

Jessi Roberts

From: Ryan Ericson <Ryan@futurewise.org>
Sent: Wednesday, January 28, 2015 2:00 PM
To: Cliff Strong
Subject: Comment on 16.16.255

As written

16.16.255 Critical areas assessment reports.

A. When the technical administrator determines a proposed development is within, abutting, or is likely to adversely affect a critical area or buffer pursuant to the provisions of this chapter, he/she shall have the authority to require a critical areas assessment report. A qualified professional, as defined by this chapter, shall prepare the report consistent with best available science. The intent of these provisions is to require a reasonable level of technical study and analysis sufficient to protect critical areas. The analysis shall be commensurate with the value or sensitivity of a particular critical area and relative to the scale and potential impacts of the proposed activity.

Proposed

16.16.255 Critical areas assessment reports.

The intent of these provisions is to require a reasonable level of technical study and analysis sufficient to protect critical areas.

- A. When the technical administrator determines a proposed development is within, abutting, or is likely to adversely affect a critical area or buffer pursuant to the provisions of this chapter, shall require a critical areas assessment report; consistent with best available science written by a qualified professional, as defined by this chapter.
- i. The analysis shall be commensurate with the value or sensitivity of a particular critical area and relative to the scale and potential impacts of the proposed activity.

Kind regards,

Ryan Ericson
Futurewise | Whatcom Community Director



Jessi Roberts

From: Ryan Ericson <Ryan@futurewise.org>
Sent: Friday, June 19, 2015 1:50 PM
To: Travis Bouma
Cc: Erin Page; Amy Dearborn; Wayne Fitch; Cliff Strong
Subject: RE: Proposed FEMA BiOp Integration Recommendations.docx

Travis,

I had in my notes;

1. Ensure Critical Area Team's review of habitat impact or vegetation species used for flood reduction. Link CAO to Title 17 for review of habitat impacts to satisfy BiOp.
2. CAO provide review of functions listed in the Appendix 4 Minimum Criteria

We can keep it more general. I mostly referenced Appendix 4: Minimum criteria, instead of writing a new regulation for each. Is Tom's concern in Appendix 4 or the main body of the Bi

I like the idea of making them HCA's I put in Frequently Flooded areas since that is way I have seen it before; I must have not written this down.

Are you around I can make the changes now?.

Ryan

From: Travis Bouma [<mailto:tbouma@co.whatcom.wa.us>]
Sent: Friday, June 19, 2015 1:19 PM
To: Ryan Ericson
Cc: Erin Page; Amy Dearborn; Wayne Fitch
Subject: RE: Proposed FEMA BiOp Integration Recommendations.docx

BTW, I thought we were going to change the CAO just slightly or just in general, such as; making floodplains HCA's with references to the BiOp and create mitigation ratios? Even Tom Sibley (NOAA-NMFS) doesn't like how the language is written in the BiOp I would be real careful on this... I would prefer we keep it general or was it decided that was not an option?



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From: Travis Bouma
Sent: Friday, June 19, 2015 1:09 PM
To: 'Ryan Ericson'
Subject: RE: Proposed FEMA BiOp Integration Recommendations.docx

This will not work, at this time we are not proposing to change Title-17



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From: Ryan Ericson [<mailto:Ryan@futurewise.org>]
Sent: Friday, June 19, 2015 12:18 PM
To: Travis Bouma
Subject: FW: Proposed FEMA BiOp Integration Recommendations.docx

Sorry I forgot to send it you. Here is the draft language for FEMA BiOp to be mostly regulated by CAO and allows PDS to review for endangered Species or provide assistance on vegetation for flood reduction.

Ryan

From: Ryan Ericson
Sent: Thursday, June 18, 2015 4:20 PM
To: 'Cliff Strong'; Erin Page; 'Amy Dearborn'; Wayne Fitch
Subject: Proposed FEMA BiOp Integration Recommendations.docx

Here are the suggested integration changes to Title 17 and Title 16

Effort to Integrate the Requirements of the FEMA BiOp with the Flood Protection Regulations

Recommendations by Ryan Ericson, with comments/edits by EPage, ADearborn, & Cstrong; additional edits Ryan Ericson

Title 17 Flood Damage Prevention

Chapter 17.04 General Provisions

17.04.010 Findings of fact.

The findings of fact are the following:

- A. The flood hazard areas of Whatcom County are subject to periodic inundation which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety and general welfare.
- B. These flood losses are caused by the cumulative effect of obstructions in areas of special flood hazards which increase flood heights and velocities, and when inadequately anchored, damage uses in other areas. Uses that are inadequately flood-proofed, elevated, or otherwise protected from flood damage also contribute to the flood loss.
- C. ~~A requirement for participating local jurisdictions in the National Flood Insurance Program (NFIP) is to ensure that any type of floodplain development does not have an adverse effect on listed species or their critical habitat.~~

Chapter 17.12 Administration

17.12.020 Administrative department – Designated.

The department of public works is appointed to administer and implement this title by granting or denying development permit applications in accordance with its provisions.

- A. ~~The department of planning and community development services is appointed to administer and implement environmental review of this title by granting or denying development permit applications in accordance with this Title's provisions and tile 16.16 Critical Areas.~~

17.12.030 Administrative department – Duties and responsibilities.

- A. The duties of the Department of Public Works shall include, but not be limited to:
 - ~~1.~~1. Permit Review. The department of public works shall:
 - ~~1-a.~~1-a. Review all development permits to determine that the permit requirements of this title have been satisfied;
 - ~~2-b.~~2-b. Review all development permits to determine that all necessary permits have been obtained from those federal, state or local governmental agencies from which prior approval is required;
 - ~~3-c.~~3-c. Review all development permits to determine if the proposed development adversely affects the flood-carrying capacity of the area of special flood hazard. For purposes of this chapter, "adversely affects" means that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point.

Comment [CES1]: I REALLY don't want to amend Title 17 if you can help it. It would open up a whole new can of worms, require review by the Flood Advisory Board, and require a separate hearing/process.

Comment [RE2]: Yes no changes to Title 17 language moved to 16.16.400. Travis was concerned the last time this title was updated there was a large concern with the Advisory Committee

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~~B.2.~~ Use of Other Base Flood Data. When base flood elevation data has not been provided in accordance with WCC [17.04.050](#), Basis for establishing the areas of special flood hazard, the department of public works shall obtain, review, and reasonably utilize any base flood elevation and floodway data available from a federal, state or other source, in order to administer WCC [17.16.070](#), Specific standards, and 17.16.120, Floodways.

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~~C.3.~~ Information to be Obtained and Maintained. The department of public works shall:

~~1.a.~~ When base flood elevation data is provided through the flood insurance study or required as in WCC [17.12.030B](#), obtain and record the actual elevation (in relation to mean sea level) of the lowest habitable floor (including basement) of all new or substantially improved structures;

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~~2.b.~~ For all new or substantially improved floodproofed structures:

~~a.1)~~ Verify and record the actual elevation (in relation to mean sea level), and

~~b.2)~~ Maintain the floodproofing certifications required in WCC [17.12.010A](#);

~~3.3)~~ Maintain for public inspection all records pertaining to the provisions of this title.

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~~D.4.~~ Alteration of Watercourse. The department of buildings and codes administration shall:

~~1.a.~~ Notify adjacent communities and the Washington State Department of Ecology prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administration;

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~~2.b.~~ Require that maintenance is provided within the altered or relocated portion of said watercourse so that the flood carrying capacity is not diminished.

~~E.5.~~ Interpretation of FIRM Boundaries. The department of public works shall make interpretations where needed, as to the exact location of the boundaries of the areas of special flood hazards (for example, where there appears to be a conflict between a mapped boundary and actual field conditions). The person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretation as provided in WCC [17.12.040](#).

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~~6.~~ Required Submission of Additional Information. The administrator shall have authority to require the applicant to submit information certified by licensed professional land surveyors, architects or engineers as may be reasonably necessary to assure conformance with the standards of this title.

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~~B. The duties of the Department of Planning and Community Service shall include, but not be limited to:~~

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~~1. Review all development permits to determine if requirements for protection of endangered species and critical habitat in this title or title 16.16 Critical Areas have been satisfied.~~

~~2. Provide assistance to Department of Public Works in determining suitable bioengineering measures or other methods of biomimicry for flood reduction.~~

17.13. Provisions for Habitat Protection

~~Before development or redevelopment activities identified in Title 16.16 Appendix XX are permitted within the floodplain or in all areas defined by FEMA as Protected Areas, listed in 16.16 Appendix XX, compliance with title 16.16.400 Critical Areas and FEMA National Flood Insurance Program (NFIP) protection standards for critical habitats for listed species shall be demonstrated through submittal of a habitat plan prepared by a qualified wildlife biologist. The plan shall identify any federally listed species and associated habitats and demonstrate that no harm will occur to such species or habitats as a result of development within the floodplain. To reduce duplicative reports a single critical area report may be submitted by the applicant to satisfy requirements of this title and title 16.16. Critical Areas~~

Comment [CES3]: Not sure where this would go yet, as there is no chapter 17.13

Title 16 Critical Areas

ARTICLE 4. Frequently Flooded Areas

16.16.400 Purpose.

The purposes of this article are to:

- A. Reduce the risk to life and safety, public facilities, and public and private property that result from floods.
- B. Avoid and minimize impacts to fish and wildlife habitats that occur within frequently flooded areas.
- C. Protect and maintain the beneficial ecological functions of frequently flooded areas, including providing the necessary flow regime to form and maintain a full range of functional and accessible salmonid habitats both within and outside of frequently flooded areas.
- D. In conjunction with the provisions of WCC Title [17](#), establish review procedures that provide an integrated approach to managing floodplain development and maintaining the capacity of the floodplain or floodway to convey and store flood waters. (Ord. 2005-068 § 1).

