MEMORANDUM

Date: February 3, 2020
To: Chehalis Basin Board
From: Andrea McNamara Doyle, Director
Re: Draft approach to completing assessment to inform the Board's Chehalis Basin Strategy and funding recommendations in fall 2020

Summary

At the February 6 Board meeting, staff will review a draft approach for bringing together the multiple types and sources of information you have requested to meet your legislative mandate to prepare an integrated strategy for reducing flood damage and restoring aquatic species habitat. Your strategy will need to include a detailed set of actions, implementation schedule, and quantified measures for evaluating success. During the February Board meeting, staff will be seeking your initial feedback on the draft approach for completing this work during fall 2020 by summarizing the main actions, analytical approaches, and key assumptions proposed for the assessment, and highlighting issues where your direction is most needed. Based on your input at the February meeting, staff will make any necessary revisions to the draft approach and then ask for your concurrence at the March meeting to proceed with the work.

Background

In creating the Office of Chehalis Basin and the Board, the legislature directed that:

> *The Chehalis Basin Strategy must include a detailed set of actions … and must be amended by the Chehalis Board as necessary to include new scientific information and needed changes to the actions to achieve the overall purpose of the strategy. The strategy must include an implementation schedule and quantified measures for evaluating the success of implementation.*

The Board is intending to make its initial strategy recommendations for a detailed set of actions and implementation schedule later this year, along with your recommendations for funding in the 2021-2023 biennium and beyond. In preparation for the Board's recommendations, OCB staff will develop a draft Long-Term Strategy Assessment (Assessment) to inform the Board's deliberations. This Assessment will build off the Programmatic SEPA EIS (completed in June 2017) and additional work completed during the 2017-2019 and 2019-2021 biennia. The Assessment will bring these multiple sources of currently available data and information together to help you evaluate the many social, environmental, economic, and other public interest considerations you will need to weigh and balance in making your policy choices. It is intended to provide a basis for your strategy and budget recommendations, as well as options for how the Board can make future amendments as necessary to include new scientific information and needed changes to the actions to achieve the overall purpose of the strategy over the long term.

To prepare you for the discussion at the February 6 meeting, the rest of this memorandum summarizes how OCB staff proposes approaching the Assessment, including:

- **Action Elements.** The suite or categories of individual actions, and the different combinations of actions, that would be most informative to evaluate at this stage in the process;
- **Analytical Approaches.** The analytical approaches that would be most helpful to evaluate the different social, environmental, economic, and other public interest considerations;
- **Key Assumptions.** The key policy and technical assumptions that will guide the analysis;
- **Implementation and Governance.** The approach for sequencing implementation, and recommending a governance structure for overseeing implementation and adaptive management decisions; and
- **Schedule.** The schedule for Board updates and major decision points involving the Assessment.

Action Elements

The Board's mission is predicated on a recognition that no single action alone will address all the aquatic species and flood-related challenges in the Chehalis Basin — a combination of both large-scale and small-scale actions targeting both aquatic species habitat restoration and flood damage reduction objectives is needed. Based on the best information currently available, OCB staff recommends that the Assessment analyze the following suite or categories of actions, which are described further within this memorandum:

- Aquatic species habitat restoration actions
- Large-scale flood damage reduction actions (e.g., proposed flood retention facility with temporary reservoir, Chehalis-Centralia airport levee improvements, Aberdeen-Hoquiam North Shore Levee, and transportation improvements)
- Local-scale flood damage reduction actions (e.g., Community Flood Assistance and Resilience [CFAR], local projects, and early flood warning systems)
- Land use actions

Aquatic Species Habitat Restoration Actions

Aquatic species habitat restoration actions, which are included in the Aquatic Species Restoration Plan (ASRP) Phase 1 document released in November 2019, are designed to protect, improve, and create sustainable ecosystem processes and functions that support the long-term productivity of native aquatic and semiaquatic species, and at much higher levels of abundance than current conditions support. The ASRP is designed to address the significant degradation of habitat that has occurred and the significant predicted results of climate change, and in the process enhance the future tribal and nontribal harvest of salmon.

