper reaches of the subbasin, tributaries to the Touchet flow through steep, narrow valleys carved into the highly erodible soil and basalt. Topography in the lowlands varies from slightly undulating to moderately hilly. In Dayton, the mainstem Touchet

flows as a low-gradient, high-flow channel through a wide valley bottom walled in by rolling Palouse hills.

3.1.3 Climate

The continental climate of the Touchet River Subbasin is largely influenced by the Cascade Mountains to the west, which intercept moisture-laden air carried east by the prevailing westerly flow. As a result, the watershed is semi-arid. Summers are hot and dry, with average temperatures ranging from 75 to 90° F in the lowlands and slighter cooler in the higher elevations. Winter temperatures range from 25 to 30° F. Precipitation within the basin generally varies with elevation. Annual precipitation at Dayton (elevation 1,557 feet) is approximately 19 inches, while average precipitation in the Blue Mountains (>5,000 feet) regularly exceeds 50 inches annually (NRCS 2014a). In the lower parts of the basin, precipitation falls mainly as rain; however, higher elevations receive both rain and snow.

Table 2 provides historical climate data from the Western Regional Climate Center (WRCC) station in Dayton for the April 1, 1893 to March 28, 2013 period of record.

Table 2. Dayton, Washington, Climate Data (Station 452030)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Avg Max. Temp. (F)	39.8	45.0	53.3	61.3	69.3	77.0	87.0	85.7	76.1	64.1	49.3	41.2	62.4
Avg Min. Temp. (F)	25.2	28.8	33.7	38.2	44.1	49.9	54.7	53.9	47.1	39.0	32.0	27.3	39.5
Average Total Precip. (in.)	2.38	1.88	2.12	1.58	1.56	1.28	0.46	0.53	0.92	1.65	2.53	2.44	19.33

Source: WRCC 2014

3.1.4 Hydrology

The Touchet River is the largest of the tributaries to the Walla Walla River, with an average monthly discharge ranging from 70 cubic feet/second (cfs) in August to 360 cfs in April (GeoEngineers 2011). Runoff is primarily from precipitation and snowmelt, and most flooding results from rain-on-snow events in the late winter and early spring. The City of Dayton, located in the historic floodplain of the Touchet, is protected from flooding by a series of federally authorized levees constructed in the mid-1960s, and smaller, unregulated dikes are also found in the upper reaches of the subbasin above Dayton (GeoEngineers 2011). Surface water from numerous streams in Walla Walla watershed has been over-appropriated since the early 1900s; that is, distributed water rights exceed the amount of water actually in the streams (Ecology 2007). As a result, no new surface or groundwater rights have been issued in WRIA 32 since 1996, and the entire Touchet River is closed to surface water withdrawals between May 1 and November 30 (Chapter 173-532 WAC).

Groundwater in the subbasin moves through a deep basalt aquifer, which underlies the entire WRIA (EES 2010). The aquifer comprises approximately 2,500 square miles within the Columbia Plateau and contains approximately 4 million acre-feet of groundwater, 65 percent of which is accessible for use (Kuttel 2001). According to a 1997 report by the U.S. Army Corps of Engineers (USACE), water levels in the aquifer appear to be declining (Kuttel 2001).

3.1.5 Land Use and Cover

The predominant land uses within the subbasin include forestry, recreation, and some dryland (e.g., wheat) farming in the upper elevations and intensive agriculture and grazing activity in the valley bottom and floodplain areas. Primary agricultural products include winter and spring wheat, barley, and orchard crops. Land cover within the Touchet River Subbasin consists of about 55 percent rangeland and cropland (GeoEngineers 2011). The remaining 45 percent of the subbasin is occupied by forestland, primarily in the upper portion of the watershed. The primary timber type is Douglas fir (*Pseudotsuga menziesii*), although ponderosa pine (*Pinus ponderosa*), lodgepole pine (*Pinus contorta*), and western larch (*Larix occidentalis*) are also common depending on elevation and aspect (McKinney 1998). The majority of the forestland is within the Umatilla National Forest, and is managed by the U.S. Forest Service according to its Forest Plan. The remainder is owned by Washington State (managed by the Washington Department of Natural Resources [DNR] and Washington Department of Fish and Wildlife [WDFW]) and private landowners.

Primary urban areas within the subbasin include the cities of Dayton (pop. 2,526) (Appendix B, Appendix B, Figures 7 and 8), Waitsburg (pop. 1,217), Prescott (pop. 318), and Touchet (pop. 421) (U.S. Census Bureau 2010). Outside of these population centers, development consists primarily of low-density residential housing and associated agricultural uses.

3.1.6 Cultural Heritage and Settlement

Prior to contact with European settlers, the Walla Walla River basin was inhabited by numerous tribes that used lands in the Touchet drainage for hunting, fishing, and gathering (McKinney 1998). Trails crossing the Touchet River near Dayton were used by the Nez Perce from the east, the Palouse from the north, the Yakamas from the west, and the Umatilla, Cayuse, and Walla Walla peoples from the southwest (McKinney 1998). In 1855, the Umatilla, Cayuse, and Walla Walla tribes ceded 6.4 million acres of land to the United States (Center for Columbia River History 2014).

Euro-American settlement in the region happened in four phases: fur trapping, livestock production, logging, and agriculture (Kuttel 2001). Commercial trapping began in the early 1800s, and by 1835, beaver and otter populations in the Walla Walla basin plummeted. The beaver population remains depressed, and off-channel habitat and wetlands formed due to beaver activity are lacking on all Walla Walla tributaries (Kuttel 2001).

Although the Lewis and Clark Expedition traveled through this area in 1806, settlers did not arrive in the Dayton area in numbers until the 1860s and early 1870s. The first settlers used the land for grazing cattle and sheep, and by 1860, the lowlands were being used for intensive agricultural production. Settlers also discovered that the fertile soils and adequate rainfall in the upper

elevations were ideal for dryland farming. Farming practices dramatically altered the landscape in the region as native vegetation was removed or replaced to accommodate the needs of the growing population of settlers. The town of Dayton was platted in 1871, and, by the spring of 1877 boasted a population of 526 residents (Dougherty 2006).

The large influx of settlers created a demand for timber. While the riparian forests along the Touchet provided mature cottonwoods (*Populus balsamifera*), large Douglas fir and ponderosa pine growing in the Blue Mountains were more profitable, and the forests were largely clear cut. Historical timber harvest and road construction damaged streams in the upper watershed, resulting in loss of habitat, altered flow regimes, and lack of large woody debris (LWD) (Kuttel 2001).

3.1.7 Water Quality

The Touchet River was listed on the Washington State Department of Ecology's (Ecology) 2004 303(d) list for elevated pesticides, fecal coliform bacteria, temperature, and dissolved oxygen and pH (Ecology 2014). As a result, four Total Maximum Daily Loads (TMDLs) were developed for WRIA 32. The TMDLs were approved by the Environmental Protection Agency (EPA) in 2007, and a Water Quality Implementation Plan (WQIP) has been implemented for the region (Baldwin et al. 2008).

