



Working Group Meeting Summary – 2024 Critical Areas Ordinance (CAO) Update

Topic: Frequently Flooded Areas – July 26, 2023 @ 9am-12pm via Zoom

Meeting Purpose: To engage in a comprehensive discussion of Frequently Flooded Areas by reviewing and discussing the Best Available Science (BAS) summary, recommendations in the Consistency and Gap Analysis report (Chapter 5), and existing County code section KCC 19.500.

Working Group Members Present	Working Group Members Not Present
Watershed Consulting Firm	USGS
Dept. of Ecology	Squaxin Island Tribe
Kitsap Public Health District	Puyallup Tribe
Suquamish Tribe	Skokomish Tribe
Port Gamble S’Klallam Tribe	Jamestown
Point No Point Treaty Council	Kitsap Alliance of Property Owners
Kitsap Environmental Coalition	
Kitsap Builders Association	
Futurewise	
DCD Staff	

Meeting Materials: [Working Group Guidelines and Schedule](#), [Gap Analysis Report](#), [Best Available Science \(BAS\) Summary Report](#), [KCC 19.500 – Frequently Flooded Areas](#)

Recommendation #1 – Consider expanding the designation and/or protection of frequently flooded areas.

In regulating frequently flooded areas, KCC Chapter 19.500, Frequently Flooded Areas, states that the County uses Title 15, Flood Hazard Areas. Title 15 applies to “all areas of special flood hazards within the jurisdiction of Kitsap County.” Areas of special flood hazards are identified by the Federal Insurance Administration in a scientific and engineering report entitled The Flood Insurance Study for Kitsap County and Incorporated Areas, dated November 4, 2010, and accompanying Flood Insurance Maps, as revised. KCC Chapter 19.500, Frequently Flooded Areas, also indicates that critical drainage areas, as defined in Title 12, Stormwater Drainage, are included for areas of review under frequently flooded areas.

Many other communities in Washington take a similar approach and regulate areas of special flood hazards using National Flood Insurance Program standards. Commerce notes that this approach can meet the minimum requirements if there are no special circumstances (Commerce 2023). Flood Insurance Maps were developed for flood insurance rating purposes to calculate the ability of the flood plain to convey flood discharges while allowing for part of the floodplain to be developed. The maps are based on limited stream gauging data (mostly before the 1950s), one-dimensional water surface modeling from 1977, hydraulic analysis with a fixed-bed, step backwater model with the lines drawn at the point the floodway rose one foot in modeling.

**This is a summarization of the working group discussion, not a transcript and does not indicate formal County recommendations or updates.*



Recommendation #1 – Continued...

Commerce also notes, however, that FEMA maps do not address all flood risk in communities, do not account for climate change, sediment routing, channel dynamics, or stormwater input flows, and do not consider impacts to stream habitat or riverine functions from development.

Commerce therefore encourages local governments to consider additional flood risks in their communities and address related regulatory issues in their frequently flooded areas chapter based on BAS. The Washington State Department of Ecology also encourages local governments to exceed FEMA minimum requirements for floodplain management (Ecology n.d.).

Most of the streams and rivers in Kitsap County are in alluvial (Qa) or glacial drift (Qgd) channel deposits with abundant sediment storage and large amounts of woody debris. Flooding in these streams is a three-dimensional process with movable bed forms where high flows of different recurrence intervals can mobilize bed sediments and frequently cause log jams to break up or form new deposits. Flooding in county streams and rivers often results from prismatic storage of sediment behind large woody debris resulting in channel avulsions and bend migrations not considered in FEMA flood insurance maps. Frequently flooded areas can experience flooding from channel flushing flows in the range of 1.6 to 2-year recurrence intervals (bank full), channel maintenance flows in the range of 2 to 10-year recurrence intervals, and channel forming and floodplain activation flows of 10 to 50-year recurrence intervals. The 100-year recurrence interval high flow, which is the basis for the areas of special flood hazard regulated by the County, has no particular significance in stream biology or geomorphology.

Recent technological advances could allow the County to augment regulation of frequently flooded areas with other available geomorphic analyses, particularly those using LiDAR data and geospatial programs. The County could consider expanding the designation and/or protection of frequently flooded areas based on other available geomorphic analyses. Expanding the designation and/or protection of frequently flooded areas in KCC Chapter 19.500 could potentially entail a variety of changes to the code, such as:

- Including additional flood hazard areas
- Consideration of climate change
- Addressing channel migration
- Providing higher development standards
- Stronger consideration of ecological functions and values

(Gap Analysis, pg. 24)

Discussion Summary: FEMA floodplain guidance maps have inadequacies. FEMA guidance is for selling flood insurance, not for resource management. FEMA maps are a snapshot in time and do not reflect moving rivers or anything beyond surface water analysis. Recommendation is to bring regulations up to date with current science-based analysis with data (GIS), and to update the county's floodplain analysis.



The County should not discontinue utilizing the FEMA program or Title 15, but rather supplement with a geomorphic-based assessment to strengthen protections of frequently flooded areas (FFA). The floodplain is a landscape feature, like a lake or stream. LIDAR data and other sources now provide methods to view, measure, and identify functions and values of floodplains. The County could do more to add existing guidance to better protect these resources. There are tools available to identify FFAs county-wide using GIS and many other jurisdictions that currently use such tools and methods to use as an example. The most recent FFA map used by Kitsap County is 2017. This may not be outdated for FEMA purposes but is outdated for protection purposes. LIDAR is effective in identifying where floodplains are as geomorphic floodplains don't change radically. These areas often overlap with other critical areas and updated mapping will allow the county to integrate for review. Kitsap Public Health District uses LIDAR data to see drainage and surface water flows but not to identify FFA's. There is some concern from the Health District regarding wastewater and drinking water infrastructure and supplies in FFA's. Adding geomorphic assessment and review may be unfeasible for many projects. Considering that the Stormwater Manual is already strict regarding annual flows, this may be an unnecessary recommendation. The County should consider incentives for people to re-develop in floodplain areas, perhaps not requiring full stormwater manual compliance if implementing geomorphic assessment and review. Geomorphic floodplain identification is not available for most of the county, so we need to begin to collect that basic info via GIS. Pierce County is a good source of code for FEMA and floodplains. They have won awards for their floodplain plans and may be a good source of code structure and content.

Future Considerations for Recommendation #1:

- Should stormwater discharges be included in FFA analysis?
- Where would additional FFA regulations go? Title 19? Title 15? Development standards? CMZ's?
- Add geomorphic floodplain boundary to Title 15 definition re: FFA?
- Conduct more frequent updates and analysis for better protection of valuable resources.
- What other counties are using LIDAR in conjunction with GIS maps?
- How do LIDAR maps compare to FEMA maps? (i.e. side by side comparison)
- Does the floodplain always get larger using LIDAR mapping compared to FEMA maps?
- Do other jurisdictions collect info first and then take time to figure out what regulations apply?
- What would the mapping effort look like? (i.e. time, resources, etc.)
- What information is needed first to update the County's FFA maps?
- Are the County's current standards on par with other jurisdictions, or have they all moved on to better data?
- Identify regulatory vs. analytical use of GIS and burden to developers.
- Would like an example of LIDAR geomorphic floodplain mapping.
- Consider habitat protections in FFA, not just infrastructure and public safety.
- Do we have good data for channel migration zones as it relates to FFA's?
- Contact Pierce County regarding implementation lessons learned.
- Not considered in current code: Climate change, sediment transport, large woody debris transport, future conditions and stormwater discharge locations.
- How to include climate resilience measure based on HB1181?
- Levy setbacks to allow for habitat enhancement in floodplain?