Chehalis Basin Strategy

Wetland Mitigation Opportunities Assessment

Prepared by Kleinschmidt Associates for the

Chehalis River Basin Flood Control Zone District

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ACKNOWLEDGEMENTS

This report was prepared by Kleinschmidt Associates for the Chehalis River Basin Flood Control Zone District, Chehalis, Washington. Kleinschmidt acknowledges the significant contributions from key authors in the preparation of this report. These key authors include:

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PREFACE

The Chehalis River Basin Flood Control Zone District proposes to construct and operate a flood damage reduction facility and to enhance an existing levee structure on the Chehalis River. Federal and state environmental review of the proposed actions will identify potential construction and operational impacts. The purpose of this Wetland Mitigation Opportunities Assessment (wetlands assessment) is to make an early determination on wetland mitigation feasibility by assessing whether sufficient opportunity exists to provide mitigation for anticipated project impacts at a reasonable cost. The assessment provided in the report demonstrates that sufficient opportunity, either as permittee responsible mitigation along the Chehalis River floodplain or credit purchase from an approved wetland mitigation bank, presently exists to provide mitigation for anticipated project impacts to aquatic and terrestrial resources. It also provides an initial estimate of the cost of such mitigation based on current mitigation bank credit pricing and per acre costs developed by Kleinschmidt for wetland restoration on the Chehalis River floodplain.

This report is not a mitigation proposal or a conceptual mitigation plan. The information in this report could be used to inform the future development of a formal mitigation proposal during the environmental permitting process.

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ACRONYMS AND ABBREVIATIONS

aquatic assessment	Aquatic and Terrestrial Mitigation Opportunities Assessment
BMP	best management practice
Applicant	Chehalis River Basin Flood Control District
Chehalis Tribe	Confederated Tribes of the Chehalis Reservation
CFR	Code of Federal Regulations
CWA	Clean Water Act
Corps	U.S. Army Corps of Engineers
DAPA	Department of the Army Section 404 Permit Application
DEIS	Draft Environmental Impact Report
DNR	Washington State Department of Natural Resources
Ecology	Washington State Department of Ecology
EDT	Ecosystem Diagnosis and Treatment model
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FRE	Flood Retention Expandable facility
FPDSI	Fish Passage and Diversion Screening Inventory
GSU	Geospatial Unit
HPA	Hydraulic Project Approval
NEPA	National Environmental Policy Act
NOAA Fisheries	National Oceanic and Atmospheric Administration Fisheries
OHWM	ordinary high water mark
QIN	Quinault Indian Nation
RCW	Revised Code of Washington
RIBITS	Regulatory In-lieu fee and Bank Information Tracking System
RM	river mile
SEPA	State Environmental Policy Act

SF	south fork
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
wetland assessment	Draft Wetland Mitigation Opportunities Assessment
WDFW	Washington State Department of Fish and Wildlife
WRIA	Water Resources Inventory Area
WSDOT	Washington State Department of Transportation

1 INTRODUCTION

1.1 Introduction

This Wetland Mitigation Opportunities Assessment (wetland assessment) identifies opportunities and evaluates options to develop wetland mitigation for unavoidable impacts to wetlands and wetland buffers that may result from the Chehalis River Basin Flood Damage Reduction Project (Project) proposed by the Chehalis River Basin Flood Control Zone District (Applicant). The proposed flood hazard reduction project includes the Flood Reduction – Expandable (FRE) facility and levee improvements near the Chehalis Airport. The proposed FRE facility location is in the upper Chehalis Basin near the city of Pe Ell, Washington, and the proposed levees would be located near the Chehalis Airport between the cities of Centralia and Chehalis, Washington. **Figure 1** shows the study area within the upper Chehalis Basin and identifies the locations of these two primary project elements. The FRE facility would operate using a flow control structure designed to fill episodically to mitigate flooding during peak flow events (HDR 2017; HDR 2018a; HDR 2018b; HDR 2019; CFCZD 2019). This wetland assessment relied on these preliminary design documents (HDR 2017, HDR 2018a, HDR 2018b, and HDR 2019) as the primary source for the description of the Project. The characterization of the affected wetlands was provided by previous wetland delineations (Anchor QEA 2018 and Anchor QEA 2019), and the description of anticipated project impacts was determined by comparing preliminary designs to the wetland delineations.

The Applicant engaged the Kleinschmidt team to identify and evaluate wetland mitigation opportunities and assess the types, locations, and quantities of wetland mitigation likely to be required. This wetland mitigation assessment does not constitute a mitigation proposal, but it lays the groundwork and demonstrates the feasibility of providing mitigation for future mitigation plan development that would be performed in coordination with regulatory agencies, tribes, and other stakeholders during a future phase of environmental permitting.

This wetland assessment addresses the following key questions:

- What types, locations, and quantities of wetland mitigation are likely to be required to address project impacts to regulated wetlands and wetland buffers?
- Are there sufficient mitigation options available to address unavoidable impacts to wetlands and buffers within the upper Chehalis basin?
- Are there opportunities to integrate wetland mitigation with mitigation for aquatic and terrestrial impacts at candidate mitigation sites?
- What is the approximate cost to mitigate anticipated impacts to wetlands and wetland buffers?

1.2 Purpose and Scope

This Wetlands Mitigation Opportunities Assessment (wetland assessment) identifies and evaluates wetland mitigation opportunities that could be applied to address unavoidable impacts to wetlands and wetland buffers associated with the Project construction and operation. The primary purpose of this wetland assessment is to identify and evaluate potential wetland mitigation opportunities to help the Applicant make an early determination on whether sufficient opportunity exists to provide wetland mitigation for anticipated project impacts and develop a preliminary estimate of what that mitigation would cost.

This report may be used to support and inform permit applications for local permits (e.g. shorelines, critical areas, land use), U.S. Clean Water Act Sections 401 and 404, Endangered Species Act (ESA) Section 7 consultation, Hydraulic Project Approval, and other related permits.

The Project will have unavoidable impacts to streams, aquatic habitats, and terrestrial species. Aquatic and terrestrial habitat mitigation is not included in the scope of this document as it has been addressed in a related report titled Aquatic and Terrestrial Mitigation Opportunities Assessment (aquatic assessment) (Kleinschmidt 2020).