The primary stressors affecting regional water quality include agricultural practices and urban influences. Currently, agriculture is the dominant land use in the watershed. Irrigated agriculture occurs primarily in or near the Touchet River floodplain. Irrigation water drawn from the channel is then returned to the river and typically contains sediments, toxics, and nutrients. Irrigation withdrawals can also reduce or eliminate flow in smaller streams. Dryland farming practiced in the higher elevations of the watershed has the potential to contribute sediment and toxic chemicals to the river. Croplands managed with conventional tillage and summer fallow practices are particularly susceptible to erosion and can deliver large amounts of sediments to downslope streams (Kuttel 2001). Livestock grazing in the watershed also affects water quality, especially where livestock have full access to streams. Historically, riparian areas were cleared for grazing, which has increased loadings of sediments and nutrients into the river and reduced the riparian canopy, which affects stream shading and temperature.

Conservation programs have been developed to help reduce erosion and protect and enhance riparian habitat in WRIA 32. As of 2010, approximately 12 percent of the 132,097 cropland acres within the Touchet River Subbasin were enrolled in the Conservation Reserve Program (CRP) (EES 2010). The CRP assists farmland owners and operator in improving soil, water, and wildlife resources by installing on-farm best management practices (BMPs) to enhance habitats and reduce sediment delivery. The CRP made improvements to 38,211 acres in Columbia County between 1986 and 2001 (EES 2010). The federal Conservation Reserve Enhancement Program (CREP) focuses on isolating the riparian zone from adjacent land use practices, including grazing, farming, development, and other uses.

Urban influences, primarily from the town of Dayton, also affect water quality in the lower Touchet River. The river channel is constrained within a system of flood control levees through the town that concentrate flows during peak flow events. This leads to increased turbidity as sediment is unable to drop out, and the lack of flood storage leads to increased flood velocities downstream. Runoff from impervious surfaces contributes fine sediments and nutrients to the river. The discharge from the wastewater plant in Dayton is a recognized point source for water pollution to the Touchet River, including thermally heated water, nutrients, fecal coliform bacteria, and other pollutants (Ecology 2011). The towns of Prescott and Waitsburg, located downstream of Dayton, are also sources of additional urban pollutants.

3.1.8 Habitat

Vegetation

Historically, WRIA 32 was dominated by prairie grassland and shrub-steppe vegetation at low to mid-elevations and coniferous forests in the higher elevations. Western white pine (*Pinus monticola*), whitebark pine (*Pinus albicaulis*), ponderosa pine, western larch, aspen (*Populus tremuloides*), cottonwood, riparian willows (*Salix* spp.), bitterbrush (*Purshia tridentata*), mountain mahogany (*Cercocarpus ledifolius*), and bluebunch wheatgrass (*Pseudoroegneria spicata*) were historically the dominant trees, shrubs, and grasses in the Interior Columbia Basin (Crawford 2003). Much of the native habitat has since been converted to commercial agriculture or pasture for livestock.

Historically, extensive riparian zones dominated by willow, cottonwood, birch (*Betula* spp.), and alder (*Alnus* spp.) existed along streams in the WRIA. Some remnant shrub-steppe vegetation is present within creek drainages, but most has been cleared for farming and grazing. Currently, riparian vegetation along the Touchet River shifts from large cottonwoods and ponderosa pines in the upper reaches of the drainage to smaller cottonwoods and alders from Dayton to Waitsburg, to scattered cottonwoods and dense shrubs further downstream (Wiseman et al. 2010).

Clearing of native vegetation for agriculture and soil disturbance caused by grazing have led to increased spread of noxious weeds in the region. Cheatgrass (*Bromus tectorum*), yellow starthistle (*Centaurea solstitialis*), tansy (*Tanacetum vulgare*), and rattlegrass (*Bromus brizaeformis*) have replaced remnant steppe vegetation throughout the region (EES 2010).

Fish and Wildlife

Wildlife habitat types within the Touchet River Subbasin primarily include aquatic habitat, riparian/floodplain zones, forest lands, remnant shrub-steppe habitat, cliff habitat and agricultural lands (SRSRB 2011). Riparian zones along the Touchet River and its tributaries provide refuge, foraging, and breeding habitat for a variety of mammals, birds, and amphibian species, and serve as wildlife migration corridors. Wading birds, including great blue heron (*Ardea herodias*) and black-crowned night heron (*Nycticorax nycticorax)* use the Touchet River corridor for nesting and foraging, and spotted sandpipers (*Actitis macularius*) nest along gravel shorelines (Mark Vekasy, pers. comm.). Large game animals, including elk (*Cervus elaphus*), deer (*Odocoileus* spp.), and black

bear (*Ursus americanus*), are common in higher elevation forests. Deer and elk are also often found in agricultural fields and remnant shrub-steppe habitat, along with upland game birds like ring-necked pheasant (*Phasianus colchicus*), chukar (*Alectoris chukar*), and wild turkey (*Meleagris gallopavo*). Large portions of the subbasin are mapped as Priority Habitat for white-tailed deer (*Odocoileus virginianus*) winter range and year-round concentrations (WDFW 2014). Basalt cliffs and outcroppings along the river and its tributaries provide nesting habitat for swallows, nighthawks, and various raptors.

The Touchet River supports a number of anadromous and resident fish species, including two listed under the federal Endangered Species Act (ESA). ESA-listed salmonid species include summer steelhead (*Oncorhynchus mykiss*, listed as threatened in 1999) and bull trout (*Salvelinus confluentus*, listed as threatened in 1998). Spring Chinook (*O. tshawytscha*) were historically present but have been extirpated since the 1930s (Kuttel 2001). Two federal species of concern, Pacific lamprey (*Lampetra tridentata*) and margined sculpin (*Cottus marginatus*) have also been documented within the subbasin (WDFW 2013).

The Upper Touchet River Subbasin contains relatively high-quality salmonid habitat and is designated as a priority restoration and protection reach in the Snake River Salmon Recovery Plan (SRSRB 2011) and Walla Walla Watershed WRIA 32 Level 1 Assessment (EES 2010). Steelhead and resident rainbow trout are found throughout the drainage in low numbers, using the Touchet River and its tributaries above Dayton for spawning and rearing. Poor habitat conditions in the Lower Touchet Subbasin have resulted in decreased spawning and rearing from Dayton downstream to the Touchet River's confluence with the Walla Walla River. The lower portion is primarily used for migration during the winter and spring, when flow and water quality conditions are at their peak (Kuttel 2001; Wiseman et. al. 2010). Bull trout are currently limited to the cold headwater tributaries in the subbasin (Wiseman et. al. 2010).

3.1.9 Recreation

Recreational uses of the Touchet River and its tributaries include water sports, angling, swimming, and innertubing (Columbia County et al. 2014). Campgrounds and hiking trails are common along higher elevation tributaries. In Dayton, common recreational shoreline uses include jogging, walking, biking, sightseeing, and picnicking (Columbia County et al. 2014).

