City of College Place

Critical Areas Ordinance

Best Available Science Review

FINAL DRAFT

Draft: August, 2008

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Acronyms

ASR	Aquifer Storage and Recovery
BAS	Best Available Science
BFE	Base Flood Elevation
bgs	Below Ground Surface
BMP	Best Management Practice
CAO	Critical Areas Ordinance
CARA	Critical Aquifer Recharge Area
CRB	Columbia River Basalt
CREP	Conservation Reserve Enhancement Program
cfs	Cubic Feet per Second
CMZ	Channel Migration Zone
CTED	Washington State Department of Community, Trade and Economic Development
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
DNR	Washington Department of Natural Resources
DPS	Distinct Population Segment
Ecology	Washington State Department of Ecology
EDT	Ecosystem Diagnosis and Treatment
ELI	Environmental Law Institute
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FEMA	Federal Emergency Management Agency
FEMAT	Forest Ecosystem Management Assessment Team
FIRM	Flood Insurance Rate Maps
ft	Feet
FWHCA	Fish and Wildlife Habitat Conservation Areas
GMA	Growth Management Act
HGM	Hydrogeomorphic Classification System
HMP	Hazard Mitigation Plan
HPA	Hydraulic Project Approval
LID	Low Impact Development
LWD	Large Woody Debris

MSA	Major Spawning Aggregations
MSL	Mean Sea Level
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration Fisheries Service
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OWL	Olympic-Wallowa Lineament
PHBA	Peak Horizontal Bedrock Accelerations
PHS	Priority Habitats and Species
RCW	Revised Code of Washington
RM	River Mile
SEPA	State Environmental Policy Act
SMA	Shoreline Management Act
SOI	Species of Interest
SPTH	Site Potential Tree Height
TMDL	Total Maximum Daily Load
UGA	Urban Growth Area
USACE	United States Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFS	United States Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDOH	Washington State Department of Health
WRIA	Water Resource Inventory Area
WSDOT	Washington State Department of Transportation
WWBWC	Walla Walla Basin Watershed Council

1 Introduction

1.1 Report Background and Purpose

Under the Washington State Growth Management Act (GMA) all counties and cities are required to protect certain natural resources within their boundaries called "critical areas". In 1995, the Washington State Legislature amended the GMA to require that local governments include Best Available Science (BAS) in designating and protecting critical areas (RCW 36.70A.172(1)). Washington Administrative Code 365-196-900 gives the background and purpose of the best available science rule followed by five sections on criteria (WAC 365-195-905 to 925). These criteria guide local governments on how to recognize and locate sources of valid scientific information and use that information in their decision making process. In addition, in 2000 the Department of Community Trade and Economic Development (CTED) adopted procedural guidance to implement these changes to the GMA, and provided guidance for identifying BAS (CTED 2004).

In the mid-1990s, the City of College Place passed a Critical Areas Ordinance (CAO) to designate and protect critical areas. This ordinance must be updated by December 1, 2008.

BAS is current scientific information derived from research, monitoring, inventory, survey, modeling, assessment, synthesis, and expert opinion that is:

- Logical and reasonable
- Based on quantitative analysis
- Peer reviewed
- Used in the appropriate context
- Based on accepted methods
- Well referenced

This document summarizes the BAS for the City of College Place's critical areas as part of the administrative record and provides recommendations for policies and CAO requirements. This report is an addendum to the BAS document prepared for Walla Walla County, containing additional information about the critical areas within the City's urban growth area (UGA).

As directed by RCW 36.70A.050, this document addresses the following critical areas:

- Geologically hazardous areas
- Frequently flooded areas
- Critical aquifer recharge areas
- Wetlands

- Fish and wildlife habitat conservation areas (FWHCAs) including habitat requirements and management needs for anadramous fish

The information contained in this document is a summary of scientific studies related to designating and protecting critical areas, including habitat for anadramous fish species, as defined by the GMA. The information, along with the County's BAS document, is intended to provide a collective BAS information set as a basis for development of the City of College Place's CAO. It is not intended to provide an exhaustive summary of all science available for all critical areas. Information for this review was selected, to the extent possible, on its relevance to the natural conditions found in the City of College Place. It should be understood that it is possible that applicable and relevant work was overlooked because of the immense volume of available information. An exhaustive review and incorporation of all relevant and applicable scientific information is beyond the scope of this project.

This report contains BAS findings for each of the critical areas for the City of College Place to consider within the CAO development process. In many cases, the information presented for one critical area may overlap, complement, or be applicable to another type of critical area because these areas function as integrated components of the ecosystem. The chapters also summarize the GMA requirements for protection of these areas.

In developing the CAO, the City has to ensure that:

- Critical areas are not exempted or excluded from designation

- All designated areas are protected using specific criteria and standards

- The values and functions of critical areas are protected, that "no net loss" of these values and functions occurs, and that adverse impacts are prevented or mitigated

In some cases the GMA is very specific about the type of protection that is required for a critical area. In others, the City will have options to choose from. Local governments must balance critical areas protection with other public values, such as preserving public health and safety, economic development, and protecting environmentally sensitive areas.

While local governments can adopt CAOs that may result in localized impacts on some critical areas or even the loss of some critical areas, there must be no net loss of the structure, value, and functions of the natural systems. A county or city must provide a detailed and reasoned justification based on best available science for any designated critical area.

The City is required to integrate critical areas protection into all of its permitting and regulation activities, including: zoning regulations, clearing and grading provisions, stormwater management requirements, subdivision regulations and other applicable regulations, plans and policies.

1.2 City Setting

The City of College Place is located in southern Walla Walla County, in southeastern Washington State. In 2007, the City had approximately 8,860 residents (OFM 2007). The Blue Mountains can be seen to the east and south of the City, which is located west of the City of Walla Walla. Garrison Creek, Stone Creek, and Doan Creek flow in the City.

1.3 References

CTED (Washington State Department of Community Trade and Economic Development). 2004. Review Guidelines for use of Best Available Science in Critical Areas Ordinances.

OFM (Washington State Office of Financial Management). 2007. April 1 Population of Cities, Towns, and Counties Used for Allocation of Selected State Revenues. Office of Financial Management Forecasting Division.

2 Fish and Other Aquatic Species

2.1 Section Overview and GMA Requirements

This analysis focuses on fish and other aquatic species and their habitats on non-federal lands in the City of College Place, with special emphasis on anadromous salmonids. This section was prepared as an addendum to Section 2 of the Walla Walla County BAS document.

2.2 Inventory of Species in the City of College Place

The aquatic habitats of the City of College Place support a number of species. Table 2.2-1 presents the aquatic species focused on in this document. The species considered include federally listed species, priority species, and focal and/or species of interest as identified in the Walla Walla Subbasin Plan (NPCC 2004). Further discussion of these categories is provided in the following sections.

Table 2.2-1
Aquatic Focal Species

Common Name	Scientific Name	Federal Status	Priority anadromous	Priority resident	Species of Interest in Subbasin Plan	Focal Species in Subbasin Plan
Brook lamprey	*Lampetra richardsoni*	-				
Pacific lamprey	*Lampetra tridentata*	-			x	
Smallmouth bass	*Micropterus dolomieu*	-		x		
Largemouth bass	*Micropterus salmoides*	-		x		
Freshwater mussels	*Mollusca unionoida*	-			x	
Summer steelhead trout	*Oncorhynchus mykiss*	Threatened[1]	x			x
Redband/Rainbow trout	*Oncorhynchus myskiss*	-		x		x
Spring/Summer Chinook	*Oncorhynchus tshawytscha*	See Note[2]	x			x
Mountain whitefish	*Prosopium williamsoni*	-		x	x	
Bull trout	*Salvelinus confluentus*	See Note[3]		x		x

1. Snake River DPS of steelhead is threatened
2. Upper Columbia River spring/summer Chinook are endangered; Snake River spring/summer Chinook are threatened
3. Columbia River DPS is threatened

Note: Brown trout are no longer a priority resident species in the Walla Walla Basin as WDFW has discontinued stocking in hopes of reducing competition and predation on ESA listed stocks in the basin (K. Divens, WDFW, pers comm.)

2.2.1 Federally Listed Species

Walla Walla County supports habitat for several listed salmonid species, though only two federally listed aquatic species are present in the Walla Walla basin: bull trout (*Salvelinus confluentus*) and summer steelhead (*Oncorhynchus mykiss*). Bull trout in the Walla Walla River basin are included in the Columbia/Klamath River Distinct Population Segment (DPS), which was listed as threatened under the Endangered Species Act (ESA) in 1998. Walla Walla County summer steelhead are part of the

Middle Columbia River DPS, which was originally listed as threatened under the ESA on March 15, 1999, with the threatened status reaffirmed in 2006. This DPS includes all naturally spawned steelhead populations upstream from the Wind River, Washington, to and including the Yakima River, Washington (NMFS 2007). Critical habitat for the DPS includes the Columbia and Snake rivers, and the mid-to upper Walla Walla River mainstem and most tributaries in the Walla Walla Subbasin. Summer steelhead is present on lower Garrison Creek within the City of College Place, and bull trout may be present during winter months.

2.2.2 State Priority Species

State-listed/priority species require protective measures for their perpetuation due to their population status, sensitivity to habitat alteration, and/or recreational, commercial, or tribal importance. Priority species include state endangered, threatened, sensitive, and candidate species; animal aggregations considered vulnerable; and those species of recreational, commercial, or tribal importance that are vulnerable.

Table 2.2-1 lists the priority species that are found within Walla Walla County, according to WDFW[1] (2007), edited to those likely applicable to the City. Priority species are subdivided into priority anadromous and priority resident. Salmon, which constitute a majority of the priority anadromous species, are also associated with other types of priority habitats and species, particularly in relation to riparian areas. As such, the protection of salmonid habitats serves to protect other species dependent on similar or associated habitats. More detailed information regarding the presence and distribution of fish species in the City is presented later in this document.

2.2.3 Walla Walla Subbasin Plan Focal Species

The Walla Walla Subbasin Plan (NPCC 2004) identified three aquatic focal species on which emphasis was placed to facilitate management of habitats in the subbasin (Table 2.2-1). The three species include:

- Steelhead/rainbow trout
- Spring Chinook
- Bull trout

The subbasin planning parties (Walla Walla County, Walla Walla Basin Watershed Council [WWBWC], WDFW, Confederated Tribes of the Umatilla Indian Reservation [CTUIR], the Water Resource Inventory Area [WRIA] 32 Planning Unit, private citizens, and other agencies and entities) selected these species based on the following considerations:

- These species' life histories are representative of the Walla Walla Subbasin ecosystem and therefore, habitat conditions that are appropriate for these three species will also provide conditions that allow for the prosperity of other aquatic life

[1] WDFW is in the process of updating the priority species database. It is recommended that the City update their PHS data annually.

- ESA status of the species
- Cultural importance of the species
- Level of information available/knowledge on each species' life history to conduct an effective assessment
- Interest by co-managers to reintroduce spring Chinook into the subbasin

2.2.4 Species Discussed in Recovery Planning Documents

Recent planning documents were reviewed during the development of this document to refine species distribution and status for various listed salmonid stocks, including those in the City of College Place. Plans reviewed included the following:

- Snake River Salmon Recovery Plan for SE Washington (Snake River Salmon Recovery Board 2006)
- Recovery Plan for Oregon's Middle Columbia River Steelhead (Carmichael 2006)
- Bull Trout (*Salvelinus confluentus*) Draft Recovery Plan (USFWS 2002)

These plans present a draft recovery framework for various listed salmon and trout and update information presented in the Walla Walla Subbasin Plan (NPCC 2004).

2.2.5 Walla Walla Subbasin Plan Focal Species of Interest

Along with mountain whitefish; Pacific lamprey (*Lampetra tridentate*), brook lamprey (*Lampetra richardsoni*), and freshwater mussels (*Mollusca unionoida*), are presented in the Walla Walla Subbasin Plan as "species of interest" (SOI). Each SOI was included in the plan in consideration of the potential ecological and/or cultural significance that the species may provide. Because there is not yet enough known regarding the value of ecological significance provided by each species, they are not currently considered focal with regard to Subbasin planning efforts and subsequent habitat protection. However, with planned research aimed at determining their specific life histories and conditions that may be limiting their productivity, they may become focal species in the future. Since these species have been suggested as SOI by various resource managers including WDFW and the CTUIR, protection of their habitat may become a priority in the near future.

2.2.6 Other Species – Game Fish

There are limited game fish present within the City of College Place.

2.3 Distribution of Salmonids in the City of College Place

Salmonid distribution data were obtained from multiple sources including the 2008 StreamNet database (http://www.streamnet.org/), the Snake River Salmon Recovery Plan for SE Washington (Snake River Salmon Recovery Board 2006), Mahoney et al. (2008), Mendel et al. (2007), and the Walla Walla Subbasin Summary (Saul et al. 2001) and Plan (NPCC 2004). Streamnet delineates specific reaches of suitable habitat

believed to be used by the various life stages of specific species, based on the best professional judgment of local fish biologists. Fish species present in the Walla Walla River and tributaries are identified in Table 2.3-1 (G. Mendel, WDFW, in Saul et al. 2001). (Note: HDR has been unable to verify whether all these species are present in the water bodies within the City).

Table 2.3-1
Fish Species Present in the Walla Walla River and its Tributaries

Common Name	Scientific Name	Origin[1]	Occurrence[2]	Federal/State Listing[3]
Bull trout	*Salvelinus confluentus*	N	Common	FT; SC
Spring Chinook	*Oncorhynchus tshawytscha*	H	Common	
Fall Chinook	*Oncorhynchus tshawytscha*	H	Rare	
Coho	*Oncorhynchus kisutch*	H	Rare	
Summer steelhead	*Oncorhynchus mykiss*	N	Common	FT, SC
Redband trout	*Oncorhynchus mykiss*	N	Common	
Mountain whitefish	*Prosopium williamsoni*	N	Few/Rare	
Brown trout	*Salmo trutta*	E	Few/Rare	
Lamprey	*Petromyzontidae*	N	Uncommon	
Longnose dace	*Rhinichthys cataractae*	N	Uncommon	
Speckled dace	*Rhinichthys osculus*	N	Abundant	
Umatilla dace	*Rhinichthys Umatilla*	N	Uncommon	SC
Leopard dace	*Rhinichthys falcatus*	N	Uncommon	SC
Chiselmouth	*Acrocheilus alutaceus*	N	Common	
Peamouth	*Mylocheilus caurinus*	N	Few	
Redside shiner	*Richardsonius balteatus*	N	Abundant	
Northern pikeminnow	*Ptychocheilus oregonensis*	N	Common	
Sucker spp.	*Catostomidae*	N	Common	
Bridgelip sucker	*Catostomus columbianus*	N	Common	
Largescale sucker	*Catostomus sp*	N	Common	
Carp	*Cyprinus carpio*	E	Common	
Bullhead catfish	*Ameiurus nebulosus*	E	Rare/ Insufficient data	
Tadpole madtom	*Notorus gyrinus*	E	Rare/ Insufficient data	
Channel catfish	*Ictalurus natalis*	E	Common	
Smallmouth bass	*Micropterus dolomieu*	E	Common	
Largemouth bass	*Micropterus salmoides*	E	Rare	
Pumpkinseed	*Lepomis gibbosus*	E	Rare	
Bluegill	*Lepomis macrochirus*	E	Rare	
White crappie	*Pomoxis annularis*	E	Few	
Black crappie	*Pomoxis nigromaculatus*	E	Few	
Warmouth	*Lepomis gulosus*	E	Insufficient data	
Yellow perch	*Perca flavescens*	E	Rare	
Paiute sculpin	*Cottus beldingi*	N	Common	
Margined sculpin	*Cottus marginatus*	N	Common	F SOC; SS
Torrent sculpin	*Cottus rhotheus*	N	Rare	
3-spine stickleback	*Gasterosteus anculeatus*	E	Rare/ Insufficient data	
Sandroller	*Percopsis transmontana*	N	Insufficient data	

Source: G. Mendel, WDFW, *in* Saul et al. (2001); Contour et al. 2003; Mahoney et al. 2008; Mendel et al. 2005
[1]Origin: N=Native stock, E=exotic, H=Hatchery reintroduction
[2]Occurrence based on average number of fish per 100 meters squared: A=abundant, C=common R=rare, U=uncommon, and I =insufficient data
[3] FT = Federally threatened, F SOC – Federal species of concern; SC = State Candidate; SS = State Sensitive

Further detail about the distribution of bull trout, summer steelhead, and other specific species is presented in the following subsections. Table 2.3-2 presents anadromous salmonids and life histories present within the City of College Place's waterways.

