

PLANNING COMMISSION MEETING AGENDA



City of Lake Stevens Vision Statement

We are a thriving community that promotes a vibrant economy, preserves natural beauty, and supports an exceptional quality of life for all.

September 17, 2025 - 6:00 PM
Hybrid - In-Person at the Mill or Remote via Zoom

[Join Zoom Meeting:](#)

or call in at: 253-215-8782 Meeting ID: 83783490992 Passcode: 997561

- 1. Call to Order**
- 2. Roll Call**
- 3. Guest Business**
- 4. Action Items**
 - A. Approve Minutes of Planning Commission Meeting of August 18, 2025
- 5. Discussion Items**
 - A. Review of Critical Areas Best Available Science and Gaps Analysis and Discussion of Potential Code Amendments David Levitan
 - B. Potential Protective Buffers for Emergency Housing and Shelters David Levitan
- 6. Commissioner Report**
- 7. Planning Director's Report**
- 8. Adjourn**

THE PUBLIC IS INVITED TO ATTEND

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PLANNING COMMISSION STAFF REPORT



Agenda Date: 9/17/2025

Subject: Approve Minutes of Planning Commission Meeting of August 18, 2025

Contact Person/Department: , Community Development

Budget Impact:

Legal Review: No

RECOMMENDATION(S)/ACTION REQUESTED:

SUMMARY/BACKGROUND:

APPLICABLE CITY POLICIES:

ATTACHMENTS:

1. 8-18-25 Planning Commission meeting minutes

PLANNING COMMISSION MEETING MINUTES



HYBRID/REMOTE AND IN-PERSON AT THE MILL

August 18, 2025

CALL TO ORDER: 6:00 PM by Chair Janice Huxford

MEMBERS PRESENT: Chair Janice Huxford, Vice-Chair Jennifer Davis, Commissioner Bruce Morton, Commissioner Mike Duerr, Commissioner Nathan Packard, and Council Liaison Ryan Donoghue (remote)

MEMBERS ABSENT: Commissioner Connor Davis, Commissioner Murika Matz. Commissioner Duerr moved, and Commissioner Morton seconded, a motion to excuse Commissioner Matz's absence and make Commissioner Connor Davis's absence unexcused. The motion passed unanimously.

STAFF PRESENT: Planning Manager Christi Schmidt, Principal Planner David Levitan, Administrative Assistant Dawn Erickson

OTHERS PRESENT: Intern Ella Barnard, Intern Cameron McTee

Chair Huxford called the meeting to order at 6:00 p.m. and led the Pledge of Allegiance.

Roll Call: As noted above.

Guest business: None. Planning Manager Schmidt welcomed interns Ella Bernard and Cameron McTee, who introduced themselves to the Commissioners.

Approval of Minutes: The August 4, 2025 meeting minutes were approved as written. Commissioner Morton made the motion, and Commissioner Packard seconded. The motion passed unanimously.

Discussion Items: Principal Planner Levitan provided an update on the proposed revisions to the LSMC STEP Housing Code Language, with draft language provided in the packet. He reviewed some of the information presented on May 21 and June 2, 2025, and pointed out highlights and rationales behind the draft code language. He also reviewed some examples of regulations in other Puget Sound cities.

In an overview of the draft language, Principal Planner Levitan highlighted the following staff recommendations:

- Allow for outright permitted uses (as opposed to requiring a CUP)
- Require a Type I permit and process accordingly
- Require individual sites to be separated by at least 500 feet

- Public notice required to adjacent neighbors, similar to STRs
- Site Management Plan must provide contact information, analyze parking and include an Operations and Safety Plan

He then requested feedback from the Commissioners.

Regarding separate approaches for emergency housing and supportive housing:

After discussion regarding:

- A sufficient buffer distance for health and safety,
- The effects of potential concentration within a neighborhood/area,
- Clarification that the buffer is between *facilities*, and applies only to emergency housing types,
- Whether one housing type will likely need more defined regulations. Principal Planner Levitan stated that the more long-term residents in permanent supportive housing typically need more comprehensive services, which lends itself to needing less regulation than emergency housing
- Should the city consider buffers between facilities, schools, parks, marijuana-related businesses, etc.? Principal Planner Levitan said the city could exceed the state recommendation for buffers related to marijuana-related businesses if a nexus could be provided.

Commissioners were comfortable with separate approaches for emergency and supportive housing types, except Chair Huxford, who said she feels that having separate approaches causes more unnecessary ambiguity. The majority favored a buffer, although the size was not agreed upon.

Due to land use development standards and fire codes, maximum occupancy was considered a non-issue for the Commissioners.

A public notice discussion centered on whether public notice requirements for emergency housing should be treated similarly to Type I or II applications. Principal Planner Levitan explained that Types II through IV permits only require a 300-foot radius for public notice; requiring a larger radius would need to be linked to a health/safety rationale. Commissioner Packard said he would be willing to exceed the 300-foot radius for emergency-type housing and later added that he would like to see more than adjacent neighbors notified. Commissioner Duerr agreed that the 300-foot radius could be increased, and Chair Huxford favors a Type II process for emergency housing. Commissioner Jennifer Davis stated she is comfortable with the requirements proposed. Commissioner Morton favors public notice for immediate neighbors. Commissioner Matz suggested, through written comments, that the facility owner/operator should be required to attend the public meeting.

Management Plan renewal frequency was discussed, with Commissioner Morton favoring no renewal requirements unless management deviates from the operational plan, or for a code violation or safety event. Principal Planner Levitan said staff could build a section detailing what would lead to permit revocation, avoiding the necessity for renewals. Commissioner Duerr views the renewal process as a way to verify that the operational plan is still being followed as outlined initially. Planning Manager Schmidt stated that the STR renewal process is just one sheet, typically processed in one week, and is a declaration that the information is true and accurate. Commissioner Matz favors a semi-annual renewal requirement, unless maximum occupancy limits are reached. Commissioner Packard quoted the “substantive change” measure in the proposed language, saying it is too subjective. Principal Planner Levitan noted the city must evaluate the occupancy (including any staff) for fire code and parking. Commissioner Jennifer Davis

asked how the safety and operational plans are evaluated. Principal Planner Levitan stated the plans would need to be reviewed by the building team, the planning team, the police, and the fire department. The Municipal Code would also require a traffic evaluation, but the city can waive impact fees to subsidize the program. Planning Manager Schmidt pointed out information handed out earlier this evening that applies to this issue.

Commissioner Reports:

Chair Huxford stated she had met with the mayor and will meet with the Public Works Director to discuss traffic management, specifically a three-way stop at the Machias Cutoff. Commissioner Packard expressed concern about the number of e-minibikes on the streets, citing it as a safety hazard. Planning Manager Schmidt stated that this has become a prevalent topic at planning conferences, and some jurisdictions regulate e-bikes, etc.

Director's Report

Planning Manager Schmidt suggested taking it to the City Council to determine whether to have exemptions for public use and public benefits. She also said that staff will have a quarterly report for the commissioners at the next meeting. She also reminded the group that meetings are moving to Wednesday, effective 9/3/25. Principal Planner Levitan told the Commissioners that the city is working on a pre-approved ADU plans project and hopes to pool resources with other jurisdictions to defray costs. He also advised the Commissioners that the draft of the BAS review for the CAO update is expected tomorrow, so the results and recommendations can be discussed at the next meeting.

Adjourn: Motion by Commissioner Duerr, with a second by Commissioner Packard, to adjourn the meeting at 7:30 p.m. The motion carried unanimously.

Respectfully,

Dawn Erickson, Administrative Assistant

PLANNING COMMISSION STAFF REPORT



Agenda Date: 9/17/2025

Subject: Review of Critical Areas Best Available Science and Gaps Analysis and Discussion of Potential Code Amendments

Contact Person/Department: David Levitan, Community Development

Budget Impact:

Legal Review: No

RECOMMENDATION(S)/ACTION REQUESTED:

No formal action is required. Staff will provide a summary of the Best Available Science (BAS) and Gaps Analysis documents prepared for the Critical Areas Ordinance (CAO) Update, including a discussion of potential amendments to demonstrate compliance with BAS.

SUMMARY/BACKGROUND:

At the Planning Commission's [February 19, 2025 meeting](#), staff introduced the update to the city's Critical Areas Ordinance (CAO; [Chapter 14.88 LSMC](#)). Similar to comprehensive plans, cities are required to periodically update their CAO to ensure compliance with changes to the Growth Management Act (GMA) and to reflect best available science (BAS) for the five types of environmental sensitive areas identified in [RCW 36.70A.030\(6\)](#):

- Wetlands
- Critical aquifer recharge areas
- Geologically hazardous areas
- Frequently flooded areas
- Fish and wildlife habitat conservation areas (primarily streams)

The city's CAO currently addresses four of the five critical areas identified above, with the exception being critical aquifer recharge areas (CARAs), which are "areas with a

critical recharge effect on aquifers for potable water, including areas where an aquifer that is a source of drinking water is vulnerable to contamination that would affect the potability of the water, or is susceptible to reduced recharge.” Staff provided an overview of the process to develop CARA regulations during the Commission’s [May 7, 2025 meeting](#). Staff continues to work on developing CARA regulations to classify wellhead protection areas and regulate land uses within mapped CARAs.

In late May 2025, the city contracted with the environmental consulting firm Facet to assist with the CAO Update. As part of its first set of deliverables, Facet prepared a Gaps Analysis (Attachment 1) and Best Available Science review (Attachment 2) to help identify CAO topics and sections that need to be amended to comply with the GMA and BAS.

Summary of Gaps Analysis and BAS Recommendations

Tables 1-7 of Attachment 1 include an analysis of and recommended changes to the various CAO sections in order to comply with BAS, which is evaluated in Attachment 2. Recommended minor changes include updating definitions and procedures to match those in the Washington Administrative Code (WAC); including references to data sources and BAS; and revising the wetland rating system to the most recent publication. More substantive identified revisions include better identification of buffer protections and mitigation requirements for specific uses such as utility crossings and hazardous tree removal; revising or providing additional BAS justification for the use of wetland buffer averaging, which allows for reduced wetland buffer width in exchange for buffer addition/enhancement in other areas; and developing the forementioned CARA regulations.

Site Potential Tree Height and Riparian Management Zones:

Facet also prepared a technical memorandum on the city’s current stream protections (Attachment 3), with a focus on recommendations from the Washington Department of Fish and Wildlife (WDFW) to regulate streams as “riparian management zones” (RMZs). In addition to the development of CARA regulations, this would represent the most notable change to the city’s current CAO.

Utilizing a [WDFW tool/model](#), the width of each RMZ would be based on the site potential tree height (SPTH) of a 200-year-old tree of a particular species. In other words, WDFW recommends that local jurisdictions adopt stream buffers based on the maximum potential tree height for tree species present within the riparian area. As discussed in Attachment 3, utilizing SPTH to regulate stream buffer widths would be a major change from current BAS and require significant changes to the city’s adopted stream buffers, which would affect the city’s amount of buildable land and could impact its ability to meet the 2044 growth targets. Facet’s analysis determined that only 0.12 miles of the city’s 26.9 miles of Type F (fish-bearing), Type Np (perennial, or year-round), Type Ns (seasonal), and Type U (unclassified) streams. As a reminder, Type S (shorelines of the state) streams are regulated by the Shoreline Master Program (SMP)

and not the CAO, so this would not apply to Catherine Creek south of Hartford Road or the reaches of Pilchuck Creek within the city. Regulations for those streams will be assessed and revised (if needed) during the next SMP periodic update.

If a tree species within the riparian areas of a stream has the potential to grow to 235 feet in height – which Table 4 of Attachment 3 shows is the case for 21.3 miles, or nearly 80% of the city's streams – the stream buffer from the SPTH model would be 235 feet. In the case of Type Np, Ns and U streams (which have a current buffer width of 50 feet), this would be a nearly five-fold increase in the stream buffer regulations; figures 1, 4, and 5 of Attachment 3 show what these much larger buffers (the red lines) would look like in different parts of the city when compared to the existing buffer width (the lighter blue buffer extending from the darker blue stream). As the city is primarily reliant on infill development on smaller lots, this could dramatically affect the city's amount of buildable land.

Staff is currently working with Facet to identify potential alternatives (i.e., reductions) to buffers based on strict adherence to SPTH, which like the rest of the CAO Update must be based on BAS. The Planning Division's intern (Cameron McTee) is currently working on mapping alternative buffers that staff plans to share with commissioners during the meeting, including:

- Establishing a minimum 100-foot buffer/RMZ for all streams in the city, which would double the current 50-foot requirement for Type Np/Ns/U streams (the majority of the city's streams) and meet the minimum 100-foot buffer width standard that is recommended for providing adequate pollutant removal, as discussed on page 10 of Attachment 3.
- Establishing a minimum 150-foot buffer for Type F (fish-bearing streams), which would be a 50% increase over the existing 100-foot buffer; match the current buffer for Type S streams; and well exceed the recommend standard for pollutant removal.

Next Steps

Over the next several months, staff will work on developing draft code language to address the recommendations in the Gaps Analysis and reflect BAS. Staff also intends to meet with WDFW staff to discuss alternatives to a strict SPTH model. Staff anticipates briefing the Planning Commission on the draft code language later in Fall 2025, before shifting to public hearings in late 2025 or early 2026 (if needed). As it develops draft code language, it will also develop a variety of online and in-person project materials and engagement opportunities to solicit and gather community feedback.

APPLICABLE CITY POLICIES:

ATTACHMENTS:

1. Attachment 1 - CAO Gaps Analysis
2. Attachment 2 - CAO Best Available Science Review
3. Attachment 3 - SPTH Memorandum



FACET

Critical Areas Ordinance Update

Lake Stevens Municipal Code, CAO Update DRAFT Gap Analysis

CHAPTER 14.88 CRITICAL AREAS

AUGUST 2025

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The information contained in this report is based on the application of technical guidelines currently accepted as the best available science. All discussions, conclusions and recommendations reflect the best professional judgment of the author(s) and are based upon information available at the time the study was conducted. All work was completed within the constraints of budget, scope, and timing. The findings of this report are subject to verification and agreement by the appropriate local, state, and federal regulatory authorities. No other warranty, expressed or implied, is made.

Acronyms and Abbreviations

BAS	Best Available Science
BMP	Best Management Practices
CAO	Critical Areas Ordinance
CARA	Critical Aquifer Recharge Area
Commerce	Washington State Department of Commerce
Corps	U.S. Army Corps of Engineers
CMZ	Channel Migration Zone
DNR	Washington State Department of Natural Resources
DOH	Washington State Department of Health
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FFA	Frequently Flooded Area
FIRM	Flood Insurance Rate Map
FWHCA	Fish and Wildlife Habitat Conservation Area
GIS	Geographic Information System
GMA	Growth Management Act
HUC	Hydrologic Unit Code
LID	Low Impact Development
OHWM	Ordinary High Water Mark
NFIP	National Flood Insurance Program
NMFS	National Marine Fisheries Service
PHS	Priority Habitats and Species
RMZ	Riparian Management Zone
RCW	Revised Code of Washington
SPTH	Site Potential Tree Height
SPU	Seattle Public Utilities
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WHPA	Wellhead Protection Areas

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APPENDIX B.	Wetland Mitigation Ratip Tables

1. INTRODUCTION

With passage of the Growth Management Act (GMA), local jurisdictions throughout Washington State, including the City of Lake Stevens, were required to develop policies and regulations to designate and protect critical areas. Critical areas are defined in the GMA and the Revised Code of Washington (RCW) 36.70A.030(11) to include wetlands, fish and wildlife habitat conservation areas, frequently flooded areas, critical aquifer recharge areas, and geologically hazardous areas. The GMA requires local jurisdictions to periodically review and evaluate their adopted critical areas policies and regulations.

An ongoing requirement of the GMA is for local jurisdictions to periodically review and evaluate their adopted critical areas policies and regulations. In accordance with the GMA, the city last completed a comprehensive update of its critical areas policies in 2019. The city is now required to update its critical areas regulations by December 31, 2025. This includes the requirement to review and incorporate best available science (BAS). Any deviations from science-based recommendations should be identified, assessed and explained (Washington Administrative Code [WAC] 365-195-915). In addition, jurisdictions are to give special consideration to conservation or protection measures necessary to preserve or enhance anadromous fisheries. A BAS review for this code update is summarized in the Best Available Science Review (Facet, July 2025).

The city's critical areas policies are currently contained in the Environmental & Natural Resources Element chapter of the City of Lake Stevens 2024-2044 Comprehensive Plan (Comprehensive Plan) adopted October 2024. The city's critical areas regulations are currently codified in the Lake Stevens Municipal Code (LSMC), Title 14, Chapter 88 Critical Areas.

This gap analysis is a review of the current critical areas regulations with evaluation of gaps in consistency between the existing regulations and BAS or the GMA. This analysis also includes recommendations for improvements to general aspects of the critical areas ordinance (CAO) such as clarity, consistency, and ease of use. The primary intention of this gap analysis is to help guide the update of the city's critical areas policies and regulations.

2. CHAPTER 14.88 PART I PURPOSE AND INTENT (SECTION 14.88.010)

This section establishes the city's intent to protect all types of critical areas by regulating development in a way that safeguards public health and safety while ensuring no net loss of critical area acreage, functions, or values. A summary of the recommended updates is provided in Table 1.

Table 1. Scope and Purpose review summary.

Code Section	Title	Review Comment and Recommendations	Reason for Recommendation
LSMC 14.88.010	Purpose and Intent	1. Mitigation sequencing needs to be revised to match WAC 197-11-768 2. The list could be described as mitigation sequencing for clarity	BAS, GMA Consistency, Clarity

2.1 Purpose and Intent (14.88.010 LSMC)

Recommend updating the mitigation sequencing described to match WAC 197-11-768 to ensure no net loss of critical area acreage, function and values.

Consider describing the list as mitigation sequencing for clarity. Once included this will align with federal policy aimed at achieving no net loss of wetland functions and values, for example.

3. CHAPTER 14.88 PART II DEFINITIONS (SECTION 14.88.100)

This section establishes the definitions used in critical areas. All definitions found in Chapter 14.88 LSMC can be found in Chapter 14.08 LSMC.

Table 2. Example code table summary.

Code Section	Title	Review Comment and Recommendations	Reason for Recommendation
LSMC 14.08.010	Aquifer Recharge Area	Consider revising to WAC language for consistency.	BAS/Clarity
LSMC 14.08.010	Fish and Wildlife Habitat (of Local Importance)	1. Expand definition beyond local importance. 2. Add WDFW PHS reference	BAS/Clarity
LSMC 14.08.010	Frequently Flooded Area	Required definition	BAS

3.1 Definitions (14.88.100 LSMC)

Aquifer Recharge Area

Consider revising definition to align with WAC 365-190-030(3) for consistency (see below).

Critical aquifer recharge areas are areas with a critical recharging effect on aquifers used for potable water, including areas where an aquifer that is a source of drinking water is vulnerable to contamination that would affect the potability of the water, or is susceptible to reduced recharge.

Fish and Wildlife Habitat (of Local Importance)

The BAS addresses FWHCAs extensively and recommends incorporating references to the WDFW PHS program. The current definition is limited in scope and, as written, appears to address only habitats of local importance. Expanding the definition to align with WAC 365-190-030 would strengthen its applicability and remove ambiguities regarding the significance of this critical area.

Frequently Flooded Area

Lake Stevens does not define frequently flooded areas nor reference WAC 365-190-030(8) in either Chapter 14.88 Part V LSMC or Chapter 14.64 LSMC Special Flood Hazard Areas. Consider adding a definition to align with the definition found in WAC 365-190-030 (see below).

Frequently flooded areas are lands in the flood plain subject to at least a one percent or greater chance of flooding in any given year, or within areas subject to flooding due to high groundwater.

These areas include, but are not limited to, streams, rivers, lakes, coastal areas, wetlands, and areas where high groundwater forms ponds on the ground surface.

4. CHAPTER 14.88 PART III GENERAL PROVISIONS (SECTION 14.88.200-14.88.340)

This section outlines citywide requirements for activities in or near critical areas, including allowed and regulated uses, submittal and reporting standards, mitigation and monitoring provisions, mapping resources, and protections such as native growth protection areas. It also addresses innovative design, reasonable use exceptions, and nonconforming activities to ensure consistent application of critical area protections.

Table 3. General Provisions code table summary.

Code Section	Title	Review Comment and Recommendations	Reason for Recommendation
LSMC 14.88.200	Applicability	No comments or recommendations	
LSMC 14.88.210	Regulated Activities	No comments or recommendations	
LSMC 14.88.220	Allowed Activities	1. Trails in buffers require appropriate mitigation 2. Hazardous Tree Removal 3. Vegetation Removal	1. BAS 2. Clarity/BAS 3. BAS
LSMC 14.88.230	Compliance	No comments or recommendations	
LSMC 14.88.250	Best Available Science	Recommend condensing section to reference RCW 36.70A.172 and WAC 365-195-900	BAS/Clarity
LSMC 14.88.240	Classification as a Critical Area	Remove section	Clarity
LSMC 14.88.250	Procedures	Revise section	BAS/Clarity
LSMC 14.88.260	Submittal Requirements	1. Mapping/Data Reference 2. Waiver Standards 3. Completeness Link	BAS

Code Section	Title	Review Comment and Recommendations	Reason for Recommendation
LSMC 14.88.270	Site/Resource-Specific Reports	1. Qualified Professional Definition Not Fully Aligned with BAS 2. No Explicit Content Requirements in Code 3. No Cross-Reference to Mitigation Sequencing 4. Waiver Criteria Tied to 14.88.260 Are Broad	BAS
LSMC 14.88.275	Mitigation Plan Requirements	1. Mitigation Sequencing Not Explicitly Required 2. Performance Standards Could Be More Function-Based 3. Site Suitability Criteria Are Limited	BAS
LSMC 14.88.276	Alternative Mitigation	These sections have no substantive change but could be revised for better clarity	Clarity. See 4.7
LSMC 14.88.277	Mitigation Monitoring		
LSMC 14.88.278	Bonding (Security Mechanism)		
LSMC 14.88.280	Maps and Inventory	No comments or recommendations	
LSMC 14.88.283	Pesticide Management	No comments or recommendations	
LSMC 14.88.285	Building Setbacks	Remove criteria	Clarity
LSMC 14.88.287	Fencing and Signage	No comments or recommendations	
LSMC 14.88.290	Critical Areas Tracts and Easements	No comments or recommendations	
LSMC 14.88.295	Permanent Protection for Streams, Wetlands and Buffers	1. Utility Crossings 2. Hazard Tree Removal	BAS
LSMC 14.88.297	Limited On-Site Density Transfer for Critical Areas	No comments or recommendations	
LSMC 14.88.298	Innovative Development Design	Consider updating to limit and target use of this code allowance.	BAS / Clarity

Code Section	Title	Review Comment and Recommendations	Reason for Recommendation
LSMC 14.88.300	Dedication of Land and/or Easements in Lieu of Park Mitigation	No comments or recommendations	
LSMC 14.88.310	Demonstration of Denial of All Reasonable Economic Uses	1. Add mitigation sequencing reference 2. Type and scope of evidence	BAS/Clarity
LSMC 14.88.320	Allowance of Regulated Use in a Critical Area Where Denial of All Economic Use is Demonstrated	Consider adding analysis	Clarity
LSMC 14.88.330	Nonconforming Activities	Consider adding reference to Chapter 14.32 LSMC	Clarity
LSMC 14.88.340	Assessment Relief	No comments or recommendations	

4.1 Allowed Activities (14.88.220 LSMC)

Public and Private Pedestrian Trails

Currently, public and private trails are an exempt activity when meeting certain requirements. There is no mention of critical area mitigation for trails located in critical areas. Appropriate mitigation measures are required to ensure no net loss of critical area values and functions. Consider removing the installation of trails as an exempt activity and only allowing the maintenance of trails as an exempt activity. The installation of trails can be an allowed use when mitigation measures are applied.

Hazardous Tree Removal

There isn't a clear process identified for hazardous tree removal and replacement in critical areas/buffers. Many jurisdictions include removal of hazardous trees with mitigation measures including leaving cut material in buffer, creating a wildlife snag, and revegetation to name a few. For reference you can review [Medina](#) or [Mill Creek](#) CAO's for specific language.

Vegetation Removal

Currently, the code allows removal of nonnative invasive plant species in wetlands (14.88.220(d)) but does not address vegetation removal in other critical areas or their buffers. It also lacks:

- Comprehensive Scope – No provisions for vegetation removal in geologically hazardous areas, fish and wildlife habitat conservation areas, or frequently flooded areas.
- Method Restrictions – No detailed limits on removal methods (e.g., hand labor vs. mechanical equipment) outside wetlands.

- Habitat Tree Considerations – No requirement for qualified biologist review when removing trees that provide critical habitat (e.g., eagle perch).
- Restoration Standards – No explicit requirement for native replanting or a restoration plan following vegetation removal in buffers or other critical areas.

Impact:

Without these safeguards, vegetation removal in critical areas/buffers could result in habitat degradation, erosion, or invasive species spread without clear mitigation or restoration measures.

