

CITY OF KIRKLAND  
2025 CRITICAL AREA ORDINANCE  
BEST AVAILABLE SCIENCE BIBLIOGRAPHY

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## I. Introduction

Under the Growth Management Act (GMA), jurisdictions are required to periodically review their comprehensive plans and development regulations, including critical area ordinances (CAO). In accordance with HB 1241 the Kirkland critical area ordinance (CAO) must be updated by December 31, 2025. Pursuant to RCW 36.70A.172(1), the CAO update must include an assessment and acknowledgement of Best Available Science (BAS).

Under the Growth Management Act (GMA), counties and cities are required to use BAS when reviewing, revising, and updating critical area policies and regulations. The State assists jurisdictions in updating their codes by defining BAS, establishing criteria for obtaining it, and offering guidance on how to apply the scientific data when applicable. Jurisdictions must demonstrate that BAS has been considered in the update of their critical areas ordinance by documenting the scientific sources referenced. BAS is defined and requirements are clarified in RCW 36.70A.172 and WAC 365-195-900 through 925.

In the last comprehensive CAO update, Kirkland engaged third-party experts to conduct thorough BAS assessments. The reports prepared by The Watershed Company (FACET) in 2016 for KZC Chapter 90 updates, and by AESI for KZC Chapter 85 updates in 2018, offer valuable information for this 2025 update and are included in this BAS Bibliography. This bibliography is not an exhaustive list of resources, nor is it a comprehensive analysis of BAS in relation to the current Kirkland critical area codes. This document includes the BAS that was gathered and reviewed as part of the code update process to fulfill the state documentation requirements.

## II. Comprehensive Publications: Critical Areas

Staff have identified the following resources as credible comprehensive best available science resources pertinent to critical areas:

Municipal Research and Services Center (MRSC). Critical Areas. web page. Modified 1.07.2025. [https://mrsc.org/explore-topics/environment/regulations/critical-areas#:~:text=Below%20are%20examples%20from%20local%20governments%20in,Areas%20Ordinance%20Best%20Available%20Science%20Review%20\(2016\)](https://mrsc.org/explore-topics/environment/regulations/critical-areas#:~:text=Below%20are%20examples%20from%20local%20governments%20in,Areas%20Ordinance%20Best%20Available%20Science%20Review%20(2016))

University of Washington Climate Impacts Group. Web page. <https://ciq.uw.edu/>

The Watershed Company (Facet). City of Kirkland Critical Areas Regulation Technical Report. 2016 <https://dupont.civicweb.net/document/31806/>

Washington State Department of Commerce. A Critical Areas Handbook.v3.0. 2018. <https://deptofcommerce.app.box.com/s/rlysrfvrxpxwnm9jvbcd3lc7ji19ntp>

Washington State Department of Commerce. Critical Areas Protection. Web page. Updated 1.23.2025. <https://www.commerce.wa.gov/growth-management/ecosystem-planning/critical-areas/>

Washington State Department of Commerce – A Guide to the Periodic Update Process Under the Growth Management Act. Revised 2022. <https://deptofcommerce.app.box.com/s/dujoznvydtqpvd4yg4ar4awv5f2v8tbc>

Washington Department of Commerce. Incentivizing low-impact development: Beyond permit requirements. 2022. <https://www.psrc.org/sites/default/files/2022-03/buildinggreencities.pdf>

Washington Department of Commerce Mapping and technical resources for critical areas monitoring and adaptive management. 2021. <https://www.ezview.wa.gov/Portals/1992/Documents/2021workshops/Webinar%201%20-%20Mapping%20and%20Technical%20Resources%20for%20Critical%20Areas%20Monitoring.pdf>

## III. Individual Critical Area Resources

Staff have identified the following resources as credible best available science resources pertinent to specific critical areas:

### a. Critical Recharge Areas

Washington State Department of Ecology. Publication 05-10-028. Critical Aquifer Recharge Areas: Guidance Document. 2021. <https://apps.ecology.wa.gov/publications/summarypages/0510028.html>

Washington State Department of Health. Source Water Assessment (SWAP) Map. Drinking water system points layer, Wellhead Protection area layer, Surface water protection areas.  
<https://experience.arcgis.com/experience/9dc3fd45206d450f828ebd7ed9cdf7be>

## **b. Flood Prone Areas**

King County. iMap: Flooding info, FEMA floodway, FEMA 100 year floodplain, FEMA 500 year floodplain layer, Regulatory floodplain layers. Updated 10.17.2024.  
<https://gismaps.kingcounty.gov/iMap/>