Table 2.3-2
Anadromous Salmonids Present in the City of College Place Waterways and their Life Histories and Stages Present

	Bull Trout			Summer Steelhead		
	Migration	Spawning	Rearing	Migration	Spawning	Rearing
Garrison Creek			x	x		x

2.3.1 Bull Trout

The current distribution of bull trout in the waterbodies of the Cities of Walla Walla and College Place is shown in Figure 2.3-1. Bull trout distribution is generally limited to the mountainous reaches of upper tributaries of the Touchet River, Walla Walla River, and Mill Creek (Mongillo 1993), although they are known to migrate into the middle or lower reaches of these rivers during winter months (Mendel et al. 2005). Although the USFWS (2002) suggests that habitat conditions in the Walla Walla River limit bull trout distribution and abundance, bull trout are common in upper reaches of the Walla Walla River basin (Contor and Sexton 2003). However, their occurrence in the lower reaches of the Walla Walla and Touchet rivers is seasonally low and may be limited by habitat conditions, particularly warm water temperatures and low flow barriers in the summer. As a result, some lower sections of the Walla Walla and Touchet Rivers are not designated as bull trout critical habitat.

Within the Walla Walla River Basin, the mainstem Walla Walla River is designated as migratory habitat from just upstream of the confluence with Dry Creek to the County limits (state line), as are the mid to lower reaches of the Mill Creek system. Only the uppermost reaches of Mill Creek are designated as spawning and rearing habitat, well outside the City limits and UGA. Within the City, Garrison Creek may be used by bull trout for winter rearing habitat.

2.3.2 Summer Steelhead

The distribution of summer steelhead in the Cities of Walla Walla and College Place is shown in Figure 2.3-2. As illustrated in this figure, the waterbodies present within the City of College Place function primarily as summer steelhead migratory corridors and for rearing. Garrison Creek is used by adults in their upstream migrations to spawning grounds, as well as by steelhead kelts, or repeat spawners that migrate back to the ocean or to large river systems before spawning again. Juvenile steelhead also outmigrate to the ocean via Garrison Creek. A screening project planned for 2009 or 2010 in upper Garrison Creek would limit Garrison to a rearing stream only, from the mouth of Lions Park within the City, where a substantial fish passage barrier currently

exists. Future habitat restoration efforts are expected for lower Garrison Creek to improve off-channel rearing conditions.

Currently, summer steelhead are believed to be the only naturally occurring anadromous fish species still present in the Walla Walla River basin (Saul et al. 2001), which includes the Walla Walla River and all its tributaries (of which the Touchet River, Dry Creek. and Mill Creek are the three largest). More information about the distribution and abundance of summer steelhead is provided in Section 2 of the County's BAS document.

2.3.3 Other Species

Lamprey

Pacific and western brook lamprey were both abundant in the Walla Walla River Subbasin historically (Saul et al. 2001, Swindell 1940). The USFWS currently recognizes Pacific lamprey as a Category 2 candidate species for listing under the ESA. The current distribution and abundance of Pacific lamprey is considered severely depressed (Saul et al. 2001), although information is incomplete. Populations of western brook lamprey appear to be maintaining, while Pacific lamprey are believed to be at or very near extinction. Mendel et al. (2007) collected lamprey during electrofish sampling in Yellowhawk Creek in 2006. During fish management sampling conducted in the Touchet and Walla Walla river watersheds from 1998 to 2006, a total of 23 sites contained lamprey in the mainstem Touchet River downstream of Coppei Creek, and relatively low numbers of lamprey were collected from sites in the mainstem Walla Walla River from Dry Creek to the state line. No sites with lamprey collections were reported in the mainstem Walla Walla River downstream of Dry Creek. Relatively low numbers of lamprey were also recorded from sites in Yellowhawk, Garrison, Russell, and Big Spring Ranch Creeks, and the East Little Walla Walla River. Moderate numbers of lamprey were collected in the Mill Creek system, with the highest percentage occurring in the reach between Gose Street and Blue Creek (Mendel et al. 2007).

Freshwater Mussels

Freshwater mussels are valuable components of salmonid ecosystems and are culturally important to Native Americans. Salmon serve as the host to juvenile mussels, who parasitize (non-lethally) individual fish for a period of 3 weeks to 4 months before dropping off the fish and maturing into adulthood. It is believed that the parasite-host relationship is species-specific in that only certain fish species can serve as hosts for a particular freshwater mussel species (O'Brien and Brim Box 1999). Because of this relationship, freshwater mussels are a useful indicator species for assessing the health of freshwater environments.

Little is known about the distribution of freshwater mussels according to information in the Walla Walla Subbasin (NPCC 2004). Brim Box et al. (2006) report that several CTUIR elders recall gathering mollusks at the mouth of the Walla Walla River, commenting that mussels were plentiful in all tributaries in the region. Although discussions with David Wolf, CTUIR biologist, indicate that no formal inventories for freshwater mussels have been conducted in the Walla Walla River watershed by the CTUIR, Mr. Wolf has conducted a few informal surveys in the watershed. He reported that individuals of the genus *Margaritifera* were observed during surveys conducted along private parcels in reaches of the mainstem Walla Walla River near Mojonnier

Insert Figure 2.3-1 (11x17)

Insert Figure 2.3-2 (11x17)

Road. Additionally, pockets of *Margaritifera* have been found in the Little Walla Walla River, and members of the genus *Anodonta* have been collected near the mouth of the Walla Walla River (D. Wolf, CTUIR, pers comm.). According to Mr. Wolf, the CTUIR is planning to conduct surveys in the Walla Walla River watershed in the future, but until then, without inventory data, it is difficult to speculate on population status.

2.4 Inventory of Aquatic Habitats in the City of College Place

Waters of the state include lakes, rivers, ponds, streams, inland waters, underground water, salt water, estuaries, tidal flats, beaches, and lands adjoining the seacoast of the state, sewers, and all other surface waters and watercourses within the jurisdiction of the state of Washington (WAC 173-183-100). Waters of the state within the City of College Place include Garrison Creek, Stone Creek, and Doan Creek. This section describes these habitats, their existing conditions, and their functions and values.

2.4.1 Existing Conditions and Limiting Factors in the City of College Place

Riparian Habitat in the Walla Walla Subbasin

Historically, extensive riparian zones existed along rivers and streams in the Walla Walla River basin (USACE 1997); however, riparian areas have diminished due to development. Riparian areas are a significant habitat resource within the City for several reasons. First, riparian zones within the arid west are home to approximately 85 percent of wildlife species (Knutson and Naef 1997), and within a developed landscape they provide connecting habitat or wildlife corridors. These areas are also important to the contribution of LWD and for providing temperature attenuation through shading. In the City of College Place, development is often directly adjacent to streams. Riparian vegetation is often limited and the riparian areas narrow.

Understanding existing riparian conditions can help provide context for stream buffer recommendations for the water bodies within the City of College Place that are presented in Section 2.6. To determine the existing riparian conditions within the Cities of Walla Walla and College Place, each stream within the Cities were analyzed based upon a series of cross-section measurements of detailed aerial imagery provided by the County's GIS department. For each stream segment, the channel width and riparian vegetation width were measured, and average, maximum, and minimum widths were determined. The results of this analysis are presented in this section and in Table 2.4-1. Figure 2.4-1 shows the riparian areas that were analyzed.

It is important to note that averages of riparian widths per stream side is meant to typify an average condition and does not necessarily reflect actual conditions. In almost every case, more or less riparian area is found on a given stream side.

Doan Creek

UGA (Stream Segment DOA-2)

The riparian width is approximately 48 feet per stream side for the one segment. The maximum riparian width (including both stream sides) is 364 feet and the minimum width (including both stream sides) is 22 feet. The stream channel width averages approximately 10 feet.

Table 2.4-1 Existing Riparian Conditions in/adjacent to the City of College Place										
Name	Stream Segment ID#	Riparian / Stream Maximum width	Riparian / Stream Minimum width	Stream at Riparian Maximum width	Stream at Riparian Minimum width	Stream Average Width	Riparian / Stream Average Total Width	Riparian Average Width	Riparian Average Width per Side	Segment Description (* Concrete channel), (UG = Underground)
DOAN CREEK	DOA-1	237.3	5.0	8.7	3.0	9.6	47.7	38.1	19.1	FROM MILL CREEK TO WHITMAN RD
DOAN CREEK	DOA-2	364.1	22.3	12.0	9.2	10.0	105.8	95.8	47.9	FROM WHITMAN DR TO HEADWATERS
GARRISON CREEK	GAR-1	69.9	19.8	12.6	13.4	15.0	35.8	20.8	10.4	FROM WALLA WALLA RIVER TO EDGE OF UGA
GARRISON CREEK	GAR-2	201.1	16.0	24.1	8.1	11.8	76.0	64.2	32.1	FROM EDGE OF UGA TO S COLLEGE AVE
GARRISON CREEK	GAR-3	144.6	15.0	20.9	7.4	9.8	53.3	43.5	21.8	FROM S COLLEGE AVE TO FORT WALLA WALLA PARK
GARRISON CREEK	GAR-4	29.7	6.8	10.2	4.8	7.9	16.8	8.9	4.4	FROM FORT WALLA WALLA PARK TO 2nd AVE
GARRISON CREEK	GAR-5	38.6	12.2	10.2	4.8	7.9	22.6	14.7	7.4	FROM 2nd AVE TO PLEASANT ST
GARRISON CREEK	GAR-6	74.8	9.0	35.1	4.8	7.4	22.9	15.5	7.8	FROM PLEASANT ST TO E. ALDER ST
GARRISON CREEK	GAR-7	112.4	10.8	7.3	4.2	6.9	27.0	20.1	10.0	FROM E. ALDER ST TO YELLOWHAWK CREEK
STONE CREEK	STO-1	164.8	26.3	7.5	8.1	23.6	73.6	50.0	25.0	FROM WALLA WALLA RIVER TO TEAL RD
STONE CREEK	STO-2	107.0	33.3	10.2	6.3	8.1	70.8	62.7	31.3	FROM TEAL RD TO S COLLEGE AVE
STONE CREEK	STO-3	121.2	15.6	7.4	6.4	8.0	46.2	38.2	19.1	FROM S COLLEGE AVE TO SE MYRA RD
STONE CREEK	STO-4	109.4	9.1	6.7	5.3	6.5	29.1	22.6	11.3	FROM SE MYRA RD TO W. TIETAN ST
STONE CREEK	STO-5	164.4	7.4	8.0	4.8	6.7	44.7	38.0	19.0	FROM W. TIETAN ST TO HEADWATERS

Insert Figure 2.4-1 (11x17)

Garrison Creek
UGA (Stream Segments GAR-2 to GAR-7)
Six stream segments were measured for Garrison Creek within the UGA areas. The average riparian width per stream side ranges from 4 to 32 feet. The maximum riparian width (including both stream sides) is 201 feet and the minimum width (including both stream sides) is 7 feet. The average stream channel width ranges from 7 to 12 feet.

Stone Creek
UGA (Stream Segment STO-2 to STO-5)
Four stream segments were measured for Stone Creek within the UGA areas. The average riparian width per stream side ranges from 11 to 31 feet. The maximum riparian width (including both stream sides) is 164 feet and the minimum width (including both stream sides) is 7 feet. The average stream channel width ranges from 7 to 8 feet.

Ecosystem Diagnosis and Treatment Analysis of the Walla Walla Subbasin
In 2003 and 2004, the WDFW assessed aquatic habitat for steelhead and spring Chinook in the Walla Walla Subbasin by stream reaches using the Ecosystem Diagnosis and Treatment (EDT) method (NPCC 2004). This analysis evaluated existing stream conditions and identified stream reaches in the subbasin, including the Walla Walla River and its tributaries, which have the potential to provide the greatest biological benefit to salmonid species. The EDT analysis does not directly pertain to any of the City's waterbodies. Further information is available in Section 2 of the County's BAS document.

2.4.2 Naturally Occurring Ponds under 20 acres

Naturally occurring ponds less than 20-acres can provide important habitat for aquatic and terrestrial species. In the City of College Place ponds under 20-acres are classified as wetlands and are addressed by wetlands buffers (Section 4).

2.4.3 Functions and Values to Protect and Manage in Aquatic Habitats

Functions and values to protect and manage fall under the general categories of those related to instream habitat, and those related to riparian habitat. These include flow, temperature, LWD, shade, and pollutant filtration. These are described in further detail in Section 2.4.4 of the Walla Walla County BAS document.

2.5 Habitat Protection Tools

2.5.1 Designation, Rating and Classification, and Regulatory Options

Classification systems should ideally be biologically and physically relevant to the fisheries resource, while also providing for ease of public understanding and straightforward implementation. Potential classification systems for use in the CAO include the following types:

- DNR Water Typing System – A combination physical/biological based classification system using simplified stream types (S, F, and N).

- Salmonscape, Snake River Recovery Plan, and Mid Columbia Steelhead Recovery Plan – Documents provide up to date information and maps of distribution, spawning and rearing.

- Aquatic Habitat Quality Based Classification System – A habitat based classification system for streams or stream reaches based on existing aquatic habitat condition and EDT-identified limiting factors.

- Combination Classification System – A habitat classification system that combines elements from several of the above methods.

Each of these is discussed in more detail below, along with the recommended classification approach. For any classification system, there will be streams that are not currently classified due to lack of available information (e.g. fish presence) or streams that are incorrectly classified. In such cases, a special study would be required to document the stream habitat features.