4.2 Best Available Science (14.88.230 LSMC)

Currently, the code codifies the entire list defined in the WAC. This method is unnecessary and could risk becoming outdated if the WAC changes.

RCW 36.70A.172 requires use of BAS and special consideration for anadromous fish habitat. The code addresses this in substance but does not specifically cite the RCW.

The BAS review points out that adaptive management requirements (funding research, changing course, committing to timelines) are more often implemented administratively or in technical guidance, not directly in code. Retaining them in code may create enforceability challenges if resources or political will shift.

This is a formatting and streamlining opportunity. The substantive requirements here are already mandated by the Growth Management Act and WAC 365-195. For efficiency and legal clarity, many jurisdictions replace lengthy BAS narrative sections with a simple statement like:

"The City shall use the best available science in developing and implementing policies and development regulations to protect the functions and values of critical areas, as defined in RCW 36.70A.172 and WAC 365-195-900 through 925."

4.3 Classification as a Critical Area (14.88.240 LSMC)

Criteria for classifying each critical area are already provided in the applicable sections of the chapter. This standalone section is redundant, adds no regulatory value, and its removal will improve clarity and reduce repetition.

4.4 Procedures (14.88.250 LSMC)

LSMC 14.88.250 generally prohibits approvals before CAO compliance but lacks explicit reference to all permit types, related review steps, and minimum standards for administrative procedures. Strengthening these references would improve consistency, transparency, and alignment with BAS.

4.5 Submittal Requirements (14.88.260 LSMC)

This section does not reference official critical area maps or data layers as required by BAS for initial screening; broad waiver authority lacks science-based criteria for consistent application; no link to application completeness determination under RCW 36.70B.070 to ensure BAS review occurs before permit timelines start. Recommend adding mapping reference, establishing BAS-based waiver standards, and tying submittal requirements to completeness for consistency and defensibility.

4.6 Site/Resource-Specific Reports (14.88.270 LSMC)

The definition of “qualified professional” is limited to biologists or geotechnical engineers and does not incorporate BAS-recommended discipline-specific qualifications for all critical area types (e.g., wetland scientists, hydrogeologists).

Minimum report content requirements are not codified, relying solely on administrative guidance, and there is no explicit requirement for documentation of mitigation sequencing pursuant to WAC 197-11-768.

Additionally, the broad waiver provisions in LSMC 14.88.260 could allow reports to be omitted without adequate scientific justification.

It is recommended that the city:

1. Expand the qualified professional definition
2. Establish core report content standards in code
3. Require mitigation sequencing analysis to ensure alignment with BAS and consistent application.

4.7 Mitigation/Enhancement Plan Requirements (14.88.275 LSMC)

While related sections (LSMC 14.88.276–.278) address alternative mitigation, monitoring, and bonding, 14.88.275 does not explicitly require demonstration of mitigation sequencing per WAC 197-11-768, tie performance standards to measurable ecological functions, or require landscape-scale site suitability analysis consistent with BAS. This section could be streamlined to focus on core submittal elements and cross-reference other sections for procedural, monitoring, and financial assurance requirements, improving clarity and reducing redundancy while ensuring BAS alignment. Building Setbacks (14.88.285 LSMC)

These are standards in LSMC 14.48.440-.050. Consider removing these and just referencing the code instead of listing them out.

4.8 Permanent Protection for Streams, Wetlands and Buffers (14.88.295 LSMC)

Utility Crossings

While the code requires the shortest feasible alignment and infeasibility of alternatives, it does not explicitly require documentation of mitigation sequencing per WAC 197-11-768 in the assessment study. Adding that reference would strengthen alignment with BAS.

Hazard Tree Removal

Hazardous tree removal is addressed here only for recorded NGPAs. BAS and other jurisdictions include hazardous tree removal allowances in general provisions to apply across all critical areas and buffers. The city may wish to consider adding a broader hazardous tree removal provision outside of NGPA-specific regulations to ensure consistency and address safety concerns citywide.

The Standards focus on safety and replacement ratios, but BAS encourages requiring replacement species to be native to the specific habitat type and requiring planting within a specified timeframe to ensure habitat continuity.

4.9 Innovative Development Design (14.88.298 LSMC)

As currently written, no limits are provided clarify when an innovative development design may be considered for a project. If an applicant is deviating from best practices and standard limitations under the Fish and Wildlife Habitat Conservation Areas (FWHCA) and wetland sections, risk of functional loss is higher, which could warrant a higher standard than maintaining 'equivalent to or better' functions and values. The city may choose to provide criteria for what current site conditions warrant innovative design (e.g. degraded urban streams).

Also recommend stating that projects must follow mitigation sequencing to avoid and minimize critical area impacts and lastly, provide mitigation. As written, this code section allows project to deviate from mitigation sequencing standards.

4.10 Demonstration of Denial of All Reasonable Economic Uses (14.88.310 LSMC)

Section 14.88.310 establishes criteria for demonstrating denial of all reasonable economic uses; however, it does not explicitly require that such demonstrations be supported by best available science or address mitigation sequencing per WAC 197-11-768. The code could be strengthened by clarifying the type and scope of acceptable evidence to prove "extraordinary hardship" and lack of practicable alternatives, and by requiring applicants to document avoidance and minimization efforts before proposing impacts.

4.11 Allowance of Regulated Use in a Critical Area Where Denial of All Economic Use is Demonstrated (14.88.320 LSMC)

Section 14.88.320 outlines the criteria for allowing a regulated use when denial of all reasonable economic use is demonstrated. The code could be improved by requiring a neighborhood land analysis as part of the site/resource-specific report. This analysis should evaluate surrounding properties with similar physical and regulatory constraints to verify that the request is consistent with the reasonable use exception criteria and to promote consistent application of the standard.

4.12 Nonconforming Activities (14.88.330 LSMC)

Section 14.88.330 establishes provisions for nonconforming activities within critical areas but does not reference LSMC 14.32 (Nonconforming Uses, Structures, and Signs), which contains the citywide framework for nonconforming standards. Adding a cross-reference would improve clarity and ensure applicants and staff apply both the general and critical area-specific requirements consistently, reducing the risk of conflicting interpretations.

5. CHAPTER 14.88 PART IV FISH AND WILDLIFE CONSERVATION AREAS (14.88.400 – 14.88.440)

This section designates fish and wildlife habitat conservation areas to protect state and federally listed species, as well as habitats of local importance. It establishes stream typing, buffer widths, and protective measures for in-stream and riparian habitat. Standards are provided for stream crossings, utility installations, and maintenance activities. The article also outlines requirements for habitat management plans, mitigation sequencing, and critical area reports to ensure habitat functions and values are maintained or enhanced during development.

Table 4. Fish and wildlife conservation area review summary.

Code Section	Title	Review Comment and Recommendations	Reason for Recommendation
LSMC 14.88.400	Classification	1. Stream Type Classification	1. BAS 2. Clarity
LSMC 14.88.410	Determination of Boundary	None	
LSMC 14.88.415	Species/Habitats of Local Importance	None	
LSMC 14.88.420	Allowed Activities	None	

Code Section	Title	Review Comment and Recommendations	Reason for Recommendation
LSMC 14.88.430	Requirements	1. Review buffer width against 2020 WDFW guidance and recommendations for Site Potential Tree Height (SPTH). Note: A minimum 100-foot buffer is recommended for all streams to protect water quality. Note: If the city chooses to assign buffer widths that are less than WDFW recommends, the code should address buffer condition requirements and associated native vegetation enhancement requirements. 2. Remove buffer reduction with enhancement. 3. Consider revising disconnected buffers	1. Regulatory flexibility 2. BAS 2. BAS, Clarity
LSMC 14.88.040	Mitigation	None	

5.1 Classification (14.88.400 LSMC)

Stream Type Classification

The city needs to consider current BAS, including WDFW's site potential tree height (SPTH) model. The SPTH model relies on soil mapping to determine the dominant tree species. It does not use the water typing system. This is summarized in Section 5.2 below.

Should the city choose to remain with the stream typology described in WAC 222-16-030 the definition of Type F Stream could be shortened by referencing the WAC 222-16-031.

5.2 Requirements (14.88.430 LSMC)

Stream Buffers and Riparian Management Zones

In 2020, the WDFW published new guidance for the protection of riparian areas (Quinn et al. 2020). The guidance emphasizes a shift in terminology from the concept of "stream buffers" to "riparian management zones" (RMZs). An RMZ is defined as "...a scientifically based description of the area adjacent to rivers and streams that has the potential to provide full function based on the SPTH [site

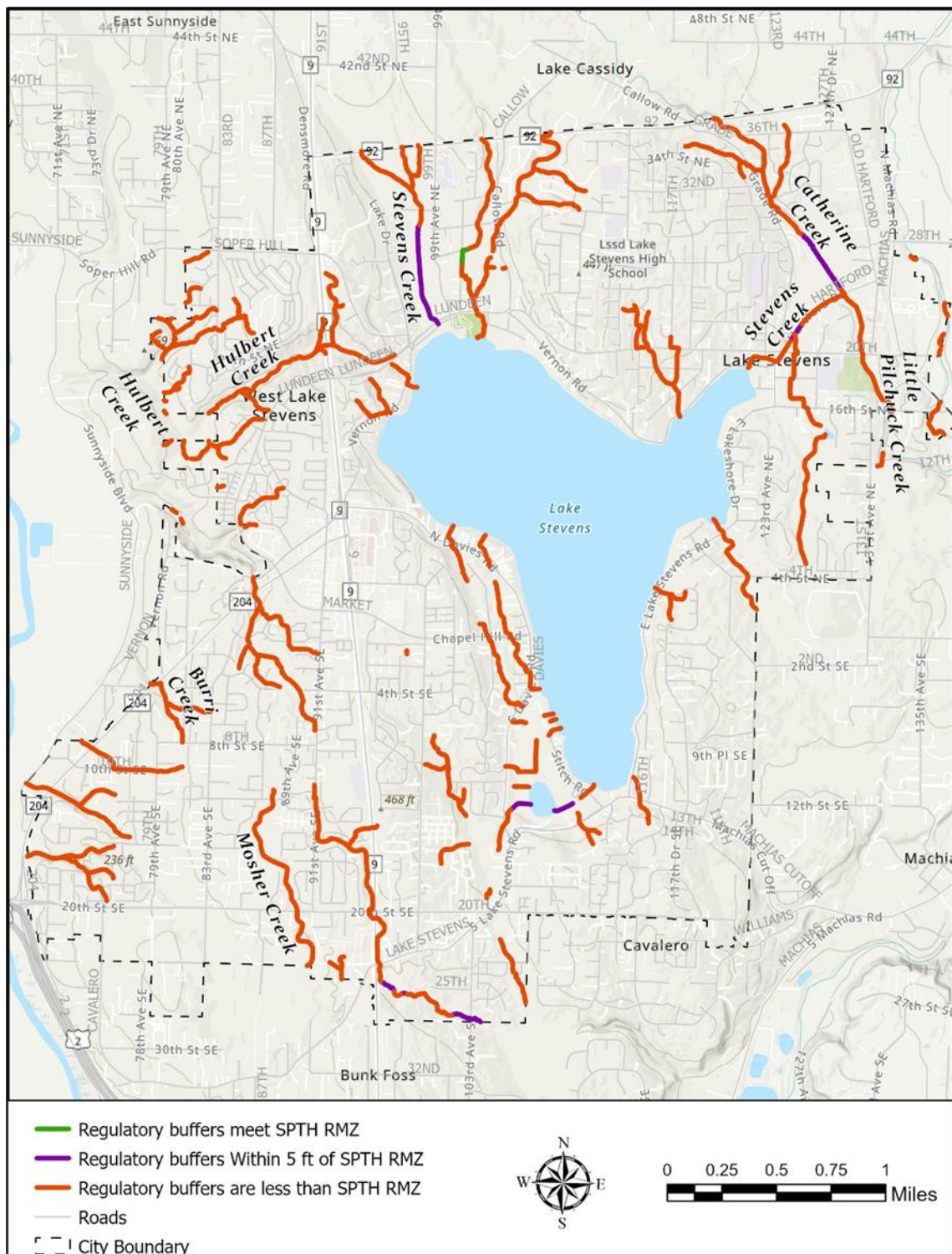
potential tree height] conceptual framework.” Further, an RMZ is recommended to be regulated as a fish and wildlife habitat conservation area itself to protect its inherent value, rather than as just a buffer for rivers and streams (Rentz et al. 2020). Stream buffers are established in local critical areas ordinances based on the best available science and are intended to protect streams but may or may not provide full riparian function. To achieve full riparian function, the WDFW guidance recommends that RMZs be considered a delineable, regulatory critical area and that the guidance be applied to all streams and rivers, regardless of size and type.

Site Potential Tree Height

WDFW’s current recommendations for establishing RMZ widths are based primarily on a site potential tree height framework, which does not use the DNR water typing system. The site potential tree height is defined as “...the average maximum height of the tallest dominant trees (200 years or more) for a given site class.” WDFW refers to this as SPTH₂₀₀. Exceptions may occur where the site potential tree height is less than 100 feet, in which case the agency recommends assigning an RMZ width of 100 feet at a minimum to provide adequate biofiltration and infiltration of runoff for water quality protection from most pollutants, but also in consideration of other habitat-related factors including shade and wood recruitment. A 100-foot-wide buffer is estimated to achieve 95% pollution removal and approximately 85% removal of surface nitrogen (Rentz et al. 2020). WDFW recommends measuring RMZ widths from the outer edge of the channel migration zone, where present, or from the ordinary high-water mark where a channel migration zone is not present.

Riparian management zones or buffers that vary by location may present practical challenges for implementation and have considerations in equity. To analyze the potential range of SPTH₂₀₀ in Lake Stevens, we conducted a review of the data available from the WDFW Site Potential Tree Height Mapping Tool, as described below. All overlaps were removed so only polygons with the greatest SPTH in each area were included. The WDFW SPTH dataset is not inclusive of all lands in Lake Stevens but is believed to be representative. Per BAS Report Figure 6 on page 35, SPTH₂₀₀ in Lake Stevens ranges from 100-feet to a maximum of 239-feet along mapped stream banks.

As a part of the CAO update, we recommend that Lake Stevens Terrace consider whether to follow WDFW recommended RMZ approach to stream classifications and buffer widths, including whether to incorporate the SPTH₂₀₀ Mapping Tool as part of stream buffer protection standards. This includes consideration of extending the buffer from the ordinary high-water mark (OHWM) or channel migration zone, whichever is greater, to align with the RMZ buffer recommendations in Rentz et al. (2020). Current BAS on water quality buffer functions must also be considered. We recommend reviewing water quality buffer functions along with stormwater management regulations. The city must review the BAS-based recommendations and determine the best regulatory approach for Lake Stevens.



Buffer Reductions

Current BAS does not support buffer reductions.

Disconnected Buffers

Consider revising LSMC 14.88.030.g to ensure the buffer area on the opposite side provides insignificant biological or hydrological functions in relation to the buffer area adjacent to the stream.

6. CHAPTER 14.88 PART V FREQUENTLY FLOODED AREAS (LSMC 14.88.500 – 14.88.540)

This section establishes regulations for development in frequently flooded areas using FEMA floodplain designations adopted through Chapter 14.64 LSMC. These standards are important for protecting public safety, reducing property damage, and minimizing environmental impacts associated with flooding.

Table 5. Frequently flooded areas review summary.

Code Section	Title	Review Comment and Recommendations	Reason for Recommendation
LSMC 14.88.500	Classification	None	
LSMC 14.88.510	Determination of Boundary	None	
LSMC 14.88.520	Allowed Activities	None	
LSMC 14.88.530	Requirements	None	
LSMC 14.88.540	Mitigation	None	

7. CHAPTER 14.88 PART VI GEOLOGIC HAZARD AREA (14.88.600 – 14.88.670)

This section establishes standards for identifying, evaluating, and mitigating risks in geologic hazard areas, including erosion, landslide, and seismic zones. It outlines definitions, mapping, and classification criteria, and prohibits or restricts development in high-risk areas unless specific conditions are met. Geotechnical assessments are required to determine site suitability and must include hazard analysis, slope stability, and mitigation measures.

Table 6. Geologic hazard area review summary.

Code Section	Title	Review Comment and Recommendations	Reason for Recommendation
LSMC 14.88.600	Classification	None	
LSMC 14.88.610	Determination of Boundary	None	

Code Section	Title	Review Comment and Recommendations	Reason for Recommendation
LSMC 14.88.320	Allowed Uses	None	
LSMC 14.88.330	Geologic Assessment Requirements	Consider strengthening this section with criteria for: 1. Subsurface and groundwater monitoring requirements 2. Minimum static and seismic factors of safety 3. Cumulative impact assessment to criteria	BAS
LSMC 14.88.340	Setback and Buffer Requirements	Provide updated language to permit additional construction methods on man-made slopes that meet certain requirements.	BAS/Clarity
LSMC 14.88.350	Allowed Alterations	None	
LSMC 14.88.360	Prohibited Alterations	None	
LSMC 14.88.370	Mitigation	None	

7.1 Geologic Assessment Requirements (14.88.350 LSMC)

Subsurface and groundwater monitoring

Currently, the city standard does not explicitly require borings, test pits, or groundwater monitoring, especially in areas of potential landslide or erosion. Add language requiring subsurface exploration and seasonal groundwater monitoring where slope instability is a concern. Further, create a Critical Aquifer Recharge Area set of code amendments, listing under LSMC 14.88.1000 – Critical Aquifer Recharge Areas.

Minimum Static and Seismic Factor of Safety

Consider requiring landslide modeling and slope stability calculations to show minimum static and seismic factor of safety ≥ 1.5 and 1.1, respectively.

Cumulative Impacts

The city can consider adding an assessment of cumulative impacts to the report requirements for geologically hazardous areas to this section.

7.2 Setback and Buffer Requirements (LSMC 14.88.340)

Recommend providing additional performance standards specific to human-made steep slopes, including best practices and construction methods. Human-made steep slopes may have marginal stability; a site-specific review by a geotechnical engineer is still recommended.

8. CHAPTER 14.88 PART VIII WETLANDS (SECTION 14.88.800 – 14.88.840)

This section establishes classification, buffer standards, mitigation requirements, and use limitations for wetlands and their buffers. It incorporates Ecology's wetland rating system, outlines performance standards for buffer uses, and sets conditions for mitigation sequencing, replacement ratios, and monitoring.

Table 7. Wetlands review summary.

Code Section	Title	Review Comment and Recommendations	Reason for Recommendation
LSMC 14.88.800	Purpose	None	
LSMC 14.88.805	Identification and Rating	Revise wetland rating system to most recent publication	Consistency with BAS
LSMC 14.88.810	Determination of boundary	None	
LSMC 14.88.820	Allowed Activities	None	
LSMC 14.88.825	Exemptions	None	
LSMC 14.88.830	Requirements	1. Habitat corridor & minimization measures for lower buffer sizes 2. Remove Buffer Reduction	1. BAS 2. BAS
LSCM 14.88.040	Mitigation	1. Update mitigation ratio table to include preservation	1. BAS

8.1 Identification (LSMC 14.88.805)

A new version of the wetland rating system was released since the code was last revised. The current version of the wetland rating system is the Washington State Wetland Rating System for Western Washington: 2014 Update, Version 2.0 (Hruby & Yahnke 2023). The current Ecology publication number is 23-06-009. We recommend updating this publication reference.

8.2 Requirements (LSMC 14.88.830)

Buffer Widths

The most recent Ecology buffer guidance is the 2022 Wetland Guidance for Critical Areas Ordinance (CAO) Updates. Our correspondence with Ecology confirms that the 2022 guidance does not supersede the Freshwater Wetlands in Washington State, Volume 2: Managing and Protecting Wetlands, Appendix 8C (updated 2018) and both are considered valid as BAS. However, there are differences in the buffer width frameworks in each of the systems. First is a distinction of terminology, since the 2018 guidance refers to buffer alternatives and the 2022 guidance refers to buffer options. Hereafter, 2018 buffer alternatives refer to Ecology (2018), 2022 buffer options refer to Ecology (2022).

Lake Stevens uses a buffer classification system that differentiates buffer widths based on site conditions, either a standard buffer (where the area is well vegetated or mitigation is provided) or a larger buffer where no mitigation occurs. This approach aligns with most of the Department of Ecology's 2022 Wetland Guidance for Critical Areas Ordinance (CAO) Updates, with one key exception: the requirement for a habitat corridor. To apply the smaller buffer widths, a habitat corridor must be provided along with implementation of recommended minimization measures. See Appendix A of this report for further details on Ecology wetland buffer guidance.

Buffer Reduction

Ecology recommendations and current BAS do not support buffer reductions. If a buffer reduction is allowed, it is recommended to ensure species have adequate access to habitat without providing a connective corridor. Consider removing the buffer reduction provision and creating a permitted alterations list, as necessary.

Buffer Increases

Lake Stevens does not require buffer increases on slopes. Ecology (2018) recommends that buffers are increased by 50% on areas with slopes greater than 30%. The degree of protection that buffers will provide on slopes will differ depending on site-specific circumstances. In practice, this method is reasonable in our opinion to meet the intent of increase buffer width requirements on steep slopes.

Disconnected Buffer

Ecology recommends adding a code provision to address functionally disconnected buffers. These are buffer areas that are functionally separated from the wetland by legally established roads or other significant development. Clear direction should be provided for practical application of buffers.

8.3 Mitigation (LSMC 14.88.840)

Consider updating the mitigation ratio table to include preservation ratios as described in the BAS report.

9. CHAPTER 14.88 PART IX TRANSFER OF DEVELOPMENT RIGHTS (SECTION 14.88.800 – 14.88.840)

These code sections were not evaluated, as the Transfer of Development Rights code is a separate process independent of the city's CAO. Preservation mitigation ratios are the same as enhancement only ratios; see Appendix B for details.

10. CHAPTER 14.88 PART X CRITICAL AQUIFER RECHARGE AREAS (SECTION 14.88.1000 – 14.88.10XX)

This section is proposed to identify and protect aquifer recharge areas (CARAs) critical to potable water supplies, including sole source aquifers and WHPA. This code is not yet written, and is a listed gap in the city's existing CAO.

CARAs set performance standards for land uses that could impact groundwater quality or recharge, restricts high-risk activities, and requires hydrogeologic reports and groundwater monitoring where needed. BMP's and mitigation measures are required to ensure long-term protection of drinking water resources.

11. REFERENCES

ECY (Washington State Department of Ecology). 2018. July 2018 Modifications for Habitat Score Ranges. Modified from Wetlands Guidance for CAO Updates: Western Washington Version. Ecology Publication No. 16-06-001.

ECY (Washington State Department of Ecology). 2021a. Wetland Mitigation in Washington State, Part 1: Agency Policies and Guidance. Ecology Publication No. 21-06-003.

ECY (Washington State Department of Ecology). 2022. October 2022, Wetland Guidance for Critical Areas Ordinance (CAO) Updates, Western and Eastern Washington. Ecology Publication No. 22-06-014.

Hruby, T. and Yahnke, A. 2023. Washington State Wetland Rating System for Western Washington: 2014 Update, Version 2. Washington State Department of Ecology Publication No. 23-06-009. Olympia, Washington.

Quinn, T., G.F. Wilhere, and K.L. Krueger, technical editors. 2020. Riparian Ecosystems, Volume 1: Science Synthesis and Management Implications. Habitat Program, Washington Department of Fish and Wildlife, Olympia, Washington.

Rentz, R., A. Windrope, K. Folkerts, and J. Azerrad. 2020. Riparian Ecosystems, Volume 2: Management Recommendations. Habitat Program, Washington Department of Fish and Wildlife, Olympia.

APPENDIX A. Wetland Buffer Approaches for Western Washington

(2022 Ecology Publication # 22-06-014, Appendix C)

Appendix C. Buffer Approaches for Western Washington

Option 1

Table 1. Wetland buffer width requirements, in feet, if Table 2 is implemented and a habitat corridor is provided

Category of wetland	Habitat score 3-5 points (corridor not required)	Habitat score 6-7 points	Habitat score 8-9 points	Buffer width based on special characteristics
Category I or II: Based on rating of wetland functions (and not listed below)	75	110	225	NA
Category I: Bogs and Wetlands of High Conservation Value	NA	NA	225	190
Category I: Interdunal	NA	NA	225	NA
Category I: Forested	75	110	225	NA
Category I: Estuarine and wetlands in coastal lagoons	NA	NA	NA	150
Category II: Interdunal	NA	NA	NA	110
Category II: Estuarine and wetlands in coastal lagoons	NA	NA	NA	110
Category III: All types except interdunal	60	110	225	NA
Category III: Interdunal	NA	NA	NA	60
Category IV: All types	40	40	40	NA

Impact minimization measures

Developments that produce the listed disturbances and are requesting a buffer reduction are required to address the disturbance through the use of applicable minimization measures.

This is not a complete list of measures, nor is every example measure required. Though not every measure is required, all effort should be made to implement as many measures as possible. Regulatory staff should determine, in coordination with the applicant, which measures are applicable and practicable.