16.16.410 Designation and mapping – Frequently flooded areas.

- A. Frequently flooded areas are areas located along major rivers, streams, and coastal areas where the depth, velocity, intensity and frequency of flood water during major events present a risk to human life and property. Areas susceptible to these types of hazards are hereby designated as frequently flooded areas and subject to the provisions of this article.
- B. The approximate location and extent of frequently flooded areas are shown on the county's critical area maps. These maps are to be used as a guide and do not provide a definitive critical area designation. The county shall update the maps as new hazard areas are identified and as new information becomes available. This article does not imply that land outside mapped frequently flooded areas or uses permitted within such areas will be free from flooding or flood damages. This chapter shall not create liability on the part of Whatcom County, any officer or employee thereof, or the Federal Insurance and Mitigation Administration (FIMA), for any flood damages that result from reliance on this chapter or any administrative decision lawfully made hereunder.
- C. Frequently flooded areas shall include, but not be limited to:
 - 1. Areas subject to a one percent recurrence interval of flood water inundation or a 100-year base flood as mapped on the current effective Federal Emergency Management Agency's Flood Insurance Rate Maps (FIRM). This includes coastal high hazard areas as defined by this chapter and as identified and designated on the FIRM maps as Zone VE or V; provided, that tsunami hazard areas are designated as geologically hazardous areas and subject to the provisions of Article 3 of this chapter.
 - 2. Other flood hazard areas identified by the county public works department based on review of historical data, high water marks, photographs of past flooding, or similar information from federal, state, county, or other valid sources when base flood

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elevation data from the Federal Insurance and Mitigation Administration has not been provided or is not accurate.

~~2.3. Protected Areas as defined by Appendix XX.~~

16.16.420 Frequently flooded areas – General standards.

A. All development shall conform to the provisions of WCC Title 17, Flood Damage Prevention, and the applicable provisions of this chapter.

B. Development within frequently flooded areas shall be allowed pursuant to:

Standards in Appendix XX Minimum Criteria

1. ~~Before development or redevelopment activities identified are permitted within the floodplain compliance with FEMA National Flood Insurance Program (NFIP) protection standards for critical habitats for listed species shall be demonstrated through submittal of a habitat plan prepared by a qualified professional. The plan shall identify any federally listed species and associated habitats, and demonstrate that no harm will occur to such species or habitats as a result of development within the floodplain.~~

1.2. ~~The mitigation sequence in WCC 16.16.260. In addition to the applicable general protective measures found in WCC 16.16.265, the technical administrator shall have the authority to require mitigation for adverse impacts to floodplain ecological functions; provided, that such mitigation shall be consistent and compatible with the goal of protecting health and safety and minimizing risks to property.~~

16.16.430 Review and report requirements.

A. When County critical area maps or other sources of credible information indicate that a site proposed for development is or may be located within a frequently flooded area, the County Public Works Department River and Flood Division and/or the technical administrator shall have the authority to require a critical area assessment report.

B. The technical administrator for the Public Works Department shall have primary responsibility for reviewing and approving proposed developments under the standards in Title 17 and ; provided, ~~that the technical administrator shall review proposals for development or redevelopment in a floodplain development proposals~~ for consistency with the standards provided in this chapter and Title section XXX Provisions for ~~may place conditions for approval and/or require mitigation in accordance with this chapter. If mitigation is required, then the Public Works technical administrator may defer to other critical areas technical staff for review of mitigation requirements.~~

Critical areas assessment reports for frequently flooded areas shall meet:

1. ~~The~~ requirements of WCC 17.12.010 and 16.16.255. The technical administrator shall have the authority to modify these requirements when he/she determines that any portion of these requirements is unnecessary given the scope and/or scale of the proposed development.

2. The critical area assessment will address the following:

i. Direct and indirect adverse impacts to ecological functions and processes, including riparian vegetation. Positive impacts may also be discussed.

~~2. The requirements in Appendix XX Minimum Criteria for review of floodplain functions.~~

Comment [CES4]: To which appendix does this refer?

Comment [RE5]: Do not add reference to Appendix. Travis was concerned with FEMA Appendix A direct reference.

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Comment [CES6]: New appendix proposed by Ryan.

Comment [RE7]: We longer need Appendix A reference

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Comment [RE8]: Add to implement 16.16.400(B)

Comment [CES9]: Does the DPW have a TA? The use of TA throughout the CAO always refers to the PDS TA.

Comment [RE10]: Added to implement existing purpose 16.16.400 B,C, and D (coordinated review).

Comment [CES11]: Ditto.

Comment [RE12]: For review in 16.16; mitigation requirements for protection habitat and ecological functions would be from the technical administrator of the CAO. The existing purpose statements indicates this CAO chapter is to protect ecological functions, fish and wildlife habitat and integrated review of CAO and Title 17.

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ii. The technical administrator also shall have the authority to require additional information that discloses and describes the effects of proposed development on floodplain functions, including, but not limited to: storing and conveying flood water; channel migration, reducing peak flows and flow velocities; reducing redd scour and displacing rearing juvenile fish; maintaining sediment quality in streams; reducing shear stress and bank erosion; improving water quality; providing wildlife habitat; maintaining fish access; and cycling nutrients or providing other hyporheic functions that link surface and ground water systems.

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iii. FEMA Biological Opinion Appendix 4 Minimum Criteria [as amended]

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~~iv.~~ The reports shall also include mitigation for adverse effects on floodplain ecological functions.

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B. Critical areas assessment report requirements may be waived for single-family developments and structures accessory to agricultural uses outside of the Protected Areas when the critical areas technical administrator and the public works department determine that no adverse impacts or risks to life, property, or ecological functions will occur.

Comment [EP13]: When would this situation ever occur? Can we delete this section C?

Comment [RE14]: I would concur (1). Above allows the report to be reduced in scope depending on the proposed development

Article 6. Fish and Wildlife Habitat Conservation Areas

16.16.710 Designation, mapping and classification – Habitat conservation areas.

- C. For purposes of this chapter, habitat conservation areas shall include all of the following:
10. Locally important species and habitats that have recreational, cultural, and/or economic value to citizens of Whatcom County, including the following:
 - b. Habitats.
 - v. Floodplain Riparian Zone is an overlay area that encompasses lands as defined below on either side of all streams associated with a floodplain and/or marine shorelines.
 - 250 feet measured perpendicularly from ordinary high water for Type S (Shorelines of the State) streams; excluding marine shorelines
 - 200 feet for Type F streams (fish bearing) greater than 5 feet wide and Type S marine shorelines, and
 - 150 feet for Type F streams less than 5 feet wide, for lakes.
 - For type N (nonsalmonid-bearing) perennial and seasonal streams:
 - o Stable slopes 150 foot
 - o Unstable slopes 225 foot
 - the Channel Migration Zone plus 50 feet; and
 - the mapped Floodway.

16.16.740 Standards – Habitat Conservation Area Buffers

- C. Buffers for Other Habitat Conservation Areas. The technical administrator shall determine appropriate buffer widths for other habitat conservation areas based on the best available information. Buffer widths for non-stream habitat conservation areas shall be as shown in Table 1.

Table 1. Buffer Requirements for HCAs

Habitat Conservation Area	Buffer Requirement
Areas with which federally listed species have a primary association	Buffers shall be based on recommendations provided by the Washington State Department of Fish and Wildlife PHS Program; provided, that local and site-specific factors shall be taken into consideration and the buffer width based on the best available information concerning the species/habitat(s) in question and/or the opinions and recommendations of a qualified professional with appropriate expertise.
State priority habitats and areas with which priority species have a primary association	
Commercial and recreational shellfish areas	Buffers shall extend 150 feet landward from ordinary high water mark of the marine shore. Buffers shall not be required adjacent to shellfish protection districts, but only in nearshore areas where shellfish reside.
Kelp and eelgrass beds	Buffers shall extend 150 feet landward from ordinary high water mark of the marine shore.
Surf smelt, Pacific herring, and Pacific sand lance spawning areas	Buffers shall extend 150 feet landward from ordinary high water mark of the marine shore.
Natural ponds and lakes	Ponds under 20 acres – buffers shall extend 50 feet from the ordinary high water mark; lakes 20 acres and larger – buffers shall extend 100 feet from the ordinary high water mark; provided, that where vegetated wetlands are associated with the shoreline, the buffer shall be based on the wetland buffer requirements in WCC 16.16.630 .

Comment [ELP15]: Fish bearing streams are regulated differently than DNR "Type F" streams. We don't use DNR typing at WC. Is this compatible throughout section 11 here? Do we adopt these definitions in 16.16.740(B)?

Comment [RE16]: I believe the TAC recommend using the interim stream typing? All state guidance uses this system

Comment [ELP17]: Need to define slope degree and stable vs. unstable, or defer to GEO code or administrator

Comment [ELP18]: Adopt CMZ maps?

Comment [ELP19]: Per Whatcom County Maps? FEMA maps?

Habitat Conservation Area	Buffer Requirement
Natural area preserves and natural resource conservation areas	Buffers shall not be required adjacent to these areas. These areas are assumed to encompass the land required for species preservation.
Locally important habitat areas	The buffer for marine nearshore habitats shall extend landward 150 feet from the ordinary high water mark.
	The need for and dimensions of buffers for other locally important species or habitats shall be determined on a case-by-case basis, according to the needs of the specific species or habitat area of concern. Buffers shall not be required adjacent to the Chuckanut wildlife corridor. The technical administrator shall coordinate with the Washington State Department of Fish and Wildlife and other state, federal or tribal experts in these instances, and may use WDFW PHS management recommendations when available.
Floodplain Riparian Zone	Buffers shall not be required adjacent to these areas. These areas are assumed to encompass the land required for protection.

Appendix 4: Minimum Criteria

It is the purpose of the following criteria to maintain streams and floodplains in their natural state to the maximum extent possible so they support healthy biological ecosystems, by: 1) assuring that flood loss reduction measures under the NFIP protect natural floodplain functions and riparian habitat, and the natural processes that create and maintain fish habitat, and 2) preventing or minimizing loss of hydraulic, geomorphic, and ecological functions of freshwater and estuarine floodplains and stream channels.

In all 100-year floodplain areas (SFHAs) the following criteria apply:

11. **Restrict development in the Riparian Buffer Zone** for all watercourses including off channel areas (areas outside this zone but within the Special Flood Hazard Area) to provide necessary protection to the RBZ. The RBZ is the greater of the following: Model Washington NFIP-ESA Ordinance D – 8 April 2011
 - 250 feet measured perpendicularly from ordinary high water for Type S (Shorelines of the State) streams, 200 feet for Type F streams (fish bearing) greater than 5 feet wide and marine shorelines, and 150 feet for Type F streams less than 5 feet wide, for lakes. For type N (nonsalmonid-bearing) perennial and seasonal streams a 150 foot or 225 foot buffer applies, depending on slope stability (the 225 foot buffer applies to unstable slopes), *[updated per the May 14, 2009, errata letter]*
 - the Channel Migration Zone¹ plus 50 feet; and
 - the mapped Floodway.

