City of Dayton, Washington

Shoreline Cumulative Impacts Analysis Report

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Section 1: Introduction

1.1 Introduction:

The State of Washington Shoreline Master Program guidelines, chapter 173-26 WAC, require local Shoreline Master Plans (SMP's) to regulate new development to "achieve no net loss of ecological function." The Administrative Code further says:

> "When based on the inventory and analysis requirements and completed consistent with the specific provisions of these guidelines, the master program should ensure that development will be protective of ecological functions necessary to sustain existing shoreline natural resources and meet the standard. The concept of "net" as used herein, recognizes that any development has potential or actual, short-term or long-term impacts and that through application of appropriate development standards and employment of mitigation measures in accordance with the mitigation sequence, those impacts will be addressed in a manner necessary to assure that the end result will not diminish the shoreline resources and values as they currently exist. Where uses or development that impact ecological functions are necessary to achieve other objectives of RCW 90.58.020, master program provisions shall, to the greatest extent feasible, protect existing ecological functions and avoid new impacts to habitat and ecological functions before implementing other measures designed to achieve no net loss of ecological functions." WAC 173-26-201(2)(c)

To meet these requirements, the SMP contains goals, policies and regulations that seek to prevent degradation of ecological functions relative to a baseline condition as documented in the City's Shoreline Characterization and Analysis Report. In addition, where development results in a degradation of ecological functionality, the SMP requires mitigation and the result of that mitigation must provide a return to this baseline.

This analysis looks at the result of cumulative impacts to the shoreline ecology, due to development efforts both anticipated and unanticipated. In addition, current mitigation efforts sponsored by outside agencies are included in this evaluation. This informed viewpoint provides a yardstick for use when fine-tuning the regulatory efforts that appear in the SMP.

When evaluating cumulative impacts, the following factors are considered:

1. Current human factors and natural processes that currently effect the shoreline;

2. Reasonably foreseeable future development and the variety of uses that take place on the shoreline; and

3. Beneficial effects of any established regulatory programs already under way by other local, state and federal agencies.

This analysis is organized into the following sections:

- An overview of existing conditions on the City's shoreline;
- Current land use patterns sorted and examined by City zoning regulations and environmental designation;
- Anticipated development within the environmental designations;
- Regulatory protections built into the updated SMP;
- Jurisdiction of outside agencies that work with the City to protect the local environment; and
- A discussion of the expected net impact on ecological function.

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Section 2: Existing Conditions

2.1: Shoreline Condition

This section is based on and expands on the information contained in the Dayton Shoreline Analysis and Characterization Report.

The volume of water in the Touchet River, including flows from Mustard Creek and Patit Creek, averages, on an annual cycle, approximately 200 cfs as it passes through Dayton. Flow is heaviest in the winter months and drops considerably during summer months. This flow level classifies the Touchet River as a Shoreline of Statewide Significance. (Per RCW 90.58.030(2)). After adoption, the updated SMP will govern activities along the above-mentioned shorelines and the area two hundred (200) feet inland.

According to the 2011 Geomorphic Assessment Report by GeoEngineers, "Peak flows in this watershed are attributed predominately to rain on snow events with the annual hydrograph being controlled by snowmelt in the headwaters and peaking in April. There is limited historical flow data available throughout the watershed, but there were significant flood events of record in May 1906 (est. 6,000 cfs at Dayton), April 1931 (est. 6,000 cfs at Dayton), February 1949, December 1964 and February 1996."

Due to the frequency of large winter/spring flow events, a system of levees was constructed through the City of Dayton by the United States Army Corps of Engineers (USACE) in 1964-1965. The locations of these levees are shown on the Jurisdiction Map, included as Appendix A. In addition to flood control, these levees provide recreational trail opportunities to the community. Trees and other riparian vegetation grows on the face of the levees, providing shade to hikers and fish species as well.

In recent flood events, the levees have been damaged, requiring periodic repairs. In 2010, the USACE requested Anderson – Perry, Inc. to perform an inspection of the levee system. Their report rates the condition of portions of the levee as "unacceptable" due to "sediment accumulation in the floodway near the Highway 12 Bridge, vegetation growth on the levees and channel degradation as contributors to reduced channel capacity and levee integrity issues." If the condition of the levee is not addressed, the USACE may decertify the levee system. Decertification would cause the Federal Emergency Management Agency (FEMA) to require additional flood insurance on shoreline properties and could limit future development opportunities.

2.2 Touchet River Channel Migration and Floodplain

Ecological processes of the Touchet River have been studied by various agencies both as a separate watershed, and also as part of Water Resource Inventory Area (WRIA) 32, the Walla Walla River watershed. The Touchet River drainage is fed mostly by snow melt from the Blue Mountains within the Umatilla National Forest. The floodplain is divided into four main sources, the South Fork of the Touchet River, the North Fork or the Touchet River, Wolf Creek and Patit Creek. All sources but Patit Creek meet south of the City of Dayton while Patit Creek meets the main stem within the Dayton City Limits.

The underlying geology of the Touchet River watershed is made up of ancient basalt layers topped by large volumes of loess, or wind-blown sand, silt and clay. Over millions of years, the rivers in the Touchet watershed have cut deep canyons through the loess and top layers of basalt. During annual high water periods, large volumes of sediment are carried downstream into and through the city.

Flood protection levees within the city limits constrict the natural flow of the Touchet River. Natural River features such as meanders and in-stream sediment berms are not allowed to mature in sections constricted by the levees, causing sediment to accumulate around man-made constrictions such as the Highway 12 Bridge.

Within the SMP jurisdiction, where the stream is controlled by the levee system, the sinuosity for the Touchet River, is highly constrained. Sinuosity increases during low flow conditions but the stream cannot move far due to the entrenched stream channel. The gradient for the Touchet River, within the SMP jurisdiction is very low. Ponding is almost non-existent and a short dam is necessary to provide depth for City irrigation intake. With average flow levels approximating 200 cfs, the width/depth ratio is high.

Due to USACE policies for levee maintenance, the majority of the shoreline lacks a vigorous native riparian plant community. Trees are discouraged from growing within the levee structures, removing an important source for shade and large woody debris (LWD). As a result, natural riparian areas are intermittent and considerably diminished in width. There are pockets of intact riparian communities in areas of flood control overflow.

The growth of timber along the streams in the Dayton area does not extend far from the banks. The dominant tree and shrub species include cottonwoods (*Populus trichocarpa*) and various willow species (*Salix spp.).* Other trees and shrubs which are common along the banks of the river include birch *(Betula microphylla),* alder *(Alnus rhombifolia),* chokecherry (*Prunus virginiana*), thorn *(Crataegus brefispina*), serviceberry (*Amelanchier florida*), red osier *(Cornus stoloniferia),* and syringia *(Philadelphus lewisii)*.

Less prevalent species are the cascara sagrada *(Rhamnus purshiana)*, ninebark *(Opulaster pauciflorus),* elder *(Sambucus glauca)*, wild cherry *(Prunus emarginata),* snowberry *(Symphoricarpus)* and clematis *(Clematis ligusticifolia).*

2.3 Aquifer Discharge/Recharge

The Touchet River is located within the Columbia Plateau Regional Aquifer system. The aquifer systems in the Dayton area are unconsolidated in nature and present little to no hydraulic conductivity to local rivers and streams. Please see Appendix B for a map showing the geographical distribution of the Columbia Plateau Regional Aquifer system.

2.4 Wetlands

There are approximately six (6) acres of identified wetland within the SMA. These wetlands include areas within the satellite City limit east of the golf course and disconnected wetlands east of the levee south of downtown Dayton. The largest wetland, along the southeastern end of the SMA, actually extends beyond the width of the SMA, extending the SMA beyond two hundred (200) feet in that area to fully encompass the feature.

2.5 Lakes and Reservoirs

There are no designated lakes and reservoirs in the City of Dayton.

2.6 Fish and Wildlife Habitat Conservation Areas

In the City of Dayton's Critical Areas Ordinance (CAO), chapter 17 DMC, the City identifies performance standards for specific habitat areas, including Bald Eagle habitat, per 232-12-292 WAC, wetland habitat and riparian habitat. Per 17-06.062(C)(1) DMC, "Riparian habitat areas shall be established for habitats that include aquatic and terrestrial ecosystems that mutually benefit each other and that are located adjacent to rivers, perennial or intermittent streams, seeps and springs."

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Per 17-06.062(C)(2) DMC, “A riparian habitat area shall have the width recommended, unless a greater width is required pursuant to Subsection (3), or a lesser width is allowed pursuant to Subsection (4). Widths shall be measured outward in each direction, on the horizontal plane, from the ordinary high water mark, or from the top of bank, if the ordinary high water mark cannot be identified.”