Table 2. Impact minimization measures

Examples of disturbance	Activities and uses that cause disturbances	Examples of measures to minimize impacts
Lights	• Parking lots • Commercial/Industrial • Residential • Recreation (e.g., athletic fields) • Agricultural buildings	• Direct lights away from wetland • Only use lighting where necessary for public safety and keep lights off when not needed • Use motion-activated lights • Use full cut-off filters to cover light bulbs and direct light only where needed • Limit use of blue-white colored lights in favor of red-amber hues • Use lower-intensity LED lighting • Dim light to the lowest acceptable intensity
Noise	• Commercial • Industrial • Recreation (e.g., athletic fields, bleachers, etc.) • Residential • Agriculture	• Locate activity that generates noise away from wetland • Construct a fence to reduce noise impacts on adjacent wetland and buffer • Plant a strip of dense shrub vegetation adjacent to wetland buffer
Toxic runoff	• Parking lots • Roads • Commercial/Industrial • Residential areas • Application of pesticides • Landscaping • Agriculture	• Route all new, untreated runoff away from wetland while ensuring wetland is not dewatered • Establish covenants limiting use of pesticides within 150 ft. of wetland • Apply integrated pest management (These examples are not necessarily adequate for minimizing toxic runoff if threatened or endangered species are present at the site.)

Examples of disturbance	Activities and uses that cause disturbances	Examples of measures to minimize impacts
Stormwater runoff	• Parking lots • Roads • Residential areas • Commercial/industrial • Recreation • Landscaping/lawns • Other impermeable surfaces, compacted soil, etc.	• Retrofit stormwater detention and treatment for roads and existing adjacent development • Prevent channelized or sheet flow from lawns that directly enters the buffer • Infiltrate or treat, detain, and disperse new runoff from impervious surfaces and lawns
Pets and human disturbance	• Residential areas • Recreation	• Use privacy fencing • Plant dense native vegetation to delineate buffer edge and to discourage disturbance • Place wetland and its buffer in a separate tract • Place signs around the wetland buffer every 50-200 ft., and for subdivisions place signs at the back of each residential lot • When platting new subdivisions, locate greenbelts, stormwater facilities, and other lower-intensity uses adjacent to wetland buffers
Dust	• Tilled fields • Roads	• Use best management practices to control dust

Table 3. Wetland buffer width requirements, in feet, for applicants not providing a habitat corridor or implementing measures in Table 2

Category of wetland	Habitat score 3-5 points	Habitat score 6-7 points	Habitat score 8-9 points	Buffer width based on special characteristics
Category I & II: Based on rating of wetland functions (and not listed below)	100	150	300	NA
Category I: Bogs and Wetlands of High Conservation Value	NA	NA	300	250
Category I: Interdunal	NA	NA	300	NA
Category I: Forested	100	150	300	NA
Category I: Estuarine and wetlands in coastal lagoons	NA	NA	NA	200
Category II: Interdunal	NA	NA	NA	150
Category II: Estuarine and wetlands in coastal lagoons	NA	NA	NA	150
Category III: All types except interdunal	80	150	300	NA
Category III: Interdunal	NA	NA	NA	80
Category IV	NA	NA	NA	50

Conditions for implementing Tables 1, 2, and 3

1. Wetlands that score 6 points or more for habitat function: the buffers in Table 1 can be used only if all of the following criteria are met:
 - a. A relatively undisturbed, vegetated corridor at least 100 feet wide is protected between the wetland and:
 - i. A legally protected, relatively undisturbed and vegetated area (e.g., Priority Habitats, compensatory mitigation sites, wildlife areas/refuges, national, county, and state parks where they have management plans with identified areas designated as Natural, Natural Forest, or Natural Area Preserve, or
 - ii. An area that is the site of a Watershed Project identified within, and fully consistent with, a Watershed Plan as defined by RCW 89-08-460, or
 - iii. An area where development is prohibited according to the provisions of the local shoreline master program, or
 - iv. An area with equivalent habitat quality that has conservation status in perpetuity, in consultation with WDFW.
 - b. The corridor is permanently protected for the entire distance between the wetland and the shoreline or legally protected area by a conservation easement, deed restriction, or other legal site protection mechanisms.
 - c. Presence or absence of the shoreline or Priority Habitat must be confirmed by a qualified biologist or shoreline Administrator.
 - d. The measures in Table 2 are implemented, as applicable, to minimize the impacts of the adjacent land uses.
2. For wetlands that score 5 or fewer habitat points, only the measures in Table 2 are required for the use of the buffers in Table 1.
3. If an applicant does not apply the mitigation measures in Table 2 or is unable to provide a protected corridor, then the buffers in Table 3 shall be used.
4. The buffer widths in Tables 1 and 3 assume that the buffer is vegetated with a native plant community appropriate for the ecoregion. If the existing buffer is unvegetated, sparsely vegetated, or vegetated with invasive species that do not perform needed functions, the buffer must either be planted to create the appropriate native plant community or be widened to ensure that the buffer provides adequate functions to protect the wetland.

Note: An expanded table with graduated buffer widths based on habitat score is also outlined in the [July 2018 Appendix 8-C⁷⁶](#) of *Wetlands in Washington State, Volume 2*. This is an approach that assigns unique buffer widths to each habitat score in seven increments. It is a gradual increase in buffer width with each point. Compared to Option 1, this avoids a marked increase in buffer width resulting from an increase of one point in the habitat score.

Option 2

Table 1. Width of buffers, in feet, needed to protect wetlands from impacts of proposed land uses (used with Table 2)

Category of wetland	Land use with low impact*	Land use with moderate impact*	Land use with high impact*
I	150	225	300
II	150	225	300
III	75	110	150
IV	25	40	50

*See Table 2 below for types of land uses that can result in low, moderate, and high levels of impacts to wetlands

Table 2. Levels of impacts from proposed land use types

[Local governments are encouraged to ensure the uses in this table match the uses specified in their development and land use regulations and are consistent with the principles in this example.]

Level of impact from proposed land use	Types of land use
High	• Commercial • Urban • Industrial • Institutional • Mixed-use developments • Residential (more than 1 unit/acre) • Roads: federal and state highways, including on-ramps and exits, state routes, and other roads associated with high-impact land uses • Railroads • Agriculture with high-intensity activities (dairies, nurseries, greenhouses, growing and harvesting crops requiring annual tilling, raising and maintaining animals, etc.)

⁷⁶ <https://apps.ecology.wa.gov/publications/parts/0506008part3.pdf>

Level of impact from proposed land use	Types of land use
	• Open/recreational space with high-intensity uses (golf courses, ball fields, etc.) • Solar farms (utility scale)
Moderate	• Residential (1 unit/acre or less) • Roads: Forest Service roads and roads associated with moderate-impact land uses • Open/recreational space with moderate-intensity uses (parks with paved trails or playgrounds, biking, jogging, etc.) • Agriculture with moderate-intensity uses (orchards, hay fields, light or rotational grazing, etc.) • Utility corridor or right-of-way used by one or more utilities and including access/maintenance road • Wind farm
Low	• Natural resource lands (forestry/silviculture—cutting of trees only, not land clearing and removing stumps) • Open/recreational space with low-intensity uses (unpaved trails, hiking, birdwatching, etc.) • Utility corridor without a maintenance road and little or no vegetation management • Cell tower

Option 3

Table 1. Wetland buffer width requirements, in feet, based solely on wetland category

Category of wetland	Buffer width
I	300
II	300
III	150
IV	50

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APPENDIX B. Wetland Mitigation Ratio Tables

(2022 Ecology Publication # 22-06-014,
Appendix E)

Appendix E. Mitigation Ratio Tables

Compensation ratios for permanent impacts (western and eastern Washington)

Table 1

Category of impacted wetland (based on score for function)	Re-establishment or creation	Rehabilitation	Preservation	Enhancement
Category I	4:1	8:1	16:1	16:1
Category II	3:1	6:1	12:1	12:1
Category III	2:1	4:1	8:1	8:1
Category IV	1.5:1	3:1	6:1	6:1

Notes:

- Ratios for rehabilitation, preservation, and enhancement may be reduced when combined with 1:1 replacement through re-establishment or creation. See Table 6B-2 in *Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance –Version 2* (Ecology et al., 2021 or as revised).
- All proposed preservation sites need to meet the preservation criteria listed in Chapter 070.3.E of Appendix A, Sample Wetland Regulations.
- The ratios provide in Table 1 are for permanent, direct impacts to wetlands. For recommended ratios for other types of impacts (e.g., long-term temporary, conversions), see Chapters 6B4.4 through 6B4.8 of *Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance –Version 2* (Ecology et al., 2021 or as revised).
- The category of impacted wetland is based on scores for functions. Compensation ratios in this table generally do not apply when impacts involve a wetland whose category is based on special characteristics. Compensation ratios for impacts to wetlands with special characteristics are provided in Table 2 below. Specific tables are provided for western and eastern Washington.

Compensation ratios for unavoidable permanent impacts to wetlands with special characteristics (western Washington)

Table 2. Western

Category of impacted wetland (based on special characteristics)	Re-establishment or creation	Rehabilitation	Preservation	Enhancement
Category I forested	6:1	12:1	24:1	24:1
Bogs	NA	NA	24:1	NA
Wetlands of High Conservation Value	Consult with WA DNR	Consult with WA DNR	24:1	Consult with WA DNR
Category I Estuarine wetlands	3:1 (re-establishment only)	6:1	12:1	Limited circumstances (case by case)
Category II Estuarine wetlands	4:1 (re-establishment only)	8:1	16:1	Limited circumstances (case by case)
Category I Interdunal wetlands	4:1	8:1 (limited circumstances)	16:1	Not considered an option
Category II Interdunal wetlands	2:1	4:1 (limited circumstances)	8:1	Not considered an option
Category III and IV Interdunal wetlands	1.5:1	3:1 (limited circumstances)	6:1	Not considered an option
Category I Wetlands in coastal lagoons	4:1 (re-establishment only)	8:1	16:1	Not considered an option
Category II Wetlands in coastal lagoons	3:1 (re-establishment only)	6:1	12:1	Not considered an option

Note: Methods of compensation are limited for certain wetlands with special characteristics. Some of these wetland types only occur naturally and have never been successfully created or rehabilitated. Some may take more than a lifetime to re-establish. Thus, avoidance is the best regulatory approach when addressing these wetlands. Refer to Chapter 6B.5 of Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance –Version 2 (Ecology et al., 2021 or as revised) for more information on methods of compensation and ratios for wetlands with special characteristics.



FACET

Critical Areas Ordinance Update

Best Available Science Review

LAKE STEVENS

AUGUST 2025

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The information contained in this report is based on the application of technical guidelines currently accepted as the best available science. All discussions, conclusions and recommendations reflect the best professional judgment of the author(s) and are based upon information available at the time the study was conducted. All work was completed within the constraints of budget, scope, and timing. The findings of this report are subject to verification and agreement by the appropriate local, state, and federal regulatory authorities. No other warranty, expressed or implied, is made.

Acronyms and Abbreviations

BAS	Best Available Science
BMP	Best Management Practices
CAO	Critical Areas Ordinance
CARA	Critical Aquifer Recharge Area
Commerce	Washington State Department of Commerce
USACE	U.S. Army Corps of Engineers
CMZ	Channel Migration Zone
DNR	Washington State Department of Natural Resources
DOH	Washington State Department of Health
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FFA	Frequently Flooded Area
FIRM	Flood Insurance Rate Map
FWHCA	Fish and Wildlife Habitat Conservation Area
GIS	Geographic Information System
GMA	Growth Management Act
HUC	Hydrologic Unit Code
LID	Low Impact Development
LSMC	Lake Stevens Municipal Code
OHWM	Ordinary High Water Mark
NFIP	National Flood Insurance Program
NMFS	National Marine Fisheries Service
PHS	Priority Habitats and Species
RMZ	Riparian Management Zone
RCW	Revised Code of Washington
SPTH	Site Potential Tree Height
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WHPA	Wellhead Protection Areas

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1. INTRODUCTION

1.1 Purpose

This review of the best available science (BAS) was compiled to support Lake Stevens' Critical Areas Ordinance (CAO) update. As a requirement of the Washington State Growth Management Act (GMA) cities and counties must complete periodic updates to their comprehensive plans and development regulations. Lake Stevens' Comprehensive Plan underwent a full update in 2024. This document sets the framework for planned CAO updates in Lake Stevens. It serves as the basis for a gap analysis to identify where updates to current critical area regulations should be prioritized for consistency with BAS.

BAS means the current and best available information that follows a valid scientific process as specified in WAC 365-195-900 through WAC 365-195-925. Characteristics of a valid scientific process include peer review, standardized methods, logical conclusions and reasonable inferences, quantitative analysis, proper context, and references. Common sources of scientific information include research, monitoring, inventory, modeling, assessment, and synthesis (WAC 365-195-905). BAS literature reviews are a synthesis of the current scientific body of knowledge, and only resources that meet these requirements are included as reference materials for this BAS.

Under the GMA, Lake Stevens must "include the 'best available science' (BAS) when developing policies and development regulations to protect the functions and values of critical areas and must give 'special consideration' to conservation or protection measures necessary to preserve or enhance anadromous fisheries"¹ (WAC 365-195-900). Regulated critical areas include wetlands, areas with a critical recharging effect on aquifers used for potable water, fish and wildlife habitat conservation areas, frequently flooded areas, and geologically hazardous areas (RCW 36.70A.030).

While the BAS review is a resource for critical area management, it is not intended to provide definitive answers for all policy and regulatory decisions. Policy and regulations should incorporate BAS but also necessitate decision-making processes based on societal values. Additionally, ecological systems are highly complex and the scientific body of knowledge is constantly evolving with the advancement of new research and technology. Despite these advancements, there are limits to the current state of science and certain topics may not be fully understood. Where there is scientific uncertainty in the literature about a particular subject, this review presents a range of potential ideas, theories, or findings. In accordance with WAC 365-195-920, decision-makers may opt for a precautionary, or no-risk approach, when scientific information is incomplete.

¹ Anadromous refers to fish or fish species that spend portions of their life cycle in both fresh and salt waters, entering fresh water from the ocean to spawn.

1.2 Climate Change

As of July 2023, with passage of Washington House Bill 1181: Climate Change in Local Comprehensive Planning, the GMA requires jurisdictions to incorporate and evaluate the effects of climate change in long-range planning. Climate change is anticipated to have a profound influence on natural systems. Addressing anticipated climate change effects on critical areas allows for decision-makers to incorporate climate resilience into policy and regulations. This section provides an overview of predicted climate change effects in the Puget Sound region of Washington State that have the potential to alter the critical area functions and values in Lake Stevens. These predicted effects are referenced and expanded upon throughout the document.

Increasing air temperatures and more extreme heat

- Long-term warming, a lengthening of the frost-free season, and more frequent nighttime heat waves have been observed (Mauger et al. 2015).
- Models predict more “hot days” each year (Ecology 2024).
- Global warming of about 1°C has already occurred. Warming may exceed 1.5°C (2.7°F) by 2030 (Snover 2019).

Seasonal changes to precipitation patterns

- Increases in both the frequency and intensity of heavy rainfall events have been documented in Western Washington (Mauger et al. 2015)
- Changes to summer precipitation frequency, intensity and duration combined with decline in snowpack are expected to make droughts more common (Ecology 2024; Mauger et al. 2015).
- An observed and projected decrease in snowpack is anticipated to result in reduced stream flows later in the year (Ecology 2024).
- Increasingly larger and more frequent floods are predicted with less snow and heavier, more frequent precipitation events (Ecology 2024).
- A likely reduction in groundwater availability is anticipated due to changes in precipitation patterns and intensity and timing of snowmelt combined with increased summer demand from people and ecosystems (Ecology 2024).

Increasing risk of wildfire and smoke

- Hotter, dryer summers and snowpack loss are projected to result in conditions that increase the likelihood of wildfires west of the Cascades (Mauger et al. 2015); although the greatest wildfire risk increases occur outside of the Puget Sound region (Ecology 2024).
- While overall risk from wildfires in Lake Stevens may not be as extreme as in other parts of the state, smoke from wildfires elsewhere often moves into the Puget Sound basin. Projections for future changes in frequency or intensity of wildfire smoke are not available (Ecology 2024). The impact of wildfire smoke on natural systems is not fully understood (Voisin et al. 2023).

Changing environmental conditions for flora, fauna and pathogens

- Climate change effects are anticipated to alter the timing of biological events, species' geographic distributions, productivity, and resilience of terrestrial ecosystem (Mauger et al. 2015).
- The prevalence and location of certain pests and pathogens will likely shift. Responses are likely to be species- and host-specific (Mauger et al. 2015).
- Introduced, adaptable species may experience greater opportunity to become established and spread after disturbance while locally evolved flora and fauna may experience stress from environmental changes that exceed historic ranges/thresholds. Plant and animal adaptability and resilience to climate change is variable by species.

2. WETLANDS

2.1 Definitions

Washington State defines wetlands in WAC 365-190-030(24) as follows:

"Wetland" or "wetlands" means areas that are inundated or saturated by surface water or groundwater 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. Wetlands do not include those artificial wetlands intentionally created from nonwetland sites, 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 a road, street, or highway. However, wetlands may include those artificial wetlands intentionally created from nonwetland areas to mitigate conversion of wetlands, if permitted by the county or city.

The local definition provided in the Lake Stevens Municipal Code (LSMC) 14.08.010 is based closely on the WAC definition. It is slightly more explicit in language and less flexible in allowing local discretion over wetlands created for mitigation. It also provides clearer guidance on delineation methods and a slightly broader list of exclusions, which may assist in implementation and enforcement at the city level.

Wetlands. Areas that are inundated or saturated by surface water or groundwater 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, bogs, marshes, and similar areas. Wetlands do not include those artificial wetlands intentionally created from nonwetland sites, including but not limited to 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 a road, street, or highway. However, wetlands include those artificial wetlands intentionally created to mitigate conversion of wetlands. See approved Federal wetland delineation manual and applicable regional supplement.

2.2 Wetlands in Lake Stevens

Wetlands are locally common in many areas of the Puget Lowlands and can be found throughout Lake Stevens. They typically occur in topographic and hydrologic low points such as valleys, depressions, the base of slopes, and along the margin of lakes and ponds. Inventoried wetlands in Lake Stevens are primarily distributed along stream corridors and depressions (Figure 1).

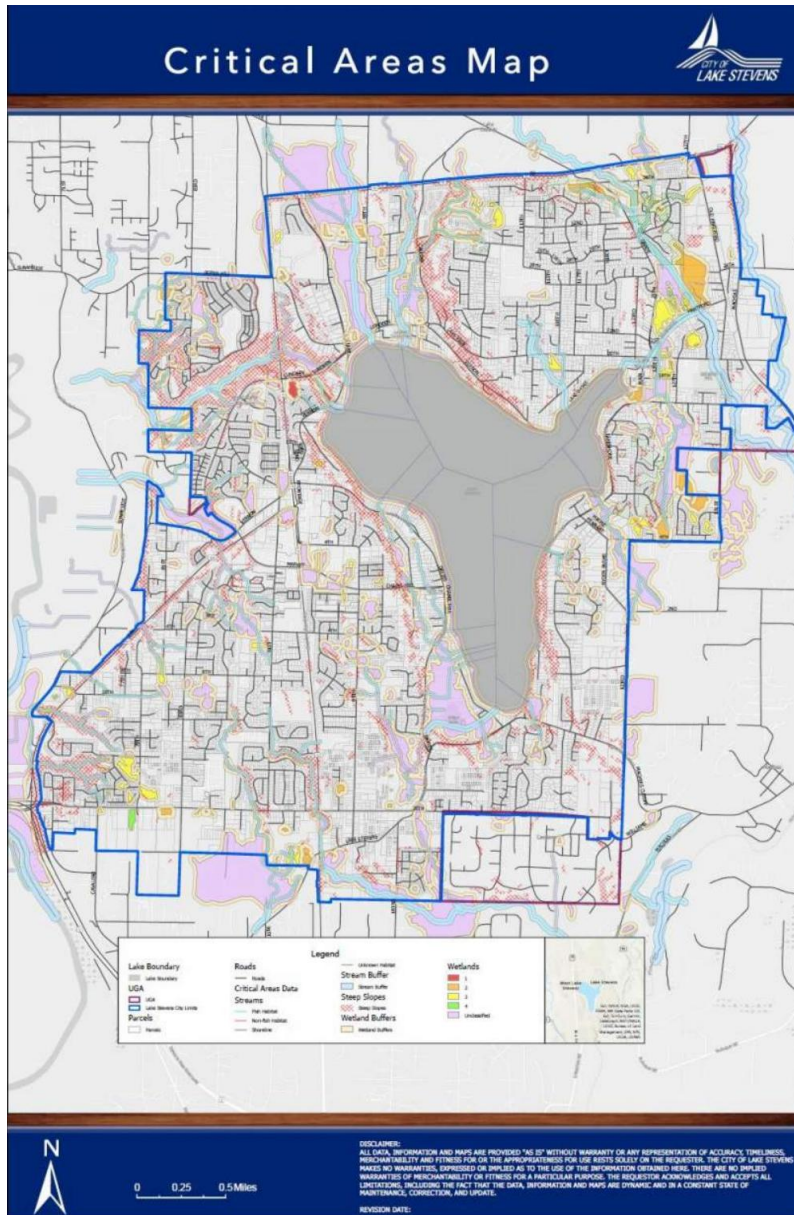


Figure 1. Biological Critical Areas Map reproduced from Lake Stevens (2024a).

2.3 Functions and Values

Wetlands are highly productive ecosystems that provide functions through physical, chemical and biological processes. The literature has previously established that wetlands provide numerous ecological functions with associated cultural and social values and economic benefits. Wetland functions vary for a given wetland based on multiple factors, including wetland landform or hydrogeomorphic class, landscape setting, vegetation structure, hydroperiods, and presence or absence of priority habitats and species. The primary ecological functions of wetlands can be grouped into the following categories (Sheldon et al. 2005):

Improving water quality

- Intercepting and detaining surface water runoff
- Sediment removal
- Filtering, removal, and transformation of pollutants
- Uptake of nutrients including phosphorous and nitrogen
- Shading

Maintaining the water regime in a watershed (i.e., hydrologic functions)

- Storage
- Velocity reduction
- Bank stabilization and erosion control
- Desynchronizing surface water flows and reducing flooding
- Groundwater recharge
- Maintaining base stream flows in the dry season

Providing habitat

- Suitability for water-dependent and water-associated organisms
- Supports unique plant assemblages
- Provides niche habitat requirements for certain species
- Surface water source
- Diversity of hydrologic regimes
- Structural complexity
- Connectivity to other ecosystems
- Supports food webs

2.4 Key Protection Strategies

2.4.1 Wetland Identification and Classification

County- and national-scale online resources such as the Snohomish County Planning and Development Services (PDS) Map Portal and the National Wetland Inventory provide modeled estimates of wetland locations. While these online databases are useful planning tools, site-level planning and development

require individual studies by a qualified professional. Wetlands are more abundant than shown in inventory databases and may change over time.

The nationwide standard for wetland delineations is the U.S. Army Corps of Engineers (USACE) *Wetlands Delineation Manual* (Environmental Laboratory 1987). In Lake Stevens, the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region Version 2.0* also applies (USACE 2010).

The Washington State Department of Ecology (Ecology) has developed a state-wide wetland rating system that has been periodically updated for Western Washington. The *Washington State Wetland Rating System for Western Washington, Version 2* (Hruby and Yahnke 2023) applies in Lake Stevens and is the regional standard. This current rating system version is similar to the prior 2014 publication. Changes were focused on clarifications, formatting improvements, updated website links, and annotations.

Ecology's rating system is a rapid assessment tool that evaluates wetland functions in the categories of water quality, hydrology, and habitat in the context of site potential, landscape potential, and societal value (Hruby and Yahnke 2023). Using this system, wetlands are classified into one of four categories. This wetland classification system was designed to help agencies make decisions about protecting and managing wetlands. The rating system is also used to establish appropriate buffer distances from wetland categories based on the preservation of functions and values.

2.4.2 Management Resources and Standards

2.4.2.1 Wetland Buffers

Wetland buffers are a primary mechanism for protecting wetlands in Washington. Buffers provide similar ecological functions as wetlands, primarily related to water quality improvement and wildlife habitat functions (Sheldon et al. 2005). Buffers are effective in reducing impacts from adjacent land uses on wetlands, although effectiveness can vary based on a buffer's physical characteristics (e.g., slope, soils, vegetation, and width) (Hruby 2013; Sheldon et al. 2005). The following are summarized key conclusions from the *Update on Wetland Buffers: The State of the Science* report (Hruby 2013):

- Wetland buffer effectiveness at protecting water quality varies in conjunction with several factors, including width, vegetation type, geochemical and physical soil properties, source and concentration of pollutants, and path of surface water through the buffer.
- Wider buffers are generally higher functioning than narrower buffers.
- Depending on site-specific environmental factors, different buffer widths may be needed to achieve the same level of protection.
- To protect wetland-dependent wildlife, a broader landscape-based approach that considers habitat corridors and connections is necessary.
- Many animals, particularly native amphibians, require undisturbed upland habitats for their survival.