3.2 Regional Processes, Stressors, and Opportunities for Improvement

WAC 176-26-201(3)(d)(i) defines the regional processes that must be identified and assessed to determine their relationship to ecological functions present within the SMP jurisdiction. WAC 176-26-201(3)(d)(i)(B)(II) defines the scope of identification and assessment to be used. It states: "*This characterization of ecosystem-wide processes and the impact upon the functions of specific habitats and human health and safety objectives may be of a generalized nature*." Table 3 below identifies the regional processes, both natural and human-induced, which may affect the ecological functions provided by SMA shorelines within the City. The table also includes general recommendations for addressing impacted functions.

Table 3. Analysis of Regional Processes and Associated Functions

Ecosystem Process	Ecological Functions	Stressors	Touchet River Condition	Recommendations (General)
Flood attenuation/ storage	Attenuating flow energy; storing and dispersing water.	Construction of dikes/levees; development in floodplain; channel confinement; low beaver population; natural episodic rain-on-snow events; lack of floodplain connectivity; removal of wood from channel; lack of riparian vegetation.	Poor - channel modifications (levees, riprap, channel straightening, etc.) increase flow velocity; lack of LWD and riparian vegetation minimizes hydraulic roughness; channel disconnected from historic floodplain in many areas.	Restrict development in 100-year floodplain; increase flood storage where available to offset periodic flood damage; remove or setback dikes where feasible; plant streambanks with woody vegetation to slow flow velocity; support reintroduction of beaver populations in upper watershed.
In-stream flows	Resident fish support; recruitment of large woody debris; development of in-stream habitat; sediment transport.	Natural summer low flow; water diversions; lack of riparian vegetation; sediment accumulation in low-gradient stream reaches.	Fair – dewatering does not occur, but diversions are present.	Improve diversion efficiency; plant riparian vegetation to reduce summer water temperatures.
Presence and movement of fish/wildlife	Fish and wildlife migration, foraging, and rearing; habitat connectivity.	Fragmented riparian buffer; channel modifications (levees /push-up dams); lack of available off-channel habitat; removal of LWD from channels; lack of beaver; low water quality/high temperature; urban development; recreational uses.	Fair/Poor – minimal fish passage issues in upper Touchet; however, spawning and off-channel habitat lacking; lacks pools/LWD; riparian buffer constricted by levees and other land uses that remove woody vegetation.	Preserve and improve riparian buffers; improve LWD recruitment by planting woody riparian vegetation; enhance upland habitats to improve wildlife migration corridors; Remove barriers to off-channel aquatic refuge habitat; control noxious weeds; allow beaver populations to rebuild.

Ecosystem Process	Ecological Functions	Stressors	Touchet River Condition	Recommendations (General)
Erosion/ Sedimentation	Sediment/gravel transport; sediment stabilization; formation of fish and invertebrates habitat; channel stability.	Combination of low stream gradient and channel confinement; removal of LWD; limit of available riparian vegetation; land practices that erode soil in upper watershed.	Poor – high sediment loads from upstream land use (grazing, cropland, forestry); poor streambank condition; bridges affect sediment conveyance.	Support restoration projects that introduce in-channel structures (LWD) to disperse flows; increase areas of deposition; plant native riparian vegetation; limit construction of new logging roads and decommission old roads; work with land conservation programs (e.g., CREP) to remove highly erodible lands from agricultural use and stabilize erodible soil areas.
Water mixing/ inputs	Water quality (nutrient, sediment, and toxicant loading and cycling; maintenance of suitable water chemistry for aquatic species).	Agriculture; logging in upper watershed; high sediment input; point source pollution (e.g., treated effluent); non-point source pollution (e.g., stormwater).	Poor– listed on 2004 303(d) list for bacteria, temperature, pH, and dissolved oxygen. TMDLs and WQIP completed by 2008 and recommended actions are actively being implemented.	Continue to implement WQIP for TMDLs; improve stormwater controls; work with landowners to review pesticide and fertilizer use and to implement best management practices; improve treatment of waste effluent.
Solarization	Maintenance of water quality temperatures that support aquatic life.	Naturally low summer flows; irrigation diversions and withdrawals; high air temperatures; lack of shade-producing riparian vegetation.	Poor – excessively wide and shallow channel and lack of riparian vegetation leads to warm summer temperatures. Water temperatures regularly exceed 65°F from early July to mid-August (Kuttel 2001).	Implement Walla Walla WQIP for TMDLs; increase summer in-stream flows; plant native riparian vegetation, particularly on southern exposures.

Ecosystem Process	Ecological Functions	Stressors	Touchet River Condition	Recommendations (General)
Growth of riparian vegetation	Fish, mammal, bird and insect habitat; migration corridor; visual buffer; thermoregulation; shoreline stabilization; nutrient input; support for local plant diversity.	Vegetation removal; non-native and invasive weeds; residential development; channel modifications; concentrated recreational use; logging/grazing.	Poor – some mature trees present, but riparian stream buffers generally narrow and often disconnected from river by dikes or agricultural land conversion practices.	Enforce land use regulations; preserve high quality riparian forest corridors; increase riparian buffer width; modify levee maintenance protocols to allow for increased vegetation; control spread of non-native vegetation; support native vegetation restoration projects.

[1] Condition ratings generally based on assessments conducted by Kuttel (2001) and GeoEngineers (2010).

4. Local Characterization

This section provides a detailed characterization of the land use, physical, biological, and ecological shoreline characteristics of the Touchet River within Dayton. Shorelines are generally described from upstream (south) to downstream (northwest) through town. Although a natural reach break exists at the confluence of Patit Creek and the Touchet River, it was determined that the separation of this report into separate descriptive reaches was unwarranted given the general similarity between the two reaches.

4.1 Land Use/Zoning

Within the shoreline zone, the majority of land is zoned as open space/recreational, with a close second made up of urban residential (Table 4 and Appendix B, Figure 6). The east side of the river is dominated by residential development, with the exception of the downtown core (zoned Commercial), which extends from Clay Street north to Commercial Avenue, and the City park parcel, zoned for Public use. The west side of the river is zoned Public from the southern City limits to the hatchery pond. This area is currently undeveloped. The hatchery pond and a portion of the athletic fields are zoned Industrial, but are used for non-industrial purposes. Areas west of the downtown commercial district are zoned as Fringe Commercial. Northwest of Commercial Street, shoreline areas southwest of the river are zoned and used as agricultural residential lands downstream to the golf course. The remainder of lands south/west of the Touchet are zoned Public/Quasi Public, including the wastewater treatment plant.

Table 4. Current Zoning within SMA Jurisdiction

Zoning	Acres	Percentage
Commercial	4.80	4.4
Fringe Commercial	5.74	5.2
Industrial	6.01	5.5
Open Space/Recreational	42.11	38.5
Public/ Quasi Public	11.92	10.9
Urban Residential	32.12	29.4
Agricultural Residential	6.72	6.1
TOTAL	**109.41**	**100**

There are several designated land uses within the City of Dayton's shoreline jurisdiction; however, most account for a very small portion of the area. The majority of Dayton's shoreline land use mirrors the shoreline zoning; it is split between public lands (parks and streets) and residential (Table 5 and Appendix B, Figure 7).