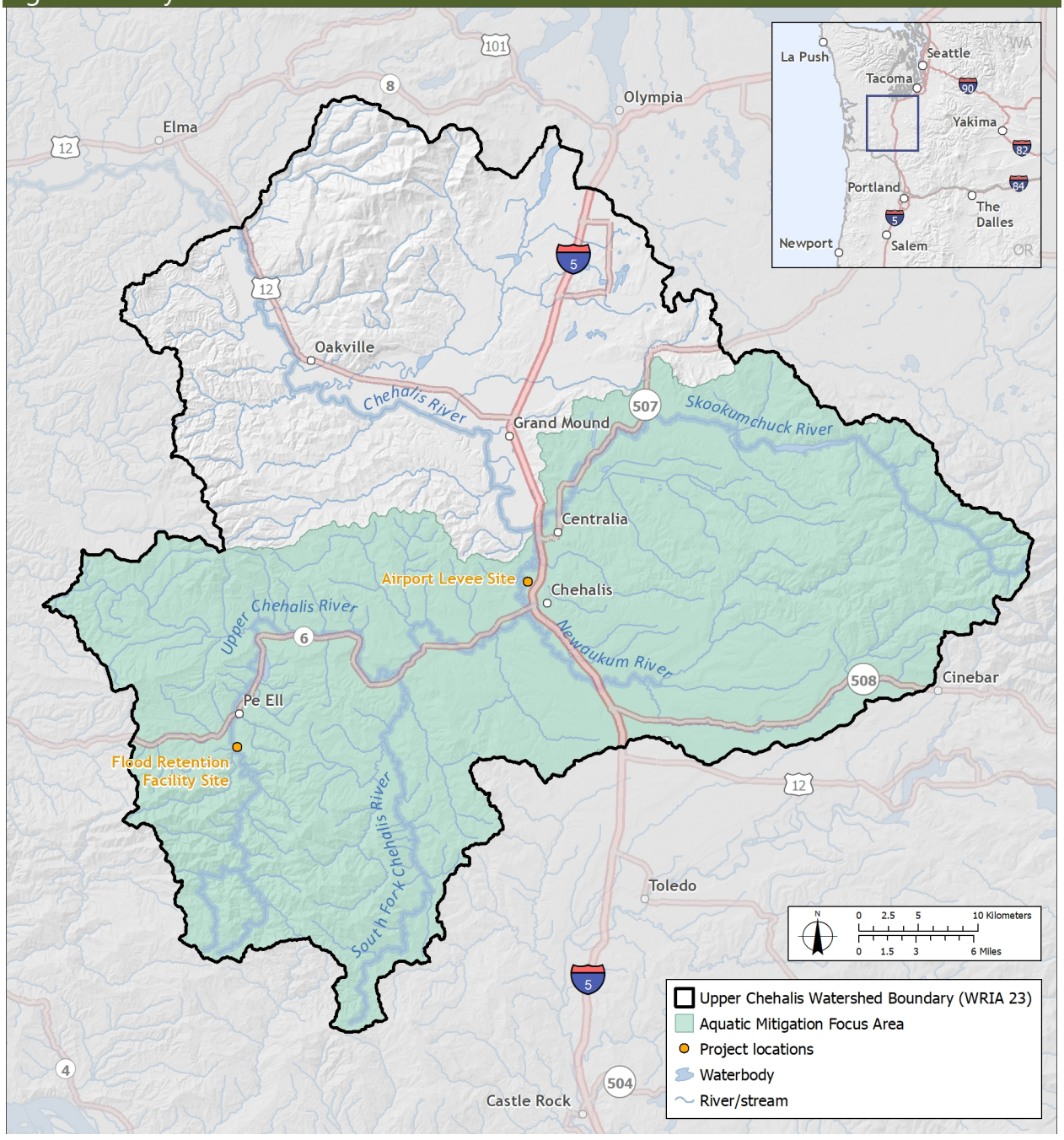
1.3 Approach

This wetland assessment began with an evaluation of project impacts to wetlands. Wetlands within the project area were identified and documented in two wetland delineation reports (Anchor QEA 2018 and 2019). Estimated project impacts were calculated based on comparing the results of the wetland delineation to the latest preliminary designs for the proposed FRE and airport levee improvements (HDR 2017, 2018a, 2018b, and 2019). Estimated impacts were compared to the summary of wetland impacts presented in the Washington State Environmental Policy Act (SEPA) Draft Environmental Impact Statement (DEIS) published by Washington Department of Ecology (Ecology) in February 2020 (Ecology 2020). The estimated impacts were similar to those presented in the SEPA DEIS with two notable differences related to impact avoidance measures applied to the Airport levee improvements and refinements to the impact characterization of wetlands potentially affected by episodic temporary inundation within the temporary reservoir. The resulting impact summary informed the preliminary assessment of mitigation requirements including an overview of applicable regulations and an estimate of required mitigation types, quantities, and locations.

Kleinschmidt identified estimated mitigation needs based on the quantities, nature, and duration of wetland impacts with reference to regulatory guidance for wetland mitigation. The estimated mitigation needs were used to identify and evaluate mitigation opportunities within the upper Chehalis Basin. Temporary impacts would generally be mitigated by post-construction restoration of the affected wetlands and buffers. Mitigation opportunities for permanent or long-term wetland impacts fell into two categories: (1) credit purchase from an established wetland mitigation bank; and (2) permittee

responsible mitigation. Permittee responsible mitigation was restricted to focus on opportunities to accomplish wetland mitigation by integrating wetland functions and values into aquatic habitat mitigation opportunities documented in the aquatic assessment (Kleinschmidt 2020). The aquatic assessment identified the need for up to 824 acres of riparian reforestation that would occur along the mainstem Chehalis River and its tributaries within the upper Chehalis Basin. In addition to riparian reforestation, the aquatic assessment also identified the need for floodplain reconnection and wetland restoration focused on providing habitat for terrestrial species affected by the Project. Kleinschmidt judged that the extensive geographic scope of likely aquatic habitat mitigation would provide abundant opportunities for restoring and enhancing wetland functions on the Chehalis River floodplain. Integrating wetland mitigation into aquatic and terrestrial mitigation efforts would provide an opportunity to increase the overall ecological lift resulting from the combination and colocation of diverse habitat types. Kleinschmidt developed a range of potential costs for wetland mitigation based on the different types of mitigation opportunities identified and evaluated in this assessment.

Figure 1 Study Area



2 PROJECT IMPACT SUMMARY

2.1 Project Description

The purpose of the Project is to reduce flood damage in the Chehalis River Basin caused by larger flood events. The CFCZD proposes to construct and operate a new flood retention facility and temporary reservoir near the town of Pe Ell, Washington, and construct levee improvements around the Chehalis Airport in Chehalis, Washington. **Figure 1** shows the location of these primary project elements within the upper Chehalis Basin. A series of design studies and reports provides a detailed characterization of the Project design (HDR 2017, HDR 2018a, HDR 2018b, and HDR 2019). Abbreviated descriptions below are based on those design documents.

Construction of the FRE flood retention facility and supporting infrastructure would include both temporary construction impacts as well as permanent impacts. The following elements of the FRE construction would result in unavoidable impacts to wetlands:

- Construction of the FRE facility and supporting infrastructure
- Construction access and staging
- Fill placement of spoils generated by excavation during FRE facility construction
- Clearing and grubbing for the FRE debris management sorting yard
- Temporary clearing, grubbing, and excavation for the Pe Ell Water Transmission Line

Future operation of the FRE would result in episodic short-term temporary impacts to wetlands located within the temporary reservoir. The maximum extent of short-term temporary inundation defining the temporary reservoir footprint would be approximately 847 acres. Impacts to those wetlands have not yet been fully characterized, however the physical effects of FRE operation would be limited to episodic short-term temporary inundation. The duration of inundation would vary depending on the magnitude of each flood event that triggers operation of the FRE. Duration of inundation would vary over a range of a few days to a few weeks with shorter durations corresponding to smaller flood events. Inundation duration also varies by elevation within the temporary reservoir with higher elevation areas experiencing less frequent, shorter inundation compared to lower elevation areas.

The airport levee improvements would protect the Chehalis-Centralia Airport, local businesses, and area transportation from damage that would result from a 100-year flood. The improvements would include raising the elevation of the existing levee around the Chehalis-Centralia Airport and raising the elevation of a 1,700 feet long section of Airport Road to match the airport levee height along the southern extent of the airport. Recent refinements to the airport levee preliminary design modified the proposed design to avoid impacts to wetlands and cultural resources (Martin 2019). This change avoids permanent impacts to wetlands associated with the airport levee improvements and reduces wetland impacts to include only temporary trimming of vegetation for one year during construction.

2.2 Summary of Estimated Impacts

The Kleinschmidt team estimated wetland impact quantities by comparing the current conceptual design (HDR 2017, HDR 2018a, HDR 2018b, and HDR 2019) for the project elements with the delineation of wetlands, waters, and OHWM conducted in 2017 and 2018 as part of Project development (Anchor QEA 2018 and 2019). Those delineations identified 123 wetlands, totaling 13.9 acres in the FRE Project study area. All wetlands were assigned a category rating of 1-4 based upon the *Washington State Wetland Rating system – Western Washington: 20014: Update (Hruby 2014).* Of those 123 wetlands, 15 were rated as Category II and 108 were rated as Category III. No Category I or IV wetlands were found in the study area.

HDR, Inc. is currently preparing a Department of the Army Section 404 Permit Application (DAPA), and as part of that application process HDR has developed a detailed estimate of wetland impacts associated with the project. Estimated wetland impacts are summarized in **Table 1**.

Table 1 Estimated wetland impacts

ACTIVITY (FILL, DRAIN, EXCAVATE, FLOOD, ETC.)	WETLAND NAME[1]	WETLAND TYPE[2] AND RATING CATEGORY[3]	IMPACT AREA	DURATION OF IMPACT
FRE Facility, and Construction Access and Staging – excavation and fill	WC, WE, WF, CR-S01-WA, WAI, WAJ	PSS/PEM; III	0.18 acres	5 years
FRE Facility Construction Spoil Areas – fill	WA, CR-S01-WA, CR-S02-WA, CR-S04-WA	PFO/PSS/PEM; III	0.41 acres	Permanent
FRE and CHTR permanent footprint – excavation and fill	WC, WD	PSS/PEM; III	0.58 acres	Permanent
FRE Debris Management Sorting Yard – clearing and grubbing	WV, WW	PEM/PFO/PSS/PEM; III, II	0.10 acres	Up to 30 days
Pe Ell Water Transmission Line – temporary clearing, grubbing, and excavation	CCLB-01, WAJ, WAI, WE	PSS/PEM; III	0.40 acres	3 years
Airport Levee – temporary trimming of vegetation	C, D, F	PSS, PEM, and PUB; II, III	4.50 acres	One year
Episodic temporary inundation within temporary reservoir	See Appendix A	PEM, PFO, PSS; III, II	11.56 acres	Episodic and temporary - variable duration and recurrence

Notes:

[1]Wetland names correspond to the names used in the wetland delineations (Anchor QEA 2018 and 2019).