Ecology's (2022) *Wetland Guidance for CAO Updates* is a useful tool for local jurisdictions updating the CAOs and addresses a variety of topics typically covered under local wetland regulations. In this document, Ecology provides three wetland buffer approach options that local jurisdictions can consider when updating their CAOs. The buffer options presented are based on a moderate-risk approach to protecting wetland functions (Ecology 2022). The three buffer options, summarized below, assume that wetland buffer is well vegetated with native species. Further detail is provided in Appendix A of this report.

- **Option 1.** Buffer width is based on wetland category and habitat score, if minimization measures are applied, and a habitat corridor is provided. If a habitat corridor is not provided or minimization measures are not implemented, then buffer width requirements increase. Modified buffers should be not less than 75 percent of the otherwise required buffer. Option 1 provides the most flexibility.
- **Option 2.** Buffer width is based on wetland category and modified by the intensity of the impacts from proposed land use. Option 2 decreases regulatory flexibility and eliminates buffer averaging and reduction provisions through the application of corridors and minimization measures.
- **Option 3.** Buffer width is based on wetland category only. Option 3 is the least flexible and simplest to administer.

Ecology's guidance also provides recommendations for when functionally disconnected buffers may be appropriate to exclude from regulated buffer area (Ecology 2022).

2.4.2.2 Wetland Mitigation

Mitigation Sequencing

Mitigation sequencing is a systematic process used to avoid, minimize, and compensate for impacts to critical resources, such as wetlands.

Mitigation sequencing is mandated by the 2008 Wetlands Compensatory Mitigation Rule issued by the U.S. Environmental Protection Agency and is also required under WAC 197-11-768. According to current guidance from the Ecology for updating Critical Areas Ordinances, mitigation sequencing must be implemented in the following order (Ecology 2022):

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, by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts;

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

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

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

Monitoring the impact and taking appropriate corrective measures.

Compensatory Mitigation

Compensatory mitigation may be achieved through a programmatic approach or an approved permittee-responsible mitigation (PRM) plan. Programmatic approaches utilize third-party sponsors to obtain mitigation credits, such as a mitigation bank or in-lieu fee (ILF) program. PRM is an applicant-managed mitigation project. PRM is typically developed and implemented concurrently with wetland impacts, but it may be done in advance. Mitigation banks are state-certified to ensure ecological function replacement is achieved. ILF programs collect fees and apply the funds to restoration projects within the service area. USACE and Ecology review and approve ILF programs. Whereas, PRM applicants must complete installation, site maintenance, monitoring, and adaptive management as needed to achieve approved mitigation plan goals and performance standards (Ecology, USACE, and EPA 2021).

State and federal agencies have determined an order of mitigation preference according to the 2008 Federal Mitigation Rule (33 CFR Part 332.3[b] and 40 CFR Part 230.93[b]). This establishes the following hierarchy:

1. Mitigation bank credits
2. ILF program credits
3. PRM under a watershed approach
4. PRM that is on-site and in-kind
5. PRM that is off-site and/or out-of-kind

Ecology's recommendations for mitigation ratios for projects in Western Washington depend on the wetland category and type of mitigation action (Granger et al. 2005). Mitigation ratios for direct wetland impacts are increased to account for temporal losses (Ecology 2022). When applying advanced mitigation, the Ecology-recommended ratios account for the wetland category and proposed mitigation actions (Ecology, USACE, and EPA 2021).

To address ecological priorities in Washington State's watersheds, Ecology has developed additional guidance and tools for applicants, including details on using a watershed approach for mitigation site selection and the credit-debit method (Hruby 2012; Hruby, Harper, and Stanley 2009). The credit-debit method is a system to calculate mitigation credits needed for a given project. The credit calculations can be used to determine compensation when utilizing in-situ mitigation, a mitigation bank, or an ILF program. Depending on specific site conditions, this may result in less or more mitigation than would be required under traditional mitigation ratio guidance (Hruby 2012).

Compensatory wetland mitigation methods in order of preference are (Ecology, USACE, and EPA 2021):

1. Restoration: Re-establishment,
2. Restoration: Rehabilitation-hydrologic processes restored,
3. Creation (establishment),
4. Preservation, and
5. Enhancement

Preservation and enhancement-only mitigation are least preferred since they result in a net loss of wetland area. Ecology prefers to see preservation or enhancement in combination with a no net loss mitigation method, such as wetland creation (Ecology, USACE, and EPA 2021).

Ecology recommends applying at least a one-to-one ratio to buffer impacts (Ecology, USACE, and EPA 2021). A ratio greater than 1:1 may be required to replace all lost critical area functions. Ecology also recommends evaluating indirect wetland impacts to determine appropriate compensatory mitigation (Ecology, USACE, and EPA 2021).

Monitoring

Evaluations of wetland mitigation outcomes found that most wetland mitigation does not fully replace impacted functions and falls short of the goal of no net loss (Ecology 2008; Johnson et al. 2002). The goal of no net loss of wetland function cannot be achieved through mitigation alone but may be met through several factors, including adequate monitoring and maintenance and appropriate performance standards. Compensatory mitigation sites typically require performance standard monitoring for a 3- to 10-year period, to ensure that implemented sites provide the functions which were planned. There are few studies of long-term compliance with performance standards, and one assessment found a reduction in site compliance 8 to 20 years following installation (Van den Bosch and Matthews 2017).

The National Research Council (2001) identifies factors that reduce the risk of mitigation failure, such as detailed functional assessment, high success standards, detailed mitigation plans, larger bonds with up-to-date market values, high replacement ratios, and greater expertise.

2.5 Climate Change Impacts and Mitigation

Climate change is predicted to significantly impact wetland ecosystems by altering hydrology, reducing biodiversity, disrupting carbon storage, modifying floral and faunal community composition, and increasing rates of disease (Aukema et al. 2017; Burkett and Kusler 2000). Anticipated hydrologic changes that impact wetlands include sea level rise and associated shifts in salinity (Burkett and Kusler 2000), increased ponding during wet seasons, and decreased water levels during dry seasons (Halabisky 2017; Mauger, Casola, Morgan, Strauch, Jones, Curry, Busch Isaksen, et al. 2015). Changes to wetland hydrology could result in loss of wetland area and shifts in plant communities. Changes to seasonal wetland hydrologic cycles can reduce the ability of wetland soil bacteria and plants to retain, process, and sequester pollutants (EPA 2015) .

Although wetlands are dynamic by nature, their ability to adapt to change is limited. Wetlands that are most vulnerable or likely to experience the greatest changes from the effects of global warming are those in coastal estuaries and those where surface water and stormwater are main sources of hydrology.

Wetlands provide functions that assist in the mediation of climate change impacts. Wetlands are important carbon sinks and help offset climate change through carbon storage by limiting the decomposition of organic carbon and sequestering greenhouse gas emissions (Gallagher, Zhang, and Chuan 2022). Wetlands and wetland buffers, like riparian corridors, support a shaded and cool microclimate that provides refuge for wildlife from higher temperatures as well as wildlife corridors at a local or landscape scale (Association of State Wetland Managers 2015). Wetlands attenuate flood waters, which are anticipated to increase in frequency and intensity with climate change.

While climate change is predicted to impact wetland systems, wetlands will also play a role in mitigating the extent and anticipated effects of climate change. The potential outcome of climate change impacts on wetlands is two-pronged: loss of wetland area may result in release of stored carbon; and loss of wetland area or impacts to wetland conditions may reduce or impair the functions that wetlands can provide. These “positive feedback” mechanisms can incrementally intensify climate change by releasing stored carbon into the atmosphere and magnify its adverse impacts on communities by reducing wetland areas and impairing their functions. Consequently, the value of wetland functions can be perceived as very high when considered in the context of climate change.

2.5.1 Strategies to Manage Climate Change Impacts on Wetlands

Current wetland protection standards Ecology (2022) utilize a moderate-risk approach to wetland protection, meaning there is a moderate risk that wetland functions would be impacted when these standards (primarily buffers) are applied. The BAS review indicates that wetlands are highly valuable for anadromous fish and climate resilience, and vulnerable to climate change. The additional strategies listed below may be considered by the City for managing their wetland resources:

- Consider creating and maintaining a database of wetlands located in the city.
- Identify wetlands they may be at risk from the effects of climate change (e.g., where surface water is a primary source of hydrology).
- Incorporate climate resiliency into mitigation sequencing.
 - Consider loss of wetland functions in the landscape within the context of climate change during mitigation sequencing.
 - Plan for climate change impacts when developing mitigation/restoration plans. For example, consider a broader range of hydrologic conditions and avoid/limit use of plant species predicted to be vulnerable to climate change stresses and pests.
 - Consider assisted migration for seed selection of native plants from locations that are better adapted to future climate conditions.
- Require applicants to document compliance with all applicable local, state, and federal permit requirements.

3. CRITICAL AQUIFER RECHARGE AREAS

3.1 Definitions

Critical aquifer recharge areas (CARAs) are defined in WAC 365-190-030(3) as follows:

Critical aquifer recharge areas are areas with a critical recharging effect on aquifers used for potable water, including areas where an aquifer that is a source of drinking water is vulnerable to contamination that would affect the potability of the water, or is susceptible to reduced recharge.

Currently, Lake Stevens does not include a CARA part in their CAO though there is a definition in Chapter 14.08 LSMC for Aquifer Recharge Area. This definition

"Aquifer Recharge Area. Geological formations with recharging areas having an effect on aquifers used for potable water where essential source of drinking water is vulnerable to contamination.

Additional information on drinking water resources in Lake Stevens is provided in the following sections.

3.2 CARAs in Lake Stevens

An inventory of CARAs has been developed by Snohomish County which covers Lake Stevens to a geographic extent. Most of the city is in areas of low aquifer susceptibility (Figure 2). A small portion of the city is designated as moderate aquifer susceptibility, primarily surrounding Lake Stevens. Areas with high susceptibility are limited to small areas on the southern and northeastern shores of Lake Stevens and along Catherine Creek.

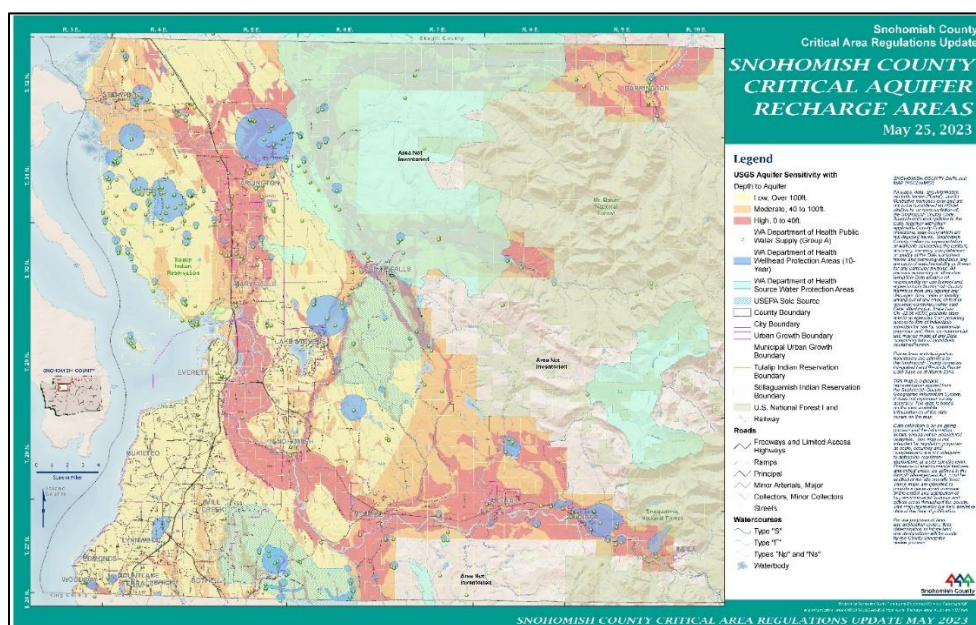


Figure 2. Map of CARAs in Snohomish County (2023).

Snohomish County maps two active Group A water supply systems and a portion of wellhead protection area associated with Snohomish County Public Utility District in the city according to Snohomish County PDS Map Portal.

3.3 Functions and Values

CARAs provide communities with safe drinking water. CARA functions also have potential to influence other critical areas through groundwater, including fish-bearing streams. General CARA functions and values are summarized in the following documents:

- *Critical Areas Handbook* (Department of Commerce 2023)
- *Critical Aquifer Recharge Areas Guidance* (Ecology 2021)

3.4 Key Protection Strategies

DOH maintains a database of WHPAs, including locations and key attributes, that is publicly available online through the SWAP Mapping tool.²

In Washington, drinking water systems are classified as follows (Asinas, Raymond, and Mehta 2022; WA Department of Health 2017).

- Private Wells: Individual wells that usually serve a single residence.
- Group A Systems: Serve 15 or more connections, and 25 or more people.
- Group B Systems: Serve fewer than 15 connections, and fewer than 25 people.

WHPAs typically have four or five zones: the sanitary control area, three zones based on different water time-of-travel rates, and a buffer zone if necessary.

The *Washington State Wellhead Protection Program Guidance Document* is a useful resource for WHPA management (WA Department of Health 2017). On the topic of addressing WHPAs as critical area, the guidance document notes the benefit of protecting noncontiguous buffer zones through CARA designations, which provide protection for the quality and quantity of public water supplies. The guidance document recommends considering number of system connections, system ownership (public or private), and contamination susceptibility when considering which WHPAs to designate as CARAs.

² <https://doh.wa.gov/community-and-environment/drinking-water/source-water/gis-mapping-tool>

3.5 Climate Change Effects

Climate change impacts to drinking water systems are projected based on increased drought, increased wildfires, and increased flooding (Asinas, Raymond, and Mehta 2022):

- Groundwater resources may be at risk from prolonged, multi-year droughts, although the likelihood of multi-year droughts in the Pacific Northwest is unclear. More research is needed to understand past and future changes in groundwater within the context of climate change (Ecology 2024). Droughts may put pressure on groundwater supplies potentially causing aquifer depletion (Asinas, Raymond, and Mehta 2022).
- Demand for aquifers during hotter summers may increase to compensate for changes in precipitation patterns and temperatures.
- Wildfires will introduce more particulates and contaminants into the environment, which settle on surface water and infiltrate into groundwater (Burton et al. 2016; Mansilha et al. 2020).
- Heavy rainfall and flooding can introduce surface contaminants into groundwater resources (Asinas, Raymond, and Mehta 2022).

3.5.1 Strategies to Manage Climate Change Impacts on CARAs

The following are general BAS-supported strategies to minimize climate change impacts on CARAs that may be applicable for WHPA management in Lake Stevens:

- Ecology recommends understanding water resources, tracking water levels and recharge sources, and focusing on water conservation as a strategy to plan for climate change impacts (Ecology 2021).
- Manage stormwater to maintain groundwater recharge in CARAs. Utilize a 20-year planning horizon to manage supply and demand given climate trends and projections (Asinas, Raymond, and Mehta 2022).
- Design stormwater systems to better mimic natural systems and mitigate some of the functions lost elsewhere in the landscape due to changes in surface and groundwater inputs. For example, the use of roadside bioswales may be expanded. Stormwater treatment capacity may be increased as needed to protect water quality and manage water quantity.
- Planning and implementing flood mitigation strategies can reduce the likelihood of contaminated runoff events.
- Promote and incentivize low-impact development, specifically infiltration of clean runoff to support aquifer recharge.

4. FREQUENTLY FLOODED AREAS

4.1 Definitions

Frequently flooded areas (FFAs) are defined in WAC 365-190-030(8) as follows:

Frequently flooded areas are lands in the flood plain subject to at least a one percent or greater chance of flooding in any given year, or within areas subject to flooding due to high groundwater. These areas include, but are not limited to, streams, rivers, lakes, coastal areas, wetlands, and areas where high groundwater forms ponds on the ground surface.

Lake Stevens does not define frequently flooded areas nor reference WAC 365-190-030(8) in either Chapter 14.88 Part V LSMC or Chapter 14.64 LSMC Special Flood Hazard Areas. Instead, Chapter 14.88 Part V states that flood hazard areas must align with the regulatory floodplain designations adopted under Chapter 14.64, which in turn adopts Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) or relies on FEMA-designated Special Flood Hazard Areas where no city-specific designations exist.

4.2 Floodplains in Lake Stevens

Floodplains are designated by FEMA along the Lake Stevens shoreline and in areas associated with Catherine Creek, Little Pilchuck Creek, and Penny Creek. These are depicted in Figure 3.

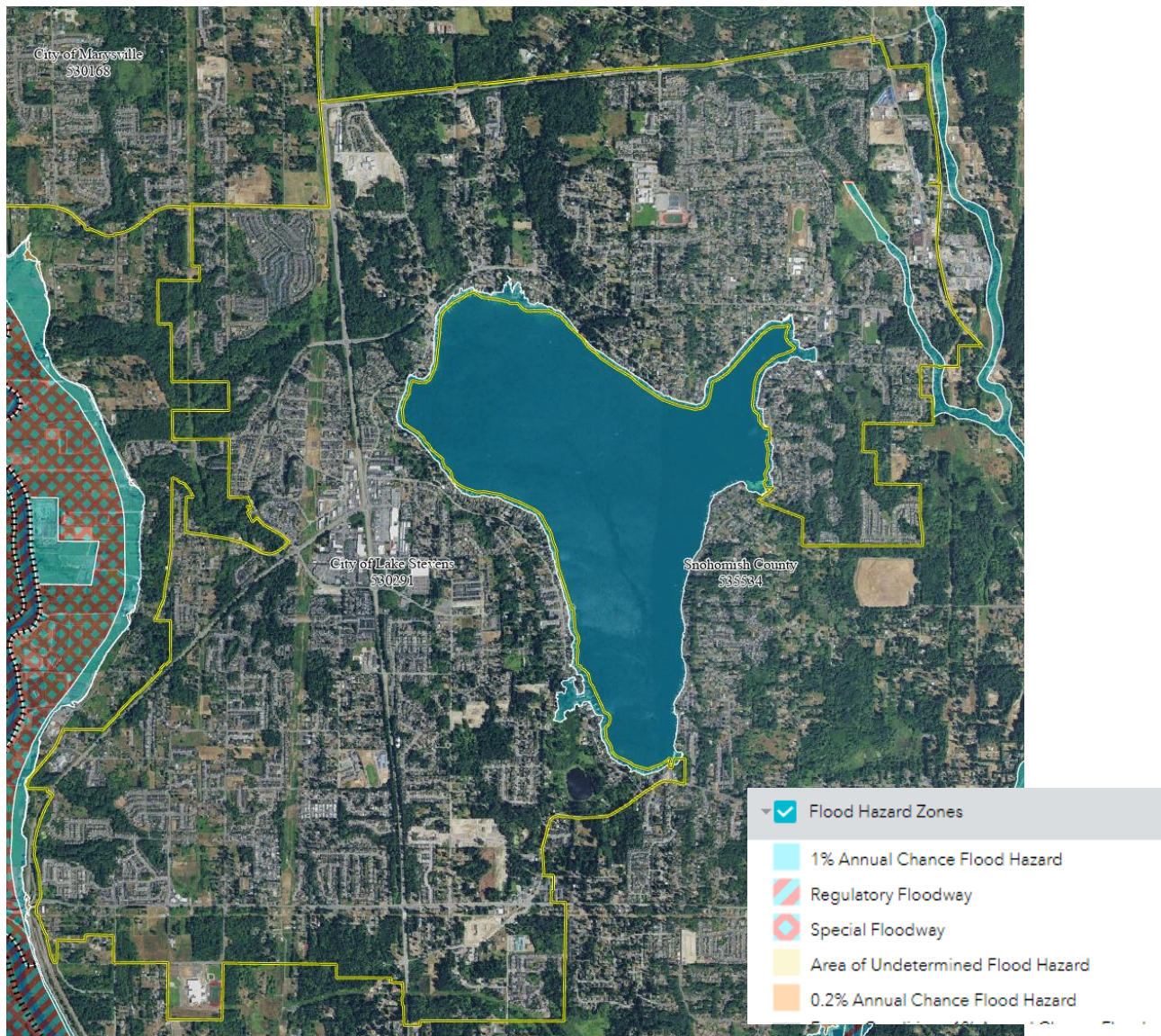


Figure 3. FEMA designated 100-year floodplain in Lake Stevens. Obtained from FEMA NFHL Viewer on July 21, 2025.

4.3 Functions and Values

Floods are events that can result in the destruction of property and loss of life but are also part of a natural ecological process that sustains river systems. Floods typically occur following large storm events but may also result from a release of impounded water, such as from a dam or levee failure, or beaver activity. FFAs are dynamic and ecologically productive environments that provide habitat for fish and wildlife and are an important component of watershed processes including:

- Flood water storage and conveyance,
- Nutrient and sediment deposition, and
- Mobilization of large woody debris.

Floodplains have been directly impacted by agriculture, residential development, and urbanization for centuries because areas susceptible to flooding tend to be well-suited for development during periods between floods. Floodplains have also been indirectly impacted by similar watershed-scale land use changes. Increased impervious surfaces and deforestation increase flooding magnitude and frequency (Booth et al. 2004). Increased flooding magnitude and frequency create greater risk for people and infrastructure within a floodplain.

Historically, approaches to mitigate floodplain risks have worsened downstream flood impacts and impacted fish and wildlife habitat (e.g., channel straightening and armoring, construction of dikes and levees, and floodplain fill). In landscape-level assessments, patterns of urban development, particularly impervious surface area and distribution, have been demonstrated to influence watershed functions (Alberti et al. 2006). Among these are stream channel downcutting, a process associated with watersheds that have frequent and short duration high peak flows, that further disconnects floodplains, increases in-stream erosion, and deposits sediment in downstream environments leading to blocked culverts (Booth 1990). Stream incision also affects surface and ground water interactions and may result in lower water table levels (Petrulia 2022).

Extreme floods have both positive and negative effects on stream health. Negative impacts include physical trauma and stress to aquatic organisms, displacement or stranding, erosion and sedimentation, loss of vegetation, pollution, disruptions to food webs and spawning, and disrupted migration. As a result, extreme floods have been documented to reduce fish densities (Milner et al. 2013). However, some studies show that fish assemblages are resilient to the effects of floods at a basin scale and recover quickly (George et al. 2015). Potential positive effects include the creation of new habitats and nutrient redistribution (Peters et al. 2015).

Flooding can result in significant economic costs from damaged homes and infrastructure, business disruption, and loss of life. The human and societal costs of flooding have increased over time as the population and amount of infrastructure in floodplains has increased and from climate change.

4.4 Key Protection Strategies

4.4.1 Identification and Classification

FEMA maintains and updates flood maps, called Flood Insurance Rate Maps (FIRMs). FEMA flood maps include any place considered to have a high risk of flooding, which is a one percent chance of flooding each year, or higher. FEMA maps are based on past flood events and do not include sea level rise or other climate impacts (Department of Commerce 2023).

4.4.2 Management Resources and Standards

The National Flood Insurance Program (NFIP), administered by FEMA, publishes basic building standards that can be implemented to protect both floodplain ecological functions and buildings, infrastructure, and people from flood risk. These standards are generally the minimum required, and

local jurisdictions may choose to implement higher standards to further reduce risk (Department of Commerce 2023).

In 2008, the National Marine Fisheries Service (NMFS) issued a Biological Opinion under Section 7 of the Endangered Species Act, which found that the implementation of the NFIP in the Puget Sound region jeopardized the continued existence of federally threatened salmonids and resident killer whales. As a result, NMFS established Reasonable and Prudent Alternatives to ensure that development within the Special Flood Hazard Area (100-year floodplain), floodway, Channel Migration Zone (CMZ), and riparian buffer zone do not adversely affect water quality, flood volumes, flood velocities, spawning substrate, or floodplain refugia for listed salmonids. Because the NFIP is implemented by FEMA through participation by local jurisdictions that adopt and enforce floodplain management ordinances, FEMA has delegated responsibility to the local jurisdictions to ensure that development does not adversely affect listed species. Projects within FEMA-designated floodplains are required to prepare habitat assessments to ascertain their potential effects on federally listed endangered species. In particular, floodplain storage volumes may not be decreased nor base flood level elevations increased.

4.5 Climate Change Effects

Climate change in the Pacific Northwest is anticipated to increase flood risks because of changes to precipitation patterns and due to the increased frequency and intensity of extreme weather events (Ecology 2024). Climate change models predict that the frequency of atmospheric rivers, which contribute to severe deluges in rainwater and other extreme weather events, will become more frequent and severe (Mauger and Kennard 2017; Salathe et al. 2014). Increased floodwater elevation and expansion of floods to new areas threaten property and public safety. Stream channel migration can also drastically alter flood risks and migration dynamics are expected to shift as a result of climate change (Mauger and Kennard 2017).

