TECHNICAL MEMORANDUM

DCG WATERSHED

Date:	October 12, 2023
To:	Kitsap County Department of Community Development
From:	Al Wald, Hydrogeologist; Alexandra Plumb, Environmental Planner
Project Name:	Kitsap County Critical Areas Ordinance Update
Project Number:	211214

Subject: Frequently Flooded Areas (FFA) Suggested Revisions

Suggested Definition

Kitsap County could consider incorporating the following definition to support expanding the designation of Frequently Flooded Areas as referenced in the *Consistency and Gap Analysis* prepared by DCG/Watershed dated June 2, 2023:

"Frequently Flooded Areas" means topographic features or landforms flooded by streams or rivers, waves or storm surges on freshwater or marine shorelines, high groundwater levels, or increased runoff from urban development. These areas usually overflow during times of high runoff, high tides, prolonged or intense rainfall and snowmelt, rising groundwater levels, or a combination of these conditions. Frequently flooded areas include, but are not limited to, streams, rivers, lakes, coastal areas, floodplains, wetlands, and areas where high groundwater forms ponds or potholes on the ground surface.

Available Data Sources

Federal Emergency Management Agency (FEMA) maps play a central role in the County's approach, but limits protections to only frequently flooded areas that are included in the Flood Insurance Rate Maps (FIRM). These maps do not consider future flood risk, sea level rise, other climate change impacts, or channel migration zones (Commerce 2023). Frequently Flooded Areas (FFAs) are typically delineated using water level data for streams and lakes, relative elevations, geological controls, and watershed or drainage area characteristics. Geomorphic floodplains are mapped using a Geographic Information System (GIS) spatial data analysis to define channel and valley boundaries, coastal topography, and upland depressional areas. New developments in GIS mapping of frequently flooded areas offer a comprehensive, geomorphic approach to the delineation of floodplains in alluvial basins (USGS et al. 2013). Incorporation of a basin-specific approach recognizes the geological and hydrological elements of sediment transport, large woody debris dynamics, and more frequent (2-year to 10-year recurrence interval) high-flow processes. The use of spatial data, particularly LiDAR (Light Detection and Ranging) coverages, for mapping floodplains is a useful and applicable augmentation of

hydraulic modeling used in FEMA flood insurance studies. Most frequently flooded areas can be delineated and mapped using LiDAR coverages available from the Washington Geologic Information Portal[1] and other sources. Integrating geospatial data to identify floodplain functions is a recommended strategy for protecting floodplains (NFFA & WMC 2023). As such, the County could consider expanding FFA designations using LiDAR data and aerial photography available from Washington State Department of Natural Resources (DNR), either through the LiDAR portal or by requesting photogrammetry from DNR directly[2]. LiDAR will have the most current mapping available, while aerial photography includes both historical and current data.

Future Actions

1. The County could consider expanding their GIS mapping based on LiDAR data (recent) and aerial photography (historical and current) that are available from Washington State Department of Natural Resources, either through the LiDAR portal or photogrammetry as outlined above. This mapping effort would expand frequently flooded areas to include, but is not limited to, landforms flooded by streams or rivers, waves, or storm surges on freshwater or marine shorelines, and high groundwater levels. This may require a significant level of effort depending on the scope or detail of mapping that the County opts to include.
2. The County could consider expanding the designation criteria for FFAs to include the additional areas at risk of flood hazards that aligns with the expanded mapped effort referenced in recommended Future Action 1.
3. To ensure adequate protection of these newly designated FFAs in recommended Future Action 1 and 2, the County should consider incorporating specific critical area report requirements including habitat assessments for development near or adjacent to delineated FFAs. The criteria for being a qualified consultant to conduct these types of reports should also be established. GIS mapping efforts are designed to be a trigger for when a site specific assessment is required. The site specific assessment will provide "ground truthing" and confirm the presence or absence of a FFA and will include delineation of the boundary and buffer from a qualified consultant, where appropriate.
4. To address future impacts from a changing climate, it is recommended to update the mapping delineations of FFA's every five (5) years, based on precipitation records, streamflow records, groundwater levels, and sea level rise.

[1] https://lidarportal.dnr.wa.gov
[2] Contact Caleb Maki, Supervisor at the Resource Mapping Section, for additional information.

The newly mapped areas in recommended Future Action 1 will not need to adhere to building requirements in KCC 15.12. The requirements in KCC 15.12 are intended to reduce flood hazards and protect buildings and infrastructure. Whereas, the expected FFA regulations are designed to reduce environmental impacts, improve ecological functions and values, and prevent or restore degradation of critical areas. The standards in KCC 15.12 will still apply for construction or redevelopment of buildings within a delineated FEMA floodplain.

Resources

National Floodplain Functions Alliance (NFFA) and Wetland Mapping Consortium (WMC). (2023). *Strategies and Action Plan for Protecting and Restoring Wetland and Floodplain Functions*. https://www.nawm.org/strategies-and-an-action-plan-for-protecting-and-restoring-wetland-and-floodplain-functions

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

U.S. Geological Survey (USGS), National Oceanic and Atmospheric Administration Fisheries (NOAA), & The Nature Conservancy. (2013). *Geomorphic floodplains and the use of process domains to guide restoration strategy*. https://www.rrnw.org/wp-content/uploads/20138_9_Wallick_RRNW_2013.pdf

Washington State Department of Commerce (Commerce). (2023). *Critical Areas Handbook*. https://deptofcommerce.app.box.com/s/rlysjrfvrxpxwnm9jvbcd3lc7ji19ntp