Table 5. Current Land Use within SMA Jurisdiction

Land Use	Acres	Percentage
Commercial	1.85	1.7
Retail/Offices	0.90	0.8
Lodging	< 0.01	< 0.1
Cultural/Religious Assembly	< 0.01	< 0.1
Manufacturing	< 0.01	< 0.1
Utilities/Communication	< 0.01	< 0.1
Public	42.65	39.0
Park	8.07	7.4
Residential	42.67	39.0
Mobile Home Parks	< 0.01	< 0.1
Open Space	0.06	0.1
Vacant	2.39	2.2
Public Roads and ROW	10.81	9.9
TOTAL	**109.41**	**100**

4.2 Shoreline Modifications

The major shoreline modifications within the Dayton shoreline jurisdiction include the levee system; a fish hatchery, which includes a diversion from the Touchet; the municipal wastewater plant, bridges; and ongoing maintenance dredging, typically conducted around the bridges (Appendix B, Figure 11). Other modifications include residential, commercial, and industrial development behind the levees.

Dayton's shoreline has been highly modified for flood control. Historically, the reach of the Touchet from the mouth of the South Fork Touchet River to the Lewis and Clark State Park has been channelized and straightened in attempts to control flooding (Kuttel 2001). Additionally, an unknown number of unregulated gravel push-up dams are located in the upper Touchet watershed. In 1965, the USACE constructed the 3.2-mile Dayton Levee System, which consists of a system of levees and bank armoring that extends from the southern City limits to the wastewater treatment plant and protects commercial and residential areas on both sides of the river. In addition to flood control, the levees provide recreational access to the river via the Touchet River Dike Path, a paved pedestrian path constructed on top of the right bank levee.

Recent inspection by the USACE have determined that the levees are currently "minimally acceptable," due to sediment accumulation in the floodway and woody vegetation growth on the levees (USACE 2013). Per USACE levee maintenance requirements, vegetation within 15 feet of the toe of the levee is limited to mowed grasses and woody plants with stems less than 2 inches in diameter (USACE 2006). The USACE has recommended levee improvements, which include vegetation removal, removal and management of levee encroachments, stabilization and replacement of displaced riprap, and removal of sediment (GeoEngineers 2011). Failure to address these issues could result in "decertification" of the levees, which would require reclassification of

much of the City into the Federal Emergency Management Agency (FEMA) floodplain, causing increased flood insurance rates and potentially limiting future development. The City is currently attempting to secure a variance to the USACE vegetation requirements, arguing that the levee vegetation provides shading to help reduce high summer water temperatures, which is beneficial to sensitive fish species.

Appendix B, Figure 9 illustrates the amount of impervious surface within the shoreline zone, which provides an estimate of the existing development intensity. Shorelines upstream of West Spring Street are generally undeveloped, except for some scattered low-density residential development and development associated with the City parks and the Touchet River Dike Path. The downtown core, from West Spring Street to West Commercial Street, is the area of highest development intensity.

The WDFW operates a steelhead acclimation pond on the west side of the river. A low concrete drop dam spans the full channel and diverts water to the pond intake on the west side of the river. The facility was developed in the mid-1980s to collect natural-origin summer steelhead for hatchery broodstock under the Lower Snake River Compensation Program (Mendel et al. 2014). In 2007-2008, the project was expanded to construct a fish ladder around the diversion dam and install higher standard fish screens (Joseph Bumgarner, pers. comm.). At that time, the intake was modified to collect water for two City irrigation districts, eliminating two downstream irrigation diversions. The pond makes permitted discharges to the Touchet River. The current National Pollutant Discharge Elimination System (NPDES) permit for the pond expires on August 1, 2015.

Three bridges span the river in this reach: a footbridge connecting Pietrzycki City Park to the Dayton School District athletic fields, the Main Street (Highway 12) bridge, and a railroad bridge. GeoEngineers (2011) concluded in their geomorphic study of the upper Touchet that the bridges "may likely contribute to sediment conveyance problems. However, site specific hydraulic and sediment transport analysis is necessary to define the specific bridges effects on sedimentation."

Maintenance dredging was conducted between the Main Street Bridge and the railroad bridge in the fall of 2009 to address excess sediment deposition. Approximately 6,666 cubic yards of sediment was dredged from the river in 2009 to increase water holding capacity (Blue Mountain News 2010).

Residential, commercial, and industrial development has converted much of the Touchet River floodplain into buildings, landscaping, lawns, and streets. Impervious surfaces, lawn care products, septic systems, and other activities associated with urban development provide input of pollutants into the river.

The City of Dayton owns and operates a trickling filter wastewater treatment plant that discharges to the Touchet River near RM 52 (Ecology 2011). The existing collection system serves an area of approximately 610 acres. After treatment, disinfected effluent flows through a 10-inch-diameter outfall pipe approximately 160 feet into the Touchet River. Solids removed during wastewater treatment are disposed of at the local landfill (for grit, rags, and other debris) or the Columbia Compost facility in Dayton (for biosolids). The current NPDES permit for the wastewater treatment plant expires on September 30, 2016.

4.3 Critical Areas

Critical areas documented within Dayton's shoreline zone include frequently flooded areas, aquifer protection areas, wetland protection areas, fish and wildlife conservation areas, and geologically hazardous areas. These areas are documented by the current City of Dayton Critical Areas Ordinance (Title 17) and by observations collected during the field inventory where areas matched the description of a critical area. Construction or development within critical areas and associated critical area buffers requires a permit from the City.

Frequently Flooded Areas

Frequently flooded areas are lands in the floodplain subject to a 1 percent or greater chance of flooding in any given year, which is consistent with the 100-year floodway mapping by FEMA. Frequently flooded areas are mapped along the entire Touchet River corridor through Dayton (see Appendix B, Figure 3).

Aquifer Protection Areas

The Dayton Wellhead Protection Plan designates three public drinking water wellhead protection areas (WHPAs) within the City of Dayton. In Washington, a WHPA is based on time-of-travel criteria, which is the theoretical distance a particle of water travels in a proscribed period of time. For example, areas within the 1-Year Time of Travel Zone represent the surface area overlying the portion of the aquifer supplying water to the well within a 1-year period. Areas within the 1-Year zone are regarded as areas with a high susceptibility to both microbial and chemical contamination, and therefore, require aggressive control of potential contamination sources. Paper copies of WHPAs for the City of Dayton show two 1-Year WHPA Time-of-Travel Zones within the shoreline jurisdiction at the south and west ends of town near the Touchet River. The approximate location of these WHPAs is shown on Appendix B, Figure 3.

Wetland Protection Areas

Existing wetland mapping data from the NWI for the City of Dayton is too general and inaccurate for use in shoreline planning; Appendix B, Figure 5 shows wetland areas as estimated during the field inventory. Wetlands are located on sediment accumulation terraces within the levees throughout town. These are generally small features within the OHWM of the Touchet River, between the existing flood levees, with a few exceptions noted below.