4.5.1 Strategies to Manage Climate Change Impacts on FFAs

The Department of Commerce's (2023) *Critical Areas Handbook* presents the following as an optional strategy to help local governments plan for flood risk, beyond the minimum standards:

Ecology's RiskMAP ("risk mapping assessment and planning") program provides additional maps that can help local governments plan for flood risk in their communities. It integrates several regulatory and nonregulatory products for hazard mitigation planning, including FEMA's National Flood Hazard Layer, 1000-year floodplain maps, depth grids (expected depth of flooding from a 100-year event), earthquake layers, landslide inventories, and building footprints for residential and critical facilities buildings. It also includes project data for RiskMAP assessment projects in certain counties. Maps of the 1000-year floodplain are included; floods of this magnitude are becoming more common with climate change and wildfires, and more communities are starting to plan for 500-year and 1000-year floods (instead of just 100-year floods). Communities may also see areas with urban flooding due to inadequate storm drainage, or issues with groundwater flooding or high sediment loads in certain streams causing them to meander into new areas. One of the most popular non

regulatory products developed through RiskMAP is a map of the base flood elevation plus one, two and three feet. Base flood elevation is how high FEMA statistically predicts the water to rise in a 100-year flood event. This helps local communities understand the inundations in low lying areas. The map also shows information about buildings from local assessor's offices, like occupancy, use, value, and materials. It has a GIS model that was developed by FEMA to estimate damage to structures from a 100-year flood or an earthquake.

Other strategies include:

- Encourage and incentivize floodplain restoration actions to restore floodplain connectivity to streams and wetlands and protect or restore riparian corridors to maintain microclimate.
- Utilize the [FEMA Climate Resiliency](#) approach to support flood hazard management planning and follow grant funding opportunities.

5. GEOLOGICALLY HAZARDOUS AREAS

5.1 Definitions

Geologically hazardous areas are defined by Washington State as “*areas that because of their susceptibility to erosion, sliding, earthquake, or other geological events, are not suited to the siting of commercial, residential, or industrial development consistent with public health or safety concerns*” (WAC 365-190-030). The four main types of geologically hazardous areas are erosion hazard areas, landslide hazard areas, seismic hazard areas, and areas subject to other geologic events such as coal mine hazards and volcanic hazards (WAC 365-190-120).

Lake Stevens defines a “geologic hazard areas” as “*areas susceptible to erosion, sliding, seismic activity, or other geological events, as defined in WAC 365-190-120. They may pose a threat to the health and safety of citizens when used as sites for incompatible commercial, residential or industrial development.*”

5.1.1 Erosion Hazard Areas

Washington State defines erosion hazard areas according to WAC 365-190-030(5) as follows:

“Erosion hazard areas” are those areas containing soils which, according to the United States Department of Agriculture Natural Resources Conservation Service Soil Survey Program, may experience significant erosion. Erosion hazard areas also include coastal erosion-prone areas and channel migration zones.

Furthermore, according to WAC 365-190-120(5), *"erosion hazard areas include areas likely to become unstable, such as bluffs, steep slopes, and areas with unconsolidated soils."*

Lake Stevens defines "erosion hazard areas" as *"lands or areas that, based on a combination of slope inclination and the characteristics of the underlying soils, are susceptible to varying degrees of risk of erosion."*

Additionally, LSMC 14.88.600(b)(1) further describes erosion hazard areas by referencing the USDA Soil Conservation Service, United States Geologic Survey, or by the Department of Ecology Coastal Zone Atlas and provides different classifications based in geologic context.

5.1.2 Landslide Hazard Areas

Washington State defines landslide hazard areas as *"areas at risk of mass movement due to a combination of geologic, topographic, and hydrologic factors,"* under WAC 365-190-030(10).

In addition, according to WAC 365-190-120(6):

They include any areas susceptible to landslide because of any combination of bedrock, soil, slope (gradient), slope aspect, structure, hydrology, or other factors, and include, at a minimum, the following:

- (a) Areas of historic failures, such as:*
 - (i) Those areas delineated by the United States Department of Agriculture Natural Resources Conservation Service as having a significant limitation for building site development;*
 - (ii) Those coastal areas mapped as class u (unstable), uos (unstable old slides), and urs (unstable recent slides) in the department of ecology Washington coastal atlas; or*
 - (iii) Areas designated as quaternary slumps, earthflows, mudflows, lahars, or landslides on maps published by the United States Geological Survey or Washington department of natural resources.*
- (b) Areas with all three of the following characteristics:*
 - (i) Slopes steeper than 15 percent;*
 - (ii) Hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock; and*
 - (iii) Springs or groundwater seepage.*
- (c) Areas that have shown movement during the holocene epoch (from 10,000 years ago to the present) or which are underlain or covered by mass wastage debris of this epoch;*
- (d) Slopes that are parallel or subparallel to planes of weakness (such as bedding planes, joint systems, and fault planes) in subsurface materials;*
- (e) Slopes having gradients steeper than 80 percent subject to rockfall during seismic shaking;*
- (f) Areas potentially unstable as a result of rapid stream incision, stream bank erosion, and undercutting by wave action, including stream channel migration zones;*
- (g) Areas that show evidence of, or are at risk from snow avalanches;*
- (h) Areas located in a canyon or on an active alluvial fan, presently or potentially subject to inundation by debris flows or catastrophic flooding; and*

- (i) *Any area with a slope of 40 percent or steeper and with a vertical relief of 10 or more feet except areas composed of bedrock. A slope is delineated by establishing its toe and top and measured by averaging the inclination over at least 10 feet of vertical relief.*

Lake Stevens has established specific definition for *landslide hazard areas*, as defined by LSMC 14.08.010.

"Landslide hazard areas" means areas that, due to a combination of slope inclination and relative soil permeability, are susceptible to varying degrees of risk of landsliding.

Further information on the specifics identified in WAC 365-190-120(6) can be found in LSMC 14.88.600(b)(2).

5.1.3 Seismic Hazard Areas

Washington State defines seismic hazard areas as *"areas subject to severe risk of damage as a result of earthquake induced ground shaking, slope failure, settlement, soil liquefaction, debris flows, lahars, or tsunamis"* under WAC 365-190-030(18). In addition, seismic hazard areas also include areas subject to severe risk of damage as a result of subsidence and surface faulting (WAC 365-190-120).

Lake Stevens has established a similar definition, excluding those hazards listed which pose no threat to the City as defined by LSMC 14.08.010.

"Seismic Hazard areas" means areas that, due to a combination of soil and groundwater conditions, are subject to severe risk of ground shaking, subsidence or liquefaction of soils during earthquakes.

5.2 Hazard Characterization

5.2.1 Erosion Hazard Areas

Erosion hazard areas present risks to infrastructure, the environment, and public safety. For example, erosion may undermine the foundation of buildings or other structures and increase the risk of landslides which threaten property and human life. There is also a direct link between erosion and impacts to other aquatic critical areas including streams, ponds, and wetlands (Dubois et al. 2018).

Erosion and landslides are natural processes that contribute sediment, rocks, and large woody debris to streams and other waterbodies. The introduction of periodic pulses or chronic turbidity and suspended solids associated with erosion has been demonstrated to harm certain types of aquatic life, particularly salmonids (Bash, Berman, and Bolton 2001). This can occur from activities such as clearing vegetation and the creation of new impervious surfaces, which can introduce sediments and pollutants to natural waterways (Booth 1991).

The stability of erosion hazard areas is influenced by the vegetation composition, structure, and cover. Vegetation reduces erosion through rainwater interception and by anchoring soils within root networks (Booth et al. 2004; R.J. Naiman and Decamps 1997). In cleared areas, rainfall tends to

concentrate in small channels, and sediment can be mobilized as the water gains depth, volume, and increased flow. Small channels or rills can eventually develop into gullies in these types of exposed soils.

Erosion hazard areas are present throughout Lake Stevens, as depicted in Figure 4. These generally occur along stream corridors and sloped areas.

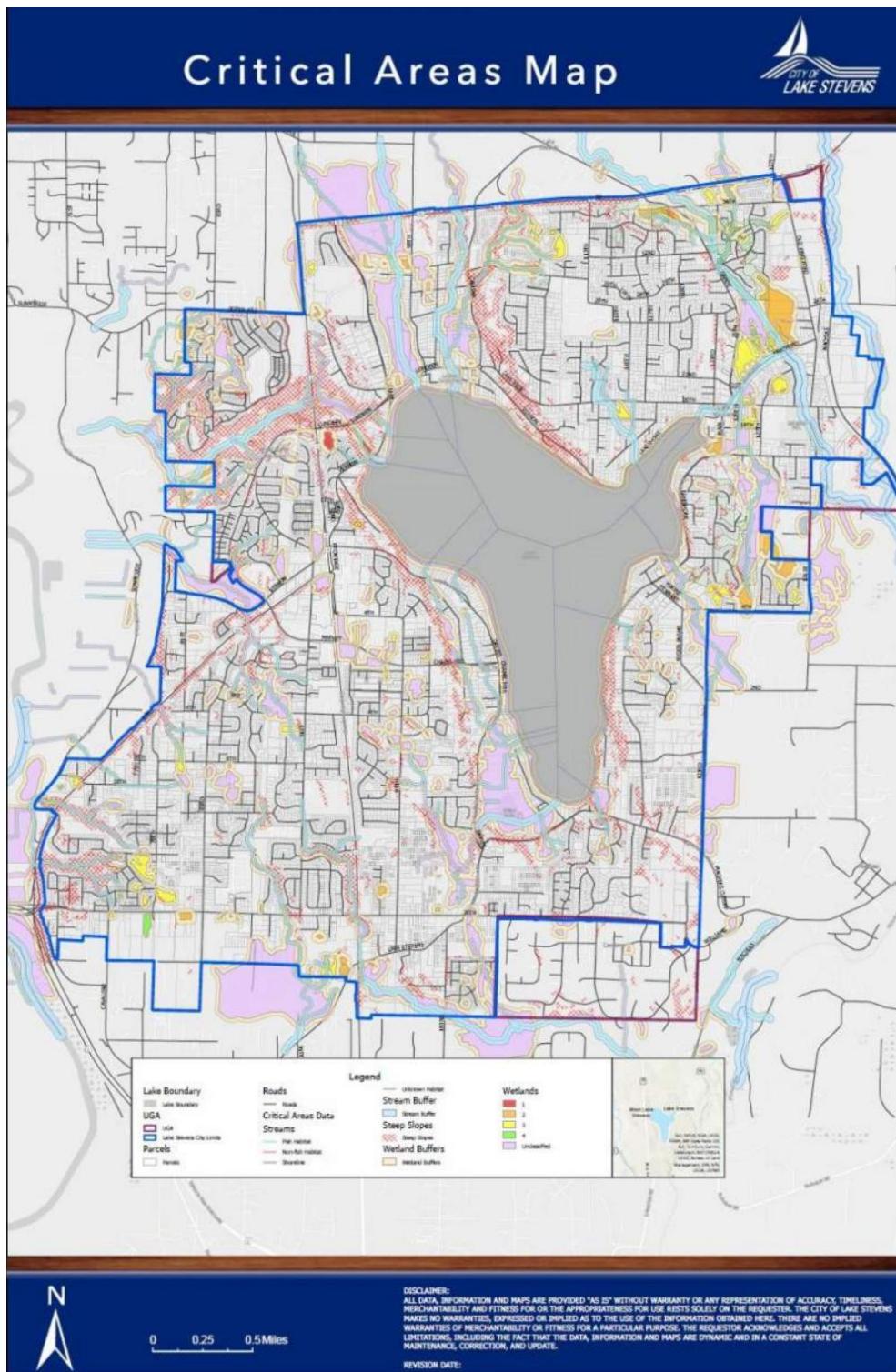


Figure 4. Map depicting Critical Areas and steep slopes from Lake Stevens (2024).

5.2.2 Landslide Hazard Areas

Landslides are difficult to predict because bluff geology, sediment composition, topography, and hydrology all influence risk of failure. Steeper slopes are more prone to failure due to increased gravitational stresses (Shipman 2004). Certain land use modifications and development activities have the potential to increase the likelihood of landslide occurrence, such as vegetation removal and the creation of new impervious surfaces. In addition to anchoring sediments, the process of evapotranspiration by plants transforms groundwater into atmospheric vapor and intercepts rainwater (Schmidt et al. 2001; Watson and Burnett 1995). The anchoring and hydrologic functions of vegetation lower the risk of slope failure and shallow-rapid landslides (Schmidt et al. 2001).

Steep slopes which may be associated with landslide hazard areas mapped by Lake Stevens are depicted in Figure 4. The Washington Department of Natural Resources (DNR) Geologic Information Portal³ provides mapping for historic landslide areas.

5.2.3 Seismic Hazard Areas

Seismic hazard areas are areas subject to damage resulting from earthquake-induced landslides, seismic ground shaking, dynamic settlement, fault rupture, soil liquefaction, or flooding caused by tsunamis and seiches. Seismic hazards are identified in DNR Geologic Information Portal. The DNR Geologic Information Portal contains information projecting the Cascadia, Seattle, and Tacoma Seismic Scenarios which include Lake Stevens in the study area.

Lake Stevens is in an area of high seismic activity, as are all areas of Western Washington. There are between 1,000-2,000 earthquakes which occur annually between Washington and Oregon, although most are small and fewer than 25 percent are perceptible (Cooper 2006; McCrumb et al. 1989). The probability of occurrence and risk of earthquakes depends on location, and seismic hazard areas have been mapped to identify areas with the greatest risk.

Secondary hazards associated with seismic events include liquefaction of the soil, rockfall, landsliding, dam failure, levee failure, and tsunamis or seiches. Liquefaction hazard areas within Snohomish County are mapped by DNR (Figure 5), in addition to seismic site class and seismic design categories. Nearly all areas of Snohomish have some level of seismic risk, even outside of designated critical areas. Liquefaction prone areas are mapped in Lake Stevens and ranked by risk level (Figure 6).

³ <https://geologyportal.dnr.wa.gov/>

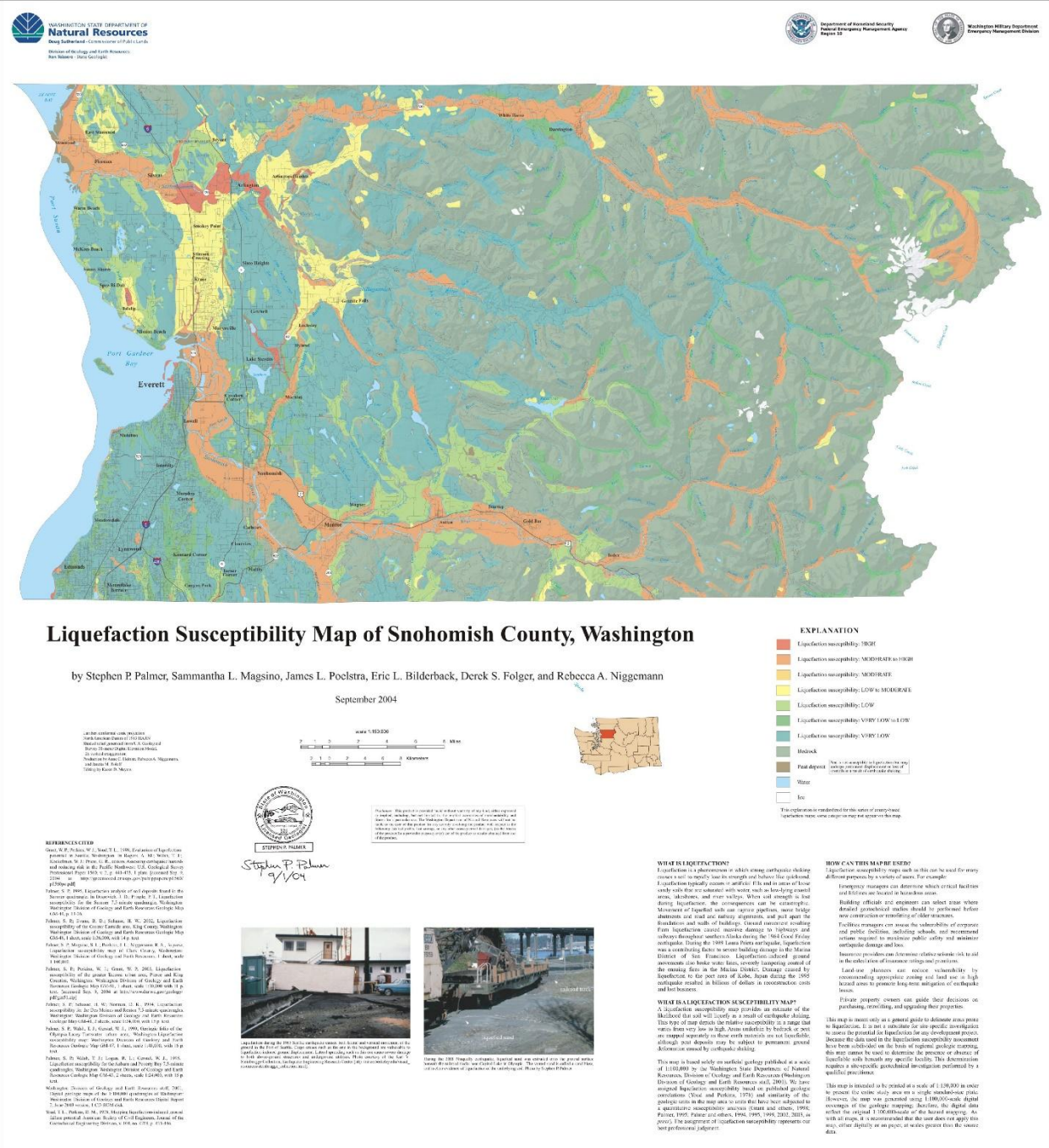


Figure 5. Snohomish County liquefaction susceptibility reproduced from Palmer et al. (2004).



Figure 6. Liquefaction susceptibility in Lake Stevens (from Lake Stevens 2024; Source data: PSRC/DNR)

5.3 Key Protection Strategies

The purpose of regulating activities in geologically hazardous areas is to protect the public from potential risks. Geologic events may occur in hazardous areas that can result in property damage, injury, and the loss of life. The type of land use and development in these areas influences the level of risk and may, in some cases, increase the potential for a hazardous event. There is public interest in regulating these areas because a geologic event occurring on one property can impact large surrounding areas. It is important to identify where such hazard areas are located to ensure that activities and development in those areas are managed for safety and stability.

5.3.1 Management Resources and Standards

The primary goal of protection measures for geologic hazards is to protect people and property. Risk management occurs at the stage of planning and development. Risks can be minimized by limiting the occupancy and development in geologically hazard areas. This risk of development in geologic hazard areas is evaluated with classification systems to inform site development restrictions and requirements. One method to manage risk is the protection of buffers around geologic hazard areas to restrict development in hazard areas. For development in erosion hazard or landslide hazard area, design and

construction standards are necessary to prevent the development from reducing slope stability and ensuring that development is resilient to potential hazards. Any such development in the hazard area or its buffer should be evaluated on a site-specific basis by a licensed geotechnical engineer or engineering geologist. Methods used in site studies should adhere to best professional standards and include subsurface exploration and testing of soils at an appropriate frequency across the site as necessary.

Although the general protective approach is to avoid disturbing geologic hazard areas, WAC 365-190-080(4) states *"Some geological hazards can be mitigated by engineering, design, or modified construction or mining practices so that risks to health and safety are acceptable."*

Additional protection strategies were identified by the SR-530 Landslide Commission following the Oso landslide that occurred in March 2014. Recommendations from the commission include integrating and funding Washington's emergency management system, supporting a statewide landslide hazard and risk mapping program, establishing a geologic hazards resilience institute, conducting landslide investigations, and advancing public awareness of geologic hazards (SR530 Landslide Commission 2014). Furthermore, the SR-530 Landslide Commission recommends identifying critical area buffer widths based on site-specific studies (2014). To improve landslide hazard and risk mapping, collaboration among agencies and landowners is recommended along with risk prioritization, utilization of lidar mapping and GIS database tools.

Seismic hazards can be managed by applying earthquake-resistant building standards to at-risk areas. The Washington State Building Code (WAC 51-50) offers guidance from the 2018 International Existing Building Code with amendments specific to the State, including several directly related to seismic standards.

5.4 Climate Change Effects

Geologically hazardous areas, particularly erosion hazard areas, and landslide hazard areas, are influenced by climate change. Climate change models project warmer, drier summers, and increased precipitation in other seasons while maintaining roughly the same amount of annual precipitation (Dalton, Mote, and Snover 2013). Extreme precipitation events modeled by the UW Climate Impacts Group are expected to increase in intensity and frequency (Mauger, Morgan, and Won 2021). Increased magnitude and frequency of rain events can lead to over-saturated soils and contribute to slope instability in hazard areas. Consequentially, geologic hazard risks are anticipated to increase because rainfall intensity and duration are known indicators of landslide events (Chleborad 2006; DNR 2020). Additionally, the severity and frequency of wildfire is expected to increase, heightening susceptibility to erosion and landslide hazards (Mauger et al. 2015).

Changing climate is also anticipated to affect vegetation community composition and native plant mortality due to shifts in plant hardiness zones and species ranges (Lenoir and Svenning 2015). Existing species assemblages, canopy types, and root systems may be disrupted and displaced by invasive species. Although plant provenance is not the only indicator of a plant's capability to stabilize slopes,

opportunistic invasive plants often have shallow root systems and short lifespans that are less effective at anchoring soils than native counterparts. Himalayan blackberry, for example, is a wide spread invasive plant likely to displace lost plants and has shallow root system and can cause soil erosion by preventing the establishment of native counterparts (Gaire et al. 2015). High levels of plant diversity also generally improve soil stability by combining multiple forms of root architecture (Ghestem et al. 2014).

5.4.1 Strategies to Manage Climate Change Impacts on Geologically Hazardous Areas

- Encourage or require climate-informed design for development and infrastructure in or near geologic hazard areas (DNR 2020).
- Require appropriate surface and ground water management practices for development near coastal bluffs.
- Encourage utilization of soft shore protection strategies.
- Identify and prioritize geologic hazards within the City, then update mapping as needed using current practices such as LiDAR and GIS database tools.
- Keep in communication with the governor's office to ensure the City of Lake Stevens is included in statewide collaborative efforts to manage geologic hazard areas.
- Manage vegetation for climate resilience and slope stability.

6. FISH AND WILDLIFE HABITAT CONSERVATION AREAS

6.1 Definition

Washington State defines fish and wildlife habitat conservation areas (FWHCAs) in WAC 365-190-030(6) as follows:

- "Fish and wildlife habitat conservation areas" are areas that serve a critical role in sustaining needed habitats and species for the functional integrity of the ecosystem, and which, if altered, may reduce the likelihood that the species will persist over the long term. These areas may include, but are not limited to, rare or vulnerable ecological systems, communities, and habitat or habitat elements including seasonal ranges, breeding habitat, winter range, and movement corridors; and areas with high relative population density or species richness. Counties and cities may also designate locally important habitats and species.*
- "Habitats of local importance" designated as fish and wildlife habitat conservation areas include those areas found to be locally important by counties and cities.*
- "Fish and wildlife habitat conservation areas" does not include such artificial features or constructs as irrigation delivery systems, irrigation infrastructure, irrigation canals, or drainage*

ditches that lie within the boundaries of, and are maintained by, a port district or an irrigation district or company.

The following FWHCAs must be considered for classification and designation (WAC 365-190-130):

- (a) Areas where endangered, threatened, and sensitive species have a primary association;*
- (b) Habitats and species of local importance, as determined locally;*
- (c) Commercial and recreational shellfish areas;*
- (d) Kelp and eelgrass beds; herring, smelt, and other forage fish spawning areas;*
- (e) Naturally occurring ponds under 20 acres and their submerged aquatic beds that provide fish or wildlife habitat;*
- (f) Waters of the state;*
- (g) Lakes, ponds, streams, and rivers planted with game fish by a governmental or tribal entity; and*
- (h) State natural area preserves, natural resource conservation areas, and state wildlife areas.*

Lake Stevens' definition of Fish and Wildlife Habitat Conservation Areas (FWHCAs) in LSMC 14.08.010 is similar to the state definition but is more limited in scope. The definition reads as follows:

"Fish and Wildlife Habitats (of Local Importance). A seasonal range or habitat element with which a given species has a primary association, and which, if altered, may reduce the likelihood that the species will maintain and reproduce over the long term. These might include areas of relative density or species richness, breeding habitat, winter range, and movement corridors. These also include habitats of limited availability or high vulnerability to alteration, such as cliffs and wetlands."

The types of FWHCAs designated in the critical areas code are listed in LSMC 14.88.400 and include those relevant to the Lake Stevens area.

6.2 FWHCAs in Lake Stevens

6.2.1 Waterbodies

There are five prominent stream systems in Lake Stevens which include Kokanee (Mitchell) Creek, Stevens Creek, Lundeen Creek, Catherine Creek, and Little Pilchuck Creek (Figure 1). Catherine Creek and Little Pilchuck Creek are considered Shorelines of the State and are subject to the Shoreline Management Act (SMA).

There are two lakes within the City. Lake Stevens covers approximately 1,040 acres and provides not only recreational enjoyment but serves as an important regional habitat. Stitch Lake, located in the southern part of the city, encompasses approximately nine acres. Lake Stevens and its shoreline-associated wetlands (including those adjacent to Stitch Lake) are also subject to the SMA.

6.2.2 Wildlife and Habitats

The City of Lake Stevens is developed and contains a few areas with high quality wildlife habitat. Development within the City and surrounding areas has significantly reduced available habitats for fish and wildlife.