Each of the three Phase 1 ASRP Scenarios will restore impaired ecosystem processes and protect high functioning areas to different degrees based on the differing levels of effort and geographic scope of actions included in each Scenario. For purposes of the Assessment, analysis of the aquatic species

actions will be based on the information available in the ASRP Phase 1 document and responses to the public input on the ASRP Phase 1 document.

The types of actions included in the Phase 1 ASRP Scenarios include:

Protecting and restoring riparian forested and headwaters areas

These actions can provide the large wood, nutrients, shading and cooling, stream bank protection, and fish and wildlife migration corridors needed by aquatic species.

Protecting and restoring floodplain and off-channel habitats and wetlands

These actions will improve watershed connectivity, water storage and exchange to augment low flows and reduce water temperatures, and help diversify available fish and wildlife habitat.

Restoring in-channel large wood

These actions increase cover and roughness, decrease channel incision, retain and sort sediments, create deep pools, and improve channel complexity and floodplain connectivity in strategic locations.

Correcting selected fish passage barriers

These actions can improve access to upstream habitats for multiple fish species, depending on location.

Large-scale Flood Damage Reduction Actions

Large-scale flood damage reduction actions are designed to protect communities and the environment from damages caused by major and catastrophic flooding on the mainstem of the Chehalis River extending into Grays Harbor communities. Communities interested in large-scale actions are focused on protecting public health and safety, and avoiding the economic losses and social harms associated with significant flooding.

The types of large-scale actions that are currently under active consideration include:

Proposed Flood Retention Facility and Airport Levee Improvements

The Chehalis River Basin Flood Control Zone District (FCZD) is proposing to construct a new flood retention facility and temporary reservoir near the town of Pe Ell to reduce peak flood levels during a major flood or larger from floods originating in the Willapa Hills. The flood retention facility also includes fish passage facilities to allow fish to pass both upstream and downstream. FCZD is also proposing levee improvements around the Chehalis-Centralia Airport in Chehalis to reduce flood damage to the Chehalis-Centralia Airport, local businesses, and area transportation from a 100-year flood. Information from the Draft SEPA EIS will be available by the end of February to include in the Board's Assessment.

In addition, contractors to the FCZD are currently developing a mitigation approach to support the Board's long-term strategy recommendation. The mitigation approach will include mitigation parameters, a prioritized suite of candidate mitigation sites, conceptual mitigation examples, and cost estimates that will be included within a Mitigation Assessment Report. The intent is to demonstrate the

feasibility of mitigating aquatic and terrestrial species habitat impacts identified within the Draft Project-level SEPA EIS. The mitigation approach will support ongoing coordination with interested parties in evaluating the feasibility and results of mitigating the impacts of the flood retention facility and airport levee improvements. The mitigation approach will be available to inform the Board's Assessment.

Aberdeen-Hoquiam North Shore Levee

The Cities of Aberdeen and Hoquiam are working in partnership to design and build the North Shore Levee to provide flood protection for low-lying parts of the cities between the Wishkah and Hoquiam Rivers north of the Chehalis River and Grays Harbor Estuary. The project will provide coastal flood protection to as many areas as is feasible, improve the storm drainage systems in Aberdeen and Hoquiam so that they more effectively collect and convey runoff from intense storm events, and significantly reduce the economic burden on the community caused by flooding. For purposes of the Assessment, available information about the North Shore Levee will be included.

Transportation Improvements

The Washington State Department of Transportation (WSDOT) has previously indicated that it will wait until after the future of the FCZD's project is decided before determining what, if any, additional actions it would take to protect I-5 and other state highway routes in the Chehalis Basin that are impacted by major flood events. WSDOT has identified potential actions that could be taken in conjunction with the FCZD's project to provide additional protection against freeway and highway closures, but it has not yet analyzed those options in detail. WSDOT has also indicated that if the FCZD's project does not move forward, it would need to lead its own planning effort focused on state transportation purposes and needs before identifying preferred actions. In the past, the types of actions considered for addressing flooding on I-5 have included floodwalls, levees, and alternative transportation access routes during major flood events. For purposes of the Assessment, OCB and WSDOT will work together to summarize the past actions considered by the WSDOT for the protection of the state transportation system. Many of these actions were previously assessed in the Programmatic EIS.