Table 2.6.1: Recommended Riparian Habitat Area Widths:

Riparian Habitat Areas	
Stream Type	Recommended RHA width
Type 1 and 2	250 feet
Type 3, or other perennial or fish bearing streams, 5-20 feet wide	200 feet
Type 3, or other perennial or fish bearing streams, less than t feet wide	150 feet
Type 4 and 5, or intermittent streams and washes with low mass wasting potential	150 feet
Type 4 and 5, or intermittent streams and washes with high mass wasting potential	225 feet

Source: DMC 17-06.062 PERFORMANCE STANDARDS – SPECIFIC HABITATS.

Within the SMP, the following areas are identified as a Native Conservation Area:

Table 2.6.2: Native Conservation Areas

Environmental Designation	Width of Native Conservation Area
Aquatic	N/A
High Intensity	50’
Natural	200’
Shoreline Commercial	75’
Shoreline Residential	100’
Urban Conservancy	150’

Source: DMC 15-16.025

The Native Conservation Area is that area landward of the ordinary high water mark where native vegetation shall be planted and maintained. The distance landward from the ordinary high water mark of the Touchet River differs depending on the Shoreline Environmental Designation in effect.

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The following goals and objectives are included under General Goals and Objectives in the City's Comprehensive Plan:

Environment Goal E: Strengthen the City of Dayton's environmental quality of life while maintaining the character and quality of the community

Community Objective E.4: Through its Critical Areas Ordinance and other development regulations, the city shall designate and protect critical areas using the best available science (BAS) in developing policies to protect the functions and values of critical areas, and giving "special consideration" to conservation or protection measures necessary to preserve or enhance anadromous fisheries.

Community Objective E.8: The City shall adopt a Critical Areas ordinance that identifies fish and wildlife habitat conservation areas. Fish and wildlife habitat conservation means land management for maintaining species in suitable habitats within their natural geographic distribution.

The Touchet River contains fisheries and spawning areas that are important for maintaining and protecting unique or locally significant fish populations, including summer steelhead, bull trout, pigmy whitefish and spring Chinook. "Key limiting factors for steelhead and spring Chinook include the following: sediment, large woody debris, key habitat (pols), riparian function, stream confinement, summer water temperature, bedscour, and flow." (Walla Walla Subbasin Plan, 2004).

2.7 Identification and Characterization of the Local Fauna

The Washington State Department of Fish and Wildlife publishes a Priority Habitats and Species (PHS) list. This list contains a catalog of species considered to be priorities for conservation and management in Columbia County. Many of these species are found in and around the Dayton area.

Table 2.7.1: PHS Species List

Life Form	Species
Fish	Pacific Lamprey
	River Lamprey
	White Sturgeon
	Leopard Dace
	Mountain Sucker
	Chinook Salmon
	Kokanee

	Rainbow Trout/Steelhead/Inland Redband Trout
	Sockeye Salmon
	Westslope Cutthroat
	Margined Sculpin
Amphibian	Columbia Spotted Frog
	Rocky Mountain Tailed Frog
	Western Toad
Reptiles	Sagebrush Lizard
Birds	Great Blue Heron
	Waterfowl concentrations
	Bald Eagle
	Ferruginous Hawk
	Golden Eagle
	Northern Goshawk
	Peregrine Falcon
	Prairie Falcon
	Dusky Grouse
	Chukar
	Mountain Quail
	Wild Turkey
	Upland Sandpiper
	E WA breeding occurrences of: Phalaropes, Stilts and Avocets
	Burrowing Owl
	Flammulated Owl
	Vaux's Swift
	Black-backed Woodpecker
	Lewis' Woodpecker
	Pileated Woodpecker
	White-headed Woodpecker
Mammals	Merriam's Shrew
	Preble's Shrew
	Roosting Concentrations of: Big-Brown Bat, Myotis Bats, Pallid Bat
	Townsend's Big-eared Bat
	White-tailed Jackrabbit
	Black-tailed Jackrabbit
	Washington Ground Squirrel
	Martin
	Bighorn Sheep
	Northwest White-tailed Deer
	Elk
	Rocky Mountain Mule Deer

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Invertebrates	Juniper Hairstreak

Source: Washington Department of Fish and Wildlife, 2013 PHS List

The Washington State Department of Fish & Wildlife performs physical surveys of nesting areas, breeding areas and priority habitats for both protected and non-protected species on a regular basis. The most recent update for the area was completed in 2013. Special mention is made of cliff-nesting habitats along the western bank of the Touchet River toward the southern City Limits.

2.8 Identification and Characterization of the Local Flora

Plant associations along the Touchet River provide food and cover for many of the different species listed above. Natural plant assemblages and growing conditions are somewhat different, depending on which bank of the river they appear. The Touchet River generally runs from southeast to northwest through the City of Dayton. The southwest bank in the southern portion of the city receive less afternoon sun and is very steep; this results in a slightly different microclimate and plant association on that side of the river. This side of the river has not been heavily impacted by urban development and includes more and larger trees. Along the southeast shore, the USACE levee contains the river bank. Vegetation on this bank is periodically trimmed to maintain the integrity of the levee. The levee is heavily silted in and vegetation easily grows in between the riprap. On the north end of the Touchet River, the levee constitutes the northern and southern shoreline. Since the separate banks are similar in contour, the natural plant assemblages in this area are very similar. Again, the levee here is silted in and vegetation grows up between the riprap. .

Some of the most beneficial plant associations for supporting a wide variety of shade and cover for fish and wildlife in the Dayton area include those containing:

- Cottonwoods
- Common Chokecherry
- Water Birch
- Willows
- Serviceberry
- Red Osier
- Syringia

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2.9 Water Quality

Water quality in the Touchet River is a result of natural influences, such as aquifer interchange, and man-made influences from upstream agricultural uses, point source effluents, water treatment and stormwater discharges.

The Federal Clean Water Act (33 U.S.C. §1251 et seq.), adopted in 1972, requires that all states restore their waters to be "fishable and swimmable." Pursuant to this act, the State of Washington's Water Quality Assessment process maintains a list of the water quality status for water bodies in the State. This assessment meets the federal requirements for an integrated status report under Sections 303(d) and 305(b) of the Federal Clean Water Act.

The portion of the Water Quality Assessment called the 303(d) list, as described in Section 303(d) of the Federal Clean Water Act, indicates waters deemed to be polluted. In other words, the water bodies that appear on the 303(d) list fall short of State surface water quality standards. Portions of the Touchet River, both above the City, where the North and South Forks meet, and below the City, are on the State of Washington's Impaired Waters list as well as the Federal 303(d) list.

As of 2004, the testing of water quality in the Dayton area indicated problems with:

- **Water Acidity:**

  Acidity (pH) outside a certain range can sicken or kill fish and other aquatic life. Highly acidic or alkaline water can also release pollutants from sediments that can further harm aquatic life. Acidity in waterways is influenced by rock and soils, as well as human sources such as industrial and car emissions, mining, and agricultural runoff.

  Problems with pH can be reduced by applying the correct amount of fertilizer on lawns and agricultural areas (and never before storms), properly disposing of chemicals, and never dumping any of the above into ditches or waterways.

  The health and survival of aquatic plants and animals depends heavily on a balanced pH. Think of acid and base as two extremes, with neutral in the middle; a pH toward either extreme is generally harder for aquatic life to survive. Most aquatic plants and animals living under extreme conditions have reduced ability to grow, reproduce, and survive. Low pH (acidic) can cause toxic metals such as aluminum and copper to dissolve into the water from bottom sediments. High pH (basic or alkaline conditions) can increase the toxic form of ammonia, a major ingredient in agricultural fertilizers, which can further harm fish and other aquatic

life. Natural sources that influence acidity in waterways are the surrounding rock and soils, and processes such as decay of plants. Human activities that can result in acidity include agriculture, urbanization, industry, and mining (acidic mine drainage). Although human activities commonly result in more acidic conditions, high alkaline conditions can occur by means of stormwater runoff from sources associated with agriculture (lime-rich fertilizers) and urbanization (runoff from asphalt roads), wastewater discharges leakage from sources associated with industry, and mining. Around 4,000 waters have been reported as polluted by pH problems on the 303(d) list, making this the 8th most common reporting category.

- **Nitrogen and Phosphorus:**

  Nitrogen and phosphorus in excessive amounts can cause aquatic plants to grow too fast, choking waterways, causing potentially harmful algae blooms, and creating low oxygen conditions that can harm fish and other aquatic life.

  Nitrogen and phosphorus are natural elements in the environment that are essential for plant and animal growth in normal amounts but are harmful in excess. Most nutrient pollution comes from runoff or discharges from fertilizing lawns and croplands, municipal waste treatment systems, and animal wastes from livestock farming. Excess nitrogen or phosphorus can cause too much aquatic plant growth and algae blooms, sometimes choking off waterways and causing toxic or oxygen-poor conditions that can kill fish and other aquatic life. Nitrogen and phosphorus pollution can be harmful to human health if the affected waterway is used for swimming or drinking water. These pollutants can also harm local economies through increased drinking water treatment costs, poor fish harvests, less income from reduced recreational tourism, and potentially reduced property values on polluted waterways.