The Riparian Buffer Zone is an overlay zone that encompasses lands as defined above on either side of all streams, and for all other watercourses including off channel areas. The RBZ is a no disturbance zone, other than for activities that will not adversely affect habitat function. Any property or portion thereof that lies within the RBZ is subject to the restrictions of the RBZ, as well as any zoning restrictions that apply to the parcel in the underlying zone.

Restrictions in this area apply to all development, per the definition of development.² Uses that are not permitted unless shown not to adversely affect water quality, water quantity, flood volumes, flood

¹ The lateral extent of likely movement along a stream reach during the next one hundred years with evidence of active stream channel movement over the past one hundred years. Evidence of active movement can be provided from aerial photos or specific channel and valley bottom characteristics. A time frame of one hundred years was chosen because aerial photos and field evidence can be used to evaluate movement in this time frame. Also, this time span typically represents the time it takes to grow mature trees that can provide functional large woody debris to most streams. In large meandering rivers a more detailed analysis can be conducted to relate bank erosion processes and the time required to grow trees that function as stable large woody debris.

With the exception of shorelands in or meeting the criteria for the “natural” and “rural conservancy” environments, areas separated from the active channel by legally existing artificial channel constraints that limit bank erosion and channel avulsion without hydraulic connections shall not be considered within the CMZ. All areas, including areas within the “natural” and “rural conservancy” environments, separated from the natural channel by legally existing structures designed to withstand the 100-year flood shall not be considered within the CMZ. A tributary stream or other hydraulic connection allowing listed species fish passage draining through a dike or other constricting structure shall be considered part of the CMZ.]

² Development. Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, storage of

velocities, spawning substrate, and/or floodplain refugia for listed salmon, include the following: new buildings, including accessory buildings; new impervious surfaces; removal of native vegetation; new clearing, grading, filling, land-disturbing activity or other “development” (see definition), other than for the purpose of replacing non-native vegetation with native vegetation, and for other approved restoration work; septic tanks and drain fields, dumping of any materials, hazardous or sanitary waste landfills; receiving areas for toxic or hazardous waste or other contaminants; and, stream relocations, unless the primary function of the action is to restore natural ecological function.

In the RBZ the following uses are allowed: [1] repair or remodel of an existing building in its existing footprint, including buildings damaged by fire or other casualties; [2] removal of noxious weeds; [3] replacement of non-native vegetation with native vegetation; [4] ongoing activities such as lawn and garden maintenance; [5] removal of hazard trees; [6] normal maintenance of public utilities and facilities; and [7] restoration or enhancement of floodplains, riparian areas and streams that meets Federal and State standards

12. Protect fish habitat and flood storage in the remaining 100-year floodplain (outside the RBZ) by either:

- a) Prohibiting development in the 100-year floodplain, OR
- b) Providing compensation for any adverse effects to floodwater storage and fish habitat function within the 100-year floodplain. *[updated per the May 14, 2009, errata letter]*

Any development in the 100-year floodplain must be compensated, for example, through the creation of an equivalent area and volume of floodwater storage and fish habitat through a balanced cut and fill program. The new flood storage/habitat area must be graded and vegetated to allow fish refugia during flood events and return to the main channel as floodwaters recede without creating stranding risks. In addition, equivalent area, if not located on site, must be located in priority floodplain restoration areas identified in the ESU Recovery Plan for listed species.

3. Mitigate for all adverse indirect effects of development in the floodplain (effects to stormwater, riparian vegetation, bank stability, channel migration, hyporheic zones, wetlands, LWD, etc.) such that equivalent or better salmon habitat protection is provided. *[updated per the May 14, 2009, errata letter]*

Stormwater. Reduce flood volumes and stormwater runoff from new development by ensuring that increased volumes of stormwater reach the river at the same frequency, timing, and duration as historical runoff. Low Impact Development (LID) methods are required to treat and infiltrate runoff as described in PSAT 2002. These methods generally include various practices for infiltrating stormwater to provide water quality treatment, match historical runoff durations, and preserve base flows.

Riparian vegetation: Maintain or replace riparian function by providing equivalent area, diversity, and function of riparian vegetation as currently exists on the site (per WDFW riparian management recommendations (Knutson and Naef 1997).

Bank Stability: Bank stabilization measures along salmonid-bearing streams, channel migration zones, and along estuarine and marine shorelines must be minimized to the maximum extent possible. If bank stabilization measures are necessary, bioengineered armoring of streambanks and shorelines must be used (per the Integrated Streambank Protection Guidelines 2003 (for riverine shorelines) or the State Shorelines Guidelines on bank stabilization (2003) (for estuarine and marine shorelines).

equipment or materials, or any other activity which results in the removal of substantial amounts of vegetation or in the alteration of natural site characteristics located within the area of special flood hazard.]Model Washington NFIP-ESA Ordinance D – 9 April 2011

Channel migration. No activity is allowed that limits the natural meandering pattern of the channel migration zone, however, natural channel migration patterns may be enhanced or restored (see Rapp and Abbe 2003, for delineating channel migration zones).

Hyporheic zones. No activity is allowed that interferes with the natural exchange of flow between surface water, groundwater and the hyporheic zone, however, natural hyporheic exchange may be enhanced or restored (see Bolton and Shellberg. 2001 for hyporheic zone issues). Model Washington NFIP-ESA Ordinance D – 10 April 2011

Wetlands. Wetland function must be maintained or replaced by providing equivalent function per Washington State Department of Ecology (McMillan 1998) regulations.

LWD. Any LWD removed from the floodplain must be replaced in kind, replicating or improving the quantity, size, and species of the existing LWD (per WDFW Aquatic Habitat guidelines).

In the 100-year floodplain outside the Riparian Buffer Zone the following apply:

- 1) For buildable lots partially in the floodplain, require structures to be located on the portion of the lot outside of the mapped floodplain. Where a buildable lot is fully in the floodplain, structures must be sited in the location that has the least impact on listed salmon, e.g., located as far from the stream or river as possible on the lot, placing structures on the highest land on the lot, orienting structures parallel to flow rather than perpendicular, and avoiding disruption of active hyporheic exchange on a site.
- 2) Require zoning to maintain a low density (e.g., 5-acre lots or greater) of floodplain development to reduce the damage potential within the floodplain to both property and habitat, and help maintain flood storage and conveyance capacity.
- 3) All structures must be set back at least 15 feet from the RBZ and shall be sited as close to the 100-year floodplain boundary as possible.
- 4) In an effort to site structures as far away from the watercourse and RBZ as possible, the applicant will be apprised of the elevations of the 10-year and 50-year floods in detailed study areas at the same time that the (city, county) provides the 100-year elevation as a part of the permit review. The applicant, in addition to plotting the 100-year elevation near the building site, will also plot the 10 and 50-year elevations on the land. The purpose is to show the applicant the significantly lower risk of placing the structure further away from the watercourse.
- 5) Structures built using post, pier, piling or stem wall construction may require less mitigation than structures built on earth fill, but must provide equivalent mitigation for lost fish habitat and indirect effects from development.
- 6) Creation of new impervious surfaces³ shall not exceed 10 percent of the surface area of the portion of the lot in the floodplain unless mitigation is provided.

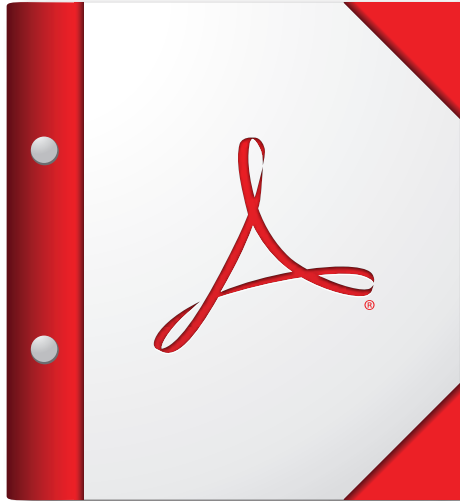
³ Any material or land alteration (i.e. clearing, grading, etc.) that reduces or prevents absorption of stormwater into the ground. That hard surface area which either prevents or retards the entry of water into the soil, water that had entered under natural conditions prior to development; and/or that hard surface area that causes water to run off the surface in greater quantities or at an increased rate of flow from that present under natural conditions prior to development. Common impervious surfaces include, but are not limited to: roof tops, walkways, patios, driveways, parking lots or storage areas, concrete or asphalt paving, gravel roads, and packed earthen materials.]

- 7) Removal of native vegetation must leave 65 percent of the surface area of the portion of the lot in the floodplain in an undeveloped state; the 65 percent pertains to the entire portion of the lot in the floodplain, including that area in the RBZ, where removal of native vegetation is generally prohibited.
- 8) The proposed action must be designed and located so that it will not require new structural flood protection (e.g., levees). Model Washington NFIP-ESA Ordinance D – 11 April 2011
- 9) During the floodplain permit review process, applicants shall be notified that their property contains land within the Riparian Buffer Zone and/or 100-year floodplain, and that the applicant is required to record a Notice on Title on the property before a permit may be issued. Applicants shall be further notified that development in the RBZ and 100-year floodplain can only occur according to the above criteria.
- 10) New road crossings over streams are prohibited.
- 11) Concepts of cluster development, density transfer, credits and bonuses, planned unit development, and transfer of development rights shall be employed wherever possible.
- 12) Any flood information that is more restrictive or detailed than the FEMA data can be used for flood loss reduction and/or fisheries habitat management purposes, including data on channel migration, more restrictive floodways, maps showing future build-out and global climate change conditions, specific maps from watershed or related studies that show riparian habitat areas, or similar maps.

In the RBZ and the floodplain the following re-development criteria apply:

1) Require that expansion to existing buildings in the floodplain be limited to no more than 10 percent of the existing footprint (i.e., when building and other structures such as garages are substantially damaged or expanded in the floodplain), unless mitigation for any adverse effects to floodplain habitat is provided, as described above .

4. Communities choosing to implement the mitigation option (2.b. above) must track the projects for which they issue floodplain development permits, including effects to flood storage, fish habitat, and all indirect direct of development. The expected development effects, the equivalent mitigation provided, and the success of the mitigation in replacing the affected fish habitat and flood storage functions shall be reported to FEMA on a semi-annual basis (according to the monitoring requirements in RPA element 3.D)



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16.16.400 Purpose.