[2]Ecology wetland category based on current Western Washington Wetland Rating System.

[3]Wetland types include Palustrine Emergent (PEM), Palustrine Scrub-Shrub (PSS), Palustrine Forested (PFO), and Palustrine Unconsolidated Bottom (PUB).

3 WETLAND MITIGATION REQUIREMENTS

This Section identifies and describes the various regulatory jurisdictional authorities for wetland mitigation and presents the framework used by the Kleinschmidt team to develop a preliminary assessment of likely mitigation requirements. The results of the assessment are described in **Section 3.3** and summarized in **Table 2** showing the approximate types, quantities, and locations of mitigation.

3.1 Regulatory Jurisdiction for Wetland Mitigation

Impacts to wetlands and buffers are regulated by multiple local, state, and federal agencies with overlapping jurisdiction regarding permitting and mitigation requirements. The following summary identifies agencies and entities that have jurisdiction over mitigation for wetlands and buffers.

3.1.1 U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (Corps) has jurisdiction over work in Waters of the United States through Section 404 of the U.S. Clean Water Act (CWA). Within the upper Chehalis Basin, Waters of the United States would include the Chehalis River, its tributaries, and associated wetlands. The Corps has authority to require mitigation for unavoidable impacts, including ecological impacts, to Waters of the United States.

3.1.2 NOAA Fisheries and USFWS

Under Section 7 of the U.S. Endangered Species Act (ESA), the Corps must consult with the National Oceanic Atmospheric Administration Fisheries (NOAA Fisheries) and the United State Fish and Wildlife Service (USFWS) as part of the CWA Section 404 permitting process to evaluate the potential project effects on federally listed threatened and endangered species. The applicant completes a Biological Assessment (BA), and NOAA Fisheries and USFWS prepare a Biological Opinion (BO) that results in nondiscretionary conditions applied to construction and operation of the Project. While NOAA Fisheries and USFWS staff do not have the authority to directly require mitigation, the ESA consultation considers mitigation as part of the Project, and the mitigation can affect the outcome of the consultation's conclusions regarding the Project's potential to jeopardize the continued existence of species or adversely modify critical habitat.

3.1.3 Native American Tribes

The U.S. Government recognizes tribal rights to fish and wildlife within each tribe's designated "Usual and Accustomed Areas" as established by treaties between the tribes and the U.S. Government. Two tribal entities are present and have rights within the Chehalis Basin: the Quinault Indian Nation (QIN), and the Confederated Tribes of the Chehalis Reservation (Chehalis Tribe). The Corps engages in a government-to-government consultation with tribes when those rights are potentially affected by a

proposed project seeking a CWA Section 404 permit. The consultation typically includes a focused dialog on impacts to aquatic and terrestrial species and the mitigation associated with those impacts. The tribal consultation typically has a strong influence on the nature and extent of the mitigation requirements.

3.1.4 Washington State Department of Ecology

Ecology administers the CWA Section 401 Water Quality Certification permits in coordination with the Corps. CWA Section 401 and CWA Section 404 permits are linked together as a concurrent requirement. Ecology also has jurisdiction over wetlands that extends beyond the limits of federal wetland jurisdiction as the Corps regulates only jurisdictional wetlands. Non-jurisdictional wetlands and all wetland buffers are regulated by Ecology and local government agencies. Ecology administers the SEPA process and oversees municipal land use jurisdiction under the State Shoreline Management Act and the Growth Management Act.

Ecology also issues Administrative Orders pursuant to the Washington State Water Pollution Control Act, codified in Revised Code of Washington (RCW) Chapter 90.48 and the Shoreline Management Act, codified in RCW 90.58. Together, these laws provide the regulatory authority allowing Ecology to regulate those wetlands and buffers not regulated under federal laws.

In 1998, the Washington State Legislature adopted Chapter 90.84 RCW, Wetlands Mitigation Banking. Through this law the state legislature recognized mitigation banking as an important tool for compensating for wetland impacts. The law notes that banking may provide benefits superior to concurrent permittee responsible mitigation that may include reduction of temporal losses, and consolidation of smaller individual projects to achieve greater ecological benefits. The law however does not change the way wetlands are regulated, and specifies that mitigation sequencing (avoidance, minimization, and compensation) still applies (Ecology 2006).

3.1.5 Municipal Governments

Municipal governments have jurisdiction over land use, shoreline zones, and critical areas under the State Growth Management Act and the State Shoreline Management Act. Local government regulations establish local jurisdiction over impacts to wetland buffers including the authority to require wetland buffer mitigation through critical areas and shorelines regulations.

3.2 Framework for Determining Mitigation Requirements

The Corps and Ecology use a wetland rating system to identify the quality of the functions and values of each wetland. The rating goes from Category 1 to a Category 4, with Category 1 wetlands providing the highest level of functions and values and Category 4 wetlands providing the least. While Category 4 wetlands provide fewer functions and values, they still provide important ecological value and therefore require mitigation when impacted.

Federal, state, and local government agencies require that impacts to wetlands and wetland buffers of the proposed project be quantified by delineating each wetland and its buffer. Wetland and buffer impacts are delineated according to the Corps 1987 Manual together with the Washington State Wetlands Identification and Delineation Manual (Ecology 1997). After a delineation is submitted along with the required permit applications, the federal, state, and local agencies typically verify the delineation in a field visit. Wetland delineations and agency confirmations are valid for five years. After five years, agencies will often require an updated wetland delineation to assess whether any changes to wetlands and associated buffers have occurred.

Washington Department of Ecology Wetland Rating System

Category I: 1) represent a unique or rare wetland type; or 2) are more sensitive to disturbance than most wetlands; or 3) are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime; or 4) provide a high level of functions. Examples include bogs and coastal lagoons.

Category II: Difficult to replace; more common than Category I. Include smaller estuarine wetlands, wetlands that perform functions well; large interdunal wetlands or those in a mosaic.

Category III: 1) wetlands with a moderate level of functions, 2) can often be adequately replaced with a well-planned mitigation project, and 3) interdunal wetlands between 0.1 and 1 ac in size.

Category IV: Have the lowest levels of function and are often heavily disturbed. These can likely be replaced and occasionally improved.

The Kleinschmidt team developed and applied a project-specific framework to identify and evaluate wetland mitigation opportunities. That framework established the basis for the geographic focus areas where mitigation would occur, determination of on-site versus off-site mitigation areas, considerations regarding in-kind versus out-of-kind mitigation, and the basis for establishing mitigation ratios.

The wetland mitigation guidance clearly states that preference should be given to a mitigation site that provides the "highest ecological benefits, whether on-site, off-site, in-kind, or out-of-kind" (Ecology 2006). There are situations where opportunities to directly replace lost ecological functions do not exist at or near the site of impact. For these situations, mitigation regulations and guidance allow for mitigation proposals to consider the ecological health of the larger watershed and allow for mitigation that is out-of-kind and/or off-site on a case-by-case basis. Out-of-kind and off-site mitigation may be technically justified in situations where the project sponsor demonstrates that the mitigation would provide superior ecological improvement in the context of the watershed. There must be a meaningful and demonstrable ecological connection between the impacts and the potential mitigation.