- **Temperature:**

  Many fish and other aquatic animals are sensitive to changes in water temperature and require a certain temperature range to survive. If water temperature goes outside that range for too long, they can sicken or die.

  Water temperature problems can be avoided by not removing shade trees and shrubs from stream banks, using less water during droughts, and directing rainwater on pavement to soak into the ground instead of running into streams, lakes, or sewer system.

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Waters can become too warm for fish and other life due to rain running off hot pavement, warmer water discharges from industry or agriculture, increased sunlight from stream bank vegetation removal, and major water withdrawals in summer, leaving shallow water conditions that heat more rapidly in the sun. High water temperatures can harm or kill fish and other life mainly by reducing the oxygen in the water or by raising temperatures above their survival limits. Warmer waters can also increase toxicity of pollutants, cause faster growth of undesirable algae blooms, and increase the spread of diseases in fish. Although high water temperature does not directly affect human health, it can speed up the growth of waterborne bacteria or toxic algae that can harm people or their pets if swallowed or contacted. Elevated temperature also directly degrades valuable uses such as recreational fishing.

Along with the items listed above, from the 303d report, the following items have also been listed as local water quality indicators:

- **Channel Complexity, Stability and Sediment Transport**

  A healthy riparian habitat requires bed and bank stability. In a natural stream, this stability is provided in large part by native tree and plant assemblages. Live trees provide root systems that hold stream banks in place while Large Woody Debris (LWD) provides an aquatic environment that allows bird and fish species places to hide and hunt.

  "Channel stability may be thought of as a channel in a state of dynamic equilibrium… a state in which small-scale adjustments are continually being made in order to maintain an approximate balance between processes and form." (GeoEngineers, 2011). A stream channel that has room for natural channel forming processes to function is more stable. In a natural channel, sediment deposition is balanced with rates of erosion.

  Within the City, natural channel functions have been restricted by flood-control levees. This reduces stream sinuosity and causes sediment to continue flowing until it meets an obstruction, like the Highway 12 Bridge. Also, a natural riparian assemblage is restricted by clearing trees and brush off of the levee, reducing shade and hiding spaces for aquatic species.

- **Restoration projects**

There are several restoration projects that are in progress, have been completed, or have been proposed, for habitats along the Touchet River. These projects address the water quality issues detailed above. The chart below is not exhaustive.

Table 2.9.1: Restoration Projects

Organization	Project	Status
US EPA	Walla Walla River Basin 2007 TMDL Cleanup Plan - pH and Dissolved Oxygen	To be completed by 2018
US EPA	Walla Walla Watershed Temperature TMDL 2007 - Temperature	To be completed by 2058
NPCC	Walla Walla Subbasin Plan - 2004	Open ended, in process
SRSRB	Snake River Salmon Recovery Plan	Current work plan started 2012

NPCC – Northwest Power and Conservation Council
SRSRB – Snake River Salmon Recovery Board

2.10 Geologically Hazardous Areas

Geologically hazardous areas in Dayton are limited to shore-side slide hazards due to erosion and steep banks along the western shore in the southern portion of the City within the Shoreline Management Area. Erosion and/or landslide hazard areas in Dayton are due to the following characteristics:

- Slopes of 30% or greater.
- Soils identified by the Natural Resource Conservation Service as having a severe potential for erosion.
- Unstable areas, as a result of rapid stream or stream bank erosion.

The soil type that has been identified as having the potential for erosion in the Dayton area is type Wr. This soil type is found along the Touchet River along the western shore in southern Dayton.

According to the National Resource Conservation Service, the soils in the Dayton area, as detailed in the Soils and Geohazards Map in Appendix C, and shown in the following table, consist of:

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Table 2.10.1: Soils in the Dayton Area

Soil Type	Description
PkA	Patit Creek silt loam, 0-3 percent slopes
PlA	Patit Creek gravelly silt loam, 0-3 percent slopes
PoA	Patit Creek cobbly silt loan, 0-3 percent slopes
Rn	Riverwash
Wr	Waha-Rock land complex

Source: NRCS Web Soil Survey, 2014

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Section 3: Shoreline Land Use Patterns

3.1 General Land Use Patterns

The Comprehensive Plan for the City of Dayton provides land use and zoning regulations for the City. Land use and zoning regulations manage the types of uses that will appear in a specific area, along with height, setback and size limitations on allowable structures. The SMP partners with land use and zoning regulations to manage the activities that impact the Shoreline Management Area.

3.2 The Effects of Zoning within the SMA

Within the Shoreline Management Area there are a mix of land use zones, including residential, commercial, industrial, public, and City uses. A zoning map for the City of Dayton is attached as Appendix D.

The Shoreline Management Area contains parcels of land that are managed by nine city zones. The majority of the land in the SMA (twenty-five parcels containing 49.4% of the total acreage) is managed by functions of the City of Dayton, Columbia County, or the US Army Corps of Engineers. In addition, the Hospital District, School District and Fire Protection Unit #3 manage land within this area. Although the middle portion of the Touchet River, as it passes through Dayton, is heavily governed by public functions, most surfaces in this area are pervious, allowing floodwater and stormwater to be quickly absorbed.

The largest number of parcels and second largest land use type in the SMA (seventy six parcels containing 35.5% of the total acreage) is reserved for single family housing. The single family housing zone and residential agricultural zone surround the Touchet River on both the northern and southern ends of the SMA. Within residential areas, impervious surfaces range from 20-50 percent. Unless care is taken with local applications of pesticides and fertilizers, these pollutants will be absorbed and adversely affect the river. A further concern in this area are roadways and residential impervious surfaces dedicated to vehicle storage and transportation, where oils and cleansers can be washed off of the hardened surfaces and be absorbed into the ground water.

Commercial and industrial zones constitute approximately 15% of the SMA. These eleven parcels, mostly surrounding Highway 12 and the downtown core, have the largest percentages of impervious surface area. In many cases the commercial and

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retail parcels are 80-100% covered with impervious surfaces. Oils and detergents from stormwater runoff is definitely a concern in this area.

3.2 The SMA Divided into Environmental Designations

The Aquatic Environmental Designation, which manages the streambed between the high water marks, takes up less than one fifth of the total area in the SMA. This environment covers the land between the high water marks on both banks of the Touchet River.

Outside the high water marks, the largest percentage of the SMA falls into the Urban Conservancy ED. This environment includes public and governmental functions and covers 48% of the total managed area. These areas provide easy public access, either physical or view. Much of this area is zoned Public or Residential. The purpose of the UCE is to protect and restore ecological functions of open space, flood plain and other sensitive lands where they exist in urban and developed settings, while allowing a variety of compatible uses. Parks and recreational areas are generally found in this environment.

The only other environmental designation that makes up more than 10% of the SMA is the Natural ED. This environment covers shoreline areas that are relatively free of human influence or that include intact or minimally degraded shoreline functions. Very low intensity uses should be continued in these areas in order to maintain local ecological functionality and ecosystem-wide processes. Within this environmental designation, there should be few impervious surfaces, although a hardened path atop the levee exists on the eastern shore. This land is used for natural flood overflow and contains the majority of the wetlands along the river.

Commercial activities along the river account for just over 8% of the SMA. These areas are concentrated along both banks around the downtown core and the southern bank of the Touchet River on the northern City limit. A portion of the city Golf Course is the main commercial activity along the northern City limit. Hardened surfaces are limited in this area to clubhouse facilities and a path along the top of the levee. In downtown, along Highway 12, commercial parcels are covered almost 100% by impervious surfaces.

The Shoreline Residential ED, designated for residential areas not suitable for easy public access, accounts for approximately 6% of the SMA.

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The High Intensity ED, covering less than 3% of the SMA exists on the northwestern edge of the City and is reserved for the water treatment facility. This plant is working under permits that expire in 2021. Effluent discharge from the facility, as currently functioning, will not meet 2018 targets for water quality criteria for fecal coliform unless substantial improvements are made. The City is currently evaluating funding options for the necessary upgrade.

Due to paths, many of them hardened, that lie on top of the levees, view access is generally available to the public along both banks of the Touchet River. One major exception is at the southern end of the City limits, where the west side is composed of slopes too steep for easy access. For the majority of the Touchet River, where it is bounded by the levees, physical access to the River is casual and usually consists of informal paths down to the water's edge. The River is fished when flows allow and these paths are entry and exit points for this type of recreational use as well as occasional swimming. Along the levees, native and non-native vegetation has been trimmed to maintain levee cohesiveness. This practice inadvertently aids river views, but reduces shade, which adversely impacts water temperatures.