Local-scale Flood Damage Reduction Actions

Community Flood Assistance and Resilience

OCB staff is developing a CFAR program consistent with guidance from the Board. CFAR has two primary objectives:

- Reduce flood losses by providing technical and funding support to property owners for the acquisition, relocation, or modification of individual floodprone buildings threatened by major river floods; and
- Prevent property losses by providing funding support for identifying hazard areas, and the acquisition or relocation of buildings threatened by a migrating stream or river channel.

The types of actions likely to be implemented as part of the CFAR program include property acquisitions (buyouts), relocation of buildings, home elevations, dry floodproofing and other retrofitting measures,

channel migration hazard mapping, channel migration zone easements, and small habitat-friendly permittable bank protection. For purposes of including CFAR within the Assessment, staff will be providing options to the Board for how to incorporate preliminary assumptions about the size and scale of the CFAR program.

Local Projects

Local projects include localized, area-specific flood damage reduction projects aimed at immediately protecting critical community infrastructure, frequently flood-damaged properties, and priority areas throughout the Chehalis Basin. For purposes of analyzing the effects of local projects in the Assessment, the analysis will focus on potential future local project actions and not on those projects from the Chehalis River Basin Flood Authority's (Flood Authority) list that have already been completed or are currently ongoing.

Early Flood Warning System

The existing Chehalis Basin Flood Warning System, completed by the Flood Authority, features publicly accessible, real-time, web-based flood data and a monitoring and mapping site. For purposes of the Assessment, the analysis of the early flood warning system will focus on the on-going maintenance and operational costs.

Land Use Actions

Decisions about how land is used are made primarily by landowners and local governments. Past, present, and future land use actions all affect the natural and built environment, which in turn affect both habitat and flooding potential.

Past land use actions have shaped the current conditions. Current land uses in the basin are regulated by local government ordinances, which vary by jurisdiction. Landowners make additional, individualized decisions about how to use their land within these regulatory frameworks. Differences in local zoning, development regulations and building codes, critical areas ordinances, shoreline and growth management plans, hazard plans, and code enforcement capabilities, etc. present a range of different challenges and opportunities for advancing both aquatic species habitat restoration and flood damage reduction priorities. Future land use actions will play a key role in determining how successful the Chehalis Basin Strategy will be in achieving its dual objectives of restoring aquatic species habitat and reducing catastrophic flood damage.

Through the work done to evaluate the ASRP, Restorative Flood Protection (RFP) approach, CFAR, and Flood Authority local projects, several different types of land use actions have been identified that could advance habitat and flood damage reduction objectives. Implementation of these different land use actions will depend on the voluntary cooperation of landowners and local governments. Landowner willingness and local government participation has been identified as a key variable affecting success of the strategy. For purposes of the Assessment, analysis of land use actions, including assumptions about the feasible scope and scale of land use changes, will be based on available information generated by

the ASRP, RFP, CFAR, and Flood Authority local projects work in partnership with the basin local governments.

Combinations of Actions

The Long-Term Strategy Assessment will evaluate how different actions may function when combined, in terms of their environmental, social, and economic impacts to address the dual goals of reducing flood damage and restoring aquatic species habitat.

The alternative scenarios, or Strategy Combinations, will be characterized by different combinations of flood damage reduction actions and a range of aquatic species habitat restoration (e.g., ASRP Scenarios 1 or 3). In addition, a No Action Strategy is included for the purpose of having a basis to compare future conditions with and without different combinations of proposed Strategy Combinations.

No Action

A No Action scenario will be intended to represent the most likely future expected in the absence of implementing any of the aquatic species habitat restoration or flood damage reduction actions. No Action will also serve as a basis to compare future conditions with and without the potential benefits and impacts of the proposed Strategy Combinations. Under No Action, existing activities, programs, and trends in the Chehalis Basin that are not currently funded by the Chehalis Basin Strategy would be assumed to continue. Climate change will be a major component in the predicted results of no action on a long-term Chehalis Basin Strategy.