Federal Emergency Management Agency Flood Hazard Map –  
<https://www.fema.gov/flood-maps>

## **c. Wetlands**

Granger, T., T. Hruby, A. McMillan, D. Peters, J. Rubey, D. Sheldon, S. Stanley, E. Stockdale. April 2005. Wetlands in Washington State - Volume 2: Guidance for Protecting and Managing Wetlands. Washington State Department of Ecology. Publication #05-06-008. Olympia, WA.  
<https://apps.ecology.wa.gov/publications/documents/0506008.pdf>

King County. iMap: Environmentally Sensitive Areas, Wetlands National Wetland Inventory layer. 2024 <https://gismaps.kingcounty.gov/iMap/> Update 2.10.2025, Accessed 3.1.2025

Modifications for Habitat Score Ranges. July 2018.  
<https://apps.ecology.wa.gov/publications/parts/1606001part1.pdf>

Sheldon, D., T. Hruby, P. Johnson, K. Harper, A. McMillan, T. Granger, S. Stanley, and E. Stockdale. March 2005. Wetlands in Washington State - Volume 1: A Synthesis of the Science. Washington State Department of Ecology. Publication #05-06-006. Olympia, WA. <https://apps.ecology.wa.gov/publications/documents/0506006.pdf>

Washington State Department of Ecology. Avoiding and Minimizing Wetland Impacts (n.d). <https://ecology.wa.gov/water-shorelines/wetlands/mitigation/avoidance-and-minimization> Accessed 03.01.2025

*Washington State Department of Ecology. Best available science for wetlands. (n.d.).*  
<https://ecology.wa.gov/Water-Shorelines/Wetlands/Tools-resources/Best-available-science>. Accessed 03.01.2025

Washington State Department of Ecology. Interagency Wetland Mitigation Guidance. Web page. <https://ecology.wa.gov/Water-Shorelines/Wetlands/Mitigation/Interagency-guidance>

Washington State Department of Ecology. Wetland Guidance for Critical Area Ordinance (CAO) Updates: Western and Eastern Washington. 2022.

<https://apps.ecology.wa.gov/publications/documents/2206014.pdf>. Accessed 3/1/2025  
Correction to Appendix E, Table 2: for western WA. April 2024.  
<https://apps.ecology.wa.gov/publications/parts/2206014part1.pdf>

Washington State Department of Ecology, U.S. Army Corps of Engineers Seattle District, and U.S. Environmental Protection Agency Region 10. (2021). Wetland Mitigation in Washington State—Part 1: Agency Policies and Guidance (Version 2). Washington State Department of Ecology Publication #21-06-003.  
<https://apps.ecology.wa.gov/publications/documents/2106003.pdf>

#### **d. Fish and Wildlife Habitat**

##### **i. Anadromous Fisheries**

King County. iMap: Environmentally Sensitive Areas, Chinook distribution layer.  
<https://gismaps.kingcounty.gov/iMap/> Accessed 3.1.2025

Washington Department of Fish and Wildlife. Integrated Fish Distribution map. Updated 9.30.2024, <https://geo.wa.gov/datasets/wdfw::statewide-washington-integrated-fish-distribution/explore?location=0.131713%2C59.327842%2C0.00>

Washington Department of Fish and Wildlife. SalmonScape. Map.(n.d)  
<https://apps.wdfw.wa.gov/salmonscape/map.html> Accessed 3.1.2025

Washington Department of Natural Resources. Fish Barrier Map Forest Practices Application Mapping Tool (FPAMT) [https://fpamt.dnr.wa.gov/2d-view#activity?-13608551\\_-13602474.6058008.6060845?WADNR\\_PUBLIC\\_FP\\_Misc!0!4!,WADNR\\_PUBLIC\\_FP\\_Hydro!3!1!,WADNR\\_PUBLIC\\_FP\\_Water\\_Type!1!,WADNR\\_PUBLIC\\_OCIO\\_Parcel!0!,WADNR\\_PUBLIC\\_FP\\_Road\\_Maint\\_Pts!0!](https://fpamt.dnr.wa.gov/2d-view#activity?-13608551_-13602474.6058008.6060845?WADNR_PUBLIC_FP_Misc!0!4!,WADNR_PUBLIC_FP_Hydro!3!1!,WADNR_PUBLIC_FP_Water_Type!1!,WADNR_PUBLIC_OCIO_Parcel!0!,WADNR_PUBLIC_FP_Road_Maint_Pts!0!)