The Revised Code of Washington (RCW) chapter 75.46 states that mitigation guidance published by the State will support alternative mitigation options that have a low risk to the environment, yet have a high net environmental, social, and economic benefit. The overarching goal is to develop and implement

mitigation projects that maximize environmental benefits from project mitigation. Washington State wetland mitigation policy guidance (Ecology 2006) supports this degree of flexibility, and states:

> *The single most important message is that compensatory mitigation should make ecological sense in the context of the landscape in which it is conducted. This entails using information about the landscape when making decisions about the type, location, and design of compensatory mitigation. Landscape information may include data accessed through geographic information systems and resource inventories, as well as local or regional plans that were developed using such information. This includes watershed, sub-basin, community, and restoration plans that are based on scientific information. These should be consulted when developing compensatory mitigation projects.*

3.2.1 Considerations for On-site versus Off-site Mitigation

Typically, the first preference for mitigation is for in-kind, on-site habitat replacement located within the Project zone as close to the site of impact as possible. Impacts to wetlands summarized in **Table 1** would occur within the work area for the FRE and supporting infrastructure, within the temporary reservoir, and within the work area for the Airport levee improvements. The on-site mitigation area would include these areas and their immediate vicinity. Off-site or out-of-kind mitigation may be considered in clear cases of species betterment: cost savings may not be the basis for rejecting more expensive on-site opportunities that would be feasible, effective, and aligned with basin-wide priorities. The rationale for site identification and pre-selecting off-site and out-of-kind mitigation would be based on Water Resource Inventory Area (WRIA) scale ecological priorities for wetlands. The maximum geographic extent considered for off-site mitigation for this analysis would be WRIA 23, which is shown in **Figure 1**.

Mitigation planning for this project will address federal and state regulatory requirements and generally follow published mitigation guidance (Ecology 2006). Conventional mitigation sequencing guidance includes, in order of preference, avoidance, minimization, on-site mitigation, then off-site mitigation. Avoidance and minimization of impacts is assigned the highest priority before resorting to compensatory mitigation. For unavoidable impacts, the types of compensatory mitigation depend on a number of variables (Ecology 2006):

- What are the functions, habitat types, and species that would be adversely affected?
- Are there priority areas for restoring species, habitat types, or functions that are important or limited in the watershed? Are the effected wetland type and its functions relatively common in the watershed, while other types and functions are relatively rare or limited due to historic losses?

- If both on- and off-site mitigation is available, will the functions, habitat type, or species proposed as off-site compensatory mitigation provide greater value to the landscape than those proposed as on-site?

In situations where off-site and in-kind mitigation is not feasible or enough to fully address project impacts, additional ecological functions and values may be provided by off-site and out-of-kind mitigation. Off-site and out-of-kind mitigation is usually required to demonstrate that it has a meaningful ecological connection to the impacted priority species and ecological communities in the context of the larger drainage basin with an emphasis on addressing critical or limiting factors and that mitigation at the off-site location will be successful.

3.2.2 Wetland Mitigation Ratios

Determining required wetland mitigation ratios consists of two key elements: 1) the quantity and type of wetland impact, and 2) the quantity and type of mitigation. Applicants must demonstrate how the two elements, impact and mitigation, ecologically balance to obtain regulatory approval.

The Kleinschmidt team based the assessment of wetland mitigation needs on the Project impacts presented in **Table 1**. The quantity and type of impacts is well defined, but the location, type, and ecological functions of possible mitigation is variable over a wide. At this phase of the Project, mitigation is not yet well defined. The types, categories, locations, and ecological functions of proposed mitigation will determine the required wetland mitigation ratios. Different ratios apply depending on whether the mitigation is a credit purchase from an approved mitigation bank or permittee responsible mitigation as described in the following sections.

3.2.2.1 *Wetland Mitigation Ratios for Permittee Responsible Mitigation*

Washington State published the following prescriptive guidance for determining wetland mitigation ratios for unavoidable wetland impacts in Washington state (Ecology 2006). Preliminary mitigation ratios for each combination of mitigation type and impact type will likely include temporal and spatial contexts; temporary or permanent impacts; and other necessary qualification to describe the range of impact types. While prescribed ratios will not be finalized by agencies until they review complete permit applications and issue permits, gaining early agreement on the rationale for determining ratios or potential ranges will help determine the amount and type of mitigation likely to be required including spatial extents and ecosystem qualities. This will also provide a preliminary framework for comparing mitigation options and evaluating the costs and benefits of alternative mitigation strategies.

If the Applicant chooses to integrate wetland mitigation into the aquatic habitat mitigation sites, ensuring the mitigation effectively offsets unavoidable wetland mitigation impacts will require a significant effort. The Applicant will be required to document the size and condition of each existing wetland, determine the area of each wetland, the nature of enhancements required to reach the desired functions and values, and develop a detailed set of performance standards for every wetland in

the riparian buffer. Once each wetland is enhanced and/or restored, performance monitoring and reporting would be required for the up to ten years after construction to verify each mitigation site is providing the functions and values it was designed to provide.

Table 2 Mitigation Ratios for Western Washington for Selected Wetland Types

CATEGORY AND TYPE OF WETLAND IMPACTS	RE-ESTABLISHMENT OR CREATION	REHABILITATION ONLY	RE-ESTABLISHMENT OR CREATION (R/C) AND REHABILITATION (RH)	RE-ESTABLISHMENT OR CREATION (R/C) AND ENHANCEMENT (E)	ENHANCEMENT ONLY
All Category IV	1.5:1	3:1	1:1 R/C and 1:1 RH	1.1 R/C and 2:1 E	6:1
All Category III	2:1	4:1	1:1 R/C and 2:1 RH	1:1 R/C and 4:1 E	8:1
Category II (other than Interdunal or Estuarine)	3:1	6:1	1:1 R/C and 4:1 RH	1:1 R/C and 8:1 E	12:1
Category I Forested	6:1	12:1	1:1 R/C and 10:1 RH	1:1 R/C and 20:1 E	24:1

Source: Ecology 2006

3.2.2.2 *Replacement Ratios for Mitigation Banks*

When using approved wetland mitigation banks, the mitigation ratios are pre-established within the mitigation bank instrument and are usually lower than prescribed wetland mitigation ratios for permittee responsible wetland mitigation. This difference accounts for the way credits are defined for a mitigation bank's credit inventory. **Table 3** presents the default ratios for application of credits to different categories of wetland at the Chehalis Basin Wetland Mitigation Bank.

Table 3 Typical Credit-Debit Ratios for the Chehalis Basin Wetland Mitigation Bank

	WETLAND CATEGORY IMPACTED	BANK CREDITS REQUIRED TO IMPACT ACRE
Chehalis Basin Wetland Mitigation Bank	Category I Wetland	Case-by-case
	Category II Wetland	1.2: 1
	Category III Wetland	1: 1
	Category IV Wetland	0.85: 1
	Wetland Buffer	Case-by-case basis

(Source: WCEI, 2013)

3.3 Estimated Mitigation Needs

The Kleinschmidt team developed a preliminary estimate of wetland mitigation needs based on the Project's estimated effects on wetlands and wetland buffers as previously described in **Section 2** and summarized in **Table 1**. Compensatory mitigation typically aligns with the locations, types, and extents of project impacts. **Table 4** lists the summary of wetland and aquatic impacts and shows estimated mitigation needs to address each component of the impacts.

Anticipated project impacts include impacts to wetland buffers. While the Corps does not explicitly regulate buffer impacts, wetland buffers are discussed here to identify and address potential buffer mitigation needs associated with state and local jurisdiction and how those needs could be met. Wetland mitigation requirements specified by the Corps will include establishing proper buffers around any wetlands included as part of a future wetland mitigation proposal. State and local jurisdiction over wetland buffers would mirror the Corps requirement and in addition typically require 1:1 replacement of lost wetland buffers and their functions.

Any wetland buffers provided as part of permittee responsible wetland mitigation would count towards replacement of lost wetland buffers. In addition, most potential buffer impacts would be related to the yet uncharacterized effects of episodic short-term temporary inundation during operation of the FRE within the temporary reservoir. Much of that potential buffer impact could be effectively mitigated as part of the approximately 824 acres of riparian buffer planting and restoration identified as an aquatic habitat mitigation need (Kleinschmidt 2020). Wetland buffer impacts and mitigation quantities are not explicitly reported as part of this analysis. However, the two options for buffer mitigation described above would greatly exceed the estimated quantity of wetland buffer loss reported in the SEPA DEIS (Ecology 2020).

The estimated mitigation based on the identified impacts is briefly identified below in **Table 4**. The estimated mitigation discussed below is preliminary and subject to critical review and revision. These estimates were developed as a starting point for discussion and loosely based upon the mitigation ratios for Western Washington as identified by Ecology; *Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance* (Ecology 2006) and summarized previously in **Table 2**.