The lakes and local streams in Lake Stevens provide important aquatic and riparian habitat for a variety of species, including Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS), salmonids and a variety of bird species. Many of the western streams are associated with deep gullies or canyons, offering unique characteristics and a high degree of isolation from the surrounding urban environment.

The WDFW PHS program has identified and mapped Priority Habitats and Species throughout the City, as listed in Table 1. As WDFW notes, habitats and species can change over time as distributions expand or contract.

Table 1. List of WDFW-designated priority habitats and species which occur in City of Lake Stevens.

Occurrence Name	Federal Status	State Status	Sensitive Location
Mountain quail			No
Coho	Candidate	N/A	No
Bull Trout	Threatened	N/A	No
Summer Steelhead	N/A	N/A	No
Dolly Varden/ Bull Trout	N/A	N/A	No
Coho	N/A	N/A	No
Cutthroat	Not Warranted	N/A	No
Steelhead	Threatened	N/A	No
Winter Steelhead	N/A	N/A	No
Wetlands	N/A	N/A	No
Great blue heron	N/A	N/A	No
Freshwater Forested/Shrub Wetland	N/A	N/A	No
Freshwater Emergent Wetland	N/A	N/A	No
Freshwater Pond	N/A	N/A	No

6.3 Functions and Values

FWHCA functions include the biological, chemical, and physical habitat conditions and processes that affect wildlife. Since wildlife may include all species, from the largest megafauna to microorganisms, these functions encompass a complex web of interacting ecological processes. At the highest level,

FWHCAs function to provide wildlife with suitable habitat. They also provide communities with sources of food and materials for consumptive and productive uses. Additionally, they are valued for a range of non-consumptive cultural, social, and economic benefits (Chardonnet et al. 2002).

6.3.1 Streams, Lakes and Ponds, and Riparian Areas

Streams, lakes, ponds, and their associated riparian areas provide critical habitat for a diverse array of wildlife species. They also provide various landscape and ecosystem functions. Commonly recognized functions and processes that influence the habitat conditions within aquatic FWHCA types are outlined below.

Water Quality

- Fish and other wildlife like amphibians require cool, clean water to meet their life history needs.
 - Riparian vegetation influences stream temperatures and microclimate conditions such as air temperature, wind, light, and moisture. Factors affecting water temperature and microclimate include shade, orientation, relative humidity, ambient air temperature, wind, channel dimensions, groundwater, hyporheic exchange, and overhead cover (Quinn, Wilhere, and Krueger 2020).
 - Salmonids have been studied frequently due to their cultural and economic importance, relative sensitivity to high temperatures, and narrow thermal tolerance (Quinn, Wilhere, and Krueger 2020). Amphibians also have narrow thermal tolerances, and they are particularly sensitive to changes in microclimate conditions (Bury 2008).

Hydrologic

- Streams, lakes, and ponds may have complex and extensive connections to other surface waters and groundwater resources in a watershed.
 - Hydrologic forces move material downstream.
- Fish and wildlife are adapted to, and in some instances reliant upon, the natural variability in seasonal and flood flows within a system.
- Riparian vegetation reduces the quantity of surface water runoff through rainwater capture and evapotranspiration (Wynn and Mostaghimi 2007).
- Floodplains, wetlands, and sinuous stream channels attenuate flood flows, which protects downstream areas from flooding.

Physical Habitat Characteristics

- Riparian microclimate affects many ecological processes and functions, including plant growth, decomposition, nutrient cycling, succession, productivity, migration and dispersal of flying insects, soil microbe activity, and fish and amphibian habitat (Brosofske et al. 1997).
- Large woody debris plays a significant role in the geomorphic formation of stream channels and in the creation of diverse channel habitat morphologies (Quinn, Wilhere, and Krueger 2020)

- Streams migrate naturally which often results in complex natural geomorphology, floodplains, and heterogeneous ecosystems.
 - Bank stability is influenced by factors such as bank material, hydraulic forces, and vegetation (Ott 2000).
- Beaver dams incorporate both small and large wood, and serve to slow water, retain sediment, and create pools and off-channel ponds used by rearing coho salmon and cutthroat trout (Pollock et al. 2004; Robert J. Naiman, Johnston, and Kelley 1988).

6.3.1.1 Urbanization Impacts

Urbanization affects natural surface waters and riparian areas (and associated fish and wildlife) in significant and numerous ways. This section outlines the mechanisms by which urbanization impacts the key functions and processes previously described.

Changing Landcover and Impervious Surfaces

- Removal of riparian vegetation impacts water quality by increasing stream temperatures (Beschta 1987; Murray, Edmonds, and Marra 2000; A. Moore and Palmer 2005; Gomi, Moore, and Dhakal 2006).
- Widespread removal of forested areas in a watershed is likely to create unstable channels (Booth et al. 2004). Increased erosion and bank instability coupled with a reduction of forest cover simplify stream morphology, leading to incised, wider, and straighter stream channels (Konrad and Booth 2005).
- Impervious surfaces impact hydrologic functions.
 - Impervious surface is positively correlated with high flow volumes, daily streamflow variability and negatively correlated with groundwater recharge rates and summer low flow volumes (Burgess, Wigmosta, and Meena 1998; Cuo et al. 2009; Konrad and Booth 2005)
 - Flows become more synchronized and become more variable and volatile (Sheldon et al. 2005).
 - Less dynamic stream morphology is linked to accelerated water transport and reduced temporary instream flood storage capacity (Kaufmann and Faustini 2012).
 - Hydrological functions are also altered through soil compaction, draining, and ditching across a landscape (R. D. Moore and Wondzell 2005; Booth et al. 2004).

Habitat Removal, Degradation, and Fragmentation

- Habitat loss, degradation, and fragmentation have profound impacts on wildlife and their ecosystems (Gaston 2010; Wiegand, Revilla, and Moloney 2005; Young et al. 2016).
- Anthropogenic inputs and disturbance from high-intensity land uses (e.g., noise, light, physical intrusions by people and pets, pollution, garbage, etc.) degrade retained habitats in urban settings.
- Fragmentation from roads, fences, buildings, and various land uses restrict interpatch movements and migrations in urban landscapes (Wiegand, Revilla, and Moloney 2005).

- Urban areas tend to contribute a disproportionate amount of sediment and contaminants to receiving waters (Soranno et al. 1996). Heavy metals, bacterial pathogens, as well as PCBs, hydrocarbons, and endocrine-disrupting chemicals are aquatic contaminants that are commonly associated with urban and agricultural land uses.
 - Some contaminants have significant effects on aquatic organisms. For example, coho salmon pre-spawn mortality is caused by a breakdown product of tire wear, 6PPD-quinone (Tian et al. 2021). Coho pre-spawn mortality is also positively correlated with the relative proportion of roads, impervious surfaces, and commercial land cover within a basin (Feist et al. 2011).
 - Fine sediment adversely affects stream habitat (Jensen et al. 2009; Galbraith et al. 2006; Knutson et al. 2004)
- Cumulative impacts of direct and indirect habitat alterations, including hydrologic changes, compromise water quality; and habitat fragmentation tends to reduce the habitat functions and values of wetlands and riparian areas (Azous and Horner 2010; Sheldon et al. 2005).

6.4 Key Protection Strategies

6.4.1 Identification and Classification

Numerous online resources are available that can be used to aid in determining likely presence or absence of the various types of FWHCAs. Several important online mapping tools are listed below; however, this list is not exhaustive. Not all FWHCAs are mapped, and anything identified online should be verified in the field by a qualified biologist.

- National Oceanic and Atmospheric Administration Fisheries Maps
- U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation online tool
- WDFW Priority Habitats and Species Database (PHS on the Web)
- Washington State Department of Natural Resources (DNR) Natural Heritage Program Data Explorer
- Streams are mapped by Lake Stevens and other Snohomish County and Washington State agency resources.

6.4.1.1 Waters of the State

Waters of the state include lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands⁴ and all other surface waters and watercourses (RWC 90.48.020, WAC 173-201A-020). The ordinary high water mark (OHWM) is typically used to determine the edge of surface waters for jurisdictional purposes. However, for tidal waters, the USACE uses the high tide line to determine jurisdiction, while Ecology uses the OHWM if present or the line of mean higher high tide if the OHWM cannot be found. The definition and guidance for determining OHWM is slightly different between the

⁴ Wetlands, while considered a type of water of the state, are typically regulated in a separate section of a local jurisdiction's critical areas regulations.

USACE and Ecology but the methods are largely similar. The OHWM should be determined in the field by a qualified biologist using one of the following manuals:

- *National Ordinary High Water Mark Field Delineation Manual for Rivers and Streams* (David et al. 2025)
- *Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State* (Anderson et al. 2016)

DNR classifies streams and other water bodies using a the “water typing system” based on various characteristics, fish use, and functions of a natural water feature (WAC 222-16-030), summarized in Table 2. Characteristics common to water typing systems are flow volume, fish use and accessibility, seasonality, and presence of salmonids.

Lake Stevens currently uses this water typing approach. However, the latest riparian management zone guidance from WDFW does not use the water typing system, but instead treats all streams equally and differentiates protection based on soil type and associated dominant tree species (Rentz et al. 2020). This new riparian management zone guidance is discussed further in Section 6.4.2.2.

Table 2. Water type classifications using DNR’s water typing system.

Type	Description
Type S Shoreline	Streams and waterbodies that are designated “shorelines of the state” as defined in chapter 90.58.030 RCW.
Type F Fish	Streams and waterbodies that are known to be used by fish, or meet the physical criteria to be potentially used by fish. Fish streams may or may not have flowing water all year; they may be perennial or seasonal.
Type Np Non-Fish	Streams that have flow year round and may have spatially intermittent dry reaches downstream of perennial flow. Type Np streams do not meet the physical criteria of a Type F stream. This also includes streams that have been proven not to contain fish using methods described in Forest Practices Board Manual Section 13.
Type Ns Non-Fish Seasonal	Streams that do not have surface flow during at least some portion of the year, and do not meet the physical criteria of a Type F stream.

All of Lake Stevens’ major streams, Kokanee (Mitchell) Creek, Stevens Creek, Lundeen Creek, Catherine Creek, and Little Pilchuck Creek are all basins which contain ESA listed salmon and trout, which can affect how stream buffers are regulated in the city.

6.4.2 Management Resources and Standards

6.4.2.1 Buffers based on Water Typing

Most jurisdictions in Washington State have managed stream and riparian habitats using buffers which are determined by a specific water type classification. This protection mechanism arose in the forestry

industry after stream habitats were impacted during the industrial forestry expansion in the mid-20th century (Richardson, Naiman, and Bisson 2012). The benefit of the set-width prescriptive buffer is that it is relatively simple to establish, implement, and administer. If fixed-width buffers based on water type are implemented, buffers should be sufficiently wide to ensure that riparian buffers are effective under a range of variable conditions. The latest BAS and state guidance recommends a conceptual shift from the fixed-width buffer approach regarding the way that streams and riparian areas are protected, as described in the next section.

6.4.2.2 Riparian Management Zones

In 2020, WDFW developed BAS guidance for the protection of riparian areas (Quinn, Wilhere, and Krueger 2020; Rentz et al. 2020). The guidance emphasizes a shift in terminology and framework from the concept of “stream buffers” to “riparian management zones” (RMZs). A RMZ is defined as “...a scientifically based description of the area adjacent to rivers and streams that has the potential to provide full function based on the SPTH [site potential tree height] conceptual framework.” Further, a RMZ is recommended to be regulated as a fish and wildlife habitat conservation area itself to protect its fundamental value, rather than as a buffer for rivers and streams (Rentz et al. 2020).

WDFW’s current recommendations for establishing RMZ widths are based primarily on a site potential tree height (SPTH) framework. The SPTH is defined as “...the average maximum height of the tallest dominant trees (200 years or more) for a given site class” (Rentz et al. 2020). To apply their methodology, WDFW has developed a web-based mapping tool for use in determining SPTH based on the 200-year site index (Rentz et al. 2020). Modeled SPTHs range from 75-239 feet in Lake Stevens.

WDFW recommends using the SPTH value as the basis for the RMZ width, measured from the edge of the channel migration zone or OHWM where a channel migration zone is not present. Exceptions may occur where the SPTH is less than 100 feet, in which case the agency recommends assigning an RMZ width of 100 feet at a minimum to provide adequate biofiltration and infiltration of runoff for water quality protection from most pollutants, but also in consideration of other habitat-related factors including shade and wood recruitment. A 100-foot-wide buffer is estimated to achieve 95 percent pollution removal and approximately 85 percent of surface nitrogen removal (Rentz et al. 2020).

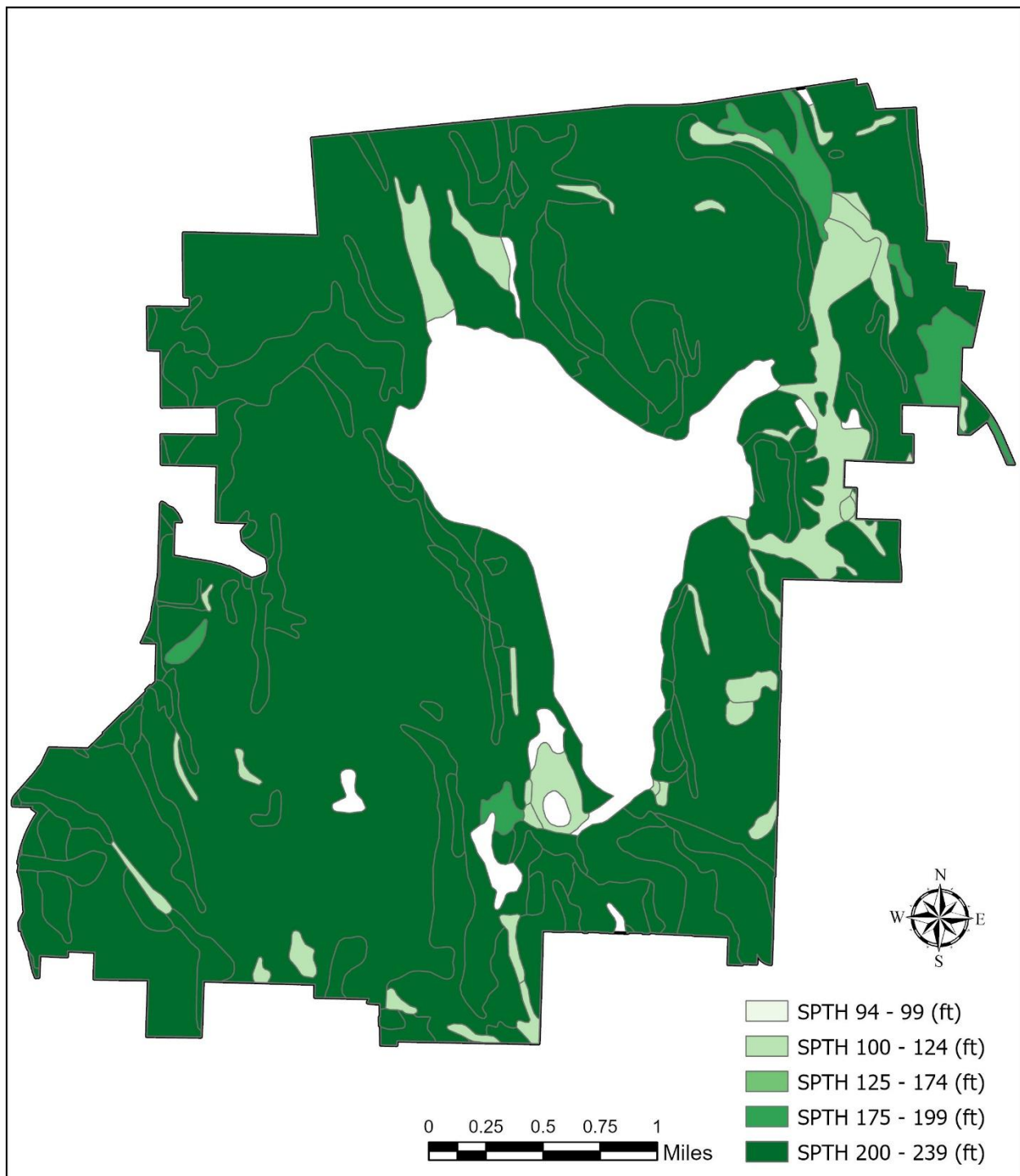


Figure 6. SPTH₂₀₀ distribution in Lake Stevens, white indicates no data. Map produced from data obtained from WDFW and NRCS (WDFW and NRCS 2024).

Acknowledging that establishing functional RMZs using the recommended methods may not be practical in many developed areas, WDFW recommends effective watershed management,

preservation, and protection, resulting in nearly full restoration of riparian ecosystem habitat functions as is feasible within existing constraints. Other WDFW management recommendations for urban riparian ecosystems include delineating stream ordinary high water marks and associated riparian management zones, document current conditions and target degraded riparian areas for restoration, maintain or improve functions through regulations and voluntary measures, prioritize opportunities to maintain and restore in-stream and riparian connectivity, manage stormwater following latest Ecology manual, and require stormwater retrofit for redevelopment projects (Rentz et al. 2020).

BAS-based literature points to a range of recommended management measures and buffer considerations to help maintain habitat functions for fish and wildlife. Effective methods to reduce impacts from urbanization and manage associated runoff can include the following:

- Limiting or consolidating development densities and impervious surface coverage;
- Limiting vegetation clearing and retaining forest cover;
- Concentrating impact activities, particularly roads and pollutant sources, away from watercourses;
- Limiting the total area of roads and requiring joint use of new access roads;
- Protecting vegetation and limiting development on or near hydrologic source areas;
- Maintaining densely vegetated riparian buffers with native trees, shrubs, and groundcover species;
- Low impact development (LID);
- Municipal stormwater treatment;
- Public education.

To achieve improved water quality in the City's streams, lakes, and ponds, riparian buffer areas should be utilized effectively to provide both biofiltration of stormwater runoff and protection from adjacent land uses. Both goals can be achieved by providing dense, well-rooted vegetated buffer areas.

Biofiltration swales, created wetlands, and infiltration opportunities for specific stormwater runoff discharges can be utilized to intercept runoff before it reaches stream channels. Stormwater runoff that is conveyed through stream buffers in pipes or ditch-like channels and discharged directly to stream channels "short circuits" or bypasses buffer areas. To maintain buffer functions, including water quality treatment via biofiltration, discharges should be dispersed in outer buffer areas. In areas where stormwater flows untreated through riparian buffer areas, the buffer is underutilized and is prevented from providing the intended or potential biofiltration function.

6.4.2.3 Endangered, Threatened, or Sensitive Species; Species of Local Importance; and their Habitats

Effective BAS-based strategies can be applied to protect state and federally listed endangered or threatened species and WDFW-identified PHS. WDFW, USFWS, and NMFS provide information on species-specific management recommendations that can be used to guide management at the city-level or site-level. There is widely available information for high profile species, though many regulated

species are poorly researched and lack specific management recommendations from state agencies. Where species or habitat-specific management recommendations are available from WDFW guidance documents, those should be followed or adapted to local regulations. General recommendations for management strategies to protect terrestrial habitat are listed below.

General Terrestrial Habitat Management Recommendations

- Existing high-quality habitats should be retained because habitat loss is one of the most important factors influencing biodiversity and loss of species (Beninde, Veith, and Hochkirch 2015).
- Generally, plan development to minimize fragmentation of native habitat, particularly large, intact habitat areas. Where large forest stands exist, manage for forest-interior species and avoid fragmentation (Donnelly and Marzluff 2004; Diffendorfer, Gaines, and Holt 1995; Mason et al. 2007; Pardini et al. 2005; WDFW 2009)
- Manage agricultural development to limit fragmentation and edge; preserve vegetative structural diversity whenever possible in agricultural areas by retaining hedge rows and areas of native vegetation (Southerland 1993).
- Protect priority habitats that have a primary association with an ESA-list species or species of local importance by continuing to regulate for adherence to WDFW management recommendations and other applicable regulatory requirements.
- Control invasive species where needed on a site- and species-specific basis. Address invasive species specifically in areas where environmental conditions tend to promote infestation, including created edges, roadways, and riparian zones where they are contiguous with developed areas that may act as a seed source (McKinney 2002; Olden et al. 2004; Pimentel, Zuniga, and Morrison 2005).
- Maintain or provide habitat connectivity with vegetated corridors between habitat patches (Gilbert-Norton et al. 2010).
- Protect, maintain, and promote habitat features such as snags and downed wood (Blewett and Marzluff 2005).
- Manage for increase native vegetative cover in landscaping and discourage lawns (Nelson and Nelson 2001).
- Plan habitat areas away from roads (Fahrig et al. 1995; Lehtinen, Galatowitsch, and Tester 1999).
- Promote buffers of adequate width to support wildlife guilds in adjacent habitat (Ficetola, Padoa-Schioppa, and De Bernardi 2009; Semlitsch and Bodie 2003; Crawford and Semlitsch 2007).
- Identify existing habitat patches and corridors and maintain connectivity with vegetated corridors to limit fragmentation and edge habitat (Gillies and St. Clair 2008; Gilbert-Norton et al. 2010). Preserve habitat patches of at least moderate size 35 ha (86 ac) within developed areas (Kissling and Garton 2008).
- Promote restoration of FWHCAs, buffers, and other management zones through critical area regulations and public outreach. Encourage stewardship on a parcel by parcel and county-wide scale.

6.5 Climate Change Effects

Climate change is predicted to result in significant and irreversible impacts to fish and wildlife, and their habitats. Global climate change is anticipated to result in habitat loss and modification through temperature changes, sea level rise, ocean acidification, extreme weather events, changes in precipitation, biological invasions, food web disruptions, and disease (Lyons, LeDee, and Boyles 2022; Nagelkerken et al. 2023). The range of effects on fish and wildlife depend on species specific interactions and may include range shifts, phenological shifts, changes to morphology and behavior, biodiversity loss, and extinction (Sattar et al. 2021). The cumulative impact of these factors on wildlife is anticipated to result in loss of biodiversity and increases to extinction rates (Sattar et al. 2021).

Changes in temperatures and seasonal precipitation patterns are projected to place additional stressors on FWHCAs. Some loss of riparian vegetation is anticipated due to the stresses of climate change, primarily warmer and drier summers. A reduction in riparian vegetation potentially triggers a cascading effect. A decrease in riparian vegetation would decrease shading, increase stream temperature, decrease detrital inputs, reduce available habitat structure, and reduce stream bank stability. Changes in seasonal hydrologic cycles may increase frequency and magnitude of flashy runoff events, mobilize greater volumes of sediments and pollutants into streams, and reduce groundwater recharge that supports base stream flows in summer. Instream habitats are particularly negatively impacted by excess sediment discharge and deposition.

Hot dry summers are projected to reduce stream flow volumes and increase instream temperatures. This stressor is compounded by extreme precipitation events, flooding and erosion. All these stressors reduce instream habitat quality and stress salmonid populations. Global warming poses a threat to freshwater fish habitat (Crozier, Zabel, and Hamlet 2008).

6.5.1 Strategies to Manage Climate Change Impacts on FWHCAs

The following actions or policies have been developed for other local jurisdictions in coordination with the University of Washington Climate Impacts Group, and are potential strategies Lake Stevens could use to reduce negative climate change impacts on FWHCAs (Redmond et al. 2022).

- Promote retention of trees and forests and maintain tree replacement and reforestation requirements.
- Encourage and incentivize enhancement and restoration of native forest patches throughout the City, particularly where connectivity to one or more FWHCAs is identified. Both voluntary and required restoration planting should be paired with monitoring and maintenance that allows for dry season irrigation and adaptive management.
- Consider assisted migration for seed selection of native plants from locations that are better adapted to future climate conditions.
- Manage stormwater infrastructure to avoid and minimize discharges of increased and/or untreated runoff to streams and thereby offset the anticipated increase in intensive rainfall

events. Promote the use of LIDs as a tool to effectively manage stormwater for minimal downstream impacts.

- Update and maintain regulations for habitats and species of local importance. This may include adding mapping resources to help identify the locations of potential habitats and species requiring protection and management.
- Prioritize protection of streams and riparian corridors to reduce the stresses of climate change on native fish species and anadromous fish, such as Chinook salmon.
- Identify and protect cold water refugia in waterbodies.
- Conduct vulnerability assessments and climate action plans.

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Appendix C. Buffer Approaches for Western Washington

Option 1

Table 1. Wetland buffer width requirements, in feet, if Table 2 is implemented and a habitat corridor is provided

Category of wetland	Habitat score 3-5 points (corridor not required)	Habitat score 6-7 points	Habitat score 8-9 points	Buffer width based on special characteristics
Category I or II: Based on rating of wetland functions (and not listed below)	75	110	225	NA
Category I: Bogs and Wetlands of High Conservation Value	NA	NA	225	190
Category I: Interdunal	NA	NA	225	NA
Category I: Forested	75	110	225	NA
Category I: Estuarine and wetlands in coastal lagoons	NA	NA	NA	150
Category II: Interdunal	NA	NA	NA	110
Category II: Estuarine and wetlands in coastal lagoons	NA	NA	NA	110
Category III: All types except interdunal	60	110	225	NA
Category III: Interdunal	NA	NA	NA	60
Category IV: All types	40	40	40	NA

Impact minimization measures

Developments that produce the listed disturbances and are requesting a buffer reduction are required to address the disturbance through the use of applicable minimization measures.