Table 3.2.1 below shows how the land area within the SMA is currently being used:

Table 3.2.1: Land Use within the Shoreline Management Area

By Zone	Acreage in SMA	Percentage
Open Space / Recreational	42.11	38.5%
Urban Residential	32.12	29.4%
Public / Governmental	11.92	10.9%
Agricultural Residential	6.72	6.1%
Industrial	6.01	5.5%
Fringe Commercial	5.74	5.2%
Commercial	4.80	4.4%
Total Acreage	109.41	100.00%
By Environmental Designation	Acreage in ED	Percentage
Urban Conservancy	50	45.8%
Aquatic	28	25.6%
Natural	12	11.1%
Shoreline Commercial	9	8.2%
Shoreline Residential	7	6.4%
High Intensity	3	2.9%
Total Acreage	109	100.00%

Source: Columbia County and City of Dayton parcel data

Section 4: Anticipated Development

4.1: Permit History, 1994-2014

To help gauge the intensity of future development, we look to the past. A study of the permitting records for the City of Dayton, from 1994-2014, is presented in table 4.1.1 below. When reading the table, be aware that the permit counts do not cross match in all cases, since multiple permits may have been issued for any specific project.

Table 4.1.1: Dayton Shoreline Permit History, 1994 – 2014

			Permit Types					
Year	Revetment Maint.	New Upland Structure	City Building Permit	Shoreline Substantial Development	Shoreline Conditional Use	Shoreline Variance	Shoreline Exemption	External Agency Permit
1994		1	3					
1995		5	10					
1996	1						2	
1997								
1998	1			1				
1999	1							
2000								
2001								1
2002								1
2003								
2004	3			1			1	1
2005		3	4					
2006		2	4					
2007		1	2					
2008		1	3					
2009			3				1	
2010			2					
2011		2	6				1	
2012			2				1	
2013		2	1					
2014		1						
Totals	**6**	**18**	**40**	**2**	**0**	**0**	**6**	**3**

Source: City of Dayton Permitting Records

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Looking at the above data, there are some trends immediately apparent;

1. During the time period captured in the table above, residences have been placed on most of any remaining buildable parcels. Other than that, most of the permitted activity has been for repair and improvement on the commercial and residential properties and flood repair and maintenance on public lands.

   There is only one large unbuilt residential parcel left, at the confluence of the Touchet River and Patit Creek. It can be expected that this parcel will be built upon within the 20 year life of this plan. Since it is zoned residential, unless it can be purchased for public purposes, we should expect that a home will be built there, with attendant outbuildings and 20-50% impervious surface coverage.

   Since the population of Dayton is not expected to grow substantially (the Dayton Comprehensive Plan only projects an additional 51 citizens by 2025) and the current zoning practices can be expected to remain, this leaves little room for any new construction in the future. There will be some pressure to add auxiliary buildings, such as shops and sheds to residential parcels, but going forward, most construction will be for replacement or repair.

2. No Conditional Use or Variance permits were issued in the shoreline area during the time period charted above. Updated Master Plan regulations may alter this situation as construction practices having to do with removal or placement of fill and vegetation removal or addition now come under greater scrutiny. This will lead to some additional permit processing and potentially longer processing times, but it also will lead to procedures that provide for opportunities for restoration of ecological impacts at each site.

4.2 Urban Conservancy Environment (UCE)

The largest segment of the SMA (~45%) is designated as Urban Conservancy. The underlying zoning along this environment is largely public space, with some zoned as residential.

Over the life of the updated Master Plan, the nature of this environment is not expected to appreciably change. This area exists on both sides of the Touchet River and includes areas behind levees as well as the few remaining naturally sloped parcels offering direct water access. In the residential areas, periodic home upgrades and

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expansions are expected. As homes in this area change ownership, development activity can be expected as they are updated and/or expanded. Normal maintenance activities can be expected to continue in the public areas such as parks, athletic fields and the golf course. Three of the four public access points exist in this environment.

Levees protect more than half of this environment. Riparian vegetation maintenance has been intermittent, but ongoing, as current USACE practices dictate. Because of this maintenance, healthy assemblages of natural riparian vegetation can only grow inland of the levee.

The Native Conservation Area (NCA) in this environmental designation reaches150 feet inland from the Ordinary High Water Mark (OHWM), covering three quarters of the SMA. Many existing structures are covered by the NCA and will now receive closer scrutiny when future development is proposed.

As future development occurs in the UCE, we expect:

- Little change in the current amount of surface water runoff;
- Little change in the percentages of impervious surfaces. Maximum impervious surfaces in this area, managed through local zoning code, are in the 20-50 percent range. Most public areas are almost 100 percent pervious;
- Since the NCA is 150 feet wide, we can expect a small increase in the ability of land in residentially zoned areas to improve the quality of the water passing through additional native vegetation gained through mitigation of development;
- Small increase in upland habitat. This depends on the amount of native vegetation gained through mitigation of development and whether the USACE allows a variance to current vegetation removal practices along levee systems.

At this time, the City is working with the USACE to secure a variance to recommended vegetation removal requirements in order to provide additional shading to the river. This additional shading and additional large woody debris will help reduce high summer water temperatures.

4.3 Aquatic Environment (AE)

The next largest segment of the SMA (~25%) is designated as Aquatic. This is the space between the two OHWM's. In Dayton, parcel lines and local zoning regulations reach into and through the aquatic environment.

Over the life of the updated Master Program, the ecological balance of this environment is expected to at least maintain equilibrium and hopefully improve. Ecological stressors, as listed in this document and in the Inventory and Characterization report, exist both outside the City's jurisdiction as well as within it. Within the plan's jurisdiction, adherence to the protective regulations in the Shoreline Master Plan and the Restoration Plan provide the tools to drive local improvements.

4.4 Natural Environment (NE)

In order of size, the Natural Environment (~11%) accounts for the next largest portion of the SMA. The underlying zoning along this environment is open space/recreational and urban residential. All of the NE is on the southern half of the City. Along the western shore, the land is steeply sloped providing little to no human access. Along the eastern shore, the land contains riparian wetlands and cottonwood forest. The nature of the land discourages public access although the levee along the eastern shore provides a walking path that passes along the western edge of the area.

Over the life of this updated Master Plan, the nature of this environment is not expected to appreciably change. The NCA within this area is 200 feet. Wetlands and riparian forest extend beyond the 200 foot buffer on the eastern shore so the NCA and the NE has been extended in this area far enough to provide protection. Along the western shore, slopes are too steep for development.

Shoreward of the levees on the eastern shore, riparian vegetation maintenance has been intermittent, but ongoing, as current USACE practices dictate.

If future development occurs in the NE, we expect:

- Little change in the current amount of surface water runoff;
- Little change in the percentages of impervious surfaces.
- Small increase in upland habitat. This depends on the amount of native vegetation gained through mitigation of development and whether the USACE allows a variance to current vegetation removal practices along levee systems.

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4.5 Shoreline Commercial Environment (SCE)

The SCE presents just over 8% of the SMA. The underlying zoning along this environment is commercial on the eastern shore and fringe commercial and public/quasi-public space on the western shore.

Over the life of the updated Master Plan, the nature of this environment is expected to change somewhat as public space toward the southern edge of fringe commercial area fills in. A large change is not anticipated and development will be balanced through mitigation efforts. This environment exists on both sides of the Touchet River and includes the traditional downtown area of Dayton. Being a commercial area, periodic upgrades and expansions are expected. As businesses in this area grow or change ownership, development activity can be expected as they are updated and/or expanded

Levees extend the full length of this environment on both sides of the river. The main river crossing, the Highway 12 Bridge, is found in this environment as well. This environment has the highest percentage of impervious surfaces, ranging from 80-100% coverage in many places. This environment has an NCA of 75 feet and few existing structures are covered by the NCA.

As future development occurs in the SCE, we expect:

- Little change in the percentage of impervious surfaces. Maximum impervious surfaces in this area, managed through local zoning code, are in the 80-100 percent range. Surface coverage is less along the southwestern portion of the environment, but still 50-80 percent coverage is allowed under current zoning regulations.

- Since the NCA is only 75 feet wide and impervious surface percentages are large, stormwater runoff issues are high in this area. That said, as development occurs, there are ample opportunities to replace currently impervious surfaces through comprehensive mitigation efforts.

- Again, if additional native vegetation can be allowed on the levees, opportunities to positively impact water temperature and flow control increase. Because of the presence of the Highway 12 Bridge, dredging activities periodically occur to clear excess sediment and flood debris. Any vegetation increase allowed on the levees will provide incremental benefit to reducing the need for this practice.

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4.6 Shoreline Residential Environment (SRE)

Two instances of the Shoreline Residential Environment exist, covering approximately 7% of the shoreline. One instance is between Jackson and McCall Street on the eastern bank of the river. The second, again only on the eastern shore, covers the area roughly between West Patit Avenue and East Commercial Street. The underlying zoning along both of these areas is Urban Residential. Levees extend along the eastern shoreline for most of this environment. The only area where the levee does not exist is at the confluence of Patit Creek and the Touchet River. Within this open space is the last undeveloped parcel of private residential land.