DNR Water Typing System

New water types have been established in WAC 222-16-030. As excerpted from WAC 222-16-030, new water types are as follows:

Type S Water - all waters, within their bankfull width, as inventoried as "shorelines of the state" under chapter 90.58 RCW and the rules promulgated pursuant to chapter 90.58 RCW including periodically inundated areas of their associated wetlands.

Type F Water - segments of natural waters other than Type S Waters, which are within the bankfull widths of defined channels and periodically inundated areas of their associated wetlands, or within lakes, ponds, or impoundments having a surface area of 0.5 acre or greater at seasonal low water and which in any case contain fish habitat.

Type Np Water - means all segments of natural waters within the bankfull width of defined channels that are perennial nonfish habitat streams. Perennial streams are waters that do not go dry any time of a year of normal rainfall. However, for the purpose of water typing, Type N Waters include the intermittent dry portions of the perennial channel below the uppermost point of perennial flow.

Type Ns Water - means all segments of natural waters within the bankfull width of the defined channels that are not Type S, F, or Np Waters. These are seasonal, nonfish habitat streams in which surface flow is not present for at least some portion of a year of normal rainfall and are not located downstream from any stream reach that is a Type Np Water. Ns Waters must be physically connected by an above-ground channel system to Type S, F, or Np Waters.

A “U” is assigned to reaches when they are un-typed, un-modeled hydrographic features that may or may not be field verified. This code is used as a placeholder in DNR’s database; it is not a water type.

Table 2.5-1 presents the main waterways in the City and its UGA as identified by the Walla Walla County Draft Comprehensive Plan (2007) and County GIS information, along with the DNR stream type assigned to each system. In some cases as indicated

in the table, WDFW surveys of specific streams have resulted in the collection of fish in creeks that were typed as non fish-bearing. In these cases, the DNR stream typing data has been corrected to Type F. Figure 2.5-1 identifies these streams.

Fish Species and Lifestage Distribution Classification System

Though DNR stream typing system was applied to City of College Place waterways, the best available science for the area has focused on the occurrence and distribution of ESA-listed aquatic species, which better define focal species use and aquatic functions that require protection. The fish distribution maps presented earlier in this section illustrate that the predominant function provided by most of the waterbodies in the City is migration and rearing for the focal salmonid species.

Based on the current distribution of anadromous salmonids and bull trout in the aquatic habitat of the City of College Place (Streamnet 2008), it is apparent that ESA-listed summer steelhead distribution should define the level of protection for most reaches. They are currently known to spawn and rear in several reaches within the Walla Walla subbasin and represent the "limiting factor" for aquatic habitat protection.

Based on distribution data, protection of summer steelhead habitat will benefit most other aquatic species present in the City. Because spawning and rearing habitat support the most critical life stages, those areas classified as steelhead spawning and rearing habitat should receive the highest level of protection. The next level of protection should be for rearing and migratory habitat, followed by migratory habitat.

Table 2.5-1
Waterways within the City of College Place and Associated DNR Stream Typing and/or Streams Identified to Contain Fish Based on WDFW Surveys

Waterway	DNR Stream Type
Garrison Creek (Walla Walla tributary)	Type F – fish bearing to Lion's park in College Place Above Lion's park – Type Np – WDFW reports[1,2] that fish have been documented throughout the system[3]
Stone Creek (Walla Walla tributary)	Type F – WDFW has documented fish[1,2]
Doan Creek	Type U[3]; plans to restore to Type F[4]

1. Sources: Mendel et al. 1999-2008; G. Mendel (WDFW, pers comm.., 7/2/08)
2. Although indicated as "Type NP – non-fish bearing" on current DNR mapping, WDFW reports that this system has documented fish use. Based on this information, the stream type has been updated to "Type F."
3. Not connected by above-ground channel to S, F, or Np waters.
4. Planned restoration of Doan Creek is expected in 2009 or 2010, which would change stream to Type F

Aquatic Habitat Quality Based Classification System

The classification of reaches for protection does not end with species utilization as other factors specific to the subbasin should also be considered. As presented in this document, extensive research has been conducted to determine the environmental or habitat elements that are limiting the potential for each reach to provide suitable habitat for various stages of each aquatic focal species. Although the EDT analysis did not result in identified priority protection and/or restoration efforts within the City of College Place, lower Garrison Creek has planned restoration efforts for enhanced off-channel rearing habitat (Personal communications with Michael Denny, WWCCD, May 2008), and should be protected accordingly.

Summary of Classifications for Aquatic Habitats in the City of College Place

Table 2.5-2 presents the aquatic reaches identified to contain habitat for various life stages of summer steelhead and how they are classified in consideration of the classification systems described above.

2.5.2 Riparian/Stream Buffers

A riparian buffer can be defined as a strip of land adjacent to a river or stream. For planning purposes, a buffer can be established to mitigate the impacts of human activities on the stream ecosystem (Johnson and Ryba 1992). In its natural state, riparian buffers are characterized by native plants, including trees, shrubs, or tall, coarse grasses. As the name suggests, these plants "buffer" the stream from anything that flows into it - polluted water, eroding soil or toxic chemicals. The roots of the plants hold the river banks in place, stabilizing the land and absorbing the water and materials that flow across the land. Riparian areas serve multiple functions in the aquatic ecosystem and in terrestrial and semiaquatic wildlife habitat, and they serve as migration or dispersion corridors. More information about riparian buffers is presented in Section 2.5 of the County's BAS document.

2.6 Aquatic Species Findings and Code Recommendations

2.6.1 Recommended Stream Classification and Buffer Systems

Stream Designation and Classification System

As noted in Section 2.5.1, several stream designation systems can be used to classify water bodies and aquatic habitats in the City of College Place. In consideration of the best available science presented in this document, the most appropriate classification system should consider all documentation relative to stream typing, summer steelhead distribution, focal species habitat and limiting factors, and existing conditions (which includes both degraded riparian areas and riparian areas enhanced through the USDA Conservation Reserve Enhancement Program [CREP] or Creating Urban Riparian Buffers [CURB]). Consideration of all the available data for specific reaches within the County results in a combination system for classification, which defines six categories of County waterways in consideration of DNR stream types, existing functions, and EDT- and SRSRP-recommended priority protection reaches. These six categories are described in Section 2.7.1 of the County's BAS document. Category 6, described in this section, includes streams within the greater City of Walla Walla and City of College Place areas. When compared to more simplified approaches that, for example, consider only DNR Stream typing for classification and application of streamside buffers, the combination system provides more protection for focal aquatic species in reaches that have been specifically identified to provide critical habitat functions.

Insert Figure 2.5-1 (11x17)

Table 2.5-2
Aquatic Reaches within the City of College Place with Mapped Use by Summer Steelhead and Associated DNR Stream Typing, EDT, Subbasin and Snake River Salmon Recovery Plan Restoration/protection Reach Classifications and Limiting Factors

Geographic Area	River Reach	Summer Steelhead Habitat Present	DNR Stream Type	EDT Priority Protection Reach	Subbasin Plan Protection Reach	SRSRP Priority Protection and Restoration Areas	Limiting Factors (as described in Subbasin Plan)	SRSRP Restoration or Protection Benefit
Garrison Creek	Mainstem from confluence with Walla Walla River to confluence with Mill Creek	Rearing and migration	F	No	No	N/A	F, T, O, K, H, LWD, SL	Low restoration benefit

KEY
Sediment load = SL, Key habitat quantity = K, Habitat diversity = H, Temperature = T, Large Woody Debris = LWD, Flow = F, Predation = P, Obstructions = O, Channel stability = C
Sources: Snake River Salmon Recovery Board (2006) – Chapters 4 and 6; Saul et al. 2001; DNR 2007;

Category 6 includes streams in the urbanized areas of the greater Walla Walla and College Place area, including both incorporated and unincorporated areas. Although some waterways within this area are mapped as spawning and/or rearing habitat for summer steelhead, the application of buffers includes consideration of existing conditions. Because the riparian areas adjacent to these waterways have been subjected to high levels of development with limited riparian protections, new development in these areas will be subjected to decreased minimum streamside buffers that reflect stream potential.

Other water bodies without bed and bank are not identified and not intended for regulation under the CAO. This includes seasonal drainage pathways and man-made water bodies, such as canals. Piped stream segments are also not regulated, but if piping is removed and a stream is restored to open channel, then it would be regulated as other open channel segments of that stream.

Designation of Buffers

Specific habitat functions important to the City of College Place streams and associated buffer recommendations are outlined in Table 2.6-1. The recommendations in Table 2.6-1 include consideration of aquatic stream classification and associated aquatic habitat conditions as provided above, and also migratory habitat conditions for terrestrial species. Water quality is also considered. This table will be referred to throughout this document. The importance of riparian habitat to terrestrial species migration is discussed in Section 3. Specific buffers for wetlands are discussed in Section 4.

Based on the stream classification approach outlined above, it is recommended that a combination of available data specific to individual stream reaches be considered in the City of College Place's code. The resulting minimum streamside buffer widths are presented in Table 2.6-1 for waterways within the City of College Place. These buffer width recommendations are measured from the ordinary high water mark, or from the edge of channel migration zones/braided channel areas, which exists in many areas. In stream segments where CREP buffers are established, then CREP buffers become the minimum streamside buffer width. Figure 2.6-1 identifies streams with their associated recommended buffers.

2.6.2 Mitigation Recommendations

Timing Restrictions

Timing restrictions for conducting in-water work are necessary to protect habitat and life-stage requirements that differ by species and time of year. Windows for conducting work below the ordinary high water mark of freshwater systems have been established by state and federal resource management agencies. The approved freshwater fish work windows for the Walla Walla River and its associated tributaries, the general work window is from July 15 to August 15. However, for other streams in the County, the general work window is from July 15 to October 31.

Insert Figure 2.6-1

Table 2.6-1 Recommended Minimum Streamside Buffer Widths Waterways within the City of College Place			
Waterway Category	**River Reach Included**	**Existing Conditions/Targeted Functions**	**Minimum Streamside Buffer Width (per side)[1,2]**
6b	Stone Creek – Headwaters to Teal Street	-Influence on downstream habitat -Existing riparian average = 20 ft -Meet CREP minimum -Control sediment, nutrients, and stormwater runoff[3]	35 feet
	Garrison Creek – Yellowhawk to Lions Park (excluding wetland)	-Influence on downstream habitat -Existing riparian average = 24 ft -Meet CREP minimum -Control sediment, nutrients, and stormwater runoff[3] -Wildlife habitat	35 feet
	Doan Creek and all Other Creeks within city limits/UGA – Intermittent open channels with piped sections	-Influence on downstream habitat -Meet CREP minimum -Control sediment, nutrients, and stormwater runoff[3]	35 feet

[1]In stream segments where CREP buffers are established, and are larger than the minimum buffer listed in Table 2.6-1, then CREP buffers become the minimum streamside buffer width.
[2]Buffer width is measured for the ordinary high water mark.
[3]Source: Table 5-8 from Sheldon et al. 2005

Mitigation Options

Mitigation is defined as actions that are required or recommended to avoid or compensate for impacts to fish and other aquatic resources from a proposed project. Complete mitigation is achieved when these mitigation elements ensure no net loss of ecological functions, wildlife, fish, and aquatic resources. Mitigation shall be considered and implemented, where feasible, in the following sequential order of preference:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation (design criteria and use of best management practices).
- Compensating for the impact by replacing and providing substitute resources or environments through creation, restoration, enhancement, or preservation of similar or appropriate resource areas.

Regulators and applicants need to look at the watershed ecosystem as a whole when considering impacts and the use of preservation, mitigation banking, and off-site or out-of-kind mitigation as tools for salmon and watershed recovery. Despite the agreed upon benefits of a watershed-based approach, there is no guidance to assist regulators and

developers with the selection and evaluation of mitigation proposals for alternative watershed-based approaches.

In some cases, protecting high-functioning, irreplaceable areas at substantially higher ratios may be the best ecological choice and acceptable for compensatory mitigation, as long as there is no overall loss of habitat functions. There is value gained in protecting sites that are already providing high quality functions necessary for watershed health and salmon recovery efforts. For example, protecting aquatic habitat high in the watershed serves to protect downstream resources from erosion and degradation.

Preservation may be beneficial in some circumstances because; a) larger mitigation areas can be set aside due to the higher preservation mitigation ratios; b) preservation can ensure protection for high quality, highly functioning aquatic systems that are critical for the health of the watershed and aquatic resources that may otherwise be adversely affected; and c) preservation of an existing system removes the uncertainty of success inherent in a creation or restoration project.

Stormwater management is a critical issue in implementing salmon recovery and watershed improvement efforts of the state. The emphasis for stormwater management should be on prevention of impacts to aquatic resources through appropriate development regulations, and best management practice applications for erosion control, water quantity and water quality treatment. The guiding principal should be to do no further harm to aquatic resources and to build into projects and plans the incremental improvements necessary to protect, restore, and enhance the beneficial uses and functions of the state's water bodies.

Mitigation for adverse impacts to riparian habitat areas should result in the replacement of equivalent functions and values so as to result in no net loss of habitat functions and values. Mitigation projects should be located as near the alteration as feasible, and be located in the same sub drainage basin as the habitat impacted. Recommendations for mitigation include the following:

- Riparian habitat enhancement through vegetating with appropriate tree and shrub species and removal of noxious weeds
- Restoring riparian understory shrub communities
- Implementing conservation easements
- Decommissioning and/or paving roads near streams
- Debris removal
- Direct seeding
- Erosion control (native riparian vegetation planting)
- Exclosures/fencing
- Woody debris addition

Walla Walla County Conservation District has developed a native vegetation planting list, based upon three precipitation zones for the County (WWCD 2008). Vegetation recommendations within each individual precipitation zones are further broken down into three riparian zones: Zone 1 is generally 0 to 35 feet, Zone 2 is generally 35' to 75 feet, and Zone 3 is typically greater than 75 feet. Riparian zones can be adjusted based upon site specific conditions, including groundwater levels, slope of the riparian area and other factors.

Planting densities are also identified, with trees planted every 8 feet, shrubs every 4 feet, and grasses planted at 6 lbs per acre. Appendix A contains the native vegetation planting recommendations developed by the Conservation District that are applicable to the City of College Place.

2.6.3 Recommended Provisions for Non-conforming Lots and Structures

In some cases, existing parcels are too small to provide for the recommended buffers. Generally, "reasonable use" exceptions or "variance" procedures are provided for those situations. In the case of a city, such as the City of College Place, where parcels have been created over a long period without consideration of current buffer requirements, it is recommended that a streamlined process be designed to provide for development of up to 3,500 square feet on a parcel under contiguous ownership, with buffer areas provided in the remaining portion of the site.

2.6.4 Recommended Provisions for Piped/Channelized Streams

One of the most significant impacts to streams or creeks is the piping or culverting of significant length as they flow through urbanized areas. In some cases, the purpose of these actions is to limit evapotranspiration loss in irrigation canals. In other cases, the natural flow of creeks conflicts with desired transportation infrastructure or development patterns. Nevertheless, some of these highly impacted stream systems still provide fish passage for anadromous species and connectivity to upstream fish habitat.