This is not a complete list of measures, nor is every example measure required. Though not every measure is required, all effort should be made to implement as many measures as possible. Regulatory staff should determine, in coordination with the applicant, which measures are applicable and practicable.

Table 2. Impact minimization measures

Examples of disturbance	Activities and uses that cause disturbances	Examples of measures to minimize impacts
Lights	• Parking lots • Commercial/Industrial • Residential • Recreation (e.g., athletic fields) • Agricultural buildings	• Direct lights away from wetland • Only use lighting where necessary for public safety and keep lights off when not needed • Use motion-activated lights • Use full cut-off filters to cover light bulbs and direct light only where needed • Limit use of blue-white colored lights in favor of red-amber hues • Use lower-intensity LED lighting • Dim light to the lowest acceptable intensity
Noise	• Commercial • Industrial • Recreation (e.g., athletic fields, bleachers, etc.) • Residential • Agriculture	• Locate activity that generates noise away from wetland • Construct a fence to reduce noise impacts on adjacent wetland and buffer • Plant a strip of dense shrub vegetation adjacent to wetland buffer
Toxic runoff	• Parking lots • Roads • Commercial/Industrial • Residential areas • Application of pesticides • Landscaping • Agriculture	• Route all new, untreated runoff away from wetland while ensuring wetland is not dewatered • Establish covenants limiting use of pesticides within 150 ft. of wetland • Apply integrated pest management (These examples are not necessarily adequate for minimizing toxic runoff if threatened or endangered species are present at the site.)

Examples of disturbance	Activities and uses that cause disturbances	Examples of measures to minimize impacts
Stormwater runoff	• Parking lots • Roads • Residential areas • Commercial/industrial • Recreation • Landscaping/lawns • Other impermeable surfaces, compacted soil, etc.	• Retrofit stormwater detention and treatment for roads and existing adjacent development • Prevent channelized or sheet flow from lawns that directly enters the buffer • Infiltrate or treat, detain, and disperse new runoff from impervious surfaces and lawns
Pets and human disturbance	• Residential areas • Recreation	• Use privacy fencing • Plant dense native vegetation to delineate buffer edge and to discourage disturbance • Place wetland and its buffer in a separate tract • Place signs around the wetland buffer every 50-200 ft., and for subdivisions place signs at the back of each residential lot • When platting new subdivisions, locate greenbelts, stormwater facilities, and other lower-intensity uses adjacent to wetland buffers
Dust	• Tilled fields • Roads	• Use best management practices to control dust

Table 3. Wetland buffer width requirements, in feet, for applicants not providing a habitat corridor or implementing measures in Table 2

Category of wetland	Habitat score 3-5 points	Habitat score 6-7 points	Habitat score 8-9 points	Buffer width based on special characteristics
Category I & II: Based on rating of wetland functions (and not listed below)	100	150	300	NA
Category I: Bogs and Wetlands of High Conservation Value	NA	NA	300	250
Category I: Interdunal	NA	NA	300	NA
Category I: Forested	100	150	300	NA
Category I: Estuarine and wetlands in coastal lagoons	NA	NA	NA	200
Category II: Interdunal	NA	NA	NA	150
Category II: Estuarine and wetlands in coastal lagoons	NA	NA	NA	150
Category III: All types except interdunal	80	150	300	NA
Category III: Interdunal	NA	NA	NA	80
Category IV	NA	NA	NA	50

Conditions for implementing Tables 1, 2, and 3

1. Wetlands that score 6 points or more for habitat function: the buffers in Table 1 can be used only if all of the following criteria are met:
 - a. A relatively undisturbed, vegetated corridor at least 100 feet wide is protected between the wetland and:
 - i. A legally protected, relatively undisturbed and vegetated area (e.g., Priority Habitats, compensatory mitigation sites, wildlife areas/refuges, national, county, and state parks where they have management plans with identified areas designated as Natural, Natural Forest, or Natural Area Preserve, or
 - ii. An area that is the site of a Watershed Project identified within, and fully consistent with, a Watershed Plan as defined by RCW 89-08-460, or
 - iii. An area where development is prohibited according to the provisions of the local shoreline master program, or
 - iv. An area with equivalent habitat quality that has conservation status in perpetuity, in consultation with WDFW.
 - b. The corridor is permanently protected for the entire distance between the wetland and the shoreline or legally protected area by a conservation easement, deed restriction, or other legal site protection mechanisms.
 - c. Presence or absence of the shoreline or Priority Habitat must be confirmed by a qualified biologist or shoreline Administrator.
 - d. The measures in Table 2 are implemented, as applicable, to minimize the impacts of the adjacent land uses.
2. For wetlands that score 5 or fewer habitat points, only the measures in Table 2 are required for the use of the buffers in Table 1.
3. If an applicant does not apply the mitigation measures in Table 2 or is unable to provide a protected corridor, then the buffers in Table 3 shall be used.
4. The buffer widths in Tables 1 and 3 assume that the buffer is vegetated with a native plant community appropriate for the ecoregion. If the existing buffer is unvegetated, sparsely vegetated, or vegetated with invasive species that do not perform needed functions, the buffer must either be planted to create the appropriate native plant community or be widened to ensure that the buffer provides adequate functions to protect the wetland.

Note: An expanded table with graduated buffer widths based on habitat score is also outlined in the [July 2018 Appendix 8-C⁷⁶](#) of *Wetlands in Washington State, Volume 2*. This is an approach that assigns unique buffer widths to each habitat score in seven increments. It is a gradual increase in buffer width with each point. Compared to Option 1, this avoids a marked increase in buffer width resulting from an increase of one point in the habitat score.

Option 2

Table 1. Width of buffers, in feet, needed to protect wetlands from impacts of proposed land uses (used with Table 2)

Category of wetland	Land use with low impact*	Land use with moderate impact*	Land use with high impact*
I	150	225	300
II	150	225	300
III	75	110	150
IV	25	40	50

*See Table 2 below for types of land uses that can result in low, moderate, and high levels of impacts to wetlands

Table 2. Levels of impacts from proposed land use types

[Local governments are encouraged to ensure the uses in this table match the uses specified in their development and land use regulations and are consistent with the principles in this example.]

Level of impact from proposed land use	Types of land use
High	• Commercial • Urban • Industrial • Institutional • Mixed-use developments • Residential (more than 1 unit/acre) • Roads: federal and state highways, including on-ramps and exits, state routes, and other roads associated with high-impact land uses • Railroads • Agriculture with high-intensity activities (dairies, nurseries, greenhouses, growing and harvesting crops requiring annual tilling, raising and maintaining animals, etc.)

⁷⁶ <https://apps.ecology.wa.gov/publications/parts/0506008part3.pdf>

Level of impact from proposed land use	Types of land use
	• Open/recreational space with high-intensity uses (golf courses, ball fields, etc.) • Solar farms (utility scale)
Moderate	• Residential (1 unit/acre or less) • Roads: Forest Service roads and roads associated with moderate-impact land uses • Open/recreational space with moderate-intensity uses (parks with paved trails or playgrounds, biking, jogging, etc.) • Agriculture with moderate-intensity uses (orchards, hay fields, light or rotational grazing, etc.) • Utility corridor or right-of-way used by one or more utilities and including access/maintenance road • Wind farm
Low	• Natural resource lands (forestry/silviculture—cutting of trees only, not land clearing and removing stumps) • Open/recreational space with low-intensity uses (unpaved trails, hiking, birdwatching, etc.) • Utility corridor without a maintenance road and little or no vegetation management • Cell tower

Option 3

Table 1. Wetland buffer width requirements, in feet, based solely on wetland category

Category of wetland	Buffer width
I	300
II	300
III	150
IV	50

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APPENDIX A. Ecology Wetland Buffer Guidance



Formerly DCG/Watershed

TECHNICAL MEMORANDUM

Date:	July 25, 2025
To:	Amber Brokenshire, Senior Planner
Cc:	David Levitan, Principal Planner Christi Schmidt, Planning Manager
From:	Alex Capron, AICP, Senior Planner Dawn Spilbury, Ecologist/GIS Analyst
Project Name:	City of Lake Stevens Riparian Buffer Analysis
Facet Number:	2501.0591.00

City of Lake Stevens Riparian Buffer Analysis

This memo presents the findings of an evaluation of stream protections in the City of Lake Stevens (Lake Stevens). Current buffer widths are reviewed relative to Washington Department of Fish and Wildlife (WDFW) recommendations and riparian functions. This analysis was prepared to support the City's review of stream regulations for the Critical Areas Ordinance (CAO) update.

In 2020 WDFW published a best available science synthesis on riparian ecosystems (Volume 1)¹ followed by guidance (Volume 2)². WDFW recommends regulating streams as riparian management zones (RMZ) with width established based on their site potential tree height of a 200-yr old tree (SPTH₂₀₀) model. This WDFW guidance represents a shift in stream protection that differs from Covington's current stream classification and buffer protection approach.

A spatial analysis was conducted as a part of this review to evaluate the differences in current stream buffer extents relative to SPTH₂₀₀. This analysis also informs Facet's ongoing Best Available Science (BAS) review for the upcoming CAO update.

¹ Quinn, T., G.F. Wilhere, and K.L. Krueger, technical editors. 2020. Riparian Ecosystems, Volume 1: Science Synthesis and Management Implications. Habitat Program, Washington Department of Fish and Wildlife, Olympia, Washington

² Rentz, R., A. Windrope, K. Folkerts, and J. Azerrad. 2020. Riparian Ecosystems, Volume 2: Management Recommendations. Habitat Program, Washington Department of Fish and Wildlife, Olympia. Washington State Department of Commerce (Commerce). (2018), Critical Areas Handbook: A Handbook for Reviewing Critical Areas Regulations. Growth Management Services. Olympia, WA.

Methods

To evaluate the difference between RMZ and existing CAO buffers, available data is processed in geographical information systems software (GIS) to create geospatial layers which contain all streams in Lake Stevens and buffers or RMZs. This process begins with the aggregation of relevant data, as detailed in Table 1. Type S water courses, such as Catherine Creek and Little Pilchuck Creek, are regulated by the City's Shoreline Master Program so are not included in this assessment.

For the regulatory buffers, the critical area map of stream buffers developed by Lake Stevens was used. The buffer width values used in the layer are listed in Table 2 and are documented in Lake Stevens' Municipal Code (LSMC) 14.88.430(c)(2). The SPTH₂₀₀ RMZ values were sourced from WDFW's mapping data available from the PHS Riparian Site Potential Tree Height (SPTH) Downloads site ([PHS Riparian Site Potential Tree Height \(SPTH\) Downloads | WA Dept of Fish and Wildlife](#)). The SPTH₂₀₀ RMZ map layers were created by intersecting Lake Stevens' stream layer and the SPTH₂₀₀ polygon layer and then applying buffers for each line segment based on the corresponding SPTH₂₀₀ value of the polygon the streamline lies within.

The analysis is subject to the following assumptions:

- Where a SPTH₂₀₀ polygon has multiple tree species and corresponding RMZ widths, the maximum width is used for buffering.
- Buffers and RMZs from streams outside the city limits, but which may extend to the city, are not included.
- There are a few areas in the SPTH₂₀₀ geospatial data that do not have a corresponding RMZ width to use for buffering. This results in some short lengths of stream in the SPTH₂₀₀ RMZ layer that are not buffered. This situation is not common in Lake Stevens and is not likely to impact outcomes or discussions.
- Buffers are drawn off the stream center line and not from a high-water-level, the edge of an associated wetland or from top of bank as required by LSMC 14.88.430 (d). This assessment is meant for planning purposes to gain a general sense of potential impact and not for permitting.

Table 1. Data and sources used in this analysis.

Data Type	Data Source	Last Updated
Streams	City of Lake Stevens	2022
SPTH	WDFW - 200 Year Site Index for Snohomish County	2024
Roads	City of Lake Stevens	2022
Zoning	City of Lake Stevens	2021
Parcels	City of Lake Stevens	2025

Data Type	Data Source	Last Updated
NWI - wetlands	USFWS	2022
City Boundary	WA Geospatial data portal	2023

Table 2. Lake Stevens CAO Buffer Widths as per LSMC 14.88.430(c)(2).

Stream Type	Buffer Width (ft)
S	150 feet
F	100 feet
Np	50 feet
Ns	50 feet
U*	50 feet

*Stream Type U is mapped by Lake Stevens but is not included in LSMC 14.88.430(c)(2). A 50-foot buffer is assumed for this analysis for assessment purposes only and does not denote a buffer requirement for permitting purposes.

Results

In Lake Stevens, the current regulatory riparian buffer widths are less than the SPTH₂₀₀ RMZs for almost all of the City's 26.9 miles of Type F, Np, Ns and U streams (Figure 1). The exception is 0.12 miles of Type F streams that meet the SPTH₂₀₀ RMZ width recommendations of 100 ft (Tables 3-4, Figures 2-3). While there are no stream reaches where the current regulatory buffers exceed SPTH₂₀₀ RMZ recommendations, 1.5 miles of the City's Type F streams have regulatory buffers (100-foot) within five (5) feet of the SPTH₂₀₀ RMZ recommendations (Figures 4-6) due to the extent of SPTH₂₀₀ RMZ polygons that recommend 102- and 105-foot RMZ widths. Catherine Creek south of Hartford Road and the reaches of Pilchuck Creek that are within city limits are Type S waters and were buffered with 150-foot buffers. However, they are not subject to CAO regulations and were not included in the statistical assessment.

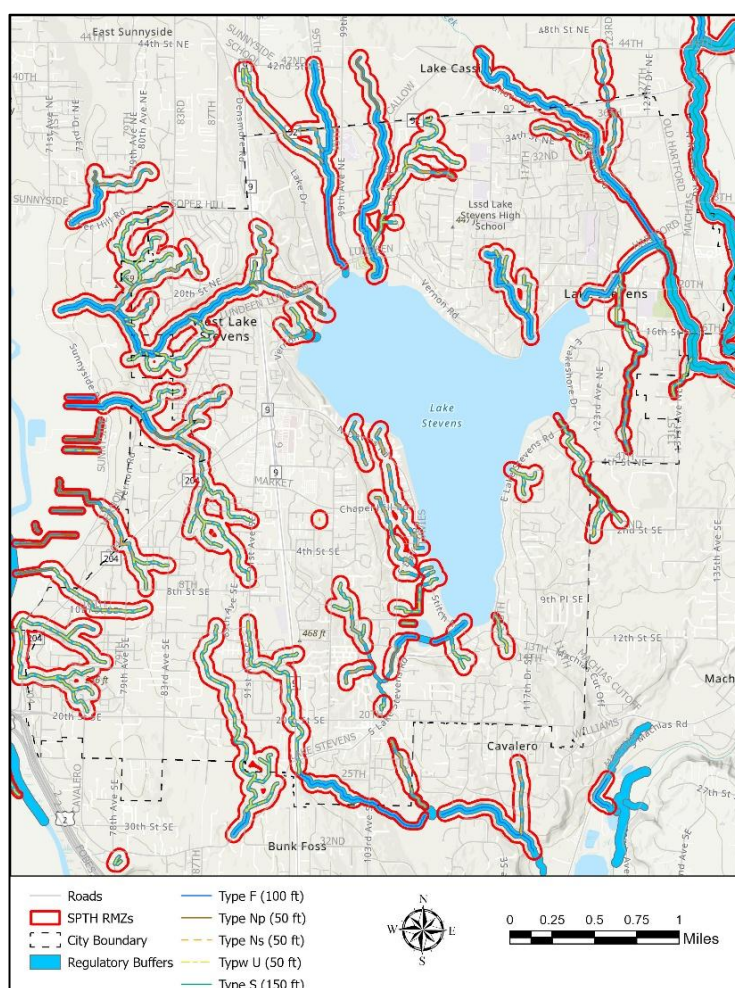


Figure 1. Riparian Buffers compared to SPTH200 RMZs for Lake Stevens. Buffers outside of the City Boundary are shown for context but were not included in stream length calculations.

Table 3. Total length of streams with SPTH₂₀₀ data by stream type.

Stream Type	Length of stream (miles)	
	Regulatory Buffers $\geq$ SPTH ₂₀₀	Regulatory Buffers $<$ SPTH ₂₀₀
F	0.12	5.84
Np	0	0.42
Ns	0	7.18
U	0	13.30
Grand Total	0.12	26.75

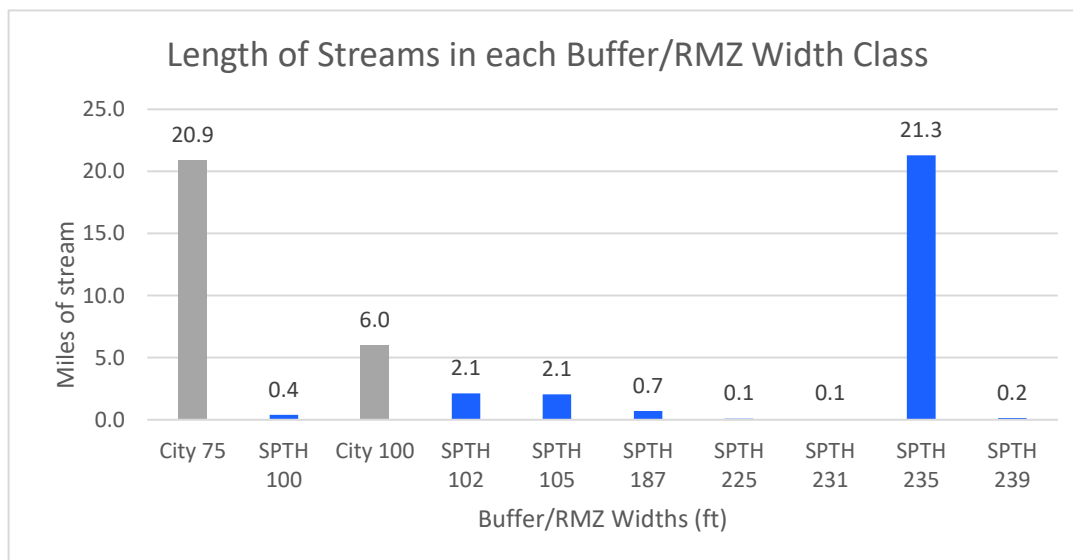


Figure 2. Length of streams in each Regulatory Buffer/RMZ width class.

Table 4. Length of streams in each Buffer/RMZ width class by stream type.

	F	Np	Ns	U	Grand Total
City 75	0	0.4	7.2	13.3	20.9
SPTH 100	0.1	0	0.1	0.2	0.4
City 100	6.0	0	0	0	6.0
SPTH 102	0.6	0	0.7	0.9	2.1
SPTH 105	0.8	0	0.6	0.6	2.1
SPTH 187	0.3	0	0.3	0.1	0.7
SPTH 225	0.1	0	0	0	0.1
SPTH 231	0	0	0.1	0	0.1
SPTH 235	4.1	0.4	5.5	11.3	21.3
SPTH 239	0	0	0	0.1	0.2

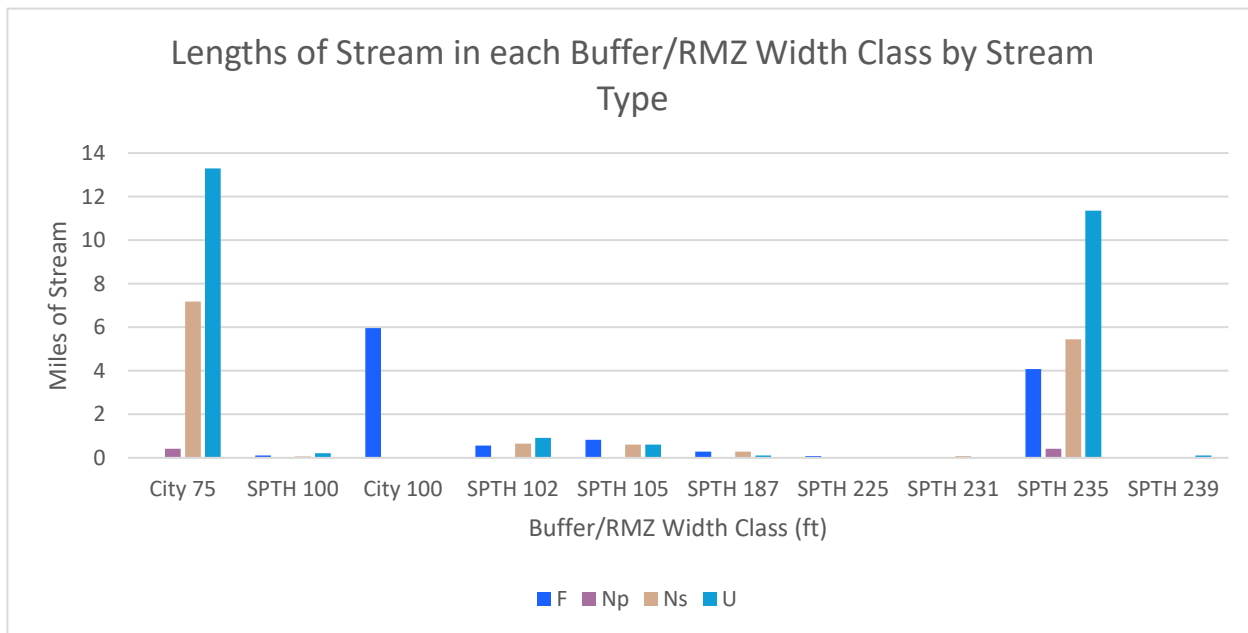


Figure 3. Lengths of stream in each Regulatory Buffer/RMZ width classes by stream type.

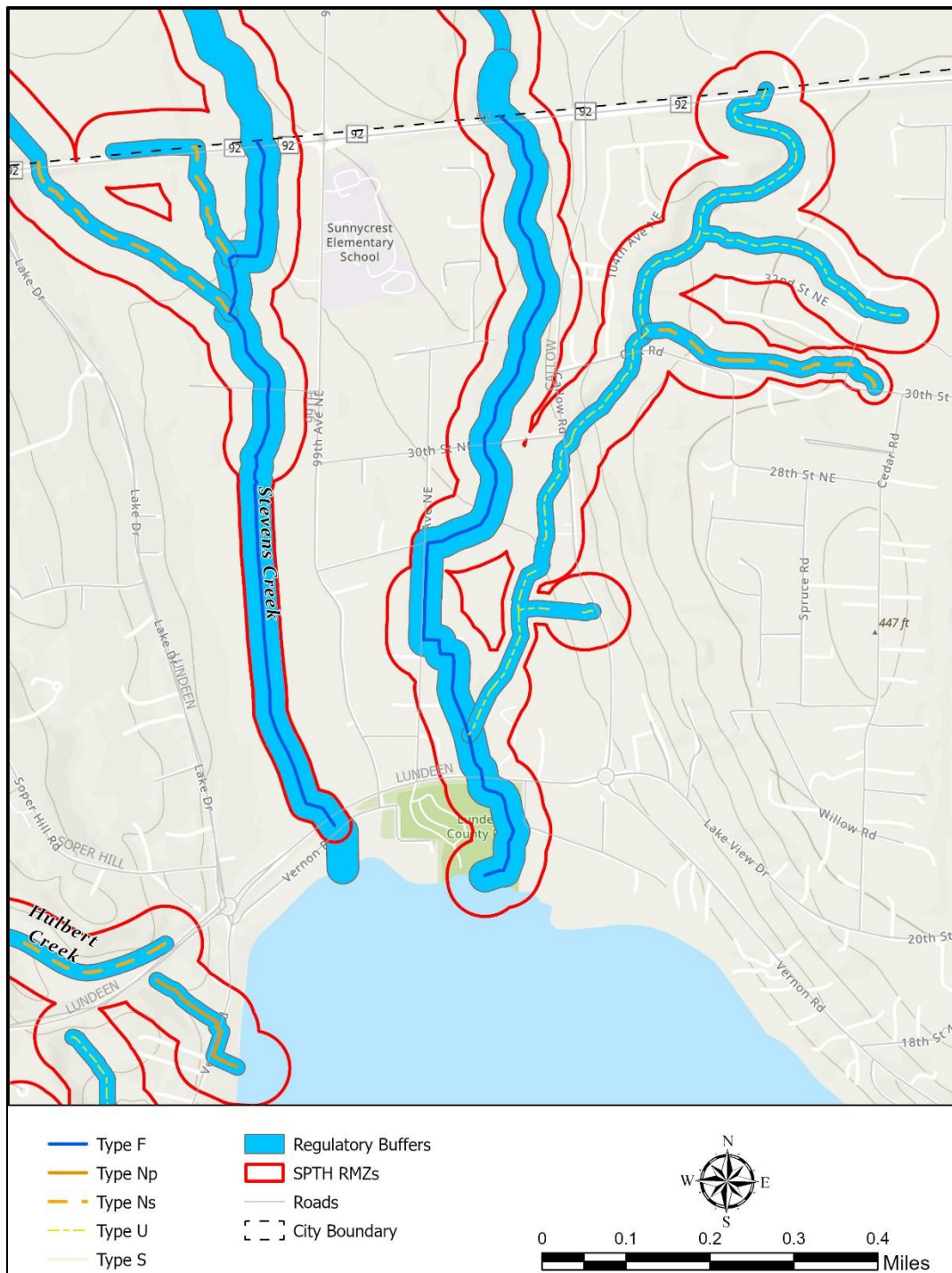


Figure 4. Regulatory buffers compared to SPTH200 RMZs.