It is important to note in **Table 4** that episodic temporary inundation within the temporary reservoir would potentially impact up to 11.56 acres of wetland within the maximum extent (847 acres) of inundation. The nature of those impacts has not yet been fully characterized. Impacts due to inundation would vary throughout the inundation zone based on local elevation of each wetland. Local elevation would determine the frequency, depth, and duration of inundation, and associated impacts to wetland function. Actual mitigation ratios for these impacts will be negotiated based on future analysis to refine the characterization of impacts based on lost wetland functions and conversions.

Table 4 Estimated Mitigation Needs

ACTIVITY (FILL, DRAIN, EXCAVATE, FLOOD, ETC.)	WETLAND NAME[1]	WETLAND TYPE[2] AND RATING CATEGORY[3]	IMPACT AREA	DURATION OF IMPACT	ESTIMATED MITIGATION NEEDED
FRE Facility, and Construction Access and Staging – excavation and fill	WC, WE, WF, CR-S01-WA, WAI, WAJ	PSS/PEM; III	0.18 acres	5 years	Restore temporary impacts – 0.18 acres
FRE Facility Construction Spoil Areas – fill	WA, CR-S01-WA, CR-S02-WA, CR-S04-WA	PFO/PSS/PEM; III	0.41 acres	Permanent	Purchase 0.41 bank credits *or* Build 0.82 acres permittee responsible mitigation
FRE and CHTR permanent footprint – excavation and fill	WC, WD	PSS/PEM; III	0.58 acres	Permanent	Purchase 0.58 bank credits *or* Build 1.16 acres permittee responsible mitigation
FRE Debris Management Sorting Yard – clearing and grubbing	WV, WW	PEM/PFO/PSS/PEM; III, II	0.10 acres	Up to 30 days	Restore temporary impacts – 0.10 acres
Pe Ell Water Transmission Line – temporary clearing, grubbing, and excavation	CCLB-01, WAJ, WAI, WE	PSS/PEM; III	0.40 acres	3 years	Restore temporary impacts – 0.40 acres
Airport Levee – temporary trimming of vegetation	C, D, F	PSS, PEM, and PUB; II, III	4.50 acres	One year	Restore temporary impacts – 4.5 acres
Episodic temporary inundation within temporary reservoir	See Appendix A	PEM, PFO, PSS; III, II	11.56 acres	Episodic and temporary - variable duration and recurrence	Purchase bank credits *or* Build permittee responsible mitigation *Quantities TBD*

Notes:

[1]Wetland names correspond to the names used in the wetland delineations (Anchor QEA 2018 and 2019).

[2]Ecology wetland category based on current Western Washington Wetland Rating System.

[3]Wetland types include Palustrine Emergent (PEM), Palustrine Scrub-Shrub (PSS), Palustrine Forested (PFO), and Palustrine Unconsolidated Bottom (PUB).

4 WETLAND MITIGATION OPTIONS

For those wetland impacts that cannot be avoided, there are two basic options for mitigation considered in this wetland assessment: permittee responsible mitigation or credit purchase from an approved mitigation bank. Both options are discussed below in the context of anticipated project impacts to wetlands and wetland buffers.

4.1 Permittee Responsible Wetland Mitigation

One opportunity for on-site wetland mitigation would be to identify places where wetland mitigation could be integrated into the aquatic restoration efforts. On-site mitigation could be accomplished by developing wetland enhancement, creation, and restoration within the riparian reforestation along 17 miles of the Chehalis River and its tributaries. Similarly, floodplain reconnection projects that focus on providing aquatic and/or terrestrial habitat mitigation could be configured or expanded to also provide wetland mitigation. Integrating multiple habitat types may provide opportunities to achieve greater overall ecological lift.

4.2 Mitigation Bank Credit Purchase

There are two approved wetland mitigation banks in the Chehalis Basin, both with available wetland mitigation credits. One bank is publicly owned, and the other bank is privately owed. Mitigation banks are intended to provide replacement of lost functions and values for wetlands, riparian habitat, and upland/buffer habitat. An applicant seeking a permit for a project with adverse impacts to the aquatic environment within the service area must generally obtain the approval of each regulatory agency with jurisdiction over that project to use the bank for mitigation.

To be approved to use one of the banks, an applicant must demonstrate that the project complies with all applicable requirements of alternatives and mitigation sequencing, and that purchasing credits from a mitigation bank would be in the best interest of the environment.

Replacement ratios change when using mitigation credits from a bank. Instead of using the mitigation ratios published by Ecology (**Table 2**), each mitigation bank has pre-established agency approved ratios for use of their mitigation credits. These ratios are developed as part of the mitigation bank approval process and included in the signed Mitigation Bank Instrument (MBI). The MBI is the legal document that creates the credits, lists the conditions for using the credits, establishes the conditions for credit release, and describes the responsibilities of the banker. One of the key elements of the MBI is defining the service area that limits the geographic range in which credits may be applied as mitigation. Mitigation banks typically have bank-specific mitigation ratios as shown in **Table 3.**

Both banks noted in the following sections have been constructed and have met performance standards. An overview of each mitigation bank is provided below.

4.2.1 The Chehalis Basin Mitigation Bank, Hanaford Valley Site

The Chehalis Basin Mitigation Bank, Hanaford Valley Site (Chehalis Bank) is a privately owned wetland mitigation bank in good standing. The service area for this bank includes all of WRIA 23, the Upper Chehalis Basin. **Figure 3** shows the approved service area for this bank.

The ecological goals for this bank are to improve water quality, hydrology, and habitat functions at the bank site, and to provide a self-sustaining stream and wetland complex that will not require ongoing maintenance, but instead will be self-sustaining (WCEI 2013).

A recent check of the Regulatory In-lieu fee and Bank Information Tracking System (RIBITS) database on July 20, 2020 showed there are 8.0073 available wetland credits from the Chehalis bank. Recent correspondence with the bank sponsor confirmed the Chehalis Mitigation Bank has seven (7) wetland credits currently available for purchase. Credit availability may decrease over time because of other credit purchases, and it may increase over time as a result of future credit releases that occur when the bank meets performance goals specified in its MBI.

4.2.2 The North Fork Newaukum Mitigation Bank

The North Fork Newaukum Mitigation Bank is a publicly owned mitigation bank in good standing. It is located east of the City of Chehalis, adjacent to the east and middle forks of the Newaukum River. This bank is intended for use in restoration and enhancement of wetlands and riparian areas. The service area for this bank includes all of WRIA 23, the Upper Chehalis Basin. **Figure 4** shows the approved service area for this bank (WSDOT 2005).

The primary goal for this bank is to provide mitigation in advance of unavoidable impacts to wetlands and other aquatic resources resulting from impacts from state highway projects in the Upper Chehalis Basin. Ecological goals for this project are to enhance and restore degraded wetlands and other aquatic resources, improve fish and wildlife habitat, restore water quality, restore hydrologic functions, and other related stream and aquatic functions (WSDOT 2005).

A recent check of the RIBITS Database on July 20, 2020 showed there are 49.97 available wetland credits from the North Fork Newaukum Bank. The state is not precluded from selling mitigation credits but is not required to make mitigation credits available to other public agencies. Recent correspondence with the bank sponsor indicated that WSDOT intends to use the available credits to address anticipated wetland impacts associated with future WSDOT projects. At the time of this report, WSDOT indicated that they would not make credits available to the Applicant to mitigate for Project impacts.