Over the life of the updated Master Plan, the nature of this environment is expected to change as this last parcel becomes developed. If developed as a residence, we can expect multiple new structures and increased impervious area landward of the NCA. We can also expect some form of flood control, since no levee protects this parcel. Throughout this residential area, periodic home upgrades and expansions are expected over time. As homes in this area change ownership, development activity can be expected as structures are updated and/or expanded. Normal yard maintenance activities can be expected to continue landward of the NCA, but as development occurs, there will be opportunities to mitigate this development with native plantings in the buffer area.

The Native Conservation Area in this environmental designation reaches100 feet inland, covering half of the SMA. Many existing structures, along with road surfaces, will be covered by the NCA and will now receive closer scrutiny as future development is proposed.

As future development occurs in the SRE, we expect:

- Development proposals for structures that currently pierce the NCA will not be allowed without a heightened level of permitting scrutiny, so little change in the current amount of surface water runoff and percentage of impervious surface is expected;

- We do expect a small increase in native habitat over time. The magnitude of this expansion depends on the amount of native vegetation gained through mitigation of development and whether the USACE allows a variance to current vegetation removal practices along levee systems.

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4.7 High Intensity Environment (HIE)

The High Intensity Environment covers only 3% of the SMA. It exists to provide space for the wastewater treatment plant, located in a satellite section along the southern shore of the Touchet River west of the City limits. The underlying zoning is public/quasi-public land.

Over the life of the updated Master Plan, the nature of this environment is expected to change. Renovation of the plant, prior to permit expiration in 2021, is necessary in order to meet new water quality standards. Major changes to the plant may be necessary by 2018 when these standards are due to be enforced. Today, both the City and the Department of Ecology are unsure if the plants' currently technology will be sufficient.

The NCA is 50 feet in the High Intensity Environment. A levee protects the length of this environment and current USACE vegetation practices dictate the amount of natural vegetation along the levee bank. Current areas of impervious surface cover 20-50% landward of the NCA.

As future development occurs in the HIE, we expect:

- An increase in the percentages of impervious surfaces and attendant surface water runoff as the wastewater treatment plant is modified/expanded;
- Since the NCA is 50 feet wide and barely extends beyond the top of the levee, we can only expect an increase in native vegetation if the City is allowed a variance to current USACE regulations.

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Section 5: Protective SMP Provisions

5.1: Permit/Development Table

The major classification scheme, and the vehicle for all protective regulations in the SMP, is the Environmental Designation. There are six environments recognized in the SMP for the City of Dayton. The table below reorganizes the information provided in DMC 15-16.330 into a hierarchy of high-impact to low impact development.

For each use type, individual practices are marked either as prohibited (X); as requiring a written Exemption (E), a Shoreline Substantial Development permit (SD); or as requiring a Shoreline Conditional Use/Variance permit (CU). The most restrictive response to development requests, of course, is the indication that the use is not allowed at all. The least restrictive is a written Shoreline Exemption. (See RCW 90.58.030 for the complete list of exemptions). Both SMP regulations and zoning regulations are reflected in the level of allowance for uses in the table below.

Table 5.1.1: Development Standards within Environmental Designations

Key: **E:** Written Statement of Exemption **SD:** Substantial Development permit required. **CU:** Conditional Use/Variance permit required. **X:** Prohibited and not eligible for Variance or Conditional Use permit.	**Aquatic**	**High Intensity**	**Natural**	**Shoreline Commercial**	**Shoreline Residential**	**Urban Conservancy**
Resource Land Uses						
Forest Practices	N/A	X	X	X	X	X
Mining	X	X	X	X	X	X
Commercial Uses						
Water-Dependent Uses						
Marinas	X	X	X	X	X	X
Single family residential dock	X	X	X	X	X	X
New dock for public access	X	X	X	X	X	X
Launch ramps for small non-motorized watercraft	X	X	X	X	X	X
Launch ramps for motorized watercraft	X	X	X	X	X	X
New dock essential to the successful operation of a permitted water-dependent use	X	SD	X	X	X	X
Water-dependent industrial uses	CU	CU	X	X	X	X
Water-dependent institutional uses	SD	X	X	SD	SD	SD
Water-dependent recreation	SD	SD	SD	SD	SD	SD
Parking, accessory to a permitted use	N/A	CU	X	SD	SD	SD
Water-Related and Water-Enjoyment Uses						
Water-related industrial uses	CU	CU	X	X	X	X

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Water-related institutional uses	SD	X	X	SD	SD	SD
Water-related recreation	X	SD	SD	SD	SD	SD
Water-enjoyment recreation	X	SD	SD	SD	SD	SD
Commercial parking or parking facility as primary use	N/A	X	X	CU(2)	X	X
Non Water Oriented Uses						
Non-water oriented industrial uses	X	X	X	X	X	X
Non-water oriented institutional uses	N/A	X	X	SD	SD	SD
Non-water oriented recreation	X	CU	CU	CU	CU	CU
On premise business signs	N/A	E	X	E	E	E
New arterial streets	N/A	X	X	X	X	X
New local access streets or street expansions serving permitted shoreline uses	N/A	SD	X	SD	SD	SD
Maintenance roads accessory to a permitted use	N/A	SD	SD	SD	SD	SD
New rail lines	N/A	X	X	X	X	X
Expansion of existing rail lines	N/A	X	X	X	X	X
Residential Uses						
Single-family residences	N/A	CU(2)	CU(2)	SE or E(2)	SD or E(2)	SD or E(2)
Two-family residences	N/A	CU(2)	X	CU(2)	CU(2)	CU(2)
Multi-family residences (3 or more dwelling units)	N/A	CU(2)	X	X	CU(2)	CU(2)
Accessory dwelling units	N/A	N/A	X	CU(2)	CU(2)	CU(2)
Detached accessory structures	N/A	X	X	SD(2)	SD(2)	SD(2)
Group living	N/A	X	X	X	CU(2)	CU(2)
Land Division						
All subdivisions including binding site plans	N/A	X	X	CU	CU	CU
Dredging						
For the primary purpose of obtaining fill material	X	N/A	N/A	N/A	N/A	N/A
For activities associated with shoreline or aquatic restoration or remediation	SD	N/A	N/A	N/A	N/A	N/A
For activities associated with removal of runoff debris	SD	N/A	N/A	N/A	N/A	N/A
Landfilling						
Waterward of the ordinary high-water mark	X	X	X	X	X	X
Waterward of the ordinary high-water mark for ecological restoration	X	X	X	X	X	X
Landward of the ordinary high-water mark	N/A	SD(1)	X	SD(1)	SD(1)	SD(1)
As part of Shoreline Habitat and Natural Systems Enhancement Projects	CU	SD(1)	X	SD(1)	SD(1)	SD(1)
Shoreline Modifications						
Shoreline Habitat and Natural Systems Enhancement Projects	SD or E	SD or E	SD or E	SD or E	SD or E	SD or E
Removal of vegetation within Native Conservation Area	SD	SD	SD	SD	SD	SD
Shoreline Armoring						
New structure for new development or for land subdivision	X	SD or E	X	SD	SD or E	SD or E

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Enlarged structure for new development or for land subdivision	X	SD	X	SD	SD	SD
New structure for protection of existing structures	X	SD	X	SD	SD	SD
Enlarged structure for protection of existing structures	X	SD	X	SD	SD	SD
New or enlarged structure to protect projects for the restoration of ecological functions or hazardous substance remediation projects	X	SD	X	SD	SD	SD
Replace existing shoreline stabilization structures	X	SD or E	X	SD or E	SD or E	SD or E

(1) Must be outside of the Native Conservation Area
(2) Structures shall not encroach into the Native Conservation Area
(3) Size and location conforms to other local development regulations
(4) Allowed in the NCA
Source: City of Dayton Draft Shoreline Master Plan

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Section 6: Effect on Permitting of Other State and Local Agencies and Programs

All of the agencies listed below work together with the City of Dayton to help manage the impacts of development on, and in, the Touchet River. Depending on the proposed development, expertise is provided to City staff and to local citizens both before, during and after the permitting process

6.1: Washington State Department of Fish and Wildlife

The Washington State Department of Fish and Wildlife (WDFW) has jurisdiction over in-water and over-water activities up to and including the Ordinary High Water Mark (OHWM), as well as any other activities that could "use, divert, obstruct, or change the bed or flow of State waters" (http://www.wdfw.wa.gov/hab/hpapage.htm). Practically speaking, these activities in the City of Dayton include, but are not limited to, installation or modification of shoreline stabilization measures and docks.