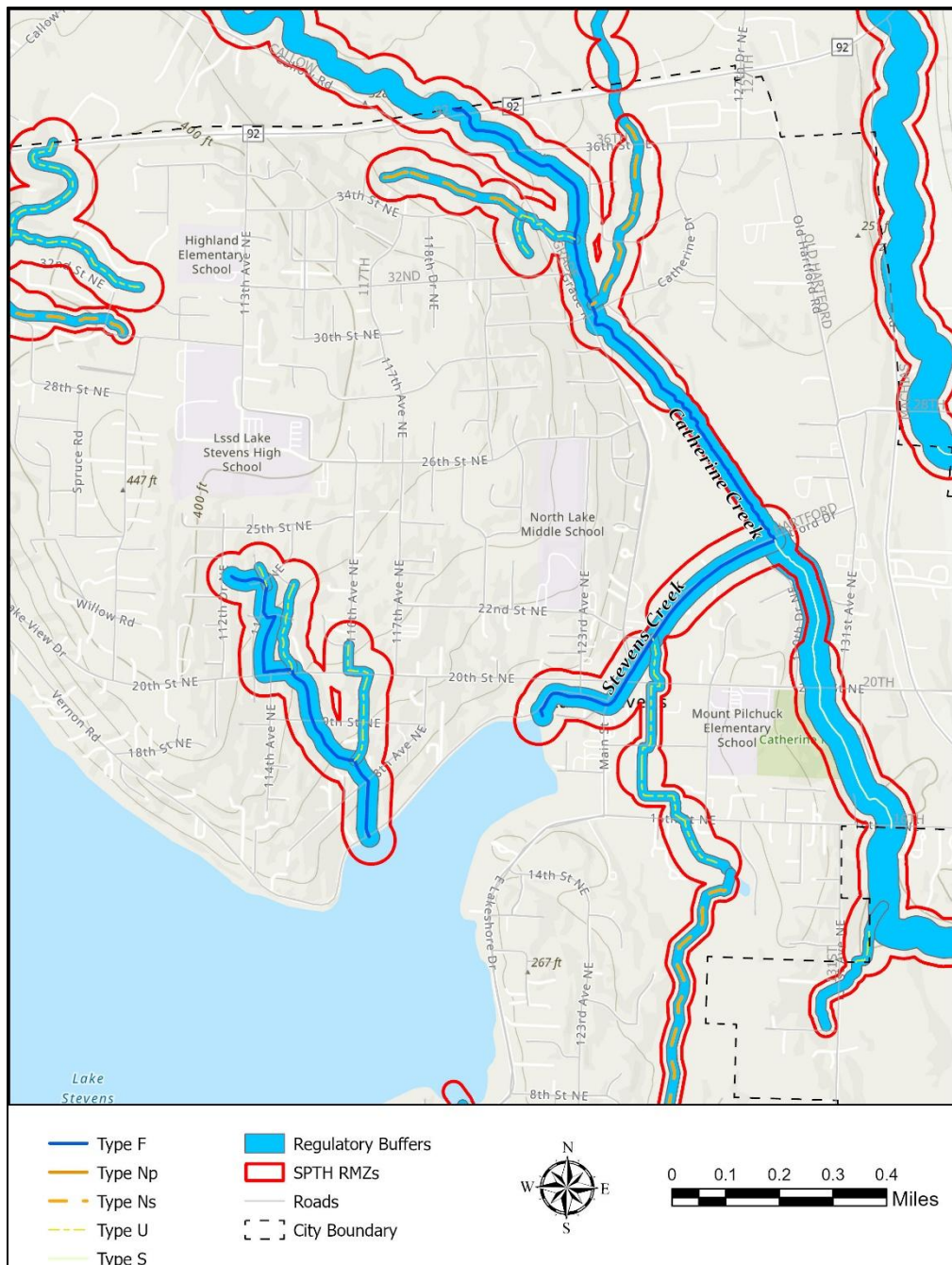


Figure 5. Regulatory buffers compared to SPTH₂₀₀ RMZs in the Catherine Creek area. The portion of Catherine Creek that runs south of Hartford Drive is Type S and not subject to CAO regulations despite the buffers being displayed here.

Discussion

As Lake Stevens considers this assessment, we recognize stream regulations will be reviewed from an implementation perspective and are balanced with other GMA requirements. Given the dense urban environment in Lake Stevens, WDFW riparian management recommendations for urban areas are provided in *WDFW Riparian Ecosystems Volume 2: Management Recommendations* (Rentz 2020), Section 3.3 include:

- maintaining and improving functions through regulatory and voluntary means,
- identifying and prioritizing restoration,
- maintaining and improving riparian connections, and
- applying stormwater management.

STREAMS OF LOCAL SIGNIFICANCE

The City may choose to designate streams of local significance based on mapped fish species distributions, basin condition, or other local priorities. Those named streams could be assigned buffer widths that may differ from the buffers assigned by water type.

RIPARIAN VEGETATION

Riparian vegetation provides several critical functions including shade, nutrient inputs, and habitat corridors. For riparian/stream buffer areas to provide intended functions they are presumed to be densely vegetated with native trees, shrubs and groundcover plants typical of our ecoregion.

WATER QUALITY

WDFW recommends a minimum 100-foot buffer width to provide pollutant removal for water quality (Quinn et al. 2020; Rentz et al. 2020).

Water quality can also be supported by incentivizing low impact development and/or Salmon-Safe project certifications.

DAYLIGHTING STREAMS

To support restoration, the City may choose to provide regulations that specifically address daylighting streams at sites with existing legally established nonconforming uses. Restoration actions recommended by WDFW include protecting existing habitat, connecting fragmented habitats, restoring natural processes, and creating or enhancing habitat. For stream daylighting or enhancement projects, this may include riparian vegetation improvements, increasing off-channel habitat, reversing channel incision, improving channel morphology, improving streambank stability, and increased quantity of large woody debris (Rentz et al. 2020).

References

- Quinn, T., G.F. Wilhere, and K.L. Krueger, technical editors. 2020. Riparian Ecosystems, Volume 1: Science Synthesis and Management Implications. Habitat Program, Washington Department of Fish and Wildlife, Olympia, Washington
- Rentz, R., A. Windrope, K. Folkerts, and J. Azerrad. 2020. Riparian Ecosystems, Volume 2: Management Recommendations. Habitat Program, Washington Department of Fish and Wildlife, Olympia. Washington State Department of Commerce (Commerce). (2018), Critical Areas Handbook: A Handbook for Reviewing Critical Areas Regulations. Growth Management Services. Olympia, WA.

PLANNING COMMISSION STAFF REPORT



Agenda Date: 9/17/2025

Subject: Potential Protective Buffers for Emergency Housing and Shelters

Contact Person/Department: David Levitan, Community Development

Budget Impact:

Legal Review: No

RECOMMENDATION(S)/ACTION REQUESTED:

No action is required. Staff has prepared maps (Attachment 1) showing the potential impacts of protective buffers between emergency housing/shelters and other uses such as schools, parks, and childcare centers and is requesting Planning Commission feedback.

SUMMARY/BACKGROUND:

During its [August 18, 2025 meeting](#), the Planning Commission reviewed draft code language for [STEP housing](#), which it had previously discussed during its [May 21, 2025](#) and [June 2, 2025](#) meetings. Development amendments to comply with the STEP housing requirements in the Growth Management Act (GMA) must be adopted by December 31, 2025.

Staff is currently working on incorporating Commission feedback into an updated draft of STEP housing code language, in advance of holding a work session with the City Council on September 23 and a public hearing with the Planning Commission in October. One of the concepts that was discussed during the Commission's August 18 meeting was for a buffer between emergency housing/shelters and uses populated by minors, such as schools, childcare centers, libraries and parks. This would be similar to the 1,000-foot buffer that is required between marijuana facilities and said uses, as established in [LSMC 14.44.097\(e\)\(4\)](#). Such buffers are not common in other cities but have been adopted by a few jurisdictions.

Staff has prepared a series of maps (Attachment 1) showing how buffers of 300 feet,

500 feet, and 1,000 feet would affect the potential siting of emergency housing and emergency shelters. State law requires that these uses must be allowed in any zoning district where hotels are permitted. In Lake Stevens, that includes the city's four commercial districts (Local Business, Business District, Central Business District, and Commercial District), which are located primarily within the city's three adopted subareas (Downtown Lake Stevens, 20th St SE Corridor, and Lake Stevens Center).

Looking at the maps in Attachment 1, the areas in yellow are the properties that would be affected by the protective buffer. A 300-foot buffer would impact just a few commercially zoned properties; a 500-foot buffer would impact a larger area; and a 1,000-foot buffer would severely limit potential sites for these uses, most notably in Downtown Lake Stevens. As a reminder, the city may not create local development regulations that effectively ban emergency housing and emergency shelters, and any regulations (including buffers) should provide a nexus between the regulation and public health and safety.

In advance of the Council's September 23 discussion and the Commission's October public hearing, staff is requesting Commission feedback on establishing a buffer between emergency housing/shelters and other uses such as parks, schools, and childcare centers. If commissioners feel that a buffer is warranted, feedback such as what is the most appropriate distance, and which uses should be considered "protected uses" is requested.

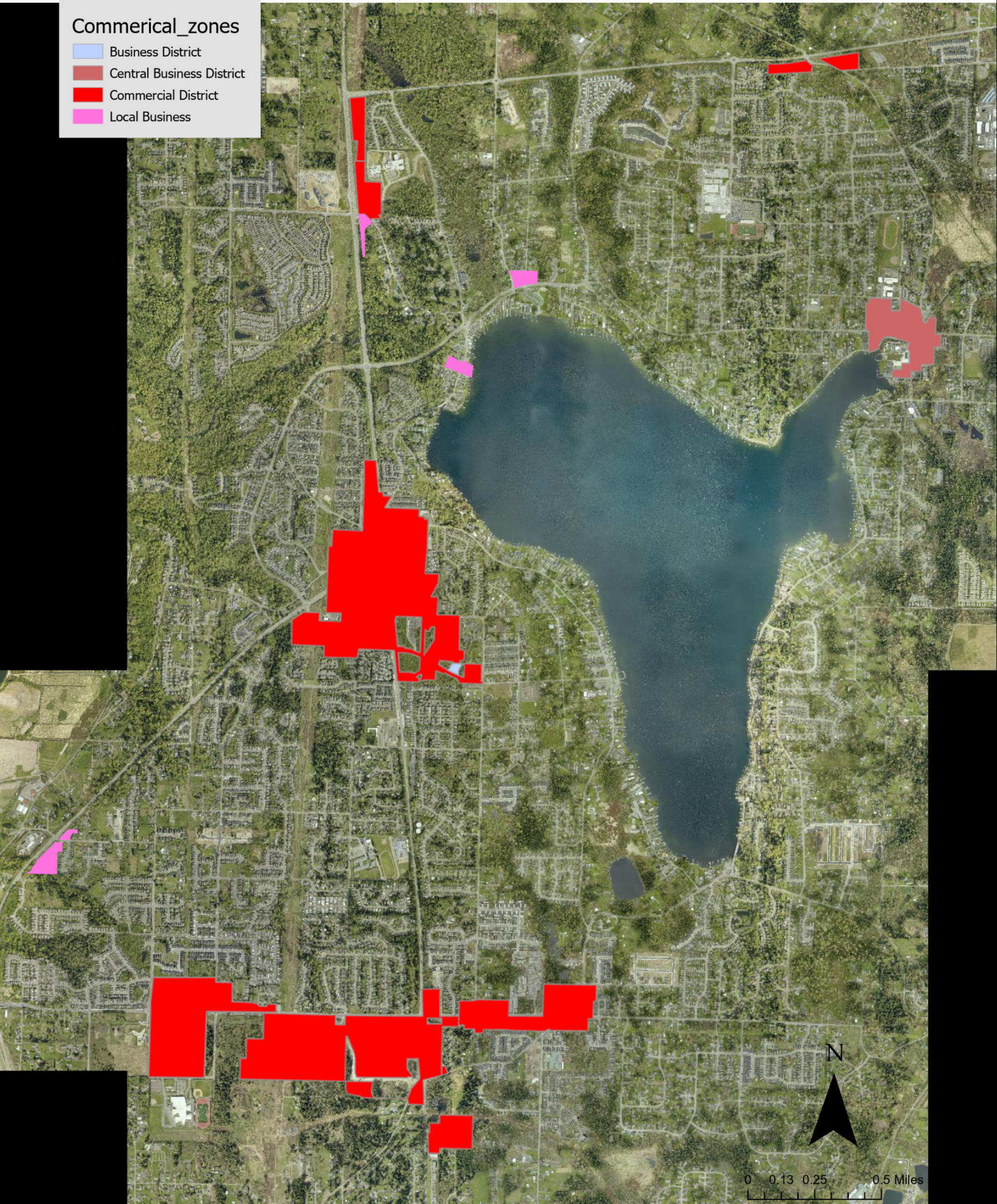
APPLICABLE CITY POLICIES:

ATTACHMENTS:

1. Attachment 1 - Maps of Prospective Buffers

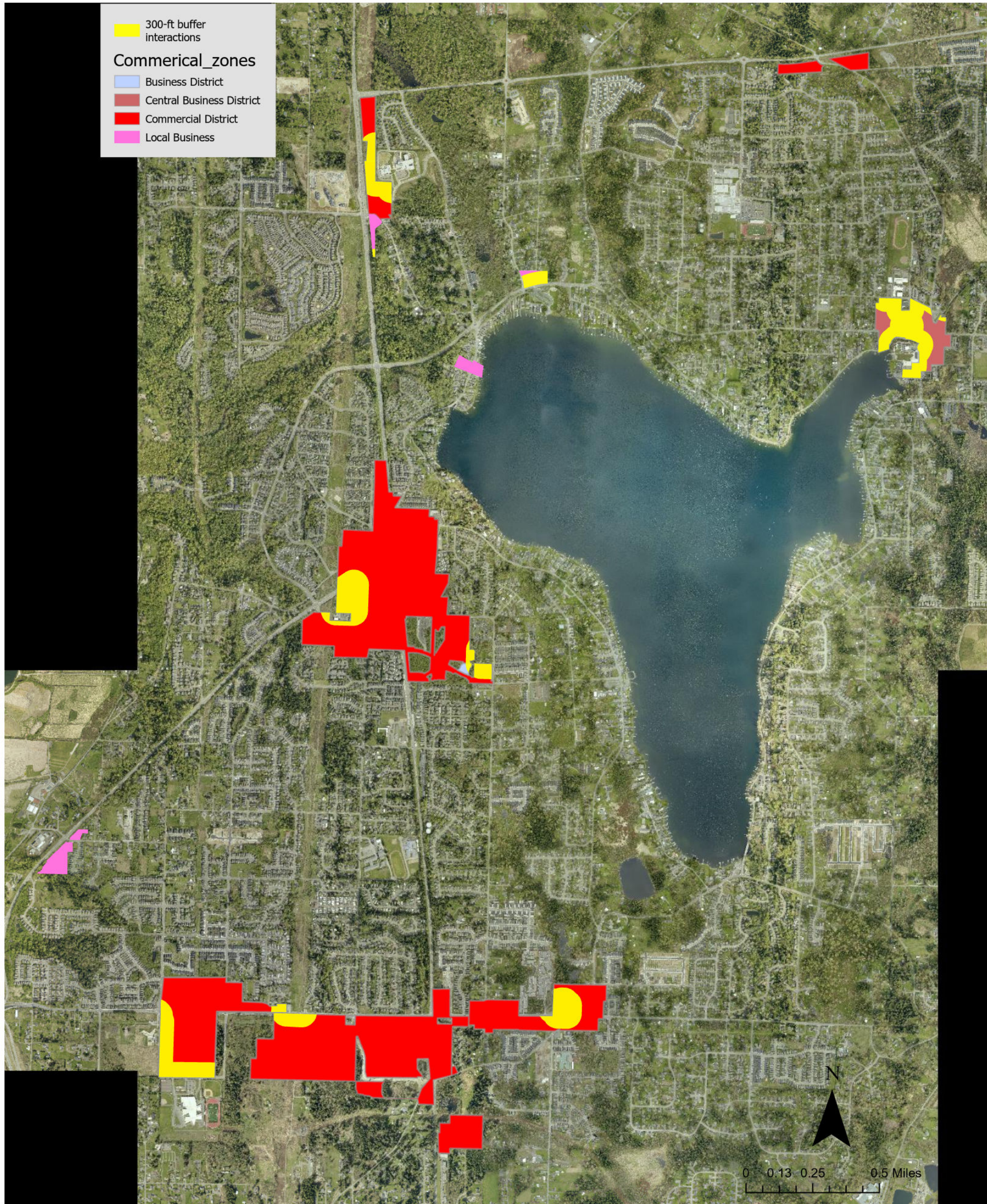
Zones Where Emergency Housing/Shelter is Permitted

Cameron McTee



Impacts of a 300-ft Protected Use Buffer on Emergency Housing/Shelter Siting

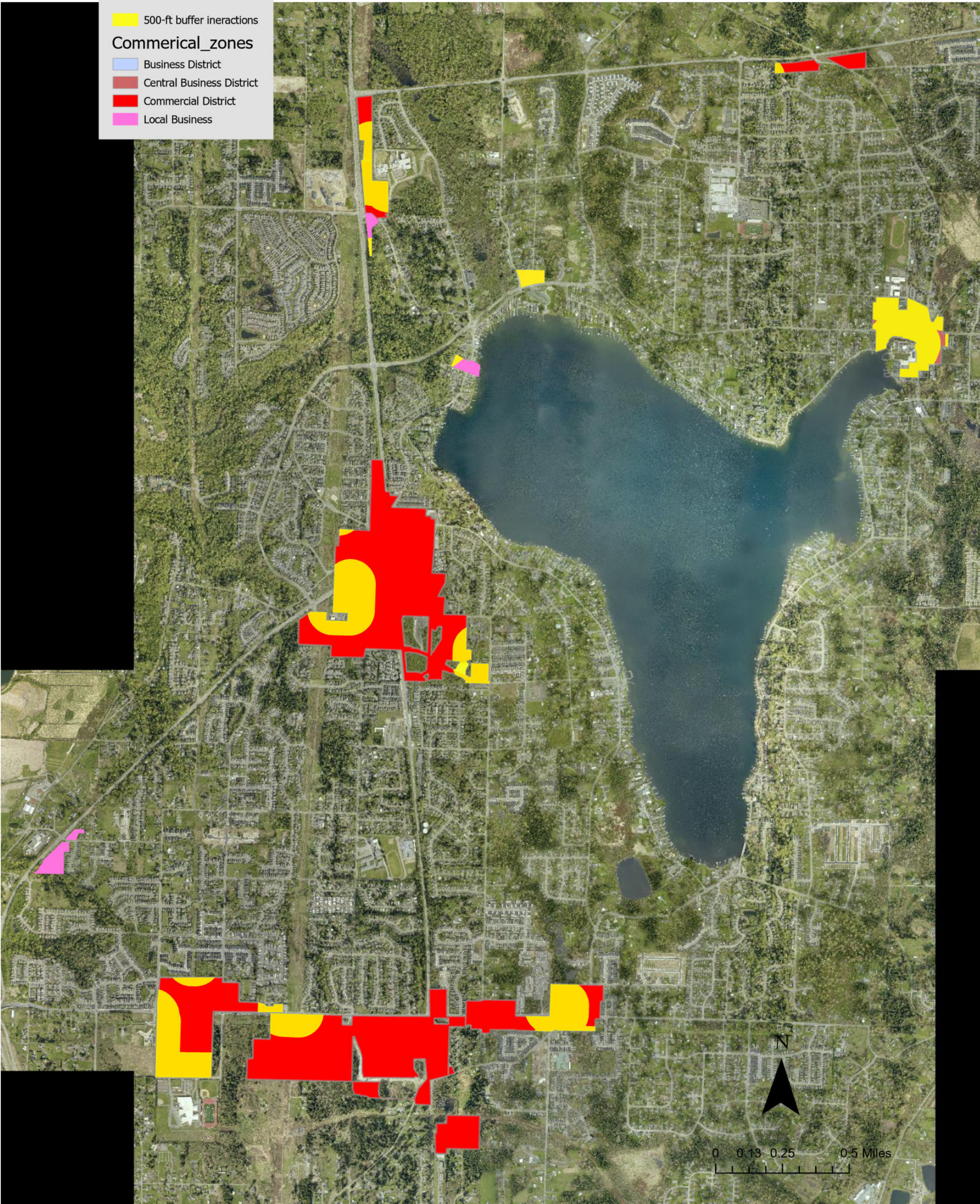
Cameron McTee



This map shows the commercial zones throughout the city and the Interaction with 300-ft buffers around Parks, Schools and Libraries.

Impacts of a 500-ft Protected Use Buffer on Emergency Housing/Shelter Siting

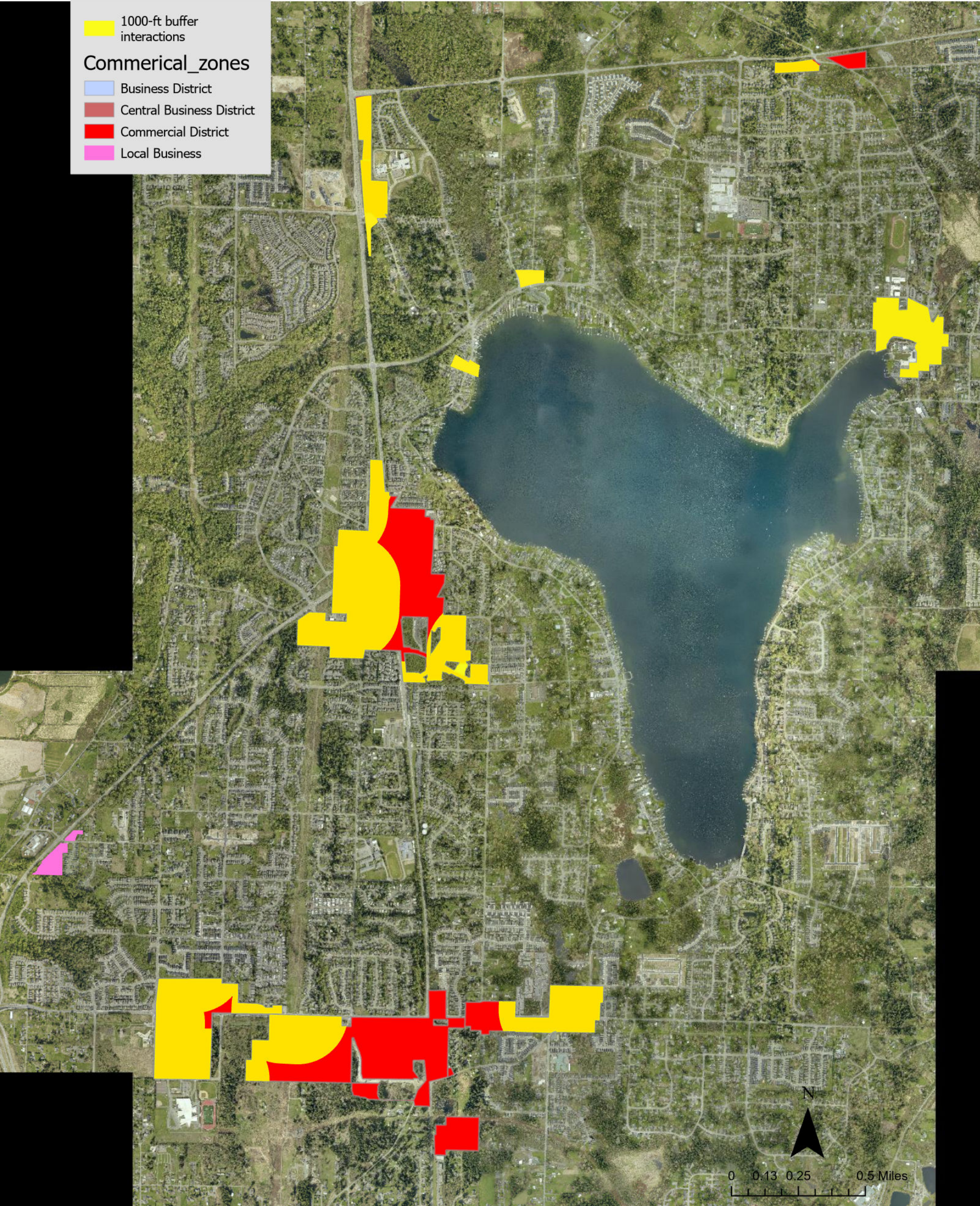
Cameron McTee



This map shows the same commercial zones with an expanded buffer of 500-ft around Parks, Schools and Libraries.

Impacts of a 1000-ft Protected Use Buffer on Emergency Housing/Shelter Siting

Cameron McTee



This map shows the affects of a 1000-ft buffer on the commercial zones of the city.