At the south end of shoreline jurisdiction, a historically connected wetland was observed east of the current levee. This wetland supports a seasonally wet cottonwood forest that is infrequently visited by humans and, therefore, provides some of the higher-quality riparian habitat within the City. Across from this wetland is an unprotected (no levee) flood terrace wetland at the base of a steep cliff on the west side of the river. This terrace wetland is partially estimated to be below the river's OHWL and provides flow attenuation and off-channel refuge during flood events. Small wetlands are estimated at the north end of town on private property; however, these could not be field verified. Estimates of wetland area are based upon aerial photo and topography interpretation.

West of town, wetlands were observed on the west and east sides of the levee that protects the water treatment plant. The landscape bears the markings of fluvial dispersal activity and, as a result, the microtopography is variable in this area. As such, the wetland area mapped on Figure 5

(Appendix B) is likely a mosaic of wetland and upland patches. Estimated wetlands west of the levee provide riparian forest functions on a flood terrace that appears to be annually flooded. The levee bisects this floodplain wetland resulting in a hydrologically isolated, forested wetland remnant northeast of the treatment plant.

Fish and Wildlife Conservation Areas

Fish and wildlife habitat conservation areas include areas associated with state or federally listed Endangered, Threatened, and sensitive species; Washington State Priority Habitats and areas associated with State Priority Species; and habitats and species of local importance (Dayton City Code 17-06.002). The Touchet River and Patit Creek both contain ESA-listed fish species, including steelhead (occurrence and breeding area), Chinook salmon (breeding area), bull trout (occurrence and migration), and rainbow trout (occurrence and migration) (WDFW 2014). The entire town and surrounding areas are noted as providing habitat for northwest white-tailed deer, listed by the WDFW as a Priority Species (WDFW 2014). Also, the Touchet River bluffs at the south end of town are mapped as a Priority Habitat for cliff-nesting birds, including cliff swallows (*Petrochelidon pyrrhonota),* nighthawks (*Chordeiles minor*), and potential raptor nesting

The field inventory identified several locally important habitat areas (Appendix B, Figure 5). Shoreline-associated habitats include riparian upland and wetland forest, cliff-nesting habitat, seasonally inundated wetland terraces, constructed wetlands, and upland forest.

Geologically Hazardous Areas

Geologically hazardous areas are areas susceptible to erosion, sliding, earthquake, or other geological events. Included are areas categorized by the Natural Resource Conservation Service (NRCS) as having a higher than moderate erosion hazard. A review of mapped soils within the Dayton shoreline zone indicates that approximately 6 acres of land on the west shore of the river is mapped as Waha-Rock land complex (Appendix B, Figure 4). The Waha-Rock complex is noted as having "Very Severe" off-road, off-trail erosion hazard due to excessive slope and erodibility (NRCS 2014b). Additionally, the Washington Department of Natural Resources Natural Hazards catalog maps the Touchet River and Patit Creek historical floodplain areas as having a high susceptibility for liquefaction in the event of an earthquake (WDNR 2014).

4.4 Recreational Use and Access

Several public recreational facilities and special use areas are located within the City's shoreline management area (Appendix B, Figure 10). Pietrzycki City Park is located south of Main Street at the end of South 1st Street and can be accessed by trails and paths and a footbridge across the Touchet River. The 22-acre park complex includes open space, a playground and fields, a day use picnic area, tennis courts, and a skate park. It also contains Dayton Pond, a stocked fishing pond for juveniles and adult anglers with a disability. Water levels in the pond are maintained via a diversion pipe from the river from early March to at least mid-July, and the pond is regularly stocked with rainbow and brown trout (WDFW 2014). Flour Mill Park is a public use park that is privately owned. It is located on Main Street in downtown Dayton where it borders the river. It contains a gazebo, restroom facilities, community art, and interpretive signage. Both parks contain

automobile parking areas that facilitate public access to the river for walking and angling. The Sports Complex, located south of Pietrzycki Park, contains a baseball field.

The 1.45-mile Touchet River Dike Path starts at Flour Mill Park and runs along the east shore of the river in Dayton and in unincorporated Columbia County south of Dayton City limits. The paved pathway allows non-motorized public access to the east shoreline. A portion of the dike path south of Main Street crosses over privately owned property. A small bridge along the path over Mustard Creek limits wheelchair access to the portion of the path between Flour Mill Park and the creek. Numerous informal trails between the path and the shoreline provide river access for fishing, wading, or other recreational activities.

On the west side of the river, the 11-acre Dayton School District athletic fields contain baseball and football fields and a track. The athletic fields are accessible from the east side of the river via a footbridge between Pietrzycki Park and the WDFW fish hatchery. No boat ramps are located within City limits.

The Touchet Valley Golf Course is partially located within the City of Dayton. This golf course provides public recreation within the shoreline jurisdiction. West of the City of Dayton, the dike path continues west, including a portion that runs along the wastewater treatment plant.

4.5 Cultural, Historical, and Archaeological Resources

A records search was conducted by URS via the Washington State Department of Archaeology and Historic Preservation's (DAHP) online Washington Information System for Architectural and Archaeological Records Data database in April 2014. The DAHP maintains a state-wide database of previously recorded archaeological resources, historic properties, and cultural resource reports. The locations of historic buildings, structures, and sites over 45 years old that are listed in or eligible for listing in national, state, or local preservation registers are non-restricted information. The locations of archaeological sites are managed as restricted access information and are exempt from disclosure per RCW 42.56.300 to prevent looting and vandalism.

The results of the DAHP record search indicate that 12 historic-era built resources and no previously identified archaeological sites are located in the City of Dayton's Touchet River shoreline management area. Additionally, the DAHP's Statewide Predictive Model identifies the entire shoreline as a very high-risk area for the presence of archaeological, historical, and cultural resources. Washington State law (RCW 27.53 and 27.44) protects archaeological resources (RCW 27.53) and Indian burial grounds and historic graves (RCW 27.44) located on both public and private lands of the State. An archaeological excavation permit issued by DAHP is required in order to disturb an archaeological site. Knowing disturbance of burials/graves and failure to report the location of human remains are prohibited at all times (RCW 27.44 and 68.60).

4.6 Characterization of Hydrologic Functions

Hydrologic functions provided within shoreline areas include flood storage, flood energy dissipation, and aquifer recharge. Within Dayton, hydrologic functions have been significantly affected by historical flood control activities. Nearly the entire shoreline within the City is constricted by a series of federally authorized flood control levees constructed in 1965. An

unknown number of private push-up dams have also been constructed to protect private property from flood damage. As a result of these modifications, the single-thread channel is overly wide and shallow and is disconnected from its historic floodplain. The streambank condition is generally poor where not armored; flow velocity, increased due to channelization and straightening, is causing bank erosion where shorelines are not protected by riprap or other bank armoring (Kuttel 2001; GeoEngineers 2011).

Flood storage capacity has also been diminished by sediment deposition, which is also the result of historical channel modifications and constraints. Straightening and channelizing upslope tributaries allows gravel and sediment to wash unimpeded into Dayton, where the river flattens out and sediments naturally settle. As the channel fills in, flood storage capacity is reduced. The USACE recently identified sediment accumulation as contributing to the "minimally acceptable" rating of Dayton's levees (USACE 2013).