The purposes of this article are to:

- A. Reduce the risk to life and safety, public facilities, and public and private property that result from floods.
- B. Avoid and minimize impacts to fish and wildlife habitats that occur within frequently flooded areas.
- C. Protect and maintain the beneficial ecological functions of frequently flooded areas, including providing the necessary flow regime to form and maintain a full range of functional and accessible salmonid habitats both within and outside of frequently flooded areas.
- D. In conjunction with the provisions of WCC Title [17](#), establish review procedures that provide an integrated approach to managing floodplain development and maintaining the capacity of the floodplain or floodway to convey and store flood waters. (Ord. 2005-068 § 1).

16.16.410 Designation and mapping – Frequently flooded areas.

- A. Frequently flooded areas are areas located along major rivers, streams, and coastal areas where the depth, velocity, intensity and frequency of flood water during major events present a risk to human life and property. Areas susceptible to these types of hazards are hereby designated as frequently flooded areas and subject to the provisions of this article.
- B. The approximate location and extent of frequently flooded areas are shown on the county's critical area maps. These maps are to be used as a guide and do not provide a definitive critical area designation. The county shall update the maps as new hazard areas are identified and as new information becomes available. This article does not imply that land outside mapped frequently flooded areas or uses permitted within such areas will be free from flooding or flood damages. This chapter shall not create liability on the part of Whatcom County, any officer or employee thereof, or the Federal Insurance and Mitigation Administration (FIMA), for any flood damages that result from reliance on this chapter or any administrative decision lawfully made hereunder.
- C. Frequently flooded areas shall include, but not be limited to:

- 1. Areas subject to a one percent recurrence interval of flood water inundation or a 100-year base flood as mapped on the current effective Federal Emergency Management Agency's Flood Insurance Rate Maps (FIRM). This includes coastal high hazard areas as defined by this chapter and as identified and designated on the FIRM maps as Zone VE or V; provided, that tsunami hazard areas are designated as geologically hazardous areas and subject to the provisions of Article 3 of this chapter.
- 2. Other flood hazard areas identified by the county public works department based on review of historical data, high water marks, photographs of past flooding, or similar information from federal, state, county, or other valid sources when base flood elevation data from the Federal Insurance and Mitigation Administration has not been provided or is not accurate. (Ord. 2005-068 § 1).

16.16.420 Frequently flooded areas – General standards. 

A. All development shall conform to the provisions of WCC Title [17](#), Flood Damage Prevention, and the applicable provisions of this chapter.

B. Development within frequently flooded areas shall be allowed pursuant to:

1. Before development or redevelopment activities identified are permitted within the floodplain compliance with FEMA National Flood Insurance Program (NFIP) protection standards for critical habitats for listed species shall be demonstrated through submittal of a habitat plan prepared by a qualified professional. The plan shall identify any federally listed species and associated habitats, and demonstrate that no harm will occur to such species or habitats as a result of development within the floodplain.

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2. The mitigation sequence in WCC [16.16.260](#). The technical administrator shall have the authority to require mitigation for adverse impacts to floodplain ecological functions; provided, that such mitigation shall be consistent and compatible with the goal of protecting health and safety and minimizing risks to property. (Ord. 2005-068 § 1).

16.16.430 Review and report requirements.

A. When county critical area maps or other sources of credible information indicate that a site proposed for development is or may be located within a frequently flooded area, the county public works department river and flood division and/or the technical administrator shall have the authority to require a critical area assessment report.

1. The public works department shall have primary responsibility for reviewing and approving proposed flood plain development, ~~e in accordance with standards in title 17;~~ provided, that the technical administrator shall review proposals for development or redevelopment in a floodplain development proposals for consistency with the standards provided in this chapter and may place conditions for approval and/or require mitigation in accordance with this chapter.

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B. Critical areas assessment reports for frequently flooded areas shall meet the requirements of WCC [17.12.010](#) and [16.16.255](#). The technical administrator shall have the authority to modify these requirements when he/she determines that any portion of these requirements is unnecessary given the scope and/or scale of the proposed development.

1. The critical area assessment will address will address the following:

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i. Direct and indirect adverse impacts to ecological functions and processes, including riparian vegetation. Positive impacts may also be discussed.

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ii. The technical administrator also shall have the authority to require ~~additional~~ information that discloses and describes the effects of proposed development on floodplain functions, including, but not limited to: channel migration, storing and conveying flood water; reducing peak flows and flow velocities; reducing redd scour and displacing rearing juvenile fish; maintaining sediment quality in streams; reducing shear stress and bank erosion; improving water quality; providing

wildlife habitat; maintaining fish access; and cycling nutrients or providing other hyporheic functions that link surface and ground water systems.

4. The reports shall also include mitigation for all adverse effects on floodplain ecological functions.

C. Critical areas assessment report requirements may be waived for single-family developments and structures accessory to agricultural uses, when the technical administrator and the public works department determine that no adverse impacts or risks to life, property, or ecological functions will occur. (Ord. 2005-068 § 1).

Fish and Wildlife Habitat Conservation Areas

16.16.700 Purpose.

The purposes of this article are to:

A. Maintain fish and wildlife populations, especially populations of anadromous fish species, by protecting and conserving valuable fish and wildlife habitat and protecting the ecological processes that sustain these resources.

B. Protect marine shorelines, valuable terrestrial habitats, and natural rivers and streams and their associated riparian areas, and the ecosystem processes on which these areas depend.

C. Regulate development so that isolated populations of species are not created and habitat degradation and fragmentation are avoided, especially along riparian corridors.

D. Maintain the natural geographic distribution, connectivity, and quality of fish and wildlife habitat. (Ord. 2005-068 § 1).

16.16.710 Designation, mapping and classification – Habitat conservation areas. 

A. Habitat conservation areas are those areas identified as being of critical importance to the maintenance of certain fish, wildlife, and/or plant species. These areas are typically identified either by known point locations of specific species (such as a nest or den) or by habitat areas or both. All areas within the county meeting these criteria are hereby designated critical areas and are subject to the provisions of this article (see also Appendix D of this chapter).

B. The approximate location and extent of identified fish and wildlife habitat areas are shown on the county's critical area maps. These maps are to be used as a guide and do not provide a definitive critical area determination. The county shall update the maps as new fish and wildlife habitat areas are identified.

C. For purposes of this chapter, habitat conservation areas shall include all of the following:

1. Streams. Streams shall be designated according to the following criteria:

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a. Shoreline streams are those streams identified and regulated as shorelines of the state as defined by WAC [173-18-410](#) and designated in the Whatcom County Shoreline Master Program (WCC Title [23](#)).

b. Other fish-bearing streams that do not meet the definition of shorelines of the state but have known or potential use by anadromous or resident fish species. The technical administrator shall make determinations of known or potential fish use in consultation with federal, state and tribal biologists and in accordance with best available science and shall take into consideration factors such as species life cycle requirements, habitat suitability, channel gradient, presence or lack of barriers, and a reasoned evaluation of current, historic, and potential fish use by a qualified professional.

c. Non-fish-bearing streams are those streams that have no known or potential use by anadromous or resident fish.

2. Areas with which federally and/or state-listed species have a primary association.

3. State priority habitats and areas associated with state priority species.

4. Commercial and recreational shellfish areas, including designated shellfish habitat conservation areas.

5. Kelp and eelgrass beds.

6. Surf smelt, Pacific herring, and Pacific sand lance spawning areas.

7. Naturally occurring ponds under 20 acres in size.

8. Naturally occurring lakes over 20 acres and other waters of the state, including marine waters, and waters planted with game fish by a government or tribal entity.

9. Natural area preserves and natural resource conservation areas.

10. Locally important species and habitats that have recreational, cultural, and/or economic value to citizens of Whatcom County, including the following:

a. Species.

i. Osprey;

ii. Turkey vulture;

iii. Nooksack dace;

iv. Salish sucker.

b. Habitats.

i. The marine nearshore habitat and the associated vegetated marine riparian zone. These areas support productive eelgrass beds, marine algal turf, and kelp beds that provide habitat for numerous priority fish and wildlife species including, but not limited to, forage fish, seabird and shorebird foraging and nesting sites, and harbor seal pupping and haulout sites. This designation applies to the area from the extreme low tide limit to the ordinary high water mark; provided, that reaches of the marine shoreline that were lawfully developed for commercial and industrial uses prior to the adoption of this chapter may be excluded from this designation, but not otherwise exempt from this chapter. See Appendix E of this chapter.

ii. Identified elk wintering and calving grounds.

iii. Unique natural plant communities designated by the Washington Department of Natural Resources.

iv. The Chuckanut wildlife corridor, which extends east from Chuckanut Mountain including Lookout Mountain, Stewart Mountain, and the northern portions of Anderson Mountain to Chuckanut Bay and the adjacent marine waters and represents the last remaining place in the Puget Trough where the natural land cover of the Cascades continues to the shore of Puget Sound. See Appendix E of this chapter.

11. Floodplain Riparian Zone is an overlay area that encompasses lands as defined below on either side of all streams associated with a floodplain and/or marine shorelines.

- 250 feet measured perpendicularly from ordinary high water for Type S (Shorelines of the State) streams; excluding marine shorelines
- 200 feet for Type F streams (fish bearing) greater than 5 feet wide and Type S marine shorelines, and
- 150 feet for Type F streams less than 5 feet wide, for lakes.
- For type N (nonsalmonid-bearing) perennial and seasonal streams:
 - Stable slopes 150 foot
 - Unstable slopes 225 foot
- the Channel Migration Zone plus 50 feet; and
- the mapped Floodway.

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The following activities may be permitted in habitat conservation areas and/or their buffers when all reasonable measures have been taken to avoid adverse effects on species and habitats, compensatory mitigation is provided for all adverse impacts that cannot be avoided, and the amount and degree of the alteration are limited to the minimum needed to accomplish the project purpose; provided, that locally important species and habitats shall be subject to WCC [16.16.730](#):

A. Developments that meet the reasonable use and variance standards set forth in WCC [16.16.270](#).

B. Relocation of streams, or portions of streams, when there is no other feasible alternative and when the relocation will result in equal or better habitat and water quality and quantity, and will not diminish the flow capacity of the stream or other natural stream processes; provided, that the relocation meets state hydraulic project approval requirements and that relocation of shoreline streams shall be prohibited unless the relocation has been identified formally by the Washington State Department of Fish and Wildlife as essential for fish and wildlife habitat enhancement or identified in watershed planning documents prepared and adopted pursuant to Chapter [90.82](#) RCW, the salmonid recovery plan or the Salmon Recovery Board Habitat Project List or county shoreline restoration plan.