Figure 2 The Chehalis Basin Mitigation Bank, Hanaford Valley Site (Chehalis Bank) Service Area

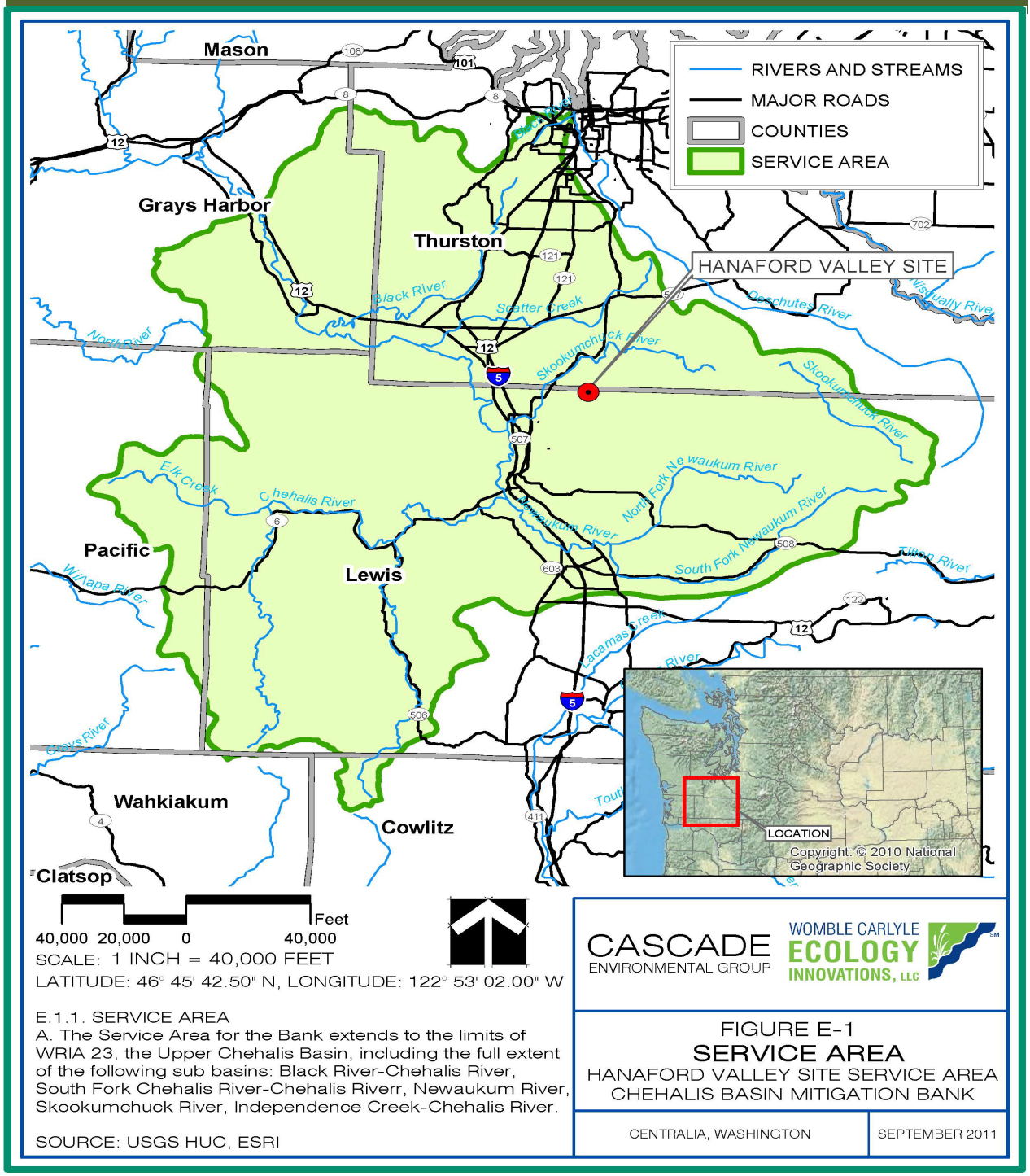
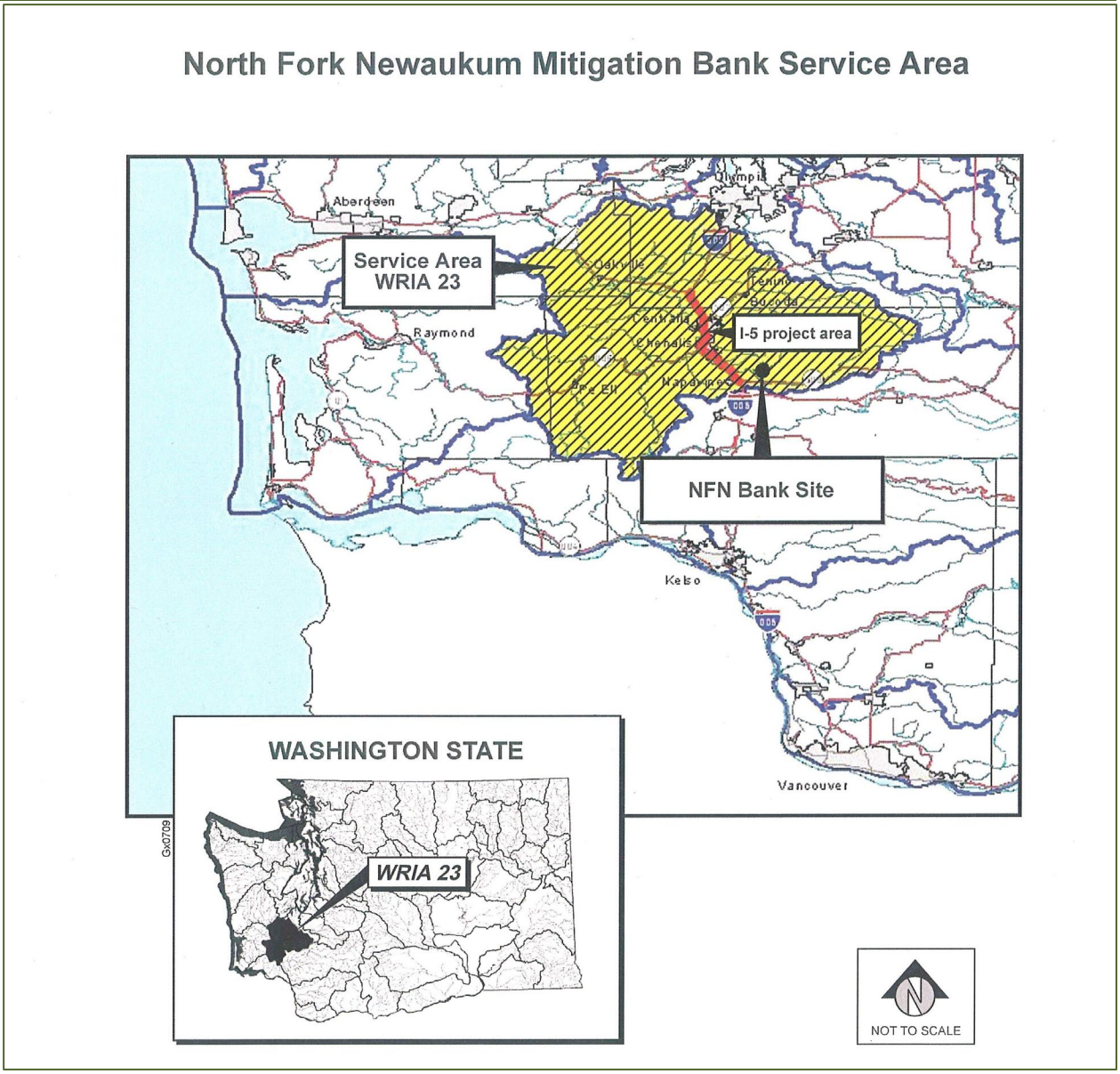


Figure 3 North Fork Newaukum Mitigation Bank Service Area



Source: WSDOT 2005

5 PRELIMINARY COST ESTIMATE

Estimated costs for wetland mitigation are based on the wetland impact quantities and types and corresponding mitigation needs summarized in **Table 4**. The following assumptions were used to determine the cost estimate and provide a reasonable comparison of costs for the two options presented:

- Temporary wetland impacts are assumed to be mitigated by post-construction restoration of the impacted wetlands. Costs associated with that restoration are assumed to be included in construction costs since that work would be completed as part of the same mobilization as the subject construction activities.

- Impacts to wetland buffers are assumed to be mitigated by the establishment of up to 824 acres of riparian forest identified as an aquatic habitat mitigation need. Since those costs would already be considered as part of the aquatic habitat mitigation cost, no additional cost is included here.

- Assume a total of 1.17 acres of permanent impacts to Category III wetlands. Permanent impacts to 0.41 acres of Category III wetland would occur as a result of fill in spoil areas related to the FRE facility construction. Permanent impacts to 0.58 acres of Category III wetland would occur as a result of excavation and fill within the permanent footprint of the FRE and CHTR. A temporary impact to 0.18 acres of Category III wetland would occur as a result of construction access and staging for the FRE facility, but due to the 5-year duration of the temporary impact this analysis will consider it a permanent impact for mitigation estimating purposes.