The GMA authorizes the protection of existing habitat in critical areas, but does not require restoration of habitat. Nevertheless, piped and culverted streams represent an area where mitigation efforts can be focused at some time in the future. Daylighting of and piped/channelized streams could be a restoration effort that the City could consider. (Note: HDR has not been able to verify whether this condition is applicable to College Place).

In a first step, it is recommended that the City prevent new permanent structures from being built over these piped and culverted streams, with exemptions for transportation and utility uses. No critical habitat area buffers would be required for sections of streams that are piped or culverted, but typical building setbacks would continue to apply. In the future the City could provide greater incentives for property owners to daylight creeks, especially when these actions represent a fiscally and ecologically sound method to improve aquatic health.

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3 Terrestrial Wildlife Habitat Conservation Areas

3.1 Section Overview and GMA Requirements

This section focuses on terrestrial wildlife species and habitats in the City of College Place. The GMA established a goal of no net loss of habitat functions and values. The CTED GMA guidelines recommend that Fish and Wildlife Habitat Conservation Areas (FWHCA) include the items discussed in Section 2.1 of the County's BAS document.

Fish and wildlife habitat conservation is defined as land management intended to maintain species in suitable habitats within their natural geographic distribution so that isolated subpopulations are not created (WAC 365-190-080). Such management is considered critical and requires cooperative and coordinated land use planning (Ousley et al. 2003). Because terrestrial species also depend on aquatic habitats and wetlands, primarily in riparian and wetland buffer areas, the protection strategies for terrestrial wildlife overlap with protection of aquatic species and wetlands. Aquatic species and wetlands are addressed in Sections 2 and 4 of this document.

3.2 Inventory of Species and Habitats in the City of College Place

3.2.1 City of College Place Species Inventory

This subsection identifies federally listed species, state priority species, Natural Heritage species, certain species designated in the Walla Walla Subbasin Plan as focal species, and other species of local importance that may be present in the City of College Place. Table 3.2-1 lists the species this analysis will focus on, their status, and habitats where they may occur. This table considers animals that may be present in Walla Walla County and therefore may be present within the City of College Place. Habitats are discussed in Section 3.2.2.

Federally Listed Species

There are two federally listed species, whose historic range includes the City of College Place: Canada lynx (*Lynx canadensis*) which was listed as threatened under the ESA in 2000, and Ute ladies'-tresses (*Spiranthes diluvialis*), which was listed as threatened in 1992 (USFWS 2007a). No critical habitat designations for these species occur within Walla Walla County. In addition, two federal candidate species could occur in the City: Yellow-billed cuckoo (*Coccyzus americanus*) and the Washington ground squirrel (*Spermophilus washingtoni)* (USFWS 2007a). Federal species of concern are also listed in Table 3.2-1.

State Priority Species

As discussed in Section 2, the Washington Administrative Code (WAC 365-190-080) identifies priority habitats and priority species as separate categories of FWHCAs. Priority species are those species that require protective measures for their perpetuation due to their population status, sensitivity to habitat alteration, and/or recreational, commercial, or tribal importance. Priority species include state endangered, threatened, sensitive, and candidate species; animal aggregations considered vulnerable; and those species of recreational, commercial, or tribal importance that are vulnerable. Table 3.2-1

Table 3.2-1
Species Presence in Habitats

Common Name	Scientific Name	Federal Status	State Status	PHS	Natural Heritage	Focal Species[1]	Cliffs/Bluffs	Ponderosa Pine/Forest	Shrub-steppe	Eastside (Interior) Riparian Wetland	Agricultural Areas
Animals											
American beaver	*Castor canadensis*	-	-	-	-	Yes		x		x	
American white pelican	*Pelecanus erythrorhynchos*	-	Candidate	Yes	-	-				x	
Bald eagle	*Haliaeetus leucocephalus*	Concern	Threatened	Yes	-	-		x	x	x	
Black-crowned night-heron	*Nycticorax nycticorax*	-	Monitor	Yes	-	-				x	
Blue grouse	*Dendragapus obscurus*	-	-	Yes	-	-		x			
Brewer's sparrow	*Spizella breweri*	-	-	-	-	Yes		x	x		
Burrowing owl	*Athene cunicularia*	Concern	Candidate	Yes	-	-			x		
Canada lynx	*Lynx canadensis*	Threatened	Threatened	-	-	-		x			
California quail	*Callipepla californica*	-	-	Yes	-	-		x	x		
Caspian tern	*Sterna caspia*	-	Monitor	Yes	-	-				x	
Chukar	*Alectoris chukar*	-	-	Yes	-	-			x	x	
Ferruginous hawk	*Buteo regalis*	Concern	Threatened	Yes	-	-			x		
Flammulated owl	*Otus flammeolus*	-	Candidate	Yes	-	Yes		x		x	
Forster's tern	*Sterna forsteri*	-	Monitor	Yes	-	-				x	
Giant Columbia spire snail	*Fluminicola columbiana*	Concern	Candidate	-	-	-				x	
Grasshopper sparrow	*Ammodramus savannarum*	-	Monitor	Yes	-	Yes			x		x
Great blue heron	*Ardea herodias*	-	Monitor	Yes	-	Yes				x	x
Loggerhead shrike	*Lanius ludovicianus*	Concern	Candidate	Yes	-	-			x		x
Long-billed curlew	*Numenius americanus*	-	Monitor	Yes	-	-			x		x
Long-eared myotis	*Myotis evotis*	Concern	Monitor	-	-	-		x	x	x	
Mule deer	*Odocoileus hemionus*	-	-	Yes	-	Yes		x	x	x	
Northern goshawk	*Accipiter gentilis*	Concern	Candidate	Yes	-	-		x	x	x	
Olive-sided flycatcher	*Contopus cooperi*	Concern	-	-	-	-		x	x	x	
Ord's kangaroo rat	*Dipodomys ordii*	-	Monitor	Yes	-	-			x		
Osprey	*Pandion haliaetus*	-	Monitor	Yes	-	-		x	x	x	
Pallid Townsend's big-eared bat	*Corynorhinus townsendii pallescens*	Concern	Candidate	-	-	-		x	x	x	
Peregrine Falcon	*Falco peregrinus*	Concern	Sensitive	Yes	-	-		x	x	x	
Prairie falcon	*Falco mexicanus*	-	Monitor	Yes	-	-		x	x	x	
Rio Grande wild turkey	*Meleagris gallopavo intermedia*	-	-	Yes	-	-		x		x	
Rocky Mountain elk	*Cervus elaphus nelsoni*	-	-	Yes	-	Yes			x	x	
Rocky Mountain-tailed frog	*Ascaphus montanus*	Concern	Candidate	-	-	-		x		x	
Sage sparrow	*Amphispiza belli*	-	Candidate	Yes	-	Yes			x		
Sage thrasher	*Oreoscoptes montanus*	-	Candidate	Yes	-	Yes			x		
Sagebrush lizard	*Sceloporus graciosus*	Concern	Candidate	-	-	-		x	x		
Sharp-tailed grouse	*Tympanuchus phasianellus*	Concern	Threatened	Yes	-	Yes			x	x	
Swainson's hawk	*Buteo swainsoni*	-	Monitor	Yes	-	-			x	x	x
Washington ground squirrel	*Spermophilus washingtoni*	Candidate	Candidate	Yes	-	-			x		
White-headed woodpecker	*Picoides albolarvatus*	-	Candidate	Yes	-	Yes		x		x	
White-tailed jackrabbit	*Leups townsendii*	-	Candidate	Yes	-	-			x	x	
Yellow-billed cuckoo	*Coccyzus americanus*	Candidate	Candidate	-	-	-				x	
Yellow warbler	*Dendroica petechia*	-	-	-	-	Yes				x	
Species in the Walla Walla Subbasin that may be present in Walla Walla County (from Subbasin Plan)											
Columbia spotted frog	*rana luteiventris*	-	Candidate	Yes	-	-				x	
Common loon	*Gavia immer*	-	Sensitive	Yes	-	-		x		x	
Western grebe	*Aechmophorus occidentalis*	-	Candidate	-	-	-				x	
Golden eagle	*Aquila chrysaetos*	-	Candidate	Yes	-	-	x		x		
Merlin	*Falco columbarius*	-	Candidate	-	-	-					x
Sandhill crane	*Grus canadensis*	-	Endangered	Yes	-	-				x	
Upland sandpiper	*Bartramia longicauda*	-	Endangered	-	-	-			x		x
Vaux's swift	*Chaetura vauxi*	-	Candidate	Yes	-	-		x			
Lewis' woodpecker	*Melanerpes lewis*	-	Candidate	Yes	-	-		x			

Table 3.2-1
Species Presence in Habitats

Common Name	Scientific Name	Federal Status	State Status	PHS	Natural Heritage	Focal Species[1]	Cliffs/Bluffs	Ponderosa Pine/Forest	Shrub-steppe	Eastside (Interior) Riparian Wetland	Agricultural Areas
Pileated woodpecker	*Dryocopus pileatus*	-	Candidate	Yes	-	-		x			
Black-backed woodpecker	*Picoides arcticus*	-	Candidate	Yes	-	-		x			
Merriam's shrew	*Sorex merriami*	-	Candidate	Yes	-	-		x	x		
Black-tailed jackrabbit	*Leups californicus*	-	Candidate	-	-	-			x		
Striped whipsnake	*Masticophis Taeniatus*	-	Candidate	Yes	-	-			x		
Plants											
Thistle milk-vetch	*Astragalus kentrophyta* var. *douglasii*	Concern	E[2]	-	-	-				x	
Bristly Sedge	*Carex comosa*	-	Sensitive	-	Yes	-				x	
Gray cryptantha	*Cryptantha leucophaea*	Concern	Sensitive	-	Yes	-				x	
Beaked cryptantha	*Cryptantha rostellata*	-	Threatened	-	Yes	-			x		
Snake Canyon desert-parsley	*Lomatium serpentinum*	-	Sensitive	-	Yes	-		x		x	
Prairie lupine	*Lupinus cusickii*	Concern	Review Group 2[3]	-	Yes	-			x		
Sabin's lupine	*Lupinus sabinianus*	-	E	-	Yes	-		x			
Pulsifer's monkey-flower	*Mimulus pulsiferae*	-	Sensitive	-	Yes	-		x			
Annual sandwort	*Minuartia pusilla* var. *pusilla*	-	Review Group 1[3]	-	Yes	-		x			
Plumed clover	*Trifolium plumosum* var. *plumosum*	-	Threatened	-	Yes	-			x		
Ute ladies'-tresses	*Spiranthes diluvialis*	Threatened	Endangered						x	x	
Liverwort monkey-flower	*Mimulus jungermannioides*	Concern	E	-	-	-	x				
Mapped Plant Communities included in Natural Heritage Program											
Snow Buckwheat/Sandberg's Bluegrass	*Eriogonum niveium/Poa secunda* Dwarg-shrub Herbaceous Vegetation	-	-	-	Yes	-			x		
Bluebunch wheatgrass - Idaho fescue canyon	*Pseudoroegneria spicata - Festuca idahoensis* Canyon Herbaceous Vegetation	-	-	-	Yes	-			x		
Bluebunch Wheatgrass - Sandberg's Bluegrass	*Pseudoroegneria spicata - Poa secunda* Herbaceous Vegetation	-	-	-	Yes	-			x		

Notes:

1. Focal species were identified for the WW Subbasin, and therefore may not be present in WW County
2. E — Possibly extinct or extirpated from Washington
3. Review Group 1 — Of potential concern but needs more field work to assign another rank
   Review Group 2 — Of potential concern but with unresolved taxonomic questions

identifies the priority wildlife species that may be found within the City of College Place. Priority habitats are discussed in Section 3.2.2.

Washington Natural Heritage Program Rare Plant Designations

The following are the Washington Natural Heritage Program's rare plants in Walla Walla County (DNR 2008a) that may be present within the City:

- Bristly sedge (*Carex comosa*)
- Gray cryptantha (*Cryptantha leucophaea*)
- Beaked cryptantha (*Cryptantha rostellata*)
- Snake Canyon Desert-parsley (*Lomatium serpentinum*)
- Prairie lupine (*Lupinus cusickii*)
- Sabin's lupine (*Lupinus sabinianus*)
- Pulsifer's monkey-flower (*Mimulus pulsiferae*)
- Annual Sandwort (*Minuartia pusilla var. pusilla*)
- Plumed Clover (*Trifolium plumosum var. plumosum*)

Walla Walla Subbasin Plan Designated Focal Species

The 2004 Walla Walla Subbasin Plan designated focal species based upon the following criteria (NPCC 2004):

1. Primary association with focal habitats for breeding
2. Specialist species that are needed for or highly associated with key habitat elements/conditions important in functioning ecosystems
3. Declining population trends or reduction in their historic breeding range (may include extirpated species)
4. Special management concern or conservation status such as threatened, endangered, species of concern, and management indicator species
5. Professional knowledge on species of local interest

As shown in Table 3.2-1, the majority of these Subbasin focal species are also designated as priority species under the PHS program. Only three species, listed below, are not. These species are included in this document due to their designation as focal species in the Subbasin Plan.

- American beaver (*Castor canadensis*)

- Brewer's sparrow (*Spizella breweri*)
- Yellow warbler (*Dendroica petechia*)

3.2.2 City of College Place Habitat Inventory

Habitat is a place where animals and plants reside, find food, water, and cover, grow, and reproduce. A habitat includes the physical and biotic resources to sustain and support fish and wildlife over space and through time. Wildlife habitat is typically classified by the predominant vegetation conditions and structures, but other environmental factors influence and affect wildlife species and their habitats as well (McComb 2001; O'Neil et al. 2001).

Typical habitat functions include the ability to provide food (foraging habitat), shelter from the weather and predators, and allowing for successional reproduction (breeding habitat) as well as migration (Lemkuhl et al. 2001; McComb 2001; O'Neil et al 2001).

The value of habitat for wildlife depends on several factors including habitat types, size, configuration, and the structural complexity. Species diversity and rarity are other ways to measure the quality of habitat.

Priority habitats, as designated by the PHS program, are those habitat types or elements with unique or significant value to a diverse assemblage of species. A priority habitat may consist of a unique vegetation type or dominant plant species, a described successional stage, or a specific structural element (WDFW 2007). Of these priority habitats, only one, riparian habitat, is present in the City. In addition, City-identified habitats of local importance are included, as well as a discussion of naturally occurring ponds under 20 acres, waters of the state, natural areas/refuges/preserves, and areas critical for habitat connectivity.