Strategy Combination 1

Strategy Combination 1 would include analysis of the following combination of actions:

- Proposed Flood Retention Facility and Airport Levee Improvements
    - With and without potential mitigation
- Aquatic Species Habitat Restoration Actions (ASRP Scenarios 1 and 3)
- Aberdeen-Hoquiam North Shore Levee
- Community Flood Protection & Resilience (CFAR)
- Local Projects
- Early Flood Warning System
- Land Use Actions

Strategy Combination 2

Strategy Combination 2 would analyze a combination of all the same actions except for the proposed flood retention facility, airport levee improvements, and associated potential mitigation:

- Aquatic Species Habitat Restoration Actions (ASRP Scenarios 1 and 3)
- Aberdeen-Hoquiam North Shore Levee
- Community Flood Assistance and Resilience (CFAR)
- Local Projects

- Early Flood Warning System
- Land Use Actions

Analytical Approaches

OCB staff recommend the Assessment include a variety of analytical approaches to help the Board weigh and balance the many social, environmental, economic, and other public interest considerations inherent in such a far-reaching strategy.

By necessity, the assessment will need to use currently available quantitative and qualitative data, rather than performing new data collection or original research.

Also by necessity, the assessment will need to rely on currently available models, rather than the creation of new models. Staff recommends that existing models be used to analyze the No Action Scenario and several different variations of the two other Strategy Combinations.

The Assessment will incorporate climate change projections for precipitation, temperature, flood peak flows, and streamflows throughout the analyses. Data and models for predicted climate change conditions used in the Assessment will be from the currently available University of Washington Climate Impacts Group, the National Oceanic and Atmospheric Administration, and Portland State University.

To more fully evaluate the breadth of potential social, environmental, economic, and other public interest impacts of the Strategy Combinations, staff also recommends additional qualitative analyses be performed beyond that which will be available from existing models.

Analyses

Economics and Benefit-Cost Analysis

The economics analysis is an evaluation of the expected economic impacts of different aquatic species habitat restoration and flood damage reduction actions. The economics analysis will assess the expected monetary costs and benefits of the proposed aquatic species habitat restoration and flood damage reduction actions and combinations of these actions. If available, information on the economic valuation of ecosystem services in the Chehalis Basin may also be included in the Assessment.

The study will include the impacts of climate change and on fish populations consistent with EDT and other modeling. The study results will quantify expected net benefits and costs, compared with the No Action baseline, for each combination of actions over a 100-year study period.

Socioeconomic / Environmental Justice Analyses

The socioeconomic and environmental justice analyses will assess and document the socioeconomic and environmental justice implications of the aquatic species habitat restoration and flood damage reduction actions and combinations of these actions. These analyses would summarize how the proposed combinations of actions could affect communities within and connected to the Chehalis Basin.

The analysis would not be conducted under a specific regulatory or legal requirement (e.g., NEPA or the federal Principles, Requirements and Guidelines for Water and Land Related Implementation Studies). It would, however, be consistent with the methodological frameworks used to describe social and economic impacts within these requirements (e.g., Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations).

Modeling

EDT Modeling

EDT models the change in abundance, productivity, population spatial structure, and diversity for a population at a certain point in time. EDT modeling will evaluate different scenarios to estimate potential changes in habitat capacity to support healthy fish populations. The scenarios will evaluate combinations of actions and their effects under different conditions and time horizons.

EDT modeling will evaluate effects to salmonid and steelhead populations as part of the following potential individual and combined scenarios:

- Timeframe (e.g., mid- or late-century)
- Degree of restoration (e.g., ASRP Scenarios 1 or 3)
- A particular flow-year (e.g., flows representative of average flows or 10- or 100-year flood events)
- Proposed flood retention facility
- Proposed flood retention facility mitigation

Modeling of each scenario will be performed with and without various proposed action(s) for five species: fall-run Chinook salmon, spring-run Chinook salmon, Coho salmon, chum, and steelhead.

OCB staff recommends that EDT modeling be completed for ASRP Scenarios 1 and 3 to represent the broadest range of potential results, but not for ASRP Scenario 2.