In partnership with the City's permitting process, WDFW requires that development projects in State waters obtain a written Hydraulic Project Approval. Prior to granting this approval, the Area Habitat Biologist (AHB) will visit the site prior to project initiation and may attach conditions concerning the equipment used for the development project, protection of water quality at the site, and the types of materials that can be used. In some cases, the project may be denied by WDFW if significant impacts would occur that could not be adequately mitigated. Our partnership with WDFW provides the City access to personnel trained in protecting and improving the biological integrity of our shoreline.

6.2: Washington State Department of Ecology

The Washington State Department of Ecology (Ecology) will review and may condition a variety of project types, including any project that needs a permit from the United States Army Corps of Engineers, any project that requires a Shoreline Conditional Use permit, or Shoreline Variance, and any project that disturbs more than one (1) acre of land.

Just as with WDFW, the additional resources provided by Ecology add expertise to City staff to help design mitigation efforts and reduce the effects of development in the area two hundred (200) feet landward from the shoreline. Prior to the start of development,

Ecology will provide resources to help evaluate current conditions and assist the City when discussing alternatives with shoreline property owners. Ecology is responsible for administering the Shoreline Management Act (RCW 90.58), the Water Code (RCW 90.03), the state Water Pollution Control Act (RCW 90.48), the state Clean Air Act (RCW 70.94), and the Model Toxics Control Act and provides expertise to the City in all these areas.

6.3: United States Army Corps of Engineers

The United States Army Corps of Engineers (USACE) has jurisdiction over any work in or over navigable waters under Section 10 of the Federal Rivers and Harbors Act of 1899, and discharges of dredged or fill material into waters of the United States under Section 404 of the Federal Clean Water Act.

In addition, the USACE also manages an extensive flood control levee system in the City of Dayton. The Corps has specific requirements concerning vegetation both water-ward and land-ward of the levees. To maintain flood control certification no vegetation is allowed within the first 15 feet waterward of the levee toe. Landward of the top of the levee, there is a vegetation free zone within three feet of the levee slope. Please see Appendix E for further information on vegetation placement within levee areas. Current guidance allows for a City to request a variance to the Corps' vegetation management guidelines if the City is able to demonstrate that the vegetation is not endangering the stability of the levee.

USACE permits are necessary for any work, including construction and dredging, in the Nation's navigable waters. During the permit process, the Corps will consider the views of other Federal, state and local agencies, interest groups, and the general public. Any adverse impacts to the aquatic environment will be offset by mitigation requirements, which may include restoring, enhancing, creating and preserving aquatic functions and values. The Corps strives to make its permit decisions in a timely manner that minimizes impacts to the regulated public.

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Section 7: Net Effect on Ecological Function

7.1: Findings

In summary, here are the findings from the data presented above, with conclusions:

1. Water cleanup activities from State and Federal agencies and private groups have been successful in mitigating stressors both above and below the City. See table 2.9.1 above. These projects are ongoing. As each project is completed, these projects provide the local shoreline ecology with a small but growing positive impact.

2. In the Shoreline Residential Environment, we expect development on the one remaining vacant parcel. If this development is to create living space, impervious surface coverage will grow to match neighboring parcels. Covering a portion of this parcel with impervious surfaces and removing native plantings will provide a negative impact to the current condition of the shoreline area. The SMP addresses these impacts through the mitigation process of avoiding as much change as possible and then requiring replanting, application of pervious surfaces where possible and then compensatory actions for any remaining development impact. This parcel is not buffered by a levee, The SMP regulations suggest soft shoreline armoring, if any is necessary, and the retention of the 100 foot buffer of native plantings. Where possible, compensatory development should be made on the same parcel as the development, but in those situations where this is not possible, the mitigation efforts can be applied off-site. Even with mitigation, all impacts cannot be foreseen, so redevelopment of this parcel has to be seen as providing a slight negative impact to the ecology of the shoreline.

3. Although the SMP is not retroactive, insistence on mitigation measures that did not appear in the last plan and the institution of restoration efforts, which also did not appear in the last plan, will result in slow improvement throughout the shoreline area.

4. A large positive impact to high summer water temperatures and flow control can be gained by allowing larger diameter trees and brush along the levees bordering the OHWM. Today, this practice runs counter to USACE regulations. The City is currently hoping to procure a variance from these regulations.

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5. In the future, there will be many unanticipated and unseen developments along the shoreline as unpermitted development occurs. These activities will provide a constant negative pressure on the shoreline area. The SMP addresses this mainly through citizen education; on planting native shoreline vegetation; removal of noxious weeds; and softer alternatives for armoring. The SMP also addresses this through requirements of compensatory actions for permitted development along the shoreline.

7.2 Conclusions

The Cumulative Impacts Analysis is designed to acknowledge development that is anticipated by the SMP, plus development that is not anticipated, and present an analysis for use in addressing the result of these actions. The analysis provides information on the current state of the shoreline ecology and presents the reasoning supporting restoration activities that mitigate future development.

Between the Urban Conservancy Environment and the Shoreline Residential Environment, we are looking at an urban area that is almost entirely developed. There is one fallow parcel that we expect will contain a new home in the future, but for the most part, development in this area is driven by updating older homes as financing allows. Human activity is constant throughout this area. We do not anticipate that these two environments will see much change in use over the life of this plan. Any ecological improvement in these areas will come from homeowner activities in response to regulations within the updated SMP. As these new regulations are followed, new development will be minimized or compensated for, providing the opportunity for slow improvement in the ecological functions of the area. Monitoring will be necessary to identify opportunities for mitigation of unforeseen development.

The Shoreline Commercial Environment includes the traditional downtown for Dayton. Portions of this downtown contain structures that have been in operation on the same sites for over a century. Most of this area is already filled in but fringe locations still exist on the western shore for future development, so we do expect some additional growth in this environment. Ecological improvement in this environment areas will come from landowner activities in response to regulations within the updated SMP. Reducing the amount of impervious surface for new commercial uses and replacement of current impervious surface with more pervious practices will provide the opportunity for slow improvement in the ecological functions of the area. Monitoring will be necessary to identify opportunities for mitigation of unforeseen development.

In the High Intensity Environment, we do expect development as the water treatment plant is updated or expanded to meet new water quality regulations. The native buffer is shallow in this environment, but any encroachment for new access to the river will require mitigation. It is up to the City to ensure that this development provides positive results for the environment that exists today.

The largest probable impact for the City includes activities surrounding the levee. As identified in section 2.1 above, maintenance to the levee system, especially in relation to dredging upstream from the Highway 12 Bridge and a variance from prescribed tree and brush maintenance practices, can result in large positive impacts. Another flood season will occur in time. By restoring the proper distance from normal water heights and the bottom of the bridge, the possibility of flood damage will be greatly reduced. If trees and brush are allowed within the 15 foot vegetation clearance zone, the force from high water events will be dissipated, protecting the levee itself and providing additional shade and woody debris for fish and wildlife protection. The dredging will be an expensive undertaking, requiring financial assistance.

The activities that are regulated in the SMP, and the meaning of the regulatory language that appears there, are a direct result of the analysis performed in the Inventory and Characterization Report and Cumulative Impacts Analysis. Also, as time goes on, future updates to the Master Program will reflect changes in the baseline ecology of the area that will once again feed into any regulatory changes required to maintain no net loss of shoreline function.