- For cost estimating purposes, it is assumed that the 1.17 acres of permanent impacts to Category III wetlands could be mitigated at a ratio of 1 credit to 1 acre of impact for a mitigation bank credit purchase or at a 2:1 ratios for permittee responsible mitigation using a combination of wetland creation and re-establishment.

- Episodic temporary inundation within the temporary reservoir would potentially impact up to 11.56 acres of wetland within the maximum extent (847 acres) of inundation. The nature of those impacts has not yet been fully characterized. Impacts due to inundation would vary throughout the inundation zone based on local elevation of each wetland. Local elevation would determine the frequency, depth, and duration of inundation, and associated impacts to wetland function. For the purposes of this cost estimate it is assumed that wetlands impacted by episodic inundation would be mitigated at up to a 1:1 ratio for credit purchase or up to a 2:1 ratio for permittee responsible mitigation. Actual mitigation ratios for these impacts will be

negotiated based on future analysis to refine the characterization of impacts based on lost wetland functions and conversions.

5.1 Mitigation Bank Credit Prices

Mitigation banks are established so that one credit of mitigation equals one acre of impact for a specified category of wetland (Category III wetland in the case of the Chehalis Basin Mitigation Bank). The credits offered at a mitigation bank are based on a credit inventory calculation that accounts for the combination of all wetland types and categories provided by the ecological restoration action. Credits do not typically correspond with actual acreage of the mitigation bank site. For example, a 300-acre wetland mitigation site may generate only 100 credits to sell. Each credit would represent three acres of land in the mitigation area, but those three acres are counted as one credit and not three acres. Each mitigation banking instrument notes the required ratio of credits to impacts specific to how credits are defined at that bank.

5.1.1 Chehalis Basin Mitigation Bank, Hanaford Valley Site

In an email dated July 20, 2020, Steve Hahr with TransAlta Centralia Mining (site owner), quoted the following prices for wetland mitigation credits from the Chehalis Basin Mitigation Bank, Hanaford Valley Site:

- 1 Credit: $250,000
- 1 to 5 Credits: $225,000 each
- 5 or more: $200,000 each

It is assumed that should the Applicant purchase wetland mitigation credits from this bank, the quantity of purchase would result in a per credit price of $200,000 per credit. These prices are current for 2020 and may be subject to change over time. Credit availability is subject to change and may increase because of future performance milestone credit releases or decrease because of credit purchases by other parties.

5.1.2 North Fork Newaukum Mitigation Bank

WSDOT oversees this public bank. In recent correspondence with WSDOT regarding credit availability WSDOT indicated that the available credits are being held for future WSDOT project needs and would not be available for sale to the Applicant.

5.2 Preliminary Cost Estimates

Table 5 presents preliminary costs for permittee responsible mitigation compared to purchase of mitigation credits from an approved mitigation bank. Preliminary estimated costs for wetland mitigation options for planning purposes range from $2,500,000 to $4,500,000.

Table 5 Estimated Costs for Wetland Mitigation Opportunities

MITIGATION ACTION TYPE	UNIT COST	ESTIMATED AMOUNT REQUIRED	TOTAL ESTIMATED COST
Offsite Wetland Creation and Enhancement	$176,000 per acre of mitigation	25.46 acres (12.73 acres at 2:1 ratio)	$4,480,960
Mitigation Credit Purchase**	$200,000 per credit	12.73 credits	$2,546,000

*Wetland restoration costs sourced from the aquatic assessment (Kleinschmidt 2020).
**Current (2020) costs quoted by owner of the Chehalis Basin Mitigation Bank, Hanaford Valley Site.

The episodic temporary inundation of up to 11.56 acres of wetland within the temporary reservoir footprint is the largest single component of the estimated impacts and mitigation, and it is also the most uncertain component in the wetland impact analysis. The assumption of up to a 1:1 ratio for credit purchase or up to a 2:1 ratio for permittee responsible mitigation is a conservative overestimate of what is likely to be required. Those ratios would be used if the impacts were considered a total permanent loss. Actual ratios will be negotiated with regulatory agencies during the permitting process based on a future detailed analysis of actual anticipated losses of wetland functions due to inundation and conversion. Negotiated ratios and resulting costs are likely to be less than this estimate.

6 RECOMMENDATIONS

As demonstrated in **Table 4,** there are enough mitigation opportunities to meet or exceed the estimated mitigation requirements for wetlands and wetland buffers. Both options (e.g. credit purchase or permittee responsible mitigation) are consistent with RCW 75.46 which states: *"the State will support alternative mitigation options that have a low risk to the environment, yet have a high net environmental, social, and economic benefit. The overarching goal is to develop and implement mitigation projects that maximize environmental benefits from project mitigation."*

The Kleinschmidt team's recommendations are a combination of on-site and off-site mitigation, which are also consistent with Washington State mitigation policy guidance (Ecology 2006).

This mitigation assessment was completed in accordance with state and federal wetland mitigation guidance. Mitigation sequencing is recommended, which will result in a combination of avoidance, minimization, on-site mitigation and off-site mitigation. The Kleinschmidt team offers the following specific recommendations as the project moves into the permitting phase, refines the preliminary design, and develops specific plans for mitigation:

- Maximize the application of avoidance measures;
- Minimize unavoidable impacts to all categories of wetlands and wetland buffers;
- Integrate wetland mitigation into aquatic and terrestrial mitigation sites; and
- Purchase credits from an approved mitigation bank to offset unavoidable permanent impacts and recurring episodic impacts to wetlands resulting from temporary inundation.

There are adequate wetland mitigation opportunities available in the watershed. Rough cost estimates have been developed to support project costing. Initial cost estimates will be considered in a future cost benefit analysis, but initial findings suggest that wetland mitigation costs would be feasible in the context of the scale and scope of the Project.

7 CONCLUSIONS

This wetland assessment addresses the following four key questions.

Key Question #1: What types, locations, and quantities of wetland mitigation are likely to be required to address project impacts to regulated wetlands and buffers?

Mitigation requirements are based on two key elements: 1) the quantity and type of wetland impact, and 2) the quantity and type of mitigation. Applicants must demonstrate that impacts and mitigation ecologically balance to obtain regulatory approval.

The Kleinschmidt team based the assessment of estimated wetland mitigation needs on the Project impacts presented in **Table 1** based on the latest preliminary design for the FRE facility and airport levee improvements (HDR 2017, 2018a, 2018b, and 2019) and on previously completed wetland delineations (Anchor QEA 2018 and 2019). Most wetland impacts would affect Category III wetlands with a smaller area of Category II wetland affected. No Category I nor Category IV wetlands were identified within the project impact areas. There are typically multiple ways to mitigate for wetland impacts with variations in the type and location of mitigation. Mitigation ratios vary based on both impacts and mitigation. The quantity of mitigation required will be determined based on the type, quality, and location of the mitigation considered. Wetland and buffer mitigation quantities were estimated based on simple measurements and established replacement ratios. The Kleinschmidt team's preliminary assessment of wetland mitigation needs is detailed in **Section 3.3** and summarized in **Table 4.**

The Kleinschmidt team assumed that all temporary construction impacts to wetlands would be mitigated at the site of impact by restoration of the affected wetlands at the completion of construction. This is a reasonable assumption provided the duration of the temporary impacts is no more than two or three years. For longer temporary impacts, state and federal agencies would likely require post-construction restoration of the affected wetlands plus additional mitigation to address the temporal loss of wetland functions. To address this, the temporary impact to 0.18 acres associated with FRE facility construction access and staging lasting 5 years was treated as a permanent impact for the purpose of estimating mitigation quantities and costs.

Based on the nature of the Project impacts, the Kleinschmidt team considered two wetland mitigation options. The Applicant could either purchase wetland mitigation bank credits from an approved wetland mitigation bank in the Chehalis Basin, or the Applicant could choose to integrate permittee responsible wetland mitigation into the same sites used for aquatic habitat mitigation. Most permittee responsible mitigation opportunities would be within the floodplain along the 20-mile section of the main stem Chehalis River downstream of the FRE extending to the South Fork Chehalis River confluence.