C. Road, trail, bridge, and right-of-way crossings, provided they meet the following criteria:

1. There is no other feasible alternative route with less impact on critical areas.
2. The crossing minimizes interruption of natural processes such as channel migration, the downstream movement of wood and gravel, and the movement of all fish and wildlife. Bridges are preferred for all stream crossings and should be designed to maintain the existing stream substrate and gradient, provide adequate horizontal clearance on each side of the ordinary high water mark, and provide adequate vertical clearance above the ordinary high water mark.
3. Culverts shall be designed according to applicable state and federal guidance criteria for fish passage as identified in Fish Passage Design at Road Culverts, WDFW, March 1999, and/or the National Marine Fisheries Service Guidelines for Salmonid Passage at Stream Crossings, 2000, (and subsequent revisions) and in accordance with a state hydraulic project approval. The applicant or property owner shall maintain fish passage through the bridge or culvert.
4. The county may require that existing culverts be removed or corrected as a condition of approval if the culvert is detrimental to fish passage or water quality, and a feasible alternative exists.
5. Crossings shall be limited to the minimum width necessary. Common crossings are the preferred approach where multiple properties can be accessed by one crossing.
6. Access to private development sites may be permitted to cross habitat conservation areas if there are no feasible alternative alignments. Alternative access shall be pursued to the maximum extent feasible, including through the provisions of Chapter [8.24](#) RCW. Exceptions or deviations from technical standards for width or other dimensions, and specific construction standards to

minimize impacts may be specified, including placement on elevated structures as an alternative to fill, if feasible.

D. Construction of a structure that is associated with an agricultural use; or the reconstruction, remodeling, or maintenance of such structures in a habitat conservation area buffer, subject to all of the following criteria:

1. The structure is located within an existing lot of record and is an existing agricultural use.
2. There is no other feasible location with less impact to critical areas.
3. Clearing and grading activity and impervious surfaces are limited to the minimum necessary to accommodate the proposed structure and, where possible, surfaces shall be made of pervious materials.
4. Unavoidable adverse effects on critical areas are mitigated in accordance with this chapter.

E. Storm water management facilities limited to detention/retention/treatment ponds, media filtration, lagoons and infiltration basins may be permitted in a stream buffer, subject to all of the following standards:

1. The facility is located in the outer 50 percent of the standard stream buffer and does not displace or impact a forested riparian community;
2. There is no other feasible location for the storm water facility and the facility is located, constructed, and maintained in a manner that minimizes adverse effects on the buffer and adjacent critical areas;
3. The storm water facility meets applicable county or state storm water management standards and the discharge water meets state water quality standards; and
4. Low impact development approaches have been considered and implemented to the maximum extent feasible.

F. Storm water conveyance or discharge facilities such as dispersion trenches, level spreaders, and outfalls may be permitted in a habitat conservation area buffer on a case-by-case basis when the technical administrator determines that all of the following are met:

1. Due to topographic or other physical constraints, there are no feasible locations for these facilities outside the buffer;
2. The discharge is located as far from the ordinary high water mark as possible and in a manner that minimizes disturbance of soils and vegetation;

3. The discharge outlet is designed to prevent erosion and promote infiltration; and

4. The discharge meets freshwater and marine state water quality standards, including total maximum daily load (TMDL) standards as appropriate at the point of discharge. Standards should include filtration through mechanical or biological means, vegetation retention, timely reseeding of disturbed areas, use of grass-lined bioswales for drainage, and other mechanisms as appropriate within approved storm water "special districts."

G. Clearing and grading, when allowed as part of an authorized activity or as otherwise allowed in these standards, may be permitted; provided, that the following shall apply:

1. Grading is allowed only during the designated dry season, which is typically regarded as May to October of each year; provided, that the county may extend or shorten the designated dry season on a case-by-case basis, based on actual weather conditions.

2. Appropriate erosion and sediment control measures shall be used at all times. The soil duff layer shall remain undisturbed to the maximum extent possible. Where feasible, disturbed topsoil shall be redistributed to other areas of the site. Areas shall be revegetated as needed to stabilize the site.

3. The moisture-holding capacity of the topsoil layer shall be maintained by minimizing soil compaction or reestablishing natural soil structure and infiltrative capacity on all areas of the project area not covered by impervious surfaces.

9. Normal sloughing, erosion of steep bluffs, or shoreline erosion itself, without a scientific or geotechnical analysis, is not a demonstration of need.

10. The bank stabilization or shore protection will not adversely affect habitat conservation areas or mitigation will be provided to compensate for adverse effects where avoidance is not feasible.

1. The dock or ramp is located and oriented and constructed in a manner that minimizes adverse effects on navigation; wave action, water quality, movement of aquatic and terrestrial life; ecological processes; eelgrass beds, shellfish beds, spawning habitat, and wetlands.

2. Docks or ramps on shorelines of the state shall comply with WCC Title [23](#) and state hydraulic project approval requirements.

3. Natural shoreline processes will be maintained to the maximum extent practicable. The activity will not result in increased erosion and will not alter the size or distribution of shoreline or stream substrate, or eliminate or reduce sediment supply from feeder bluffs.

4. No adverse impact to critical fish or wildlife habitat areas or associated wetlands will occur.

5. No alteration of juvenile fish migration corridors will occur.

6. No net loss of intertidal or riparian habitat function will occur.

C. Buffers for Other Habitat Conservation Areas. The technical administrator shall determine appropriate buffer widths for other habitat conservation areas based on the best available information. Buffer widths for nonstream habitat conservation areas shall be as follows:

Habitat Conservation Area	Buffer Requirement
Areas with which federally listed species have a primary association	Buffers shall be based on recommendations provided by the Washington State Department of Fish and Wildlife PHS Program; provided, that local and site-specific factors shall be taken into consideration and the buffer width based on the best available information concerning the species/habitat(s) in question and/or the opinions and recommendations of a qualified professional with appropriate expertise.
State priority habitats and areas with which priority species have a primary association	
Commercial and recreational shellfish areas	Buffers shall extend 150 feet landward from ordinary high water mark of the marine shore. Buffers shall not be required adjacent to shellfish protection districts, but only in nearshore areas where shellfish reside.
Kelp and eelgrass beds	Buffers shall extend 150 feet landward from ordinary high water mark of the marine shore.
Surf smelt, Pacific herring, and Pacific sand lance spawning areas	Buffers shall extend 150 feet landward from ordinary high water mark of the marine shore.
Natural ponds and lakes	Ponds under 20 acres – buffers shall extend 50 feet from the ordinary high water mark; lakes 20 acres and larger – buffers shall extend 100 feet from the ordinary high water mark; provided, that where vegetated wetlands are associated with the shoreline, the buffer shall be based on the wetland buffer requirements in WCC 16.16.630 .
Natural area preserves and natural resource conservation areas	Buffers shall not be required adjacent to these areas. These areas are assumed to encompass the land required for species preservation.
Locally important habitat areas	The buffer for marine nearshore habitats shall extend landward 150 feet from the ordinary high water mark.
	The need for and dimensions of buffers for other locally important species or habitats shall be determined on a case-by-case basis, according to the needs of the specific species or habitat area of concern. Buffers shall not be required adjacent to the Chuckanut wildlife corridor. The technical administrator shall coordinate with the Washington State Department of Fish and Wildlife and other state, federal or tribal

	experts in these instances, and may use WDFW PHS management recommendations when available.
<u>Floodplain Riparian Zone</u>	<u>Buffers shall not be required adjacent to these areas. These areas are assumed to encompass the land required for protection.</u>

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Jessi Roberts

From: Ryan Ericson <Ryan@futurewise.org>
Sent: Thursday, June 25, 2015 11:46 AM
To: Cliff Strong; Travis Bouma
Cc: Amy Dearborn; Erin Page; Wayne Fitch
Subject: RE: FEMA Updated Recommendations
Attachments: FEMA Updated Recommendations; Proposed FEMA BiOp Integration Recommendations - REricson w EPage CStrong edits, RE.docx

Thank you Cliff. I forgot to cc you on the last email with changes to 16.16.400 and removed all title 17 changes as Travis suggested. I have attached the email and a document with my additional comments and proposed edits.

Ryan

From: Cliff Strong [mailto:CStrong@co.whatcom.wa.us]
Sent: Thursday, June 25, 2015 10:56 AM
To: Ryan Ericson; Travis Bouma
Cc: Amy Dearborn; Erin Page; Wayne Fitch
Subject: RE: FEMA Updated Recommendations

Ryan, I've taken your recommendations (deleting the sections where no changes were proposed) and added Amy's and Erin's comments and edits, and included some of my own as well. Please review.

Travis, I'd like to know your opinion as well.

I think Erin's trying to get us together again. I'd certainly like to get this before the TAC soon, perhaps at their next meeting (7/8, for which I'd need a product next Thursday at the latest). We're at the tail end of things, so time is of the essence.

Thanks,

Cliff Strong
Senior Planner
Whatcom County Planning & Development Services

cstrong@co.whatcom.wa.us
360.676.6907
www.co.whatcom.wa.us/pds

From: Amy Dearborn
Sent: Wednesday, June 24, 2015 4:10 PM
To: Cliff Strong
Subject: FW: FEMA Updated Recommendations

From: Ryan Ericson [<mailto:Ryan@futurewise.org>]
Sent: Wednesday, June 24, 2015 1:01 PM
To: Wayne Fitch; Amy Dearborn; Erin Page; Travis Bouma
Subject: FEMA Updated Recommendations

We need to setup another meeting, for later this week.

Attached is the document with changes made to 16.16 only. Giving endangered species review authority in Frequently Flood areas to technical administrator and provide Floodplain Riparian Zone as a fish and wildlife conservation area. The CAO already had language in the purpose of Frequently Flooded Section to protect fish and wildlife, added review language for the technical administrator. New FWHCA of Floodplain Riparian Zone, this is intended to be an overlay for managing a no net loss of vegetation and not a reduction of uses allowed in FWHCA uses allowed in and outside of stream buffers applies.

Option 2. – Put all the language in 16.16.700 as its own section. Easy to do.