3.2.3 Riparian Habitat

Description of Habitat

As a habitat, riparian areas support the highest amount of fish and wildlife biodiversity (Knutson and Naef 1997). WDFW defines riparian habitat as "the area adjacent to aquatic systems with flowing water (e.g., rivers, perennial or intermittent streams, seeps, springs) that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other." (Knutson and Naef 1997). The Walla Walla Subbasin Plan (NPCC 2004) quotes Ashley and Stovall's (2004) description of eastside riparian wetlands in eastern Washington as follows:

> "Historically, riparian wetland habitat was characterized by a mosaic of plant communities occurring at irregular intervals along streams and dominated singularly, or in some combination by grass-forbs, shrub thickets, and mature forests with tall deciduous trees. Beaver activity and natural flooding are two ecological processes that affected the quality and distribution of riparian wetlands."

The WDFW Priority Habitats and Species Program includes Riparian Areas as a Priority Habitat. The WDFW define riparian as:

> "The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. In riparian systems, the vegetation, water tables, soils, microclimate, and wildlife inhabitants of terrestrial ecosystems are influenced by perennial or intermittent water. Simultaneously, the biological and physical properties of the aquatic ecosystems are influenced by adjacent vegetation, nutrient and sediment loading, terrestrial wildlife, as well as organic and inorganic debris. Riparian habitat encompasses the area beginning at the ordinary high water mark and extends to that portion of the terrestrial landscape that is influenced by, or that directly influences, the aquatic ecosystem. Riparian habitat includes the entire extent of the floodplain and riparian areas of wetlands that are directly connected to stream courses."

Riparian Habitat in the City of College Place

Riparian habitats within the City are dominated by fast-growing deciduous species of plants like willows and cottonwood trees, manicured lawns, landscape plants, and building encroachments. Many of the limits to riparian vegetation have been in place for several decades, and most of the streamside areas within the City of College Place have been developed. This existing land use limits riparian functions within the urban land use zone. Streams that flow within the urban zone of the City of College Place provide mostly migratory corridors for fish, and riparian areas provide a discontinuous strip of corridor vegetation. These riparian areas still function well as habitat for migratory songbirds and urbanized furbearers, but do not function well as wildlife travel corridors for larger mammals, such as deer, or animals unaccustomed to human activity, such as lynx or bear.

Riparian vegetation, even exotic landscape species, provide thermal cover to stream areas and help shade aquatic habitat. Vegetation also provides habitat for invertebrates that then may fall to the stream and be consumed by fish or other aquatic organisms. Herbicides, pesticides, and ongoing human disturbance tend to limit these benefits.

Species Associated with Riparian Habitat in the City of College Place

Table 3.2-1 indicates the focal species that are associated with riparian habitat within the City of College Place.

3.2.4 Habitats of Local Importance

Due to the density of human habitation and the long history of settlement in the area, few natural habitat areas still exist within the City limits. Large tracts of habitat are limited to areas already protected as parks, such as Lions Park. These areas provide habitat for migratory songbirds and are publicly-owned.

Riparian areas are important habitat areas, even within the City and even in their low functioning state because of how they can influence stream temperature, and therefore the functioning of an entire stream system, and also because they provide habitat links through the altered landscape. Restoration is currently planned for Doan Creek, which will make this area more functional as a riparian corridor.

3.2.5 Naturally Occurring Ponds under 20 acres

Naturally occurring ponds less than 20-acres can provide important habitat for aquatic and terrestrial species. Naturally occurring ponds under 20 acres are considered wetlands and are addressed by wetland buffers (Section 4).

3.2.6 Waters of the State

Waters of the state include lakes, rivers, ponds, streams, inland waters, underground water, salt water, estuaries, tidal flats, beaches, and lands adjoining the seacoast of the state, sewers, and all other surface waters and watercourses within the jurisdiction of the state of Washington (WAC 173-183-100).

Waters of the state within the City of College Place include Garrison Creek, Stone Creek, and Doan Creek. Instream habitats for these waterways are discussed in Section 2.

3.2.7 Federal and State Natural Areas/Refuges/Preserves

There are no federal or state natural areas, refuges, preserves, or natural resource conservation areas found within the City of College Place (DNR 2008b).

3.2.8 Areas Critical for Habitat Connectivity

In the City of College Place, riparian areas serve as areas critical for habitat connectivity. Wildlife use the riparian areas along Garrison Creek, Stone Creek, and Doan Creek to migrate within the City. A restoration project of Doan Creek is currently planned, which will make this area more functional for habitat connectivity.

3.3 Code Recommendations

By implementing the following recommendations, the City of College Place would provide protection of terrestrial species and habitats that conform with the requirements of the GMA:

- Designation, Rating, and Classification: No priority habitats or species have been identified for the area within the City of College Place. In general, the riparian corridors along the streams and associated wetlands provide terrestrial species habitat within the City as identified in Figure 2.4-1.

- Buffers: The buffers recommended in Table 2.6-1 should be implemented as they incorporate riparian habitat areas.

- Timing: Some species of wildlife may be particularly sensitive to disturbance during their breeding seasons, on their wintering grounds, or during migration. Providing restrictions on when highly disturbing types of activity may occur when proposed near sensitive habitat areas is another way to protect habitat and help maintain species use of these areas. The WDFW management recommendations for bald eagles, for example, recommend minimizing disturbance between February 1 and April 15 when eagles are most sensitive to disturbance (WDFW 2008). The WDFW,

USFWS and NMFS have developed timing restrictions for work that may impact other listed species of fish and wildlife.

- Habitat Mitigation: Mitigation refers to a series of steps that project proponents can employ to first locate and avoid impacting sensitive species and habitats and then minimizing the effects of a project and ultimately compensating for any unavoidable impacts. Mitigation may result in restoration and compensatory mitigation of wildlife habitat that results in better and better functioning habitat. Where required, mitigation often includes the approval of a mitigation plan, and the posting of a mitigation bond. The mitigation plan usually includes a monitoring plan and a requirement for the project proponent to monitor the mitigation site for a given period. The plan should include measures to mitigate for impacts to FWHCA based on WDFW management recommendations and should be developed by consulting with WDFW biologists.

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4 Wetlands

4.1 Section Overview and GMA Requirements

The U.S Army Corps of Engineers (USACE) (Federal Register 1982), the Environmental Protection Agency (EPA) (Federal Register 1985), the Shoreline Management Act (SMA), and the Growth Management Act (GMA) all define wetlands as "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

Wetlands generally include swamps, marshes, bogs, and similar areas but do not include those artificial wetlands such as irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of roadways. Mitigated wetlands that are created from upland areas may be included (WAC 173-22-030).

All of the following criteria must be met for an area to be defined as a wetland:

1. Hydrophytic vegetation. Hydrophytic vegetation is defined as vegetation adapted to growing in wetland conditions (Reed 1997).

2. Wetland hydrology. Wetland hydrology criteria are considered to be satisfied if the soil was seasonally inundated or saturated to the surface for a consecutive number of days greater than or equal to 12.5 percent of the growing season (Ecology 1997).

3. Hydric soils. Hydric soil is formed when soils are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions.

Detailed description of wetland delineation methods are found in the Washington State Wetlands Identification and Delineation Manual (Ecology 1997).

4.2 Inventory of Wetlands in the City of College Place

The following section is primarily derived from the Walla Walla Subbasin Plan (NPCC 2004).

Walla Walla County lies within the rainshadow formed by the Cascade Mountains. This effect creates the semi-arid conditions that define most of the County. Because of this semi-arid condition, wetlands have formed primarily along perennial drainageways. These wetlands are generally referred to as "riparian wetlands" primarily due to their landscape position and how they interact with the surface water system in the stream. Water availability appears to limit the extent of wetlands, and therefore, riparian wetlands are the most common wetland type found within the County and the City of College Place.

Riparian wetlands within the City of College Place provide important functions to both humans and wildlife. Woody vegetation provides stability to streamside areas in times of flood or high water. The woody vegetation helps regulate temperatures within the aquatic environment, and provides habitat support for aquatic and terrestrial areas.

Riparian vegetation, particularly, the woody vegetation such as willow and cottonwood, provide habitat for insects which support both resident and migratory birds.

Stone Creek and Doan Creek provide some riparian wetland habitat, but habitat functions are limited in these systems by existing land use and because these systems provide discontinous corridor habitat and are not accessible to anadromous fish. Future restoration efforts may restore connectivity and improve habitat conditions. Wetlands within the City of College Place are shown on Figure 4.2-1.

4.2.1 Wetland Identification

Wetlands within the City of College Place were identified by two steps: reviewing existing information and conducting limited reconnaissance-level fieldwork. These two steps are discussed in detail below.

Document Review

The following information was reviewed to determine the presumed presence of wetlands in the study area:

- National Wetland Inventory (NWI) maps (online at http://wetlandsfws.er.usgs.gov/wtlnds/launch.html)

- The NWI map identified wetlands in Walla Walla County based on the USFWS wetland classification system (Cowardin et al. 1979). The USFWS wetland classification system, also called as the Cowardin classification system, characterizes wetlands according to water sources and vegetation types.

- WDFW Priority Habitat and Species Data

- Soil Survey for Walla Walla County (http://websoilsurvey.nrcs.usda.gov/app/)

- Aerial photographs

Field Investigation

Qualified wetland scientists conducted field reconnaissance surveys in May 2008 to verify the existence of wetlands identified by document review. This effort, while brief and not comprehensive confirmed the notion that the presence of wetlands is limited within the City. Wetland data from field work done in the County is provided in Appendix B.

Wetland scientists met with the Conservation District to learn about wetlands of local importance, and the range of conditions expected to occur in the City of College Place. The CREP program, administered by the Farm Services Agency and the Conservation District, uses national criteria to establish appropriate buffer zones along qualifying streams. This program provides an effective template for riparian revegetation throughout the area.

Insert Figure 4.2-1 (11x17)

Some wetlands that were included within the NWI mapping of the City were removed from Figure 4.2-1 because they were determined to be man-made, and not associated with a natural drainage course. These wetlands generally included areas that were designed as water quality treatment systems, or wetlands or ponds that were fed by pumps and then water levels were controlled with control structures. These include farm ponds or ornamental ponds near rivers.

The field investigation revealed that most wetlands within the City would be classified as:

- Riverine, flow-through (usually within the ordinary high water mark of the stream or river)
- Riverine, impounded (usually abandoned side channels or off-channel areas fed by groundwater or only high flows)
- Depressional, open (usually in headwater areas and may be culvert-controlled)
- Depressional, closed (classification reserved for vernal pool type wetlands)

To evaluate the potential and opportunity for wetlands in the City of College Place to perform specific functions, biologists rated select wetlands according to the Washington State Wetland Rating System for Eastern Washington – Revised 2007. Riverine flow-through, Riverine impounded and Depressional open were evaluated in the field. This effort revealed that wetlands that occur along major fish-bearing rivers, like the Walla Walla River are capable of providing many functions well. It is likely that riparian wetlands associated with these major river/riparian corridor areas will rank Category I or II under the state rating system.

Smaller streams are also maintained by well-functioning wetlands. Smaller streams may be particularly dependent on headwater seep-driven wetlands even though these wetlands score lower for habitat functions. Wetlands associated with smaller streams are likely to rate as Category II or III wetlands according to the state wetland rating system.

Depressional wetlands that display surface water outlets are usually associated with headwater areas. These wetlands also may play significant roles maintaining stream functions, but may not score high for habitat functions. Depressional wetlands with no outlet appear to be rare in Walla Walla County.

4.3 Wetland Functions and Values

Wetlands potentially perform a variety of unique physical, chemical and biological functions which are beneficial for both the human and biological environment (NRC 1995; Brinson and Rheinhardt 1996). These functions include flood storage and retention, stream base flow maintenance and groundwater support, improving water quality, shoreline protection, and biological support for fish and wildlife habitat (Null et al. 2000; Adamus et al. 1987; Hruby et al. 1999). Because of their unique combination of water and biodiversity, wetland areas are also used by humans for a broad range of recreational, educational, and aesthetic activities including bird watching and hunting.

Factors affecting wetland function include size of wetlands, location, vegetation diversity, and the level of disturbance. Not all wetlands perform all functions, nor do they perform all functions equally (Novitzski et al. 1995). More information about wetlands functions and values is provided in Section 4 of the County's BAS document.

4.4 Human Activity and Wetland Habitat Functions

Human activities may alter wetland functions and values that could have both positive and negative effects. For example, agriculture, mining, urbanization, and construction of utilities, in-water structures, and roads could have negative impacts whereas restoration, enhancement, dam removal, and control of invasive species could result in beneficial effects on wetlands (Mitsch and Gosselink 2000; Booth 2000; Sheldon et al. 2005). More information about human activity and wetland habitat functions is provided in Section 4 of the County's BAS document.

4.5 Wetland Protection and Regulation

Wetlands in the City of College Place are currently regulated at the federal, state, and local levels. Under Section 404 of the Clean Water Act, the USACE regulates discharges of dredged or fill materials into waters of the United States, including wetlands. Additionally, Section 401 of the Clean Water Act requires that any activities permitted under Section 404 meet water quality standards regulated by state and tribal governments. Wetlands for all farm program participants are regulated by U.S. Department of Agriculture (USDA) under the Food Security Act. The City's existing CAO also regulates activities that could impact wetlands.

The GMA requires cities and counties to designate critical areas including wetlands by adopting development regulations (RCW 36.70A.130). Detailed information about the regulatory options for protecting wetlands is provided in Section 4 of the Walla Walla County BAS document.

Regulatory Recommendations

Both the USACE and Ecology have established a coordinated framework for assessing impacts to wetlands and mitigation of such impacts (Ecology et al 2006a; Ecology et al 2006b) It is recommended that the City of College Place adopt regulations that are as consistent as possible with this state and federal framework, and consistent with County policies. This will ensure that a prospective applicant will develop their projects in a manner that meets the requirements of all three levels of jurisdiction, and that City approvals will be consistent with state and federal approvals, thereby minimizing conflicting requirements for the permittee.

The following requirements would therefore be incorporated into the City's regulations:

- Wetland delineation: the City would require that wetlands be delineated in accordance with the Washington State Wetlands Identification and Delineation Manual for delineating wetlands (RCW 36.70A.175, Chapter 173.22.080 WAC).

  It should be noted that the Corps has developed supplements to the 1994 delineation manual that the state's manual must comport with. This is the Arid West Supplement (U.S. Army Corps of Engineers. 2006. *Interim regional supplement to*

the Corps of Engineers Wetland Delineation Manual: Arid West Region. ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-06-16. Vicksburg, MS: U.S. Army Engineer Research and Development Center.)

The Corps now requires this supplement to the 1987 manual be used in the arid interior west, which includes all of Walla Walla County. Ecology typically will accept the use of this manual in place of the Ecology manual until the Ecology manual is updated and republished to incorporate the changes. In cases where only isolated wetlands are affected, the applicant can choose which manual they use; Ecology's preference is to use both so that they may evaluate any changes to delineation lines that may be expected from the new supplement.

- Wetland rating: the City would require that wetlands be rated according to the Washington State Wetland Rating System for Eastern Washington – Revised, Ecology Publication No. 04-06-15, unless updated.

- Wetland exemptions: the City should allow minor activities without review, but no activity should be allowed that degrades the functions and values of the critical area affected.