Hydraulic Modeling

Hydraulic modeling will evaluate changes in the (1) extent and depth of inundation and (2) increase or reduction in flood damage to high-value structures along the Chehalis River mainstem and parts of some major tributaries on particular flow years (e.g., 10- or 100-year flood events), with or without the inclusion of large-scale flood damage reduction actions, including the proposed flood retention facility and Aberdeen/Hoquiam North Shore Levee. Local-scale flood damage reduction actions and aquatic species habitat restoration actions would not be included in hydraulic modeling.

HAZUS Flood Modeling

HAZUS will be used to model flood damage reduction impacts for the No Action and combinations of actions with sufficient information available to develop flood depth grids.

Key Assumptions

Below are some of key assumptions informing the proposed actions and analyses of impacts for development of the Assessment:

- The Assessment will use currently available quantitative and qualitative data, rather than performing new data collection or original research.
    - Existing data will be used for climate change projections. No new climate change data collection, modeling or analysis will be completed.
- The Assessment will use currently available models (including EDT, Hydraulic Modeling, and HAZUS), rather than creating new models, to evaluate different combinations of actions and scenarios.
    - EDT modeling will be used to estimate potential changes in fish populations. NOAA Life-Cycle modeling will not be completed.
    - Hydraulic modeling will be focused on the mainstem Chehalis River, evaluating flooding originating from the Willapa Hills. Flooding within major tributaries (which are currently not included in the hydraulic model) will be qualitative.
    - HAZUS will be used to predict and quantify flood damage impacts under different scenarios.
- The Assessment will not consider ASRP actions as mitigation for aquatic species habitat impacts associated with any of the large-scale flood damage reduction actions. Consistent with the June 2018 memo approved by the Board, if ASRP restoration or protection projects are identified as potential mitigation for impacts from flood damage reduction actions, they would no longer be counted towards ASRP "results." In such cases, alternative ASRP projects may need to be identified to compensate for the reduction in anticipated benefits. For the Assessment, no projects will be counted toward both mitigation and ASRP.
- The Assessment will not include a forest practices analysis because the proposed assessment (to be completed by DNR) will not be complete by fall 2020.

Long-Term Implementation and Governance

In addition to the quantitative analyses listed above, and in order for the Board to develop quantified measures for advancing success as laid out in statute, the Assessment will include a description of the long-term implementation and governance needs for the long-term strategy. This includes an approach for sequencing or phasing of priority investments to develop assurances, articulation of a long-term governance structure, and creating a long-term financing plan.

Schedule

Below is a high-level schedule outlining the major topics and decision points related to the Assessment through the October 2020 Board meeting:

February 6	OCB staff present recommendations on approach and key assumptions for Assessment.
March 5	Board approves approach and key assumptions for developing the Assessment.
April 2	OCB staff present recommendations on approach to developing 2021-23 budget.
May 7	Board approves approach to 2021-23 budget development.
June 4	Board receives briefing on Draft SEPA EIS public comments
July 9	Board receives briefing on preliminary EDT and economics results
August 6	OCB staff present preliminary information on Draft Assessment findings and conclusions
Sept 3	OCB staff present preliminary Draft Assessment and 2021-23 budget recommendation
Sept 9-10	Board holds public hearings to receive public comment on preliminary Draft Assessment
Sept 17	Board receives briefing on Draft NEPA EIS; and considers public comments on preliminary Draft Assessment
Sept 30	Board workshop on Assessment and 2021-23 budget recommendation
Oct 1	Board approves Assessment and 2021-23 budget recommendation

Outreach

OCB staff will host a webinar on February 11 from 11am – 1pm, between the February 6 and March 5 Board meetings, to allow Board members, their staff or consultants, and other interested parties to ask questions, provide input, and learn more details about the information provided on the Assessment in this memo. The webinar is meant to inform the Board's recommendation on an approach to analyze the different elements that will inform their decision on a long-term strategy at the March 5 Board meeting.

Questions for Board Consideration

- Do the Action Elements capture the types of actions that should be evaluated in the Assessment?
- What combinations of actions, or what scenarios, are you most interested in?
- What questions or concerns do you have about the Key Assumptions?
- What additional information or clarification do you need in advance of the March 5 Board meeting in order to approve the approach staff is recommending for completing the Assessment?