Mitigation Area Ratios for Riparian Buffers

I have reviewed a number of State Agency documents from Washington, California, Oregon, Maryland, Minnesota, and Pennsylvania. Each document reviewed recommended an equal replacement area of 1:1. Number of plants per area (Spacing and Density) did differ.

Plant Spacing and Density – Outside of wetland papers I found very few empirical studies on replacement ratios of Riparian Vegetation, some papers addressed wetland and riparian plant density together; State agencies provided different guidance ranging from at least 60% canopy coverage to elaborate formulas. Examples:

- Suggested density for seedling was 200 to 400, one agency suggested a mature density of 300 trees per acre. (10x10 tree spacing is about 436, 8x8 = 681)
- Department of Ecology study from 2002 found in areas with planting plans designed to achieve rapid canopy coverage a good ratio is 4 tree species to 6 species of shrubs or 1:1.5, which could be rounded up to 1:2.
- Tukwila has a maximum of 70 trees per acre, and uses a similar strategy as WSDOT
- WSDOT has a decent strategy which is standardized by diameter of tree

Minimize loss of tree canopy cover, as measured by aerial cover using air photos and current urban forestry methodology.
a. Avoid impacts where feasible. When a project cannot be constructed without removing trees, restore within the disturbed roadside areas of the project according to the following guidelines:

Category 3: Small coniferous and other late successional species trees less than 4 inches in diameter, measured 6 inches from the ground, and all shrubs:

- Replace disturbed functions.
- Consider a 1:1 ratio using a mix of trees and shrubs.
- Use best management practices (BMPs) for restoration of the disturbed areas (see the *Highway Runoff Manual*, Chapter 5).

Category 2: Moderate-size coniferous and other late successional species trees between 4 and 30 inches in diameter, measured 4.5 feet from the ground:

- Replace at a ratio of one 1-gallon replacement tree for each 1-inch of trunk diameter.
 - If larger container sizes are used, the plant quantity will be adjusted down. For example, if 2-gallon container plants are used, only half the number of plants will be required.

- Use BMPs for restoration within the disturbed roadside areas of the project (see the *Highway Runoff Manual*, Chapter 5).

Category 1: Mature, old-growth, large specimen, or heritage trees greater than 30 inches in diameter, measured at 4.5 feet from the ground:

- Consult with the HQ Design Landscape Architect to determine appropriate project-specific restoration.
- Environmental benefits of the project can balance impacts to individual trees, such as those resulting from fish passage improvement projects.

RECOMMENDATION:

I would suggest we use a hybrid of WSDOT and current mitigation practices. For a mixed story planting using the ratio of 1 tree per 2 shrubs. Also Travis and I agree to meet conditions of no net loss of Riparian Functions within the floodplain, if a site is heavily disturbed, consisting of manicure lawn, ornamentals, noxious/invasive species. That the applicant could offset permanently lost vegetation with an area ratio of 0.5 to 1. This would require the planting to occur which would provide the greatest benefit and when available contiguous with existing Riparian Vegetation.

17.04.010 Findings of fact.

The findings of fact are the following:

A. The flood hazard areas of Whatcom County are subject to periodic inundation which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety and general welfare.

B. These flood losses are caused by the cumulative effect of obstructions in areas of special flood hazards which increase flood heights and velocities, and when inadequately anchored, damage uses in other areas. Uses that are inadequately floodproofed, elevated or otherwise protected from flood damage also contribute to the flood loss. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

[C. A requirement for participating local jurisdictions in the National Flood Insurance Program \(NFIP\) is to ensure that any type of floodplain development does not have an adverse effect on listed species or their critical habitat.](#)

17.04.020 Statement of purpose and liability disclaimer.

This title is enacted as an exercise of the police power of the county for the benefit of the public at large. It is not intended to create a special relationship with any individual, or individuals, nor to identify and protect any particular class of persons. The purpose of this title is to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas. The degree of flood protection required by this title is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on occasion. Flood heights may be increased by manmade or natural causes. This title does not imply that land outside of the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages. This title shall not create liability on the part of Whatcom County, any officer or employee thereof, or the Federal Insurance Administration, for any flood damages that result from reliance on this title or any administrative decision lawfully made thereunder. Nor shall the county or any officer, agent, or employee thereof incur or be held as assuming any liability by reason or in consequence of any permission, certificate of inspection, inspection or approval authorized herein, or issued or given as herein provided, or by reasons or consequence of any things done or acts performed pursuant to the provisions of this title. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.04.030 Methods of reducing flood losses.

In order to accomplish its purposes, this title includes methods and provisions for:

A. Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;

B. Requiring that uses vulnerable to floods, including facilities which serve such uses, shall be protected against flood damage at the time of initial construction;

C. Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel flood waters;

D. Controlling filling, grading, dredging, and other development which may increase flood damage; and

E. Preventing or regulating the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards in other areas. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.04.040 Application of title.

A. This title shall apply to all areas of special flood hazards within the jurisdiction of Whatcom County. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.04.050 Basis for establishing areas of special flood hazard.

The areas of special flood hazard identified by the Federal Insurance Administration are contained in a scientific and engineering report entitled "The Flood Insurance Study for the County of Whatcom, Washington" (effective date September 30, 1977). The accompanying Flood Insurance Rate Maps, dated September 30, 1977, and September 28, 1990, including accompanying reports and any subsequent amendments made by the Federal Emergency Management Agency, are adopted by reference and declared to be a part of this title. The flood insurance study is on file at the department of public works. (Ord. 96-050 Exh A; Ord. 90-94; Ord. 87-25 (part)).

17.04.060 Abrogation and greater restrictions.

This title is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this title and another ordinance, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.04.070 Interpretation.

In the interpretation and application of this title, all provisions shall be:

- A. Considered as minimum requirements;
- B. Liberally construed in favor of the governing body; and
- C. Deemed neither to limit nor repeal any other powers granted under state statutes. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.04.080 Compliance required.

No structure or land shall hereafter be constructed, located, extended, converted, or altered without full compliance with the terms of this title and other applicable regulations. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.04.090 Penalty for noncompliance.

Any person, firm or corporation violating any of the provisions of this title shall be deemed guilty of a misdemeanor and each day during which such violation is continued or committed shall constitute a separate offense, and upon conviction thereof, shall be punished by a fine of not more than \$500.00 or by imprisonment in the county jail for a period not exceeding 90 days, or by both such fine and imprisonment. Nothing contained herein shall prevent Whatcom County from taking such other lawful action as is necessary to prevent or remedy any violation. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.12.010 Establishment of development permit.

A development permit shall be obtained before construction or development begins within any area of special flood hazard established in WCC [17.04.050](#). The permit shall be for all structures including manufactured homes, as set forth in the definitions, and for all development including fill and other activities, also as set forth in the definitions. Application for a development permit shall be made on forms furnished by the department of public works and may include, but not be limited to, plans in duplicate drawn to scale showing the nature, location, dimensions, and elevations of the area in question, existing or proposed structures, fill, storage of materials, drainage facilities, and the location of the foregoing. Specifically, the following information is required:

- A. Elevation in relation to mean sea level, of the lowest floor (including basement) of all structures;
- B. Elevation in relation to mean sea level to which any structure has been floodproofed;
- C. Certification by a registered professional engineer or architect that the floodproofing methods for any nonresidential structure meet the floodproofing criteria as provided in WCC [17.16.090](#); and
- D. Description of the extent to which any watercourse will be altered or relocated as a result of proposed development. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.12.020 Administrative department –Designated.

A. The department of public works is appointed to administer and implement this title by granting or denying development permit applications in accordance with its provisions. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

B. The department of planning and community development services is appointed to administer and implement environmental review of this title by granting or denying development permit applications in accordance with this titles provisions and tile 16.16 Critical Areas.

17.12.030 Administrative department – Duties and responsibilities.

The duties of the department of public works shall include, but not be limited to:

A. Permit Review. The department of public works shall:

1. Review all development permits to determine that the permit requirements of this title have been satisfied;
2. Review all development permits to determine that all necessary permits have been obtained from those federal, state or local governmental agencies from which prior approval is required;
3. Review all development permits to determine if the proposed development adversely affects the flood-carrying capacity of the area of special flood hazard. For purposes of this chapter, “adversely affects” means that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point.

B. Use of Other Base Flood Data. When base flood elevation data has not been provided in accordance with WCC [17.04.050](#), Basis for establishing the areas of special flood hazard, the department of public

works shall obtain, review, and reasonably utilize any base flood elevation and floodway data available from a federal, state or other source, in order to administer WCC [17.16.070](#), Specific standards, and 17.16.120, Floodways.

C. Information to be Obtained and Maintained. The department of public works shall:

1. When base flood elevation data is provided through the flood insurance study or required as in WCC [17.12.030B](#), obtain and record the actual elevation (in relation to mean sea level) of the lowest habitable floor (including basement) of all new or substantially improved structures;
2. For all new or substantially improved floodproofed structures:
 - a. Verify and record the actual elevation (in relation to mean sea level), and
 - b. Maintain the floodproofing certifications required in WCC [17.12.010A](#);
3. Maintain for public inspection all records pertaining to the provisions of this title.

D. Alteration of Watercourse. The department of buildings and codes administration shall:

1. Notify adjacent communities and the Washington State Department of Ecology prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administration;
2. Require that maintenance is provided within the altered or relocated portion of said watercourse so that the flood carrying capacity is not diminished.

E. Interpretation of FIRM Boundaries. The department of public works shall make interpretations where needed, as to the exact location of the boundaries of the areas of special flood hazards (for example, where there appears to be a conflict between a mapped boundary and actual field conditions). The person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretation as provided in WCC [17.12.040](#).

F. Required Submission of Additional Information. The administrator shall have authority to require the applicant to submit information certified by licensed professional land surveyors, architects or engineers as may be reasonably necessary to assure conformance with the standards of this title. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

E. The duties of the department of planning and community service shall include, but not be limited to:

1. Review all development permits to determine if requirements for protection of endangered species and critical habitat in this title or title 16.16 Critical Areas have been satisfied.
2. Provide assistance to department of public works in determining suitable bioengineering measures are other methods of biomimicry for flood reduction.

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17.12.040 Variances – Appeals board established – Factors taken into account – Maintenance of records.

A. The hearing examiner as established by Whatcom County shall hear and decide appeals and requests for variances from the requirements of this title.

B. The hearing examiner shall hear and decide appeals when it is alleged there is an error in any requirement, decision, or determination made by the administrator in the enforcement or administration of this title.