Should the Applicant choose to purchase wetland credits, the Kleinschmidt team estimates that up to 12.73 wetland mitigation credits would be required. Should the Applicant opt for permittee responsible mitigation and enhance or restore wetlands within the riparian buffers anticipated for aquatic habitat mitigation, up to 25.46 acres of mitigation would be required.

Key Question #2: Are there sufficient wetland mitigation opportunities available to address unavoidable impacts to wetlands and buffers within the upper Chehalis Basin?

Comparison of the estimated mitigation needs to the available opportunities demonstrated that there are sufficient wetland mitigation opportunities to address the anticipated unavoidable project impacts to wetlands and wetland buffers. Wetland mitigation may be provided as an integrated component of aquatic habitat mitigation sites that focus on riparian forest and floodplain restoration. Wetland mitigation may also be provided by purchase of credits from an approved existing wetland mitigation bank located within WRIA 23. Either permittee-performed mitigation or credit purchase from a mitigation bank would comply with regulatory guidance for wetland mitigation. Initial contact with wetland mitigation bank points of contact indicated that there currently are available credits at the private wetland mitigation bank, but WSDOT intends to use the available credits at the North Fork Newaukum Bank for future WSDOT project needs. Actual credit availability may change over time, and future coordination and negotiation with the wetland mitigation bank owners will be necessary to secure credits. Similarly, any future wetland mitigation proposal will be developed in close consultation and coordination with regulatory agencies, tribes, and stakeholders, and specific wetland mitigation sites and actions will be subject to the review and approval of agencies in consultation with tribes.

Key Question #3: Are there opportunities to integrate wetland mitigation with mitigation for aquatic and terrestrial impacts at candidate mitigation sites?

This assessment concluded that that are abundant opportunities to integrate wetland mitigation with mitigation for aquatic and terrestrial impacts at candidate mitigation sites. Specific opportunities for such integration focus on:

- Accomplish wetland buffer mitigation within the approximately 824 acres of riparian reforestation and floodplain reconnection identified as a mitigation need for impacts to aquatic habitats.

- Focus off-site permittee responsible wetland mitigation on floodplain locations where aquatic habitat mitigation would occur as a way of achieving greater ecological benefits by integrating more diverse habitat types and functions.

The Kleinschmidt team expects that there will be opportunities to further integrate wetland mitigation as an integrated component of the aquatic habitat mitigation based on the nature and function of the riparian buffer zone. The aquatic assessment is expected to include a forested riparian buffer on

approximately 17 miles of river and stream channels, approximately 200 feet from ordinary high water mark on both sides of the streams. There are known regulated wetlands within the potential footprint of the riparian buffer. Existing wetland acreage within the anticipated riparian buffer will be available once a formal wetland delineation is conducted within the riparian buffer zone. Existing wetlands in the anticipated riparian buffer include wetlands that were once functional wetlands but have been converted to agricultural use, called prior converted wetlands. Existing wetlands within the anticipated riparian buffer, including prior converted wetlands, could be enlarged, enhanced, and/or re-established as an integrated part of the aquatic habitat mitigation.

Key Question #4: What is the approximate cost to mitigate anticipated impacts to wetlands and wetland buffers?

The approximate costs to mitigate anticipated impacts to wetlands and wetland buffers would range from approximately $2,500,000 to $4,500,000 depending on whether mitigation was accomplished by credit purchase from an approved mitigation bank (low end of range) or permittee responsible off-site mitigation (high end of range).

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Appendix A
Summary Table of Wetlands Potentially Affected by Episodic Inundation in the Temporary Reservoir

WETLAND NAME[1]	WETLAND TYPE[2]	RATING CATEGORY[3]	IMPACT AREA (ACRES)
WP	PEM	3	0.007
WT	PFO/PEM	2	0.241
WU	PEM	3	0.088
CR-LB01-WA	PFO/PEM	3	0.179
WS	PEM	3	0.026
CC-RB06-WC	PEM	3	0.086
CC-RB06-WA	PSS/PEM	3	0.045
CC-RB07-WB	PSS	3	0.055
CC-WC	PSS/PEM	3	0.090
WI	PFO/PEM	2	0.153
CR-LB03-WA	PEM	3	0.102
CR-WD	PFO/PEM	3	0.001
CR-WE	PFO/PEM	3	0.000
CR-WC	PFO/PEM	3	0.006
CR-LB04-WA	PEM	3	0.029
WY	PEM	2	0.074
HC-WE	PSS/PEM	2	0.177
HC-WD	PFO/PEM	3	0.046
HC-WC	PEM	3	0.042
HC-WB	PSS/PEM	3	0.018
HC-WA	PEM	3	0.025
WX	PFO/PEM	3	0.029
WAC	PFO/PSS/PEM	2	0.214
WAA	PFO/PSS	2	0.064
CR-WG	PSS/PEM	3	0.023
CR-WL	PFO/PSS	3	0.007
CR-RB13-WA	PSS/PEM	3	0.090
CR-RB08-WA	PEM	3	1.254
CR-RB10-WA	PSS/PEM	3	0.040
WAE	PSS/PEM	3	0.043
CR-WI	PSS/PEM	3	0.016
CR-WJ	PSS/PEM	3	0.024
CR-WK	PSS/PEM	3	0.033
WAD	PFO/PSS	3	0.078
CR-WH	PSS/PEM	3	0.015
CR-RB09-WA	PSS/PEM	3	0.455
BC-WA	PEM	3	0.056
CR-LB13-WA	PSS/PEM	3	0.051
CR-LB15-WA	PFO/PSS/PEM	3	0.062
CR-LB16-WA	PFO/PSS/PEM	3	0.204
CR-WM	PFO/PSS	3	0.790
CR-LB19-WA	PSS/PEM	3	0.006
CC-WF	PFO/PSS	3	0.022
CC-LB10-WA	PFO/PSS	3	0.060

CC-WE	PSS	3	0.035
CC-LB07-WA	PSS/PEM	3	0.012
WK	PFO/PSS	3	0.055
CC-LB06-WB	PSS/PEM	3	0.030
CC-LB05-WA	PFO	3	0.221
WH	PSS/PEM	3	0.031
LC-WA	PFO/PSS	3	0.059
LC-WB	PFO/PSS/PEM	3	0.263
WR	PSS/PEM	3	0.018
CR-WA	PSS	3	0.005
CR-S04-WA	PEM	3	0.026[4]
CR-S02-WA	PFO/PSS/PEM	3	0.148[4]
CC-RB05-WA	PEM	3	0.009[4]
CR-S18-WA	PFO/PSS	2	0.098
LC-LB01-WA	PSS/PEM	3	0.247
WG	PEM	3	0.244
CC-WA	PFO/PSS	2	0.056
CC-LB03-T2-WA	PFO/PEM	3	0.031
CC-LB01-WA	PEM	3	0.236
WE	PEM	3	0.162
WD	PSS/PEM	3	0.437
WO	PEM	3	0.034
WAG	PEM	2	0.018
WAF	PEM	3	0.146
CR-RB01-WA	PFO	3	0.373
CR-S01-WA	PSS/PEM	3	0.355
CC-LB04-WA	PSS/PEM	3	0.358
CC-LB04-WB	PSS/PEM	3	0.074
CC-WB	PFO/PSS	3	0.073
CC-WD	PFO/PSS	3	0.113
CC-LB06-WA	PSS/PEM	2	0.182
CC-RB06-WB	PSS/PEM	3	0.441
CR-LB02-WA	PFO/PSS/PEM	2	0.578
WW	PFO/PSS/PEM	2	1.092
CR-WF	PFO/PSS	3	0.096
WV	PEM	3	0.051
CR-WB	PFO/PEM	3	0.043
WZ	PEM	3	0.032
CR-LB14-WA	PSS/PEM	3	0.113
WF	PEM	3	0.025
CC-RB07-WA	PSS	3	0.238
WQ	PEM	3	0.011
CC-WI	PSS/PEM	3	0.014
CC-WJ	PSS/PEM	2	0.009
WAI	PEM	3	0.062
WAJ	PEM	3	0.010

Notes:
[1]Wetland names correspond to the names used in the wetland delineations (Anchor QEA 2018 and 2019).
[2]Ecology wetland category based on current Western Washington Wetland Rating System.
[3]Wetland types include Palustrine Emergent (PEM), Palustrine Scrub-Shrub (PSS), Palustrine Forested (PFO), and Palustrine Unconsolidated Bottom (PUB).