- Wetland reporting: It is recommended that the City require documentation that aligns as closely as possible with the requirements of Ecology and the USACE (Ecology et al 2006b). This will simplify the permitting procedure across local state and federal requirements for the prospective applicant.

Ecology is responsible for administering the State Water Pollution Control Act (RCW 90.48). Under this state law, wetlands are "waters of the state," including wetlands considered "isolated" by the Corps via the Corps Jurisdictional Determination process (requested from the Corps in writing by an applicant). Discharges to waters of the state, including the placement of fill in a wetland, are regulated by Ecology under chapter 90.48 RCW. Thus, the state Department of Ecology is continuing to regulate isolated wetlands and to apply the water quality standards called for in the state law. However, the department's process for reviewing projects involving isolated wetlands is now different from the process for other types of wetlands.

Instead of using the 401 Water Quality Certification process (triggered by a 404 permit from the Corps), Ecology uses Administrative Orders to regulate projects involving isolated wetlands. The review standards and elements within the Order remain the same as those found in the 401 Certification.

The State Water Quality Standards consist of three main elements: characteristic uses of surface waters and numerical criteria for conventional water quality parameters that are not to be exceeded (173-201A-130), and an antidegradation policy (173-201A-070). The antidegradation policy establishes the bottom line for water quality protection in the state: "Existing beneficial uses shall be maintained and protected and no further degradation which would interfere with or become injurious to existing beneficial uses shall be allowed. Beneficial uses are more or less equivalent to wetland "functions and values" and therefore include: water supply, surface and groundwater treatment, stormwater attenuation, fish and shellfish migration, rearing, spawning, and harvesting, wildlife habitat, recreation, support of biotic diversity, and aesthetics.

4.5.1 Wetland Buffers

Wetland Buffers Values and Functions

Buffers are relatively undisturbed, vegetated areas adjacent to wetlands that can reduce impacts through physical, chemical, and/or biological processes. Buffers generally provide habitats for wildlife species, but primary function of buffers is to protect and maintain many functions and values of wetlands described above. The scientific literature provides considerable guidance on buffer characteristics and effectiveness of providing functions (Sheldon et al. 2005).

Wetland buffers may provide the following functions to protect and maintain wetland functions:

- Remove sediment
- Remove excess nutrients (phosphorus and nitrogen)
- Remove toxics (bacteria, metals, pesticides)
- Influence the microclimate
- Maintain adjacent habitat critical for the life needs of many species that use wetlands
- Screen adjacent disturbances (noise, light, etc.)
- Maintain habitat connectivity

Buffer Recommendations

- Buffers for wetland critical areas: In order to protect the values and functions of wetland critical areas, BAS clearly recommends the implementation of buffers around wetlands. Prospective permittees would be required to evaluate the impact of their projects on both wetlands and wetland buffers and implement best management practices in both of these types of areas. Buffers should be consistent with those recommended by Ecology in the Wetlands in Washington State. Volume 2: Guidelines for Protecting and Managing Wetlands (Granger et al. 2005) with incorporation of mitigation impacts in site design and buffer screening.

- Buffer widths: Wetland buffers for the City of College Place should be applied according to the Ecology Alternative 3A method, meaning that larger buffers should be applied to wetlands that serve significant habitat functions. The following standards do not preclude the County from conditioning land use decisions to include larger or smaller buffers. These standards are meant to be a guideline, and a means to simplify project reviews. Site-specific management plans are the best way to preserve functions and values and should be encouraged as part of the land use decision process. The standards presented reflect CREP evaluation criteria, Ecology recommendations, and existing conditions. Wetlands that qualify as Category 1 Wetlands due to “Special Characteristics,” such as natural heritage site, bogs, alkali wetlands and mature forested systems would receive specific buffers as shown in in Table 4.5-1.

- Buffer width adjustment: It is recommended that the City allow changes (i.e. increases, reductions, or enhancements) in the proposed buffer widths if proper mitigation or conditions are present.

- Low impact development and stormwater management: It is recommended that the City encourage projects that implement low impact development techniques, since these techniques benefit many types of critical areas.

Table 4.5-1
Recommended Buffer Widths under Alternative 3

Wetland Characteristics	Buffer Width by Impact of Proposed Land Use	Other Measures Recommended for Protection
Category IV Wetlands (For wetlands scoring less than 30 points or more for all functions)		
Score for all 3 basic functions is less than 30 points	Low – 25 ft Moderate – 40 ft High – 50 ft	No recommendations at this time[1]
Category III Wetlands (For wetlands scoring 30-50 points or more for all functions)		
Moderate level of function for habitat (score for habitat 20-28 points)	Low – 75ft Moderate – 110ft High – 150 ft	No recommendations at this time[1]
Not meeting above characteristic	Low – 40 ft Moderate – 60 ft High – 80 ft	No recommendations at this time[1]
Category II Wetlands (For wetlands that score 51-69 points or more for all functions or having the "Special Characteristics" identified in the rating system)		
High level of function for habitat (score for habitat 29-36 points)	Low – 100 ft Moderate – 150 ft High – 200 ft[2]	Maintain connections to other habitat areas.
Moderate level of function for habitat (score for habitat 20-28 points)	Low – 75ft Moderate – 110ft High – 150 ft	No recommendations at this time[1]
High level of function for water quality improvement and low for habitat (score for water quality 24-32 points; habitat less than 20 points)	Low – 50 ft Moderate – 75 ft High – 100 ft	No additional surface discharges of untreated runoff
Vernal pool	Low – 100 ft Moderate – 150 ft High – 200 ft OR Develop a regional plan to protect the most important vernal pool complexes – buffers of vernal pools outside protection zones can then be reduced to: Low – 40 ft Moderate - 60 ft High – 80 ft	No intensive grazing or tilling of wetland
Riparian forest	Buffer width to be based on score for habitat functions or water quality functions	Riparian forest wetlands need to be protected at a watershed or subbasin scale Other protection based on needs to protect habitat and/or water quality functions
Not meeting above characteristic	Low – 50 ft Moderate – 75 ft High – 100 ft	No recommendations at this time[1]

Table 4.5-1 Recommended Buffer Widths under Alternative 3		
Wetland Characteristics	**Buffer Width by Impact of Proposed Land Use**	**Other Measures Recommended for Protection**
Category I Wetlands (For wetlands that score 70 points or more for all functions or having the "Special Characteristics" identified in the rating system)		
Natural Heritage Wetlands	Low – 125 ft Moderate – 190 ft High – 250 ft	No additional surface discharges to wetland or its tributaries. No septic systems within 300 ft of wetland. Restore degraded parts of buffer.
Bogs	Low – 125 ft Moderate – 190 ft High – 250 ft	No additional surface discharges to wetland or its tributaries. Restore degraded parts of buffer.
Alkali	Low – 100 ft Moderate – 150 ft High – 200 ft	No additional surface water discharges to wetland or its tributaries Restore degraded parts of buffer
Forested	Buffer width based on score for habitat functions or water quality functions	If forested wetland scores high for habitat, need to maintain connections to other habitat areas.
High level of function for habitat (score for habitat 29-36 points)	Low – 100 ft Moderate – 150 ft High – 200 ft	Restore degraded parts of buffer. Maintain connections to other habitat areas
Moderate level of function for habitat (score for habitat 20-28 points)	Low – 75ft Moderate – 110ft High – 150 ft	No recommendations at this time[1]
High level of function for water quality improvement (24-32 points) and low for habitat (less than 20 points)	Low – 50 ft Moderate – 75 ft High – 100 ft	No additional surface discharges of untreated runoff
Not meeting above characteristics	Low – 50 ft Moderate – 75 ft High – 100 ft	No recommendations at this time[1]

1. No information on other measures for protection was available at the time the document was written. Ecology will continue to collect new information future updates to this document.

2. Fifty of the 122 wetlands used to calibrate the rating systems for western Washington were Category II. Of these 50, only five (10 percent) would require 300-ft buffers to protect them from high-impact land uses. The maximum buffer width for the remaining 45 wetlands would be 150 ft.

4.6 Wetland Mitigation

Mitigation is a sequential process to avoid, minimize, or compensate for the loss of functions and values of wetlands from the proposed impacts. When the proposed project has the potential to adversely affect a wetland, federal and state government agencies generally require the mitigation sequencing to be used for addressing impacts to wetlands. According to the Washington State Environmental Policy Act (WAC 197-11-768), mitigation sequencing is defined as:

1. Avoiding the impact all together by not taking a certain action or parts of an action;

2. Minimizing impacts by limiting the degree of magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts;

3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;

4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;

5. Compensating for the impact by replacing, enhancing, or providing substitute resources or environments; and/or

6. Monitoring the impact and taking appropriate corrective measures.

The majority of local jurisdictions in Washington implement these guidelines through local critical area regulations. Local jurisdictions generally require compensatory mitigation as the fifth mitigation element, only after the first four have been addressed. Compensatory mitigation is required when wetlands and/or their buffers are impacted from development or associated activities. Types of compensatory mitigations include creation, rehabilitation, enhancement, and preservation (Gwin et al. 1999; Sheldon et al. 2005). The different types of compensatory mitigation take place either on-site or offsite but are typically applied within the same basin. Mitigation guidance prepared by the WA Department of Ecology, the Corps and EPA titled Wetland Mitigation in Washington State, Parts 1 and 2 provides specific details on mitigation plans.

4.6.1 Wetlands Mitigation Recommendations

Both the USACE and Ecology have established a coordinated framework for mitigating impacts to wetlands, and providing compensatory mitigation to off-set losses of wetlands (Ecology et al 2006a; Ecology et al 2006b). It is recommended that the City of College Place adopt regulations that are as consistent as possible with this state and federal framework. This will ensure that mitigation projects are reviewed and approved by local, state and federal agencies using on a consistent basis, and provide the least uncertainty for prospective permittees. The City should also consider a wetland banking system as a future option.

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5 Geologically Hazardous Areas

5.1 Section Overview and GMA Requirements

This section describes geologically hazardous areas that can be found in the City of College Place and summarizes the scientific literature concerning various types of geologic hazards. The section also presents the management and protection tools for these areas that can be implemented through a CAO and other City ordinances.

This section was prepared as an addendum to Section 5 of the Walla Walla County BAS document. According to WAC 365-190-080 (4)(a), geologically hazardous areas include areas susceptible to erosion, landslides, earthquakes, volcanic eruptions, or other geological events. These areas can pose a threat to the health and safety of citizens when incompatible commercial, residential, or industrial development is sited in areas of significant hazard. Some geologic hazards can be reduced or mitigated by engineering, design, or modified construction practices so that risks to health and safety are acceptable.

5.2 Overview of the City of College Place's Geological Setting

5.2.1 Regional Setting

Walla Walla County lies within the southeastern part of the Walla Walla Plateau section of the Columbia Plateaus physiographic province (Freeman et al., 1945), and the City is in the southeastern area of the County, west of the City of Walla Walla. The Columbia Plateaus is bounded by the northern Rocky Mountains to the east and the Sierra Nevada-Cascade region to the west. Noted for its diverse landforms in Oregon, Idaho, and Washington, the Columbia Plateaus covers approximately 100,000 square miles. The Columbia Plateaus consist of relatively uniform basaltic lava flows that contain significant folding and faulting, causing elevations to range from approximately 200 to 5,000 feet above mean sea level (MSL). Older mountains (i.e., Blue Mountains and Wallowa Mountains) protrude through the lava flows in select areas.

The terrain of the Columbia Plateaus is almost uniformly harsh and arid; it contains coulees, scablands, and other phenomena characteristic of a rush of glacial waters across the land surface, with isolated volcanic features. Sedimentary deposits are mixed with the lava, and the loess is deep enough on some surfaces to provide fertile land. The plateau encompasses lands within the Big Bend of the Columbia River in Washington (the Walla Walla Plateau), the Blue Mountains of eastern Oregon, the Snake River Plain of southern Idaho, and the Harney Desert of southern Oregon.

5.2.2 Physiographic Divisions

Based on contrasting topographic features, climate, and other distinguishing characteristics, Walla Walla County is broken into the Walla Walla and Blue Mountain sections, or physiographic divisions. The Walla Walla section is considered the upper, eastern edge of the greater Columbia Basin and consists of "rolling, treeless upland, deeply mantled by fine, windborne deposits of silt that overlie the previously eroded and incised Columbia River basalt. Thick lake and stream-terrace deposits…" (Harrison et al. 1964) line the valley floor.

Within the Walla Walla section, distinct physiographic features distinguish the Walla Walla Valley, Mill Creek Fan, Gardena Terrace, Eureka Flats, and the Wallula Gap subsections. The Walla Walla Valley consists of Walla Walla River and Mill Creek deposits. The City of College Place lies at approximately 949 feet MSL.

5.2.3 NRCS Soil Survey

The Natural Resources Conservation Service's (NRCS's) Soil Survey (formerly USCS Soil Survey) of Walla Walla County groups 16 soil associations into seven "General Soil Areas." More detailed information is available in Section 5 of Walla Walla County's BAS document. Three of the "General Soil Areas" occur in the City. The areas and predominant soil associations are briefly described in Table 5.2-1.

Table 5.2-1
Description of General Soil Areas and Relevant Soil Associations

General Soil Area	Predominant Soil Associations[1]	Description
1) Bottom Lands and Low Terraces Nearly level to gently sloping stream bottoms and low terraces, soil associations account for large percentage of irrigated farms.	1. Snow-Patit Creek	Found in the upper valleys of major streams; generally deep, well-drained soils formed from alluvium washed from the uplands; annual precipitation ±16-24 inches.
	2. Yakima-Hermiston-Ahtanum	Found in Mill Creek drainage system, and lower valleys of Cottonwood, Reser, and Russell Creeks; also includes small areas of the Catherine, Pedigo, Onyx, and Touchet soils; consists of mixed soils on alluvial fans, stream bottoms, and small outwash plains; annual precipitation ±12-16 inches.
	3. Onyx-Hermiston-Pedigo	Found along Dry Creek above Sudsbury and along the Touchet River above the Shaw Bridge; formed from deep alluvium washed from the uplands, deep, mostly well-drained; annual precipitation ±12-16 inches.
	4. Esquatzel	Found on the wide bottoms of the lower Walla Walla and Touchet Rivers; also has small inclusions of the Onyx, Pedigo, and Umapine soils; deep, well-drained soils annual precipitation ±8-12 inches.
	5. Umapine-Stanfield	Found in the Walla Walla Valley, including areas of Onyx and Touchet soils on the Walla Walla River flood plain; saline or alkaline soils; annual precipitation ±8-12 inches.
2) Loessal Uplands	6. Athena-Palouse	Occupies a narrow belt along the eastern edge of the loessal upland; dark-colored, well-drained soils annual precipitation ±16-24 inches.
	7. Walla Walla	Occupies a 6-10 mile wide area that extends from Walla Walla northeast to Columbia County; well-drained, mostly deep soils annual precipitation ±12-16 inches.
	8. Ritzville	Occupies approximately the western half of the loessal uplands; well-drained soils that lie at a depth of 30-36 inches; annual precipitation ±8-12 inches.