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Section 9: Appendices

Appendix A: City of Dayton SMP Jurisdiction Map

Appendix B: Columbia Plateau Aquifer System

Appendix C: Soils in the Dayton, Washington area

Appendix D: Zoning map for Dayton, Washington

Appendix E: Vegetation on levee structures

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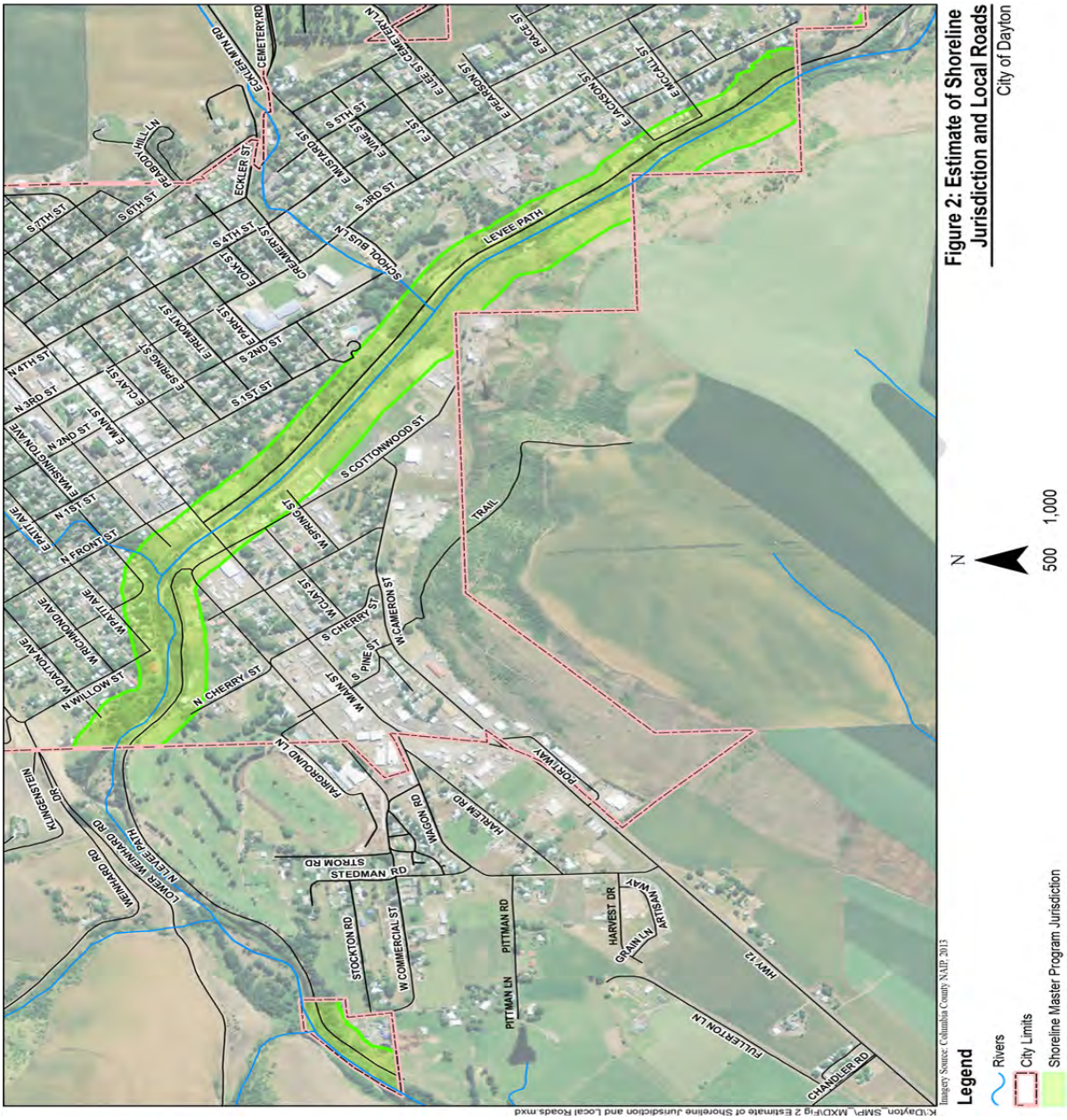
Section 9: Appendices

Appendix A: City of Dayton SMP Jurisdiction Map



Appendix B: Columbia Plateau Aquifer System

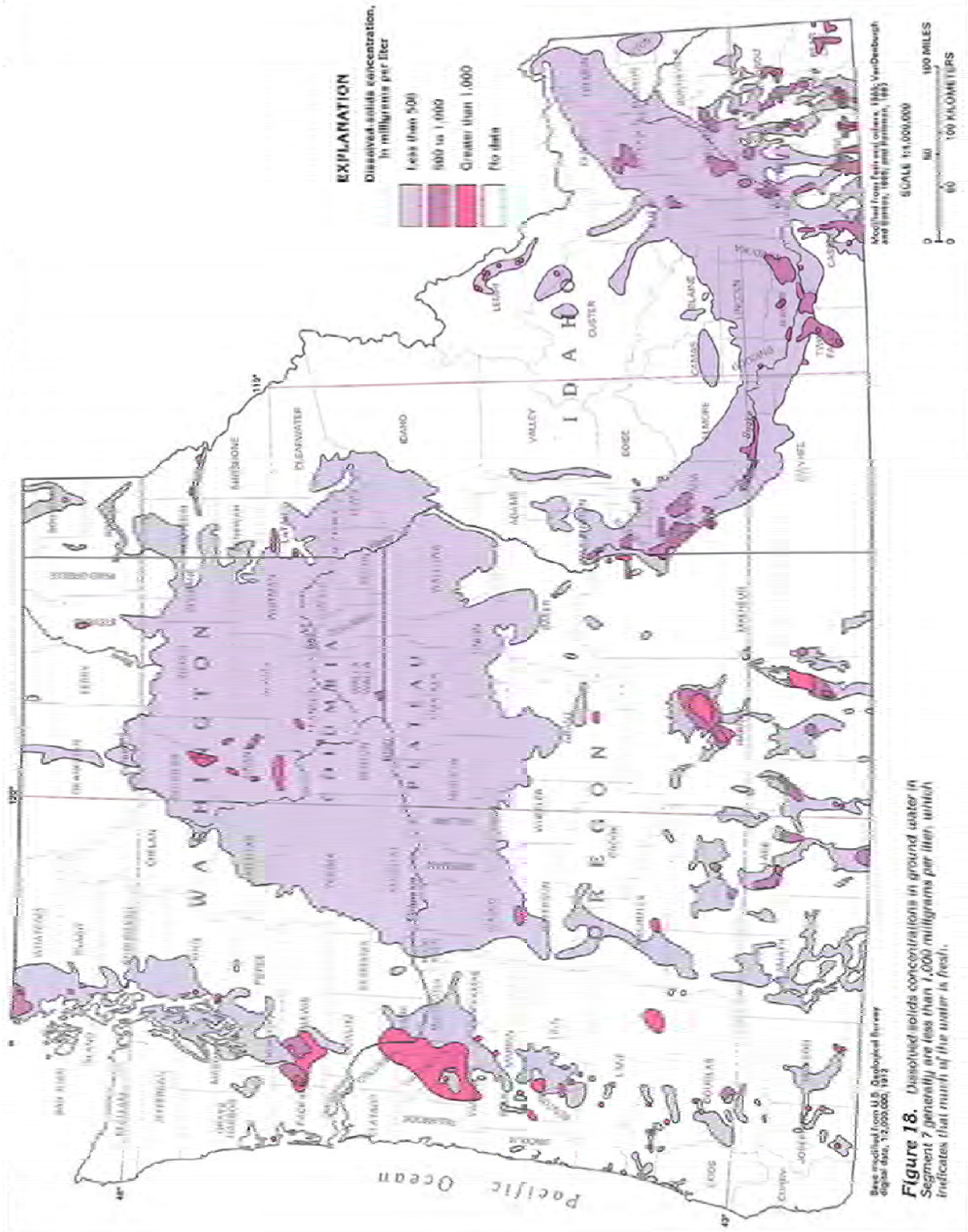


Figure 18. Dissolved solids concentrations in ground water in Segment 7 generally are less than 1,000 milligrams per liter, which indicates that much of the water is fresh.