4.7 Characterization of Water Quality Functions

The shoreline environment can provide water quality functions including sediment filtration and abatement; dilution and uptake of nutrients and pollutants; input of dissolved oxygen, and thermoregulation, or cooling of the water by providing shade. Water quality in the upper Touchet River was rated poor ("Not Properly Functioning") in the Salmonid Habitat Limiting (Kuttel 2001), and this reach was listed on the 2004 303(d) list for temperature, fecal coliform, pH, and dissolved oxygen (Baldwin et al. 2008).

Poor water quality functions in this reach can be primarily attributed to upstream agricultural activities and historical shoreline modifications to the Touchet and its upstream tributaries. Straightened and armored banks have resulted in an excessively wide and shallow channel, which warms quickly during the summer months when flow is naturally low. Historical vegetation removal for grazing, farming, logging, urban development, and flood control has resulted in narrow, disconnected riparian buffers that provide little shading or streambank stabilization. Farming and periodic logging activities in the contributing watershed, particularly conventional tillage, result in high levels of sedimentation. Sediment accumulates in town, clogging the levee armoring, raising the river bottom, and decreasing flood storage.

Two tributaries enter the Touchet within this reach: Mustard Hollow Creek and Patit Creek. Both tributaries enter from the east and drain rural agricultural areas; thus both are significant sources of sediment and agricultural runoff (Kuttel 2001). Both have been highly altered by vegetation removal, straightening, and channelizing. Neither tributary meets the flow requirements (20 cubic feet mean annual flow) to be shorelines of the state, therefore only the lower portions of the streams where they intersect with the Touchet River are regulated by the SMP.

The mainstem of the Touchet River and several of its upstream tributaries were included in the four TMDLs prepared to address water quality in the Walla Walla basin. Table 6 summarizes the water quality standards set for the Touchet River at the Main Street Bridge in Dayton.

Table 6. TMDL Standards for Touchet River at Dayton

TMDL Standards	Fecal Coliform	Temperature	pH and Dissolved Oxygen
Target Months	June–October	July–August	May–October
Water Quality Target	78% reduction	Not to exceed 18°C (64.4°F) due to human activities 73% increase in effective shade after 50 years	Return to natural background concentrations of dissolved inorganic nitrogen and soluble reactive phosphorus
Timeline for Target	2018	2058	2018

Source: Baldwin and Stohr 2007

The Dayton wastewater treatment plant and the acclimation pond both have current NPDES permits, which set limits on effluent discharge to meet water quality standards. Meeting the 2018 TMDL targets at the wastewater plant will require substantial improvements and modifications to the existing wastewater treatment facilities (Baldwin et al. 2008). The City is currently evaluating funding options for upgrades; however both the City and Ecology agree that the standards will be difficult to meet with current technology (Smith 2012). The City has until 2021 to comply with water quality standards.

The WQIP developed for the watershed identifies numerous opportunities for improving water quality. The WQIP categorizes the upper Touchet River subbasin, above Dayton, as a "primary protection zone" and prioritizes restoration there to reduce pollutant and temperature loads downstream. Riparian planting projects have already been conducted on most of the Touchet's upstream tributaries (Baldwin et al. 2008).

4.8 Characterization of Habitat Functions

Shorelines can provide habitat for native aquatic and shoreline-dependent birds, invertebrates, amphibians, mammals, and fish. Habitat functions may include providing food, water, and appropriate conditions for reproduction; and providing cover for rest, migration and/or dispersal. Habitat present within the Dayton shoreline area includes aquatic habitat (in the Touchet and tributary streams), wetlands, riparian habitat, cliff-nesting habitat, and developed areas (Appendix B, Figure 5).

Aquatic Habitat

The 2001 salmonid limiting factors assessment rated aquatic habitat in this reach of the Touchet River as "Not Properly Functioning" (Kuttel 2001). The levees and bank armoring have resulted in a wide and shallow channel that is disconnected from the floodplain. Cover for fish is lacking, as off-channel habitat, pools, and LWD are minimal in this reach. Riparian vegetation is limited, which

limits shading and allows rapid warming during low summer flows. Sediment, delivered by upstream tributaries, covers spawning gravels.

Five fish species that have been prioritized by the State of Washington for conservation have been documented as using the Touchet River: margined sculpin, Chinook salmon, rainbow trout, steelhead, and bull trout (WDFW 2013). Within Dayton, this use is primarily limited to migration (movement through the City). Additionally, the river provides habitat for other seasonal and year-round game fish species, including brown trout (*Salmo trutta*), whitefish (*Coregonus clupeaformis*), speckled dace (*Rhinichthys osculus*), redside shiner (*Richardsonius balteatus*), and northern pike minnow (*Ptychocheilus oregonensis*) (City of Dayton 2008).

Wetland Habitat

Seasonally inundated wetland habitat exists within the stream channel. In-stream wetlands typically support vegetation comprised of willows and reed canarygrass (*Phalaris arundinacea*). As such, they dissipate flow energy during periods of high flow, which provides beneficial foraging and migration habitat for a variety of juvenile fish species. Inundated wetlands also provide suitable foraging habitat for herons and other wading birds, although none have been documented using wetland terraces in this reach (Mark Vekasy, pers. comm.). As water levels recede through the late spring and summer, these wetlands become terraces along the creek that provide habitat for amphibians, juvenile fish, and wetland-associated songbirds.

Wetlands also exist outside of the flood control levee, primarily at the south end of town and northeast of the water treatment plant. These wetlands are forested. Like the riparian habitat described below, these wetlands provide a variety of habitat functions for amphibians and terrestrial wildlife, including cover, migration, forage, and nesting functions.

Riparian Habitat

Vegetation within the inner riparian areas is characterized by a mixture of primarily native trees and shrubs with non-native grasses in the understory. Common constituents within observed riparian habitat areas include black cottonwood, black hawthorn (*Crataegus douglasii*), mountain alder (*Alnus incana*), willows (Pacific, peachleaf, and coyote), chokecherry (*Prunus virginiana*), mallow ninebark (*Physocarpus malvaceus*), Nootka rose (*Rosa nutkana*), red-osier dogwood (*Cornus sericea*), snowberry (*Symphoricarpos* sp.), and reed canarygrass. The dominant forest cover within the outer portion of Dayton's riparian shorelines is a mixture of ponderosa pine forest communities.

The salmonid habitat assessment conducted for the Touchet River rates the riparian condition of this reach of the river as "Not Properly Functioning" (Kuttel 2001). Mature trees are present along the shoreline, but buffers are often narrow or disconnected from the river by levees (Kuttel 2001). The levees are vegetated along most their length but routine levee maintenance requires that vegetation be removed to maintain the integrity of the levee system, which can be weakened by root penetration.