Table 5.2-1 Description of General Soil Areas and Relevant Soil Associations		
General Soil Area	**Predominant Soil Associations[1]**	**Description**
4) Loessal and Lake-Laid Terraces	10. Ellisforde-Ritzville	Occupies the strongly rolling to hilly uplands north of the Walla Walla Valley, on both sides of the Touchet River; also includes small areas of Sagemoor and Esquatzel soils, and rock land; well-drained to somewhat excessively drained, loessal soils; annual precipitation ±9-12 inches.
	11. Sagemoor-Ellisforde	Found in the lower Walla Walla Valley, also includes small scattered areas of saline-alkali soils, Basalt rock land, and Farrell soils; well-drained to excessively drained soils over stratified lake deposits; annual precipitation generally ±6-8 inches.

1. Numbers coincide with numbering system in NRCS Soil Survey of Walla Walla County (1964).

5.2.4 Groundwater

Groundwater levels likely vary based on characteristics of the local sediments, proximity to water bodies, underlying rock characteristics, time of year, etc. Based on well data available from Ecology (http://apps.ecy.wa.gov/welllog/MapSearch), the local groundwater table ranges from greater than 100 feet in the northern area to less than 10 feet below ground surface (bgs) in the bottom lands.

Perched groundwater may exist when water becomes trapped on relatively impermeable layers of clays, silts, and/or cemented materials. Based on the general soil descriptions listed in Table 5.2-1, perched conditions are likely limited and only occur in isolated areas, most notably during the winter months.

5.2.5 Faulting and Seismisity

For the purpose of fault activity classification, faults are often grouped into the categories shown in Table 5.2-2.

Table 5.2-2 Fault Classification[1]	
Latest Known Movement (Geologic Time)	**Description**
Historic	Displacement during historic time (approximately the last 200 years)
Holocene	Displacement has occurred within the last 11,000 years
Late Quaternary	Displacement has occurred within the last 700,000 years but evidence of Holocene activity is lacking
Quaternary	Evidence of displacement within the last 1.6 million years
Pre-Quaternary	No recognized evidence of displacement in Quaternary time

1. After Jennings, 1994 and Hart, 1997.

Faults with Historic or Holocene rupture are often considered "active." Table 5.2-3 lists recognized faults located within 63 miles of the City. Due to the relatively light to moderate number of studies completed on the regional fault systems, Maximum Earthquake Magnitudes (Moment Magnitude, MW), which are based on seismological data such as maximum historic earthquakes and on geologic data such as fault length

and fault displacement parameters, are not available. The faults listed are considered to have the greatest potential for impacting the City if they were to rupture.

The major tectonic element in southeastern Washington is the northwest-trending Olympic-Wallowa lineament (OWL), including the Wallula Fault Zone. The OWL is in part a strike-slip fault system that is aligned with many of the anticlines of the Yakima fold belt (Tolan and Reidel 1989). Most of the Yakima fold belt structures plunge to the east and die out in central Washington, but the Horse Heaven Hills anticline continues east across southern Washington and intersects the larger Blue Mountains anticline in northern Oregon. Between the Columbia River and the Blue Mountains, the OWL is formed by a 650-foot high escarpment that marks the trace of the Wallula Fault Zone, a series of high-angle en echelon faults that display evidence for both dip-slip and strike-slip motion.

The Hite Fault intersects the OWL at an approximate right angle 22 miles southeast of Walla Walla. This northeasterly-striking fault disappears near Lower Granite Dam on the Snake River (Tolan and Reidel 1989). On July 15, 1936, the Walla Walla area experienced an intensity VII (approximately magnitude 6) earthquake (Brown 1937). The earthquake and its aftershocks may have been caused by movement on the Wallula Fault Zone and/or the Hite Fault.

Table 5.2-3
Faults Located Within approximately 63 miles of the City of College Place

Fault Name	General Location	Most Recent Deformation (Ma)
Olympic-Wallowa Lineament (Wallula Fault Zone)	±8 miles southwest, oriented northwest to southeast	<0.015 to 1.6
Hite Fault System	±12 miles east, oriented north-northeast to south-southwest	<0.750 to 1.6
West Grande Ronde Valley Fault Zone	±29 miles southeast, oriented north-northwest to south-southeast	<.015
East Grande Ronde Valley Fault Zone	±30 miles southeast, oriented north-northwest to south-southeast	<0.015
Saddle Mountains Structures	±60 miles northwest, oriented west to east-southeast	<0.130 to 1.6
Columbia Hills Structures	±59 miles southwest	<1.6
Wallowa Fault Zone	±47 miles southeast, oriented northwest to southeast	<0.750
Unnamed Faults near Jaussaud Creek	±27 miles east-southeast, oriented northeast to southwest	<1.6

5.3 Overview of Applicable Geologic Hazards and Engineering Constraints

5.3.1 Faulting and Ground Shaking

Due to the proximity of "active" faulting to the City boundaries, transportation corridors, and population centers, the potential for significant ground rupture and/or fault creep (if either or both should occur within the City during a seismic event) is low. However, some degree of ground motion resulting from seismic activity in the region is expected.

The United States Geological Survey (USGS) National Seismic Hazards Maps indicate that for a seismic event with a two percent probability of exceedance in 50 years, the City should expect peak horizontal bedrock accelerations (PHBA) of approximately 0.13 to 0.18g.

5.3.2 Liquefaction

Liquefaction can occur when loose to medium dense, granular, saturated soils (generally within 50 feet of the surface) are subjected to ground shaking. The City lies within historic drainage basins with generally high groundwater conditions. According to DNR's Liquefaction Susceptibility Map of Walla Walla County, Washington (Palmer 2004), the majority of the City is mapped as "moderate to high" with interspersed "fingers" labeled as "low to moderate." Figure 5.3-1 shows areas considered potentially susceptible to liquefaction.

5.3.3 Landslides and Slope Stability

According to mapping by WDNR, landslides are generally confined to areas with approximately 40 percent or greater slopes. In a study on landslides in Washington after the February 5-9, 2006 storm event, the USGS (Harp, et al., 1997) states that the County experienced the "highest concentration (in the state)…at the northwest edge of the Blue Mountains…." Washington State Department of Transportation (WSDOT) also indicates "…localized landslides in loess cuts…" are common (Anderson, et al. 2005) in their study for the Hwy 12 realignment project, west of the City. Small, localized events of this nature likely go unrecognized due to their relatively minimal impact to property and economics.

The landslides at the northwest edge of the Blue Mountains generally consisted of shallow, surficial slumps of fine-grained, virtually saturated, loess materials immediately underlain by sloping bedrock conditions. The localized events along the Hwy 12 realignment corridor are similar in that they generally occur during or shortly after extreme precipitation events. We believe landslides of this frequency pose a very low hazard in the City due to the extreme events required to trigger such occurrences. However, the potential for localized slumping of loess deposits exists. Figure 5.3-2 shows the slopes within the City of College Place.

5.3.4 Seismically Induced Sediment

During a seismic event, ground shaking can cause densification of soil that can result in settlement of the ground surface. Due to the presence of relatively young outburst flood deposits, particularly within the low-lying river bottom areas, some degree of densification may occur at anticipated ground motion levels. Therefore, we consider the potential for seismically induced ground settlement as low to moderate.

5.3.5 Collapsible Soil

Based on the non-uniform arrangement of soil particles typically associated with loess soil deposits, the possibility of collapsible soils exist, particularly under new development and during the seasonally wetter portions of the year. Site selection, grading, and foundation design should consider potential collapsible soils. The potential for collapsible soils that may result in potentially damaging effects is likely moderate to high and generally confined to loess deposits.

5.3.6 Volcanic Activity

According to the USGS (1997), the annual probability of 10 centimeters or more of ash (tephra) to fall within the City from volcanoes known to be active in the last 4,000 years (all located in the Cascade Mountain Range) is 0.01 percent, or less. The potential hazards associated with volcanic activity is likely low.

5.3.7 Flooding/Earthquake Induced Flooding

The Federal Emergency Management Agency (FEMA), National Flood Insurance Program, Flood Insurance Rate Maps (FIRM) dated September 7, 2001 indicates that much of the low-lying bottom areas along rivers and creeks lie within the 100-year floodplain.

In 1942, the U.S. Army Corps of Engineers (USACE) completed the Mill Creek Flood Control Project. The USACE constructed a silt embankment and diversion structure from the main branch of Mill Creek, essentially creating an off-channel reservoir (Virgil B. Bennington Lake) to protect the urban area from flooding. The reservoir is located approximately one mile east of the City of Walla Walla. When full, the reservoir contains approximately 53 surface acres of water. In the event of a dam failure, impounded water would flow into downstream creeks (Russell, Yellowhawk, and Cottonwood) that pass through or near the southern UGAs of Walla Walla and College Place. The City should consult with the USACE to assess the potential likelihood of failure of the embankment and diversion structures and the inherent consequences.

5.3.8 Tsunamis or Seiches

Tsunamis are great sea waves typically generated by ground shaking or ground displacement. A seiche is wave action created within restricted bodies of water, typically in response to an earthquake or earthquake induced landslide. Based on the City's location relative to the sea and the absence of large water bodies, the potential for tsunamis or seiches is nonexistent.

5.3.9 Erosion

The potential for erosion from wind and water varies depending on the physical properties of individual soil associations, including clay content, particle size and shape, depositional environment, etc. Erosion potential due to stormwater runoff and the thawing of ice and snow generally increases with the increase in slope gradient. Similarly, topography is also a factor of wind erosion, although to a lesser extent. Based on definition, many of the soils within the City consist of fine-grained, wind-blown deposits (loess) and alluvium. Therefore, their potential for wind erosion is relatively high.

According to customary practices, Erosion Hazard Areas include "Areas with a slope greater than 15 percent." Based on slope data from the NRCS Soil Survey, we list the following slope ranges (Table 5.3-1) to categorize the soil associations. According to the NRCS data, many of the categories' slope ranges overlap each other due to the presence of certain soil associations to exist across a broader range of slopes.

Insert Figure 5.3-1 (11x17)

Insert Figure 5.3-2 (11x17)

Table 5.3-1 Slope Categories	
Slope Range (percent)	**Comments**
Less than 15	No slope hazard.
Less than 30	Mix of slope areas; potential slope hazard, evaluate on case-by-case basis.
15 to 30	Generally located in transitional topographic areas.
30 to 45	Occurs mostly in steeper areas surrounding the City (Athena, Ellsforde and Walla Walla soils).
30 to 60	Limited steep areas surrounding the City (Basalt rock land and Walvan soils).
45 to 60	Limited steep areas surrounding the City (Basalt rock land and a few areas of
>60	Terrace escarpments

Based on topographic overlay of the Geologic Hazards Slope Map, we note that current topographic information and NRCS data may not be consistent. Specifically, we note areas mapped with slopes from 15 to 30 percent (according to NRCS) and located northwest to northeast and southeast of Cities of Walla Walla and College Place. Current topographic contours suggest slopes in these areas may actually be as low as 1 to 2 percent. We recommend field verification and updated mapping for these areas.

To classify the County's various soil associations for potential susceptibility to water and wind erosion, we considered the intent of this ordinance. Specifically, when looking at water erosion, the Universal Soil Loss Equation (USLE) is often applied. However, the equation is focused on the effects from the natural environment; it is not readily applicable to development conditions. The USLE considers such factors as ground cover type and amount, slope length, annual precipitation, etc. However, we understand the intent of this ordinance is to guide development. Under development conditions, key factors of the USLE either are not applicable (i.e., ground cover, assuming worst case scenario and common practice, development strips the land) or are considered negligible compared to potential effects development will introduce (i.e., concentrated flows of irrigation or site run-off, etc. versus typical precipitation events). A common equation to assess wind erosion is the Wind Erosion Equation (WEQ), which again, is primarily directed towards application to natural or managed landscapes, not development. The WEQ considers vegetative cover, soil crust factor which is computed from clay and organic matter contents, climatic factor, etc. In large part, the same holds true for typical methods to quantify wind erosion and water erosion. However, we do acknowledge a shortcoming of our wind erosion assessment, that being a climatic factor including average wind speeds should be included. Comprehensive wind data is not readily available to use in our rating system. Therefore, our wind ratings are based solely on the NRCS soil erodibility factor, a physical properties assessment. In summary, wind and water erosion as rated herein, are developed to guide development decisions. The ratings represent worse case scenarios potentially introduced during development, not our assessment of the native, undisturbed soils.

In Tables 5.3-2 and 5.3-3, we list each soil association (by symbol) located in the City UGA according to assigned ratings for water and wind erosion, respectively. In Appendix C, we list each soil association (name and symbol), slope information, and

their potential for erosion (wind and water) according to the NRCS Soil Survey of Walla Walla County.

Based on the ratings in Table 5.3-2, we provide a breakdown of the General Soil Areas generally associated with the different water erosion ratings. Within each General Soil Area, isolated areas (soil associations) exist that differ from the general ratings assigned (see Table 5.2-1). Figure 5.3-3 shows the susceptibility of City of College Place to water erosion.

High to very high: Fine-grained soils (silt loam), particularly on slopes (Loessal Uplands, and Loessal and Lake-Laid Terraces)

Moderate: Alluvial land, hardpan, and gravelly/cobbly soils

Slight: Basalt rock land and gravelly/cobbly soils

Table 5.3-2
Water Erosion Ratings of Soil Associations

	Very High	High	Moderate	Slight	Non-Susceptible
Soil Association Symbol	AmA, EfE2, RlD, RlD2, RlE2, RvB, VaC, WvB, WvD2, WvF2	AtB, AtD, AtD2, AtE, AtE2, CaA, EfB, EfC, EfD, EyA, HmA, HnA, OnA, PmA, PoA, SoA, SrA, SsA, StA, SvA, TsA, UmA, UpA, UwA, WaB, WaD, WaD2, WaE, WaE2, WaF, WhB WIB, WID, WID2	An, EhB, PkA, Tc, ToA, YmA	BcF, YaA, YkA	BcG, Bp, Rw

Table 5.3-3
Wind Erosion Ratings of Soil Associations

Soil Association Symbol	Very High	High	Moderate	Slight to Non-Susceptible
	RvB, VaC, WvB, WvD2, WvF2	AmA, An, EfE2, EyA, HnA, PmA, PoA, RlD2, RlE2, SrA, SsA, StA, SvA, UmA, UpA, YaA, YkA	AtB, AtD, AtD2, AtE, AtE2, CaA, EfB, EfC, EfD, EhB, HmA, OnA, PkA, RlD, SoA, Tc, ToA, TsA, WaB, WaD, WaD2, WaE, WaE2, WaF, WhB, WIB, WID, WID2, YmA	BcF, BcG, Bp, Rw

Insert Figure 5.3-3 (11x17)

Based on the ratings in Table 5.3-3 above, we provide a breakdown of the General Soil Areas generally associated with the different wind erosion ratings. Within each General Soil Area, isolated areas (soil associations) exist that differ from the general ratings assigned (see Table 5.2-1). Figure 5.3-4 shows the susceptibility of the City of College Place to wind erosion.