Appendix C: Soils in the Dayton, Washington area

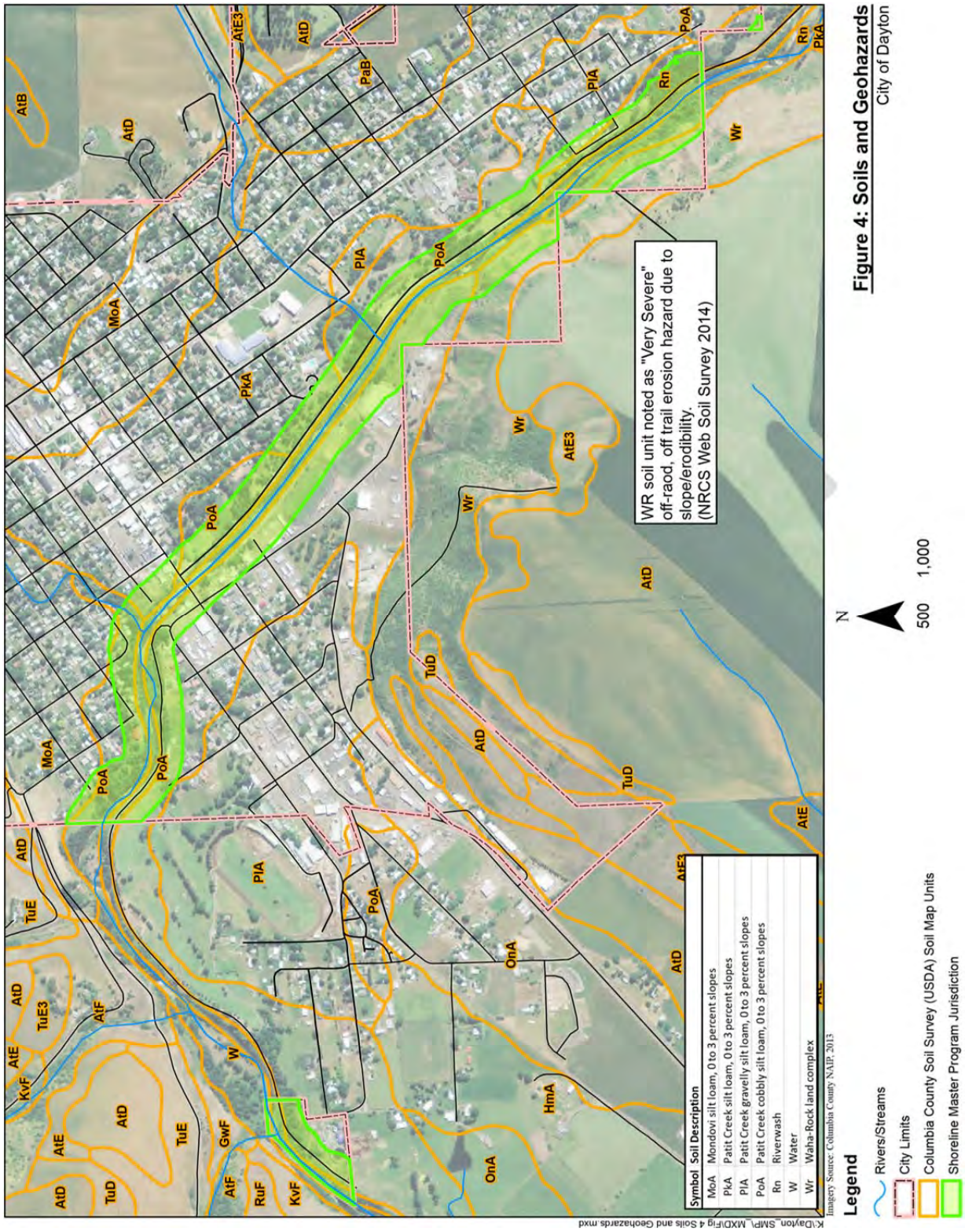
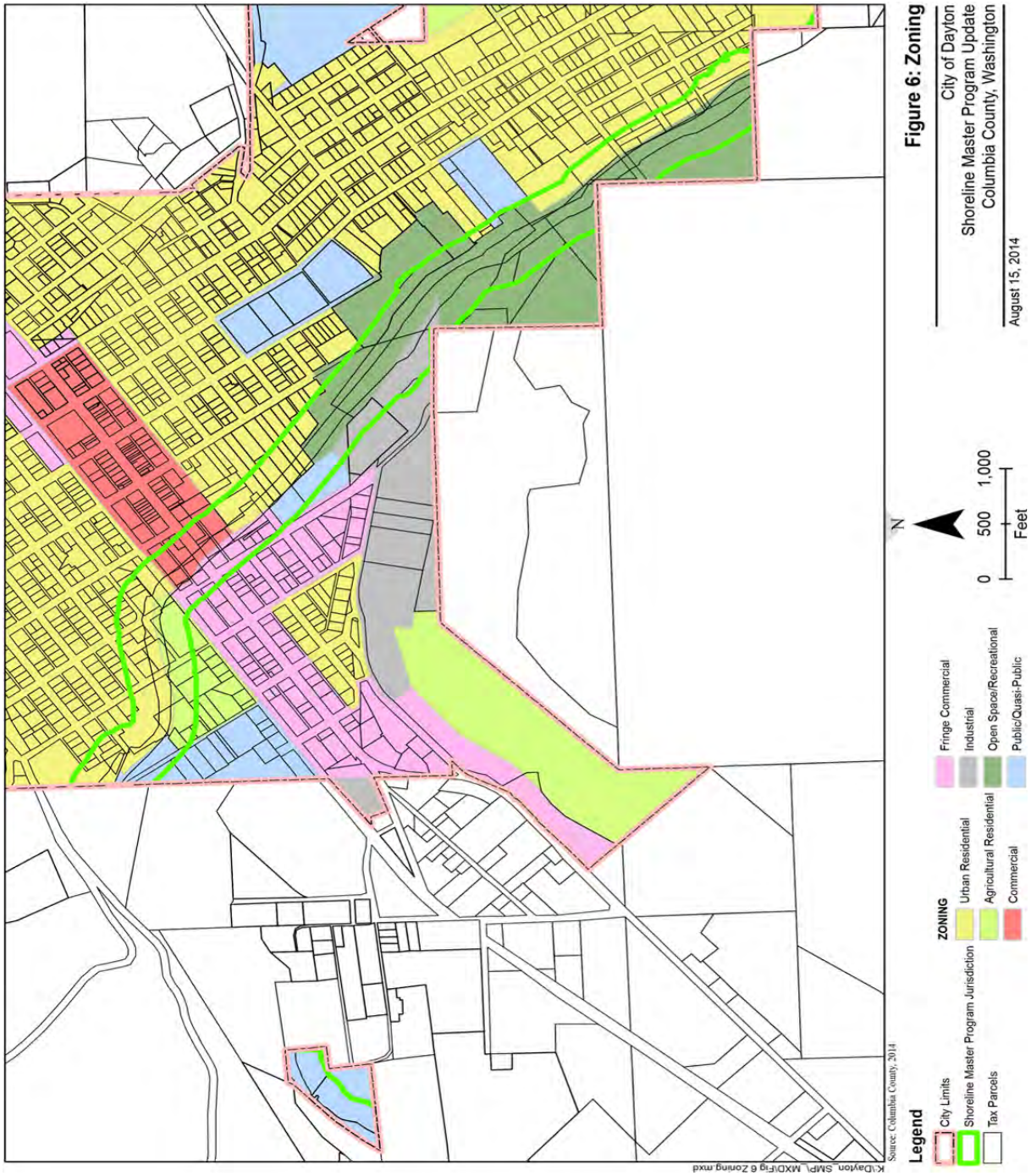


Figure 4: Soils and Geohazards
City of Dayton

Appendix D: Zoning map for Dayton, Washington



Appendix E: Vegetation on levee structures

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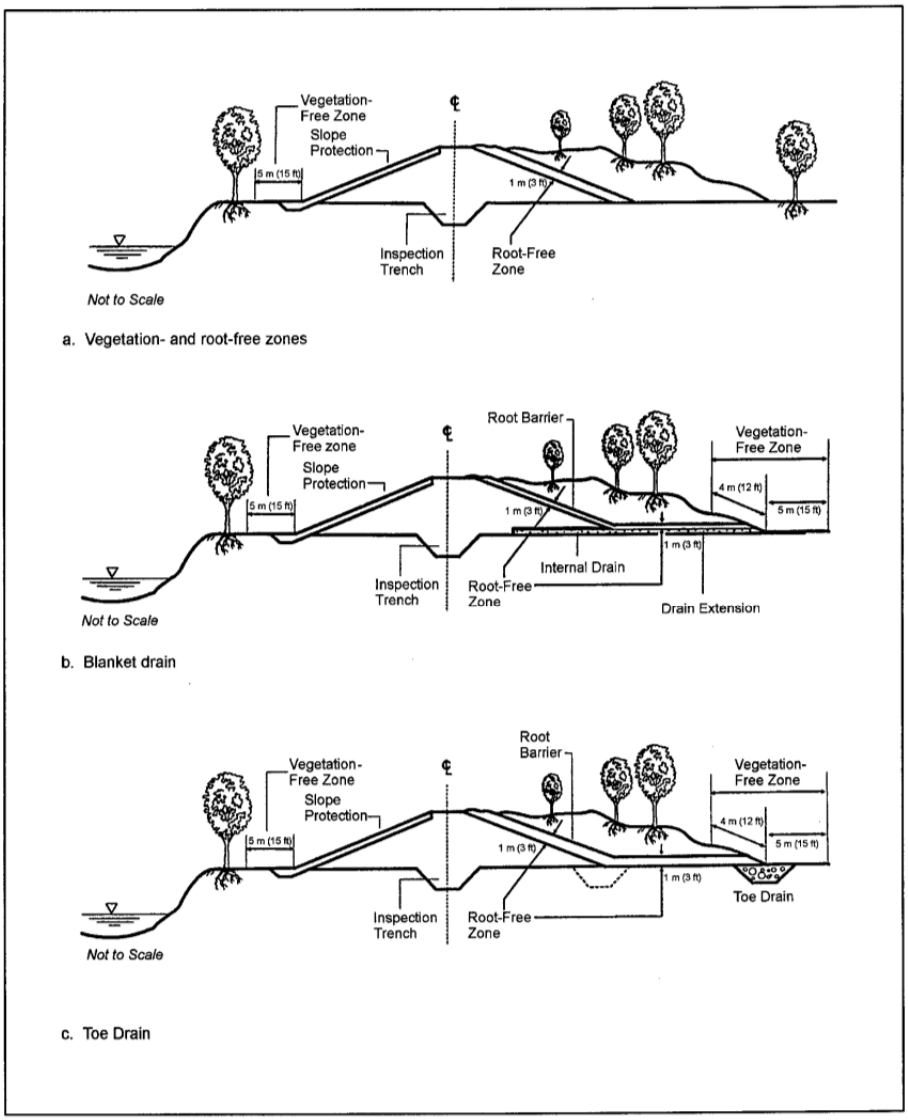

Figure 2-1. Basic levee project structure, with landscape planting

2-2