Riparian vegetation functions to prevent lateral erosion of the river banks, provide wildlife cover, shade the river, produce large woody debris, entrain fine sediment loads, attract insects that provide food for fish, create decaying organic matter that provides nutrients to the soil and water,

and provide general channel stability. The rating of "Not Properly Functioning" indicates that the existing riparian habitat is providing these functions at low levels. Routine levee maintenance, as currently mandated, precludes the opportunity to restore riparian habitat functions within the levee zone throughout town.

Cliff-nesting Habitat

Cliffs located at the south end of town along the west side of the Touchet River are listed as a Priority Habitat by the WDFW because they provide habitat for cliff-nesting swallows and perches for raptors (WDFW 2014). This habitat type generally faces little development or recreational use pressure and is unlikely to change over the course of the subsequent decade.

Developed Areas

Developed areas within the shoreline zone include maintained park lands, residential homes with lawns and landscaping, and urban settings. Developed areas provides habitat for variety of bird life that includes sparrows, robins, blue jays, starlings, yellow finches, hummingbirds and, in the less intensely developed areas, owls, hawks, pheasant, quail, geese, and ducks (City of Dayton 2008).

4.9 Ecological Condition, Stressors, and Opportunities for Restoration or Conservation

The following ecological baseline will be used to measure changes over time as the City works to achieve the "no net loss of shoreline ecological functions" goal (per WAC 173-26-186(8)).

Ecological Baseline and Stressors

This 3.7-mile stretch of the Touchet River was included in a larger reach assessed in the 2001 salmonid habitat limiting factors analysis conducted by the Washington State Conservation Commission (Kuttel 2001). The study assessed salmonid habitat condition from the mouth of the Wolf Fork (approximately 4 miles upstream from City limits) downstream to the Lewis and Clark State Park (approximate RM 53). The reach was rated as "Fair" for fish passage, pool quality, water quantity/dewatering, and change in flow regime. All other parameters rated "Not Properly Functioning," including riparian condition, floodplain connectivity, LWD, and off-channel habitat. Agricultural land conversion, historical channel modifications (i.e., levees, push-up dams, upstream channel straightening), and riparian vegetation removal are cited as the primary causes of the current condition.

High Quality Conservation Areas

The limiting factors analysis did not note any high quality conservation areas within this reach. The report instead suggests protecting and restoring upstream reaches that do currently provide higher quality aquatic habitat: the North Fork Touchet River from Lewis Creek upstream and the Wolf Fork, from Whitney Creek upstream. Existing riparian/wetland forest habitat areas within Dayton should also be protected, where possible (Appendix B, Figure 5).

Degraded Areas and Opportunities for Restoration

Degraded areas within the shoreline zone are common and generally the result of flood management practices. The system of levees has created a degraded river channel that is overly wide, disconnected from its floodplain, and lacking in a robust riparian corridor that would shade

the river. Opportunities for significant restoration of shoreline ecological functions within the City are limited by the levee maintenance activities; the USACE requires that the levees be kept free of woody vegetation. Currently, most of the dense woody vegetation along the Touchet River within Dayton is growing on or within 15 feet of the levees. The City may be required to remove this vegetation to avoid levee decertification and subsequent reclassification of the Dayton floodplain. Planting additional vegetation on or within 15 feet of the levee is prohibited by the USACE.

Water quality degradation is also an important aspect of current shoreline conditions, as described in Section 4.7 above. Improved waste water treatment will be an important aspect of the City's ability to protect water quality.

Degraded areas are also found outside of the levees within the City's shoreline jurisdiction. Degradation is associated with residential, commercial, and municipal development that is located within SMA jurisdiction. These areas create stormwater, preclude riparian vegetation, and/or contribute common household pesticides and fertilizers associated with lawn/athletic field maintenance.

Opportunities for the restoration of degraded shoreline ecological functions include small projects within the City, as well as larger projects outside of the City. Minor river habitat improvement projects are possible within the City, including the addition of large, anchored woody debris to promote channel forming processes and add habitat complexity; native plantings on the terrace at the west bank of the river near the southern City limits; and noxious weed removal activities.

Also, City park properties could incorporate native riparian plantings, at an acceptable distance from the levee, to fill in gaps within the riparian corridor. This would provide enhanced cover for wildlife, including mammals and birds. Although outside of the SMA jurisdiction, riparian planting projects along Patit Creek may also benefit the Touchet River by providing it with cooler water and nutrients.

Where homes and buildings are located above and away from the river, the current shoreline environment can be maintained by development setbacks to avoid future development pressure. Native landscaping can be encouraged in shoreline development regulations to preserve and enhance riparian habitat.

The draft Snake River Salmon Recover Region, Provisional 3-Year Work Plan identifies improvements that can be made to the WDFW fish diversion in Dayton (SRSRB 2012). This is an opportunity to remove hatchery fish from the upper portions of the Touchet River, which provide important spawning habitat for native fisheries.

Several opportunities for the restoration of ecological functions exist outside of the City and are well documented in the Provisional 3-Year Work Plan, the Salmonid Habitat Limiting Factors report (Kuttel 2001), the Touchet River Geomorphic Assessment (GeoEngineers, 2011), and updated draft stream restoration plans provided by Steve Martin, Director of the SRSRB, in 2014. Areas immediately upstream of Dayton have been identified as opportunities for improved floodplain connectivity, increased habitat complexity, channel morphology improvements, and sediment dispersal and entrainment. Although just outside of the City, support for this and other, similar opportunities upstream of Dayton may be one of the more effective means of ensuring no net loss of

ecological functions within the City's shoreline jurisdiction. Such projects would improve the habitat conditions for resident and migratory fish species, as well as reduce sediment loads entering the City.

Recommendations

Table 7 provides recommendations for minimizing the effects of local stressors on current and future shoreline ecological conditions in Dayton. Ecological conditions evaluated in Table 7 are generally associated with salmon recovery planning, the Touchet River TMDL, and the Riparian Management recommendations (Knutson and Naef 1997)

Table 7. Summary of Ecological Shoreline Conditions in Dayton

Ecological Condition	Local Stressors	Recommendations
Flow Regime	Levee system, lack of channel complexity, lack of LWD	Upstream riparian and stream restoration; remove or set back push-up dams; allow beaver population to rebuild upstream. Confine channel with anchored woody debris in the current seasonal in-stream wetland terraces.
Erosion/Sedimentation	Channel modifications, upstream land practices, lack of riparian vegetation	Work with land conservation programs (e.g., CRP, CREP) to apply farming BMPs and exclude riparian zones from agricultural use; support restoration projects that increase channel complexity (i.e., LWD, pools, deposition areas).
Water Quality	Wastewater, sedimentation, urban development, lack of riparian vegetation (shading), natural low summer flow	Work with conservation programs to reduce upstream erosion; continue to implement TMDLs; support restoration projects that restore riparian buffers where feasible; Look into alternatives for use of wastewater at the treatment plant to limit fecal coliform inputs. Possible uses include water for landscaping areas, such as those at the nearby golf course.
Riparian Cover	Existing and future shoreline development, levee maintenance requirements	Conserve/protect existing mature riparian forest areas with development setbacks based on the Touchet River OHWL ; plant in riparian corridor gaps with woody shrubs where feasible (not on levee); enhance the narrow riparian area on the Dayton Country Club property at the west end of town; revegetate upstream tributaries to improve temperature of inputs to Touchet mainstem; incorporate native plantings into river-adjacent parks properties; encourage farmland

		owners/operators within City limits to enroll in CRP/CREP.
Aquatic Habitat	High summertime water temperatures; excessive nutrients; excessive sedimentation; low summer base flows; channel confinement; competition from hatchery and non-native fish;	Provide shade for river through riparian plantings in Dayton and upstream areas, including associated tributaries; Augment stream channel to create main flow channel with high flow/off-channel refugia; increase floodplain connectivity upstream of Dayton to allow for sediment entrainment; Install anchored large woody debris in channel; limit upstream migration of hatchery fish; several other recommendations apply–see local salmon recovery documents.