C. Those aggrieved by the decision of the hearing examiner, or any taxpayer, may appeal such decision to the superior court, as provided in RCW Chapter [36.70](#).

D. In passing upon such applications, the hearing examiner shall consider all technical evaluations, all relevant factors, standards specified in other sections of this title, and:

1. The danger that materials may be swept onto other land to the injury of others;
2. The danger of life and property due to flooding or erosion damage;
3. The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner;
4. The importance of the services provided by the proposed facility to the community;
5. The necessity to the facility of a waterfront location, where applicable;
6. The availability of alternative locations for the proposed use which are not subject to flooding or erosion damage;
7. The compatibility of the proposed use with existing and anticipated development;
8. The relationship of the proposed use to the comprehensive plan and floodplain management program for that area;
9. The safety of access to the property in times of flood for ordinary and emergency vehicles;
10. The expected heights, velocity, duration, rate of rise, the sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site; and
11. The costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, water systems, and streets and bridges.

E. Upon consideration of the factors of subsection D of this section and the purposes of this title, the hearing examiner may attach such conditions to the granting of variances as it deems necessary to further the purposes of this title.

F. The hearing examiner shall maintain the records of all appeal actions and report any variances to the Federal Insurance Administration upon request. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.12.050 Variances – Conditions for issuance.

A. Generally, the only condition under which a variance from the elevation standard may be issued is for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, provided items 1 through 11 in WCC [17.12.040D](#) have been fully considered. As the lot size increases the technical justification required for issuing the variance increases.

B. Variances may be issued for the reconstruction, rehabilitation or restoration of structures listed on the National Register of Historic Places or the State Inventory of Historic Places, without regard to the procedures set forth in the remainder of this section.

C. Variances shall not be issued within any designated floodway if any increase in flood levels during the base flood discharge would result.

D. Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.

E. Variances shall only be issued upon:

1. A showing of good and sufficient cause;
2. A determination that failure to grant the variance would result in exceptional hardship to the applicant; and
3. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public as identified in WCC [17.12.040D](#), or conflict with existing local laws or ordinances.

F. Variances as interpreted in the National Flood Insurance Program are based on the general zoning law principle that they pertain to a physical piece of property; they are not personal in nature and do not pertain to the structure, its inhabitants, economic or financial circumstances. They primarily address small lots in densely populated residential neighborhoods. As such, variances from the flood elevations should be quite rare.

G. Variances may be issued for nonresidential buildings in very limited circumstances to allow a lesser degree of floodproofing than watertight or dry-floodproofing, where it can be determined that such action will have low damage potential, complies with all other variance criteria except WCC [17.12.050A](#), and otherwise complies with WCC [17.16.020](#) and [17.16.030](#) of the general standards.

H. Any applicant to whom a variance is granted shall be given written notice that the structure will be permitted to be built with a lowest floor elevation below the base flood elevation and that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced lowest floor elevation. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.13. Provisions for Habitat Protection

A Before development or redevelopment activities identified in title 16.16 Appendix XX are permitted within the floodplain or B. In all areas defined by FEMA as Protected Areas, listed in title 16.16 Appendix XX, compliance with title 16.16.400 Critical Areas and FEMA National Flood Insurance Program (NFIP) protection standards for critical habitats for listed species shall be demonstrated through submittal of a habitat plan prepared by a qualified wildlife biologist. The plan shall identify any federally listed species and associated habitats, and demonstrate that no harm will occur to such species or habitats as a result of development within the floodplain

1. To reduce duplicative reports a single critical area report may be submitted by the applicant to satisfy requirements of this title and title 16.16. Critical Areas

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17.16.010 General standards.

In all areas of special flood hazards the standards set forth in WCC [17.16.020](#) through [17.16.060](#) are required. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.16.020 Anchoring.

A. All new construction and substantial improvements shall be anchored to prevent flotation, collapse or lateral movement of the structure.

B. All manufactured home must likewise be anchored to prevent flotation, collapse or lateral movement, and shall be installed using methods and practices that minimize flood damage. Anchoring methods may include, but are not limited to, use of over-the-top or frame ties to ground anchors (reference FEMA's "Manufactured Home Installation in Flood Hazard Areas" guidebook for additional techniques). (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.16.030 Construction materials and methods.

A. All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.

B. All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage. Electrical, heating, ventilation, plumbing and air-conditioning equipment and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating within the components during conditions of flooding. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.16.040 Utilities.

A. All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system.

B. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharge from the systems into flood waters.

C. On-site waste disposal systems shall be located to avoid impairment to them, or contamination from them, during flooding. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.16.050 Subdivision proposals.

A. All subdivision proposals shall be consistent with the need to minimize flood damage.

B. All subdivision proposals shall have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize flood damage.

C. All subdivision proposals shall have adequate drainage provided to reduce exposure to flood damage.

D. Where base flood elevation data has not been provided or is not available from another authoritative source, it shall be generated for subdivision proposals and other proposed development which contain at least 50 lots or five acres (whichever is less). (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.16.060 Review of building permits.

Where elevation data is not available, either through the flood insurance study or from another authoritative source (WCC [17.12.030B](#)), applications for building permits shall be reviewed to assure that proposed construction will be reasonably safe from flooding. The test of reasonableness is a local judgment and includes use of historical data, high water marks, photographs of past flooding, etc., where available. Failure to elevate at least two feet above grade in these zones may result in higher insurance rates. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.16.070 Specific standards.

In all areas of special flood hazards where base flood elevation data has been provided as set forth in WCC [17.04.050](#), Basis for establishing the areas of special flood hazards, or WCC [17.12.030B](#), Use of other base flood data, the provisions set forth in WCC [17.16.080](#) through [17.16.110](#) are required. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.16.080 Residential construction.

A. New construction and substantial improvement of any residential structure shall have the lowest floor, including basement, elevated to or above base flood elevation.

B. Fully enclosed areas below the lowest floor that are subject to flooding are prohibited, or shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of flood waters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or must meet or exceed the following minimum criteria:

1. A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided;
2. The bottom of all openings shall be no higher than one foot above grade;
3. Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of flood waters. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.16.090 Nonresidential construction.

New construction and substantial improvement of any commercial, accessory, agricultural, industrial or other nonresidential structure:

A. Shall either have the lowest floor, including basement, elevated to the level of the base flood elevation; or

B. Together with attendant utility and sanitary facilities, shall:

1. Be floodproofed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water;
2. Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and
3. Be certified by a registered professional engineer or architect, that the design and methods of construction are in accordance with accepted standards of practice for meeting provisions of this subsection based on their development and/or review of the structural design, specifications and plans.

Such certifications shall be as set forth in WCC [17.12.030F](#) and shall be provided by the applicant or required by the department of public works.

C. Nonresidential structures that are elevated, not floodproofed, must meet the same standards for space below the lowest floor as described in WCC [17.16.080B](#).

D. Applicants floodproofing nonresidential buildings shall be notified that flood insurance premiums will be based on rates that are one foot below the floodproofed level (e.g., a building constructed to the base flood level will be rated as one foot below that level). (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.16.100 Manufactured homes.

All manufactured homes to be placed or substantially improved within Zones A1-30, AH, and AE shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is at or above the base flood elevation and be securely anchored to an adequately anchored foundation system in accordance with the provisions of Section [17.16.020B](#). (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.16.110 Agricultural buildings.

Agricultural buildings shall comply with WCC [17.16.090](#). (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.16.115 Recreational vehicles.

Recreational vehicles placed on sites within Zones A1-30, AH, AE and all V Zones on the community's FIRM shall either:

- A. Be on the site for fewer than 180 consecutive days; and
- B. Be fully licensed and ready for highway use, on its wheels or jacking system, attached to the site only by quick disconnect type utilities and security devices, and having no permanently attached additions; or
- C. Meet the requirements of WCC [17.16.100](#) and anchoring requirements for manufactured homes. (Ord. 96-050 Exh A).

17.16.120 Floodways.

Located within areas of special flood hazard established in WCC [17.04.050](#) are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of flood waters which carry debris, potential projectiles, and erosion potential, the following provisions apply:

- A. Prohibit encroachments, including fill, new construction, substantial improvements, and other development unless certification by a registered professional engineer or architect is provided demonstrating that encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.
- B. Construction or reconstruction of residential structures is prohibited within designated floodways, except for (i) repairs, reconstruction, or improvements to a structure which do not increase the ground floor area; and (ii) repairs, reconstruction or improvements to a structure, the cost of which does not exceed 50 percent of the market value of the structure either (a) before the repair, reconstruction, or improvement is started; or (b) if the structure has been damaged, and is being restored, before the

damage occurred. Work done on structures to comply with existing health, sanitary, or other safety codes or to structures identified as historic places shall not be included in the 50 percent.

C. If WCC [17.16.120A](#) is satisfied, all new construction and substantial improvements shall comply with all applicable flood hazard reduction provisions of this chapter. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.16.130 Standards for shallow flooding areas (AO Zones).

Shallow flooding areas appear on FIRMs as AO Zones with depth designations. The base flood depths in these zones range from one to three feet where a clearly defined channel does not exist, or where the path of flooding is unpredictable and where velocity flow may be evident. Such flooding is usually characterized as sheet flow. In these areas, the following provisions apply:

A. New construction and substantial improvements of residential structures within AO Zones shall have the lowest floor (including basement) elevated above the highest adjacent grade of the building site, to or above the depth number specified on the FIRM (at least two feet if no depth number is specified).

B. New construction and substantial improvements of nonresidential structures within AO Zones shall either:

1. Have the lowest floor (including basement) elevated above the highest adjacent grade of the building site, to or above the depth number specified on the FIRM (at least two feet if no depth number is specified); or
2. Together with attendant utility and sanitary facilities, be completely floodproofed to or above that level so that any space below that level is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. If this method is used, compliance shall be certified by a registered professional engineer or architect as in WCC [17.16.090A.3](#).