WRIA 8 Salmon Recovery Council. 2017. Lake Washington/Cedar/ Sammamish Watershed Chinook Salmon Conservation Plan 10-year Update (2017). Water Resource Inventory Area (WRIA) 8, Seattle, WA.  
<https://govlink.org/watersheds/8/planning/chinook-conservation-plan.aspx>

##### **ii. Streams**

City of Kirkland. Kirkland Watersheds <https://kirkland-watersheds-kirklandwa.hub.arcgis.com/> Accessed 03.01.2025

City of Kirkland. Stream Habitat Dashboard. Stream Habitat | Kirkland Watersheds <https://kirkland-watersheds-kirklandwa.hub.arcgis.com/pages/stream-habitat-dashboard>. Accessed 03.01.2025

City of Kirkland. Water Quality Dashboard | Kirkland Watersheds <https://kirkland-watersheds-kirklandwa.hub.arcgis.com/pages/water-quality> Accessed 03.01.2025

Henrichsen, E. Stream Buffer Literature Review for the City of Kirkland. 2025.



King County. Beavers in King County. Web page.  
<https://kingcounty.gov/en/dept/dnrp/nature-recreation/environment-ecology-conservation/wildlife/beavers>

King County. iMap: Environmentally Sensitive Areas, Stream Type Layer,  
<https://gismaps.kingcounty.gov/iMap/> Accessed 3.1.2025

Quinn, T., G.F. Wilhere, and K.L. Krueger, technical editors. Revised 2020. Riparian Ecosystems, Volume 1: Science Synthesis and Management Implications. Habitat Program, Washington Department of Fish and Wildlife, Olympia.  
<https://wdfw.wa.gov/publications/01987>

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. <https://wdfw.wa.gov/publications/01988>

Washington Department of Fish and Wildlife. 2025. Guidelines for Determining Site Potential Tree Height from Field Measurements. Olympia, WA.  
<https://wdfw.wa.gov/sites/default/files/publications/02564/wdfw02564.pdf>

### iii. Upland Habitats

Priority Habitats and species Maps: web page. <https://wdfw.wa.gov/species-habitats/at-risk/phs/maps>

Washington Department of Fish and Wildlife. Priority Habitats and Species Local Government User Guide. 5.12.2023  
<https://wdfw.wa.gov/sites/default/files/publications/02426/wdfw02426.pdf>

Washington Natural Heritage Program. Rare Plant and Ecosystem Locations. Map.  
[https://experience.arcgis.com/experience/174566100f2a47bebe56db3f0f78b5d9/page/Rare-Plant-and-Ecosystem-Locations#data\\_s=id%3AdataSource\\_1-18579fd4769-layer-42-18579fd47f9-layer-43%3A308376](https://experience.arcgis.com/experience/174566100f2a47bebe56db3f0f78b5d9/page/Rare-Plant-and-Ecosystem-Locations#data_s=id%3AdataSource_1-18579fd4769-layer-42-18579fd47f9-layer-43%3A308376)

### e. Geological Hazardous Areas

Associated Earth Sciences Incorporated. (2018). *Geologic Hazard Code Update – Gap Analysis and Best Available Science Consistency Review*. Link pending.

Department of Commerce. (2021, February 3). *Geologically Hazardous Areas* [Webinar].  
<https://vimeo.com/510973729/acc2e513b8>

U.S. Geological Survey. (n.d.). *topoView Portal*. <https://ngmdb.usgs.gov/topoview/>

U.S. Geological Survey. (n.d.). *National Map Viewer*.  
<https://apps.nationalmap.gov/viewer/>

United States Department of Agriculture. (n.d.). *Web Soil Survey*.  
<https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>

Washington State Department of Natural Resources. (n.d.). *Geologic Hazards and the Environment*. <https://www.dnr.wa.gov/programs-and-services/geology/geologic-hazards-and-environment>

Washington State Department of Natural Resources. (2021). *Geologic Hazards Resources for Washington State*.  
[www.fortress.wa.gov/dnr/geologydata/hazards/wa\\_geologic\\_hazards\\_resources.pdf](http://www.fortress.wa.gov/dnr/geologydata/hazards/wa_geologic_hazards_resources.pdf)

Washington State Department of Natural Resources. (n.d.). *Geologic Information Portal*.  
<https://www.dnr.wa.gov/geologyportal>