5. Shoreline Use Analysis

Updating an SMP requires a shoreline use analysis in order to estimate the future demand for shoreline space and identify potential land use conflicts that can be planned for in the SMP. The following analysis includes a discussion of preferred shoreline uses and an evaluation of existing and planned land uses, total acreage available, and percentage vacant lands by zoning category within the 200-foot SMP jurisdiction along the City's shorelines.

Preferred shoreline uses are identified in the SMP Guidelines (WAC 173-26-201(2)(d)). Preferred uses are those that are unique to, or dependent on a shoreline location. These include the following water-oriented uses, in order of preference:

- Water Dependent – Cannot exist in a location that is not adjacent to water.
- Water Related – Not intrinsically dependent but whose economic viability is dependent upon a waterfront location.
- Water Enjoyment– Recreational or other use that requires public access.

When determining allowable uses or resolving use conflicts, the following criteria should be considered (truncated from WAC 172-26-201(2)(d)(i-v)):

- Provide appropriate areas for protection and restoration of ecological functions.
- Provide areas for water-dependent and associated water-related issues.
- Provide areas for water-related and water enjoyment uses that are compatible with ecological protection and restoration objectives.
- Locate single-family residential uses where appropriate and where development can occur without significant impact to ecological functions or displacement of water-dependent uses.
- Limit non-water-oriented uses to those locations where the above-described uses are inappropriate or where they demonstrably contribute to the objectives of the SMA.

5.1 Current Shoreline Use

Within the City, there are approximately 110 acres under the jurisdiction of the SMA. This accounts for approximately 12 percent of the 915 acres within City limits. Along the levee, the eastern portion of the shoreline is used for recreational trail walking and angling access. Outside of the levee, the east side of the river is primarily used for residential purposes, with the exception of Pietrzycki City Park and the downtown commercial area. Shoreline uses along the west side of the river are mixed and include (from downstream to upstream) open space conservation at the south end of town, a state-run fish hatchery, high school athletic fields, commercial/industrial areas west of the downtown commercial district, and agricultural residential uses west of Willow Street. A separate satellite of City jurisdiction lies west of town along the southern bank of the Touchet River. This area is primarily used for wastewater treatment, but it also includes a small area used as agricultural land associated with a nearby residence. The dike path, City park, and athletic fields are all very popular recreational areas within the City. Currently, the Dayton Hospital is constructing a pedestrian trail (Booker Walkway) that will tie into the dike path. This trail was approved under the current SMP.

5.2 Projected Shoreline Use

Dayton's population has remained relatively steady since the 1940s. The 2010 population was given as 2,526 persons (U.S. Census Bureau 2010). The 2008 City of Dayton Comprehensive Use Plan includes population projections for Dayton. According to that analysis, the estimated 2025 population of Dayton will be 2,577, an increase of 51 persons (City of Dayton 2008). With this small increase in population, future shoreline development intensity is expected to be low. Few of the remaining developable lands within the SMA jurisdiction are vacant. However, one private residential property bordered by the Patit Creek/Touchet River confluence is currently vacant and likely to be sold over the forthcoming decade. The property contains large amounts of fill material but is otherwise undeveloped. If the property is not developed for shoreline residential purposes, it may be a strong candidate use as a conservation reserve due to its location at the stream/river confluence.

Based upon conversations with City staff and review of the Cooperative Park Master Plan (Columbia County, City of Dayton, Port of Columbia 2014), planned public capital improvement projects in Dayton's shoreline jurisdiction include:

- Americans with Disabilities Act access improvements to the Dayton Fishing Pond in Pietrzycki Park
- Smith Hollow Historic School House landscape and shoreline restoration improvements (2016)
- Four Mill Park Restrooms (2017)
- Pietrzycki Park Playground (2016)
- Pietrzycki Park Outdoor Pool (2019) and Water Feature & Splash Pad (2020)
- Touchet/Patit path (2020)
- Historic Dayton Bike/Pedestrian trail extensions and bridge over Touchet River (2020-2014)

- Touchet River Dike Path extension west of river (2024-2034)
- Renovation of the public wastewater treatment plant prior to the permit expiration in 2021. The City is still uncertain as to how they will be able to meet updated water quality criteria for fecal coliform without substantial renovations to the wastewater treatment plant. Such renovations would be well beyond the City's ability to finance through City funds.

5.3 Potential Conflicts

With regard to the goals of the SMA, the primary conflict lies in the ongoing maintenance of the flood protection levees that flank the Touchet River throughout town. While the levees protect the town from the harm of floods, and also provide excellent shoreline accessibility via the public walking trail, they preclude the opportunity for substantial shoreline restoration opportunities. However, the levee system has been the status quo for several decades and the levees have had an ongoing and substantial effect on the current suite of shoreline ecological functions described in this report. As such, achieving the SMA's stated goal of no net loss of ecological functions will be met by preventing further developments within the river channel, improving stormwater runoff and treated wastewater prior to discharge into the river, and supporting/partnering habitat enhancement project upstream of the City, as planned by the conservation district, salmon recovery board, and other restoration partners.

During the SMP update kick-off meeting in 2014, the conflict between vegetation management on the levees and the goals of improved shoreline habitat was discussed with Herb Bessey, the USACE's regional Levee Safety Program Manager. Mr. Bessey noted that ongoing studies are looking into the current vegetation prohibitions on levees to determine if there would be greater benefit provided by allowing some vegetation growth. It is uncertain when such studies would have the potential to change current guidance for levee maintenance, but such a change in levee maintenance criteria would have the potential to allow for a net increase in shoreline ecological functions by substantially improving riparian habitat functions

Future shoreline developments, including infill and redevelopment proposals, have the opportunity to be allowed in a manner that balances growth with shoreline enhancements to maintain no net loss of ecological functions. This balance would occur through the issuance of shoreline substantial development or conditional use permits, which can be granted with special conditions requiring native plant establishment or similar enhancement activity. Similarly, future capital improvement projects undertaken by the City in shoreline zones can be tailored to fit the goals of public access, restoration of degraded shoreline habitats, and avoidance of high-quality riparian areas.

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Appendix A
Data Inventory List

Appendix B
Data Inventory List
Shoreline Inventory Map Portfolio

Appendix C

Technical Review Group Comments

(Reserved for Anticipated Feedback)