C. Adequate drainage paths around structures on slopes to guide flood waters around and away from proposed structures shall be provided. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

17.16.140 Coastal high hazard areas.

Located within areas of special flood hazard established in WCC 17.14.050 are coastal high hazard areas, designated as Zones V1-V30, VE and/or V. These areas have special flood hazards associated with high velocity waters from tidal surges and, therefore, in addition to meeting all provisions in this title, the following provisions shall also apply:

A. All new construction and substantial improvements in Zones V1-V30 and VE (V if base flood elevation data is available) shall be elevated on pilings and columns so that:

1. The bottom of the lowest horizontal structural member of the lowest floor (excluding the pilings or columns) is elevated to or above the base flood level; and
2. The pile or column foundation and structure attached thereto is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components. Wind and water loading values shall each have a one percent chance of being equaled or exceeded in any given year (100-year mean recurrence interval). A registered professional engineer or

architect shall develop or review the structural design, specifications and plans for the construction and shall certify that the design and methods of construction to be used are in accordance with accepted standards of practice for meeting the provisions of 1 and 2 of this subsection.

B. Obtain the elevation (in relation to mean sea level) of the bottom of the lowest structural member of the lowest floor (excluding pilings and columns) of all new and substantially improved structures in Zones V1-30 and VE, and whether or not such structures contain a basement. The local administrator shall maintain a record of all such information.

C. All new construction shall be located landward of the reach of mean high tide.

D. Provide that all new construction and substantial improvements have the space below the lowest floor either free of obstruction or constructed with non-supporting breakaway walls, open wood latticework, or insect screening intended to collapse under wind and water loads without causing collapse, displacement, or other structural damage to the elevated portion of the building or supporting foundation system. For the purpose of this section, a breakaway wall shall have a design safe loading resistance of not less than 10 and no more than 20 pounds per square foot. Use of breakaway walls which exceed a design safe loading resistance of 20 pounds per square foot (either by design or when so required by local or state codes) may be permitted only if a registered professional engineer or architect certifies that the designs proposed meet the following conditions:

1. Breakaway wall collapse shall result from a water load less than that which would occur during the base flood; and

2. The elevated portion of the building and supporting foundation system shall not be subject to collapse, displacement, or other structural damage due to the effects of wind and water loads acting simultaneously on all building components (structural and nonstructural). Maximum wind and water loading values to be used in this determination shall each have a one percent chance of being equaled or exceeded in any given year (100-year mean recurrence interval).

E. If breakaway walls are utilized, such enclosed space shall be usable solely for parking of vehicles, building access, or storage. Such space shall not be used for human habitation.

F. Prohibit the use of fill for structural support of buildings.

G. Prohibit manmade alteration of sand dunes which would increase potential flood damage. (Ord. 96-050 Exh A; Ord. 87-25 (part)).

16.16.400 Purpose. 


The purposes of this article are to:

A. Reduce the risk to life and safety, public facilities, and public and private property that result from floods.

B. Avoid and minimize impacts to fish and wildlife habitats that occur within frequently flooded areas.

C. Protect and maintain the beneficial ecological functions of frequently flooded areas, including providing the necessary flow regime to form and maintain a full range of functional and accessible salmonid habitats both within and outside of frequently flooded areas.

D. In conjunction with the provisions of WCC Title [17](#), establish review procedures that provide an integrated approach to managing floodplain development and maintaining the capacity of the floodplain or floodway to convey and store flood waters. (Ord. 2005-068 § 1).

16.16.410 Designation and mapping – Frequently flooded areas. 

A. Frequently flooded areas are areas located along major rivers, streams, and coastal areas where the depth, velocity, intensity and frequency of flood water during major events present a risk to human life and property. Areas susceptible to these types of hazards are hereby designated as frequently flooded areas and subject to the provisions of this article.


B. The approximate location and extent of frequently flooded areas are shown on the county's critical area maps. These maps are to be used as a guide and do not provide a definitive critical area designation. The county shall update the maps as new hazard areas are identified and as new information becomes available. This article does not imply that land outside mapped frequently flooded areas or uses permitted within such areas will be free from flooding or flood damages. This chapter shall not create liability on the part of Whatcom County, any officer or employee thereof, or the Federal Insurance and Mitigation Administration (FIMA), for any flood damages that result from reliance on this chapter or any administrative decision lawfully made hereunder.

C. Frequently flooded areas shall include, but not be limited to:

1. Areas subject to a one percent recurrence interval of flood water inundation or a 100-year base flood as mapped on the current effective Federal Emergency Management Agency's Flood Insurance Rate Maps (FIRM). This includes coastal high hazard areas as defined by this chapter and as identified and designated on the FIRM maps as Zone VE or V; provided, that tsunami hazard areas are designated as geologically hazardous areas and subject to the provisions of Article 3 of this chapter.

2. Other flood hazard areas identified by the county public works department based on review of historical data, high water marks, photographs of past flooding, or similar information from federal, state, county, or other valid sources when base flood elevation data from the Federal Insurance and Mitigation Administration has not been provided or is not accurate. (Ord. 2005-068 § 1).

[C. Protected Areas as defined by Appendix XX](#)

16.16.420 Frequently flooded areas – General standards. 

A. All development shall conform to the provisions of WCC Title [17](#), Flood Damage Prevention, and the applicable provisions of this chapter.

B. Development within frequently flooded areas shall be allowed pursuant to:

[1. Standards in Appendix XX Minimum Criteria](#)

[2. The mitigation sequence in WCC \[16.16.260\]\(#\)](#). The technical administrator shall have the authority to require mitigation for adverse impacts to floodplain ecological functions; provided, that such mitigation shall be

consistent and compatible with the goal of protecting health and safety and minimizing risks to property. (Ord. 2005-068 § 1).

16.16.430 Review and report requirements. 

A. When county critical area maps or other sources of credible information indicate that a site proposed for development is or may be located within a frequently flooded area, the county public works department river and flood division and/or the technical administrator shall have the authority to require a critical area assessment report.

1. The public works department shall have primary responsibility for reviewing and approving proposed developments standards in title 17 and ~~provided, that~~ the technical administrator shall review development proposals for consistency with the standards provided in this chapter and title 17.13 habitat protection.

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B. Critical areas assessment reports for frequently flooded areas shall meet

~~1.~~ 1. The requirements of WCC 17.12.010 and 16.16.255. The technical administrator shall have the authority to modify these requirements when he/she determines that any portion of these requirements is unnecessary given the scope and/or scale of the proposed development.

2. The requirements in Appendix XX Minimum Criteria for review floodplain functions.

3. The technical administrator also shall have the authority to require additional information that discloses and describes the effects of proposed development on floodplain functions, including, but not limited to: storing and conveying flood water; reducing peak flows and flow velocities; reducing redd scour and displacing rearing juvenile fish; maintaining sediment quality in streams; reducing shear stress and bank erosion; improving water quality; providing wildlife habitat; maintaining fish access; and cycling nutrients or providing other hyporheic functions that link surface and ground water systems.

4. The reports shall also include mitigation for adverse effects on floodplain ecological functions.

C. Critical areas assessment report requirements may be waived for single-family developments and structures accessory to agricultural uses outside of the Protected Areas when the technical administrator and the public works department determine that no adverse impacts or risks to life, property, or ecological functions will occur. (Ord. 2005-068 § 1).

Appendix 4: Minimum Criteria

It is the purpose of the following criteria to maintain streams and floodplains in their natural state to the maximum extent possible so they support healthy biological ecosystems, by: 1) assuring that flood loss reduction measures under the NFIP protect natural floodplain functions and riparian habitat, and the natural processes that create and maintain fish habitat, and 2) preventing or minimizing loss of hydraulic, geomorphic, and ecological functions of freshwater and estuarine floodplains and stream channels.

In all 100-year floodplain areas (SFHAs) the following criteria apply:

1. Restrict development in the Riparian Buffer Zone for all watercourses including off channel areas (areas outside this zone but within the Special Flood Hazard Area) to provide necessary protection to the RBZ. The RBZ is the greater of the following: Model Washington NFIP-ESA Ordinance D – 8 April 2011

- 250 feet measured perpendicularly from ordinary high water for Type S (Shorelines of the State) streams, 200 feet for Type F streams (fish bearing) greater than 5 feet wide and marine shorelines, and 150 feet for Type F streams less than 5 feet wide, for lakes. For type N (nonsalmonid-bearing) perennial and seasonal streams a 150 foot or 225 foot buffer applies, depending on slope stability (the 225 foot buffer applies to unstable slopes), *[updated per the May 14, 2009, errata letter]*
- the Channel Migration Zone²² plus 50 feet; and
- the mapped Floodway.

The Riparian Buffer Zone is an overlay zone that encompasses lands as defined above on either side of all streams, and for all other watercourses including off channel areas. The RBZ is a no disturbance zone, other than for activities that will not adversely affect habitat function. Any property or portion thereof that lies within the RBZ is subject to the restrictions of the RBZ, as well as any zoning restrictions that apply to the parcel in the underlying zone.

[Footnote 22: The lateral extent of likely movement along a stream reach during the next one hundred years with evidence of active stream channel movement over the past one hundred years. Evidence of active movement can be provided from aerial photos or specific channel and valley bottom characteristics. A time frame of one hundred years was chosen because aerial photos and field evidence can be used to evaluate movement in this time frame. Also, this time span typically represents the time it takes to grow mature trees that can provide functional large woody debris to most streams. In large meandering rivers a more detailed

analysis can be conducted to relate bank erosion processes and the time required to grow trees that function as stable large woody debris.

With the exception of shorelands in or meeting the criteria for the “natural” and “rural conservancy” environments, areas separated from the active channel by legally existing artificial channel constraints that limit bank erosion and channel avulsion without hydraulic connections shall not be considered within the CMZ. All areas, including areas within the “natural” and “rural conservancy” environments, separated from the natural channel by legally existing structures designed to withstand the 100-year flood shall not be considered within the CMZ. A tributary stream or other hydraulic connection allowing listed species fish passage draining through a dike or other constricting structure shall be considered part of the CMZ.]

Restrictions in this area apply to all development, per the definition of development.²³ Uses that are not permitted unless shown not to adversely affect water quality, water quantity, flood volumes, flood velocities, spawning substrate, and/or floodplain refugia for listed salmon, include the following: new buildings, including accessory buildings; new impervious surfaces; removal of native vegetation; new clearing, grading, filling, land-disturbing activity or other “development” (see definition), other than for the purpose of replacing non-native vegetation with native vegetation, and for other approved restoration work; septic tanks and drain fields, dumping of any materials, hazardous or sanitary waste landfills; receiving areas for toxic or hazardous waste or other contaminants; and, stream relocations, unless the primary function of the action is to restore natural ecological function.

[Footnote 23: Development. Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, storage of equipment or materials, or any other activity which results in the removal of substantial amounts