High to very high: Very fine sandy loam soils and volcanic ash (Bottom Lands and Low Terraces, Loessal Uplands, and Loessal and Lake-Laid Terraces)

Moderate: At least portions of all General Soil Areas to have moderate potential for wind erosion

Slight to non-susceptible: Basalt rock land and riverwash

The NRCS indicates many soil associations possess minimal soil cover and, in various other soil associations, the soil and its vegetation are routinely disturbed due to general land practices. We expect the potential for erosion from wind and/or water to increase as vegetation is disturbed. Proper stormwater runoff management with silt fencing or other techniques may be required to limit the effects of erosion on the surrounding areas; erosion due to wind is difficult to minimize. Outside of agricultural areas, permanent slopes should be protected from erosion with revegetation. During construction, the contractor should make efforts to reduce wind erosion through moisturizing or fixing of soils using appropriate methods. Drainage channels and/or banks may require hardening through appropriate methods. Special consideration may be warranted in areas adjacent to potentially unstable slopes.

5.3.10 Mining

According to the Directory of Washington Mines (2001), registered mines within the County consist of surface operations for rock, stone, and/or sand and gravel products. The Walla Walla County Mining and Mineral Sites map indicates surface and mineral sites exist at various locations throughout the County. A borrow pit is mapped just east of the City of Walla Walla. However, details of many of the mines, including those that may contain vertical shafts and lateral tunnels are not readily available. Case histories from around the country indicate ground collapse and/or subsidence of underground mining operations is a very real and present danger. For surface mining operations, slope stability should be reviewed prior to development near these mines. Based solely on the relatively low density of mining operations in proximity to the City, the potential hazards related to public health and safety is likely low.

5.3.11 Geologic Hazards Summary

Based on our review and analysis, **potential** geologic hazards could significantly impact select areas of the City. These include the following:

1. A moderate potential for ground shaking to occur.

2. A moderate to high potential for liquefiable soils to be present, generally as mapped by DNR.

3. A low to moderate potential for seismically induced settlement to occur within the City (outburst flood deposits of low-lying bottom areas).

4. A moderate to high potential for collapsible soils generally confined to loess deposits.

5. A moderate to very high potential for significant erosion due to wind and/or water to occur within various soil associations.

5.4 Recommendations

The following recommendations would help limit the health and safety threats to the City of College Place residents in geologically hazardous areas:

- Require the preparation of a critical areas report that contains a geologic assessment of the area of proposed development.

- Apply provisions consistent with findings from geologic assessments.

- Consider applying a buffer around severe erosion or landslide hazard areas.

5.5 References

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6 Frequently Flooded Areas

6.1 Section Overview and GMA Requirements

For regulatory purposes, frequently flooded areas are defined as "lands in the floodplain subject to a one percent or greater chance of flooding in any given year" (WAC 365-190-030 (7)). This is equivalent to the 100-year floodplain designation mapped by the Federal Emergency Management Agency (FEMA) on Flood Insurance Rate Maps (FIRMs). FEMA also produces a separate set of Floodway maps for the portions of the floodplain areas that are included in the detailed study areas, as described in the Flood Insurance Study. This section was prepared as an addendum to Section 6 of the Walla Walla County BAS document.

6.2 Overview of Inventory

6.2.1 Existing Inventory

The City of College Place has floodplain along Garrison Creek. The existing FIRMs, which were prepared by FEMA and have an effective date of September 7, 2001, are the basis for the existing inventory of frequently flooded areas. Existing FEMA designated floodplains for the City of College Place are indicated in Figure 6.2-1.

6.2.2 Past Major Floods

There have been three major floods in the County since 1930 (USACE 1997), some of which have affected the City of College Place. Details about these floods are available in Section 6 of the County's BAS document.

6.3 Flood Control Projects

As a means of reducing future similar flood damages, the Corps of Engineers constructed the Mill Creek diversion and storage reservoir (Bennington Lake) and the Mill Creek flood channel, which was completed in November 1941. This system diverts a portion of Mill Creek floodwater and stores it in Bennington Lake, decreasing the peak flow of Mill Creek as it passes through Walla Walla. The Mill Creek flood channel passes through Walla Walla and College Place and is composed of three sections: (1) a concrete-lined rectangular middle section, (2) a wide rectangular gravel upper section, and (3) a wide rectangular gravel lower section. This system has alleviated future flood damages through this area of Mill Creek during the other significant flooding events in 1964 and 1996 in this area.

In response to the devastating flooding from the 1996 flood in the County, the US Army Corps of Engineers (USACE) prepared the 1997 Walla Walla River Watershed Reconnaissance Report describing problems and opportunities related to the creeks and rivers in the County. This report identified two potential projects which received a positive Benefit Cost ratio: a Coppei Creek Levee and a Mill Creek Levee. The following is a short summary of the Mill Creek project and the current status. The Mill Coppei Creek projects are discussed in Section 6 of the County's BAS document.

6.4 Flood Hazard Mitigation Planning

The City of College Place is included in the Walla Walla County Hazard Mitigation Plan that was approved by FEMA on May 17, 2005. Details of this plan are available in Section 6.6 of the County's BAS document.

6.5 GMA Requirements and Regulatory Options

This section analyzes the existing code for potential deficiencies in meeting the requirements of chapter 36.70A.

6.5.1 GMA Standards

Chapter 365-190 WAC contains minimum guidelines for classification of critical areas including frequently flooded areas. WAC 365-190-080(3) states that classifications of frequently flooded areas should include, at a minimum, the 100-year floodplain designations of FEMA and the NFIP.

GMA guidelines in chapter 365-190 WAC do not provide specific guidelines to address hazards to human health and safety from frequently flooded areas. CTED policy interpreting the GMA discourages allowing any new development within a floodplain. However, if a local jurisdiction does allow development in floodplains, the CTED guideline for density in a floodplain is one dwelling unit per 10 to 20 acres.

6.5.2 FEMA/Ecology Requirements

Even though they are not requirements, the GMA guidelines and CTED policies are more restrictive than the FEMA/Ecology minimum requirements, which do not specifically regulate or prohibit development densities in the floodplain. More information about the FEMA/Ecology requirements is provided in Section 6.7.2 in the County's BAS document.

6.5.3 Existing City of College Place Regulations

The City of College Place has a current floodplain ordinance (City ordinance #867) and participates in the NFIP. The following are some of the key sections from the flood ordinance:

- Section 2.2 requires that the area regulated under this ordinance (areas of special flood hazard) is based on the City's Flood Insurance Study and is shown on the FIRMs, with an effective date of September 7, 2007

- Section 3.1.1 requires a development permit prior to construction or development in a special flood hazard area

- Section 4.3.2 requires that new construction or substantial improvement of any residential structure shall have the lowest floor, including basement, elevated to or above one foot above the base (100-year frequency) flood elevation

Insert Figure 6.2-1 (11x17)

- Section 4.3.3 requires that new construction or substantial improvement of any commercial, industrial or other non-residential structure shall have the lowest floor, including basement, elevated to the level of one foot above the base flood elevation

- Section 4.4 contains additional requirements for floodways, including the prohibition of any fill or development of any nature that would result in any increase in flood levels

6.5.4 Regulatory Options

There are four basic approaches to limiting flood exposure for new development:

- Limiting the types and density of uses allowed in floodplains by zoning these areas for resource use rather than for residential, commercial, and industrial use.

- Limiting or prohibiting subdivisions within these areas, or requiring new lots to have a buildable area outside the floodplain.

- Requiring new construction on existing parcels to locate outside of the floodplain if a buildable area is outside the floodplain.

- Allowing limited new development in floodplains, but requiring construction to be done in such a manner that potential flood damages are minimized and do not cause an increase in flood levels.

Limitations on Development in Floodplains

The restriction of development in the floodplain has a threefold purpose:

1. To reduce risk to human health, safety, and property

2. To prevent development activities from adversely affecting the capacity of the floodplain or floodway to convey and store floodwaters

3. To preserve important ecological functions of the floodplain

The type, depth, velocity and severity of flooding in the identified floodplains within the County vary widely. In the steeper portions of the river and creek gradients, high velocity flooding occurs that even with shallow depths, can result in flood damages. In other portions of the County where the gradient is flatter and the flood velocities are relatively low, shallow flooding typically does not result in severe damages, Greater depths of flooding even in low velocity areas, can cause severe damages and inconveniences relating to access.

In addition, some areas not in the identified floodplain, but which are adjacent to identified floodplains which have high banks above flooding levels can be subject to erosion from the flood flow velocities. These areas are also hazardous because there is the potential for buildings washing away as a result of the eroding stream banks caused by flooding.

6.6 Floodproofing

Floodproofing is designed to limit the damage from flooding. In a flood situation, individuals are often evacuated, but with adequate floodproofing they can often return to their property after the flood and resume activities with little need for repair.

Section 4 of the City's flood ordinance and the Department of Ecology and FEMA requirements all require floodproofing of new non-residential construction and substantial improvements to existing non-residential construction within the floodplain, to reduce damage to structures during floods. Key floodproofing provisions include the following:

- Anchoring to prevent flotation, lateral movement, or collapse
- Construction of utilities to prevent entry of water during flooding
- Elevation of residential structures to or above one foot above the BFE
- Prohibition of enclosed areas below the lowest floor, or allowance for flow of floodwaters
- Elevation of non-residential structures to one foot above the BFE or floodproofing so that portions of the structure below the BFE are watertight and non-buoyant

6.7 Findings and Code Recommendations

A specific review was not conducted for the City of College Place existing floodplain ordinance. HDR did review the County's existing code, and made the following observations that may also be applicable to the City.

In its present form, the Walla Walla County Chapter 18.12 Flood Damage Prevention addresses the minimum guidelines for frequently flooded areas, and with some minor updates, would meet the FEMA and Ecology minimum requirements for continuation of being in good standing for participation in the National Flood Insurance Program.

The following are recommendations made for Walla Walla County's Flood Damage Prevention ordinance that the City of College Place may want to consider for their ordinance:

- Update the existing version of the ordinance to incorporate the 2002 revisions to the Ecology requirements contained in Chapter 173-158 WAC- Floodplain Management
- Consider increasing the elevation requirement from one foot above the base flood elevation to two foot or more above the base flood elevation for floor levels for residential structures and non-residential structures. Also, consider prescribing additional flood proofing requirements for non-residential structures.
- Consider establishing setback areas from river banks to provide additional safety from erosion as well as providing a riparian buffer for protecting fish and wildlife habitat, or establish setback areas through the Fish and Wildlife Habitat Conservation Areas

- Consider adding language relating to wetlands management as described in Chapter 173-158 WAC

- Consider adding language relating to farmhouses in floodplains as addressed in Chapter 173-158 WAC

- Consider adding language relating to a definition of critical facilities and more restrictive location requirements for these types of facilities, which can including hospitals, assisted living facilities, etc.

- Consider only locating water wells on high ground that is not within the floodway

6.8 References

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7 Critical Aquifer Recharge Areas

7.1 Section Overview and GMA Requirements

Critical Aquifer Recharge Areas (CARAs) are defined as areas with a critical recharging effect on aquifers used for potable water that is vulnerable to contamination that would affect water quality (WAC 365-190-030(2)). Examples include sole-source aquifers designated pursuant to the federal Safe Drinking Water Act; areas established for special protection pursuant to RCW 90.44, 90.48, and 90.54; and wellhead protection areas designated pursuant to WAC 246-290-135. Critical aquifer recharge areas function to protect human health from contaminated drinking water (anti-degradation of ground water), and to maintain stream flows and moderate temperatures for fish and wildlife. This section was prepared as an addendum to Section 7 of the Walla Walla County BAS document.

7.2 Summary of Aquifers in the City of College Place

The Walla Walla basin has two primary aquifers: (1) The gravel aquifer, which consists of unconsolidated sediments lying above a clay unit in the south central lowland part of the County and also straddles the state line, and (2) the underlying basalt aquifer, which underlies the entire Walla Walla County (and Walla Walla River basin). The gravel aquifer encompasses approximately 190 square miles (about a third of which is in Oregon), while the basalt aquifer system in the Walla Walla River basin is approximately 2,500 square miles including the portion of the Basin in Oregon (Barker and MacNish 1976).

7.3 Applicability of CARAs in the City of College Place

Recharge areas replenish groundwater supplies but also allow contaminants into the aquifer, and as a result all groundwater is potentially vulnerable to contamination. However, problems or risk to contamination vary spatially and not all regions are equally vulnerable. Effective protection strategies for groundwater should be targeted at the most critical areas. The following considerations are used to designate the critical aquifer recharge areas in the City of College Place:

- Of the three regulatory measures that account for susceptibility and value of the groundwater resources (WAC 246-290-145, WAC 173-100-010, and WAC 173-200-090; see Section 7.4 of the Walla Walla County BAS document for further details) only the Source Water Protection – Wellhead Protection Area (WAC 246-290-135) currently applies to the City of College Place. The City of College Place has requested information from the state on wellhead protection areas submitted by community water systems required to prepare wellhead protection plans. The City will periodically update this information with Washington State Department of Health (DOH) provided information from systems (see Table 7.3-1). The 10-year time of travel to the wellhead captures a reasonable area for management purposes and beneficial use.

- The Gravel Aquifer receives recharge from stream and canal leakage and infiltration of irrigation water and there is a high level of hydraulic connectivity between the gravel aquifer and the surface streams.

- The Basalt Aquifer is generally less susceptible to contamination than the Gravel Aquifer because of the depth to groundwater, presence of overlying sediments, and the lower permeability of the basalt formation. The main source of susceptibility of the Basalt Aquifer is through water supply wells installed in the aquifer. The primary recharge area to the Basalt Aquifer is in Blue Mountains located at the south and east side of the County and Walla Walla River Basin. Most of this area is part of a watershed protected by United State Forest Service (USFS) and City of College Place regulations. Although the basalt aquifer is less susceptible to contamination, it is difficult to treat contamination once it occurs.

Based on the considerations above, the critical aquifer recharge areas for the City of College Place are defined as:

- The 10-year time of travel as defined in the wellhead protection plans submitted by communities and water providers to DOH. The City of College Place and other water utilities within the City maintain these groundwater capture zones. The CARA delineated by the 10-year capture zones are defined in Figure 7.3-1. Table 7.3-1 lists the communities and water providers in the City of College Place or its UGA that have designated wellhead protection areas. A list of potential best management practices for activities in this area is shown in Appendix D.

- The entire extent of the gravel aquifer as delineated in Figure 7.3-1 is *not* defined as a CARA, however it is an aquifer of significance/consideration. Recommended best management practices are presented in Appendix D.

Table 7.3-1
List of Water Providers with 10-year Capture Zones Delineated

College Place Water Department
Consolidated Irrigation District #14
Green Tank Irrigation District #11
Walla Walla College

Source: WDOH 2007

7.4 Recommendations

It is recommended that the City inform residents of best management practices for critical aquifer recharge areas and for the gravel aquifer zones. Recommended BMPs are provided in Appendix D.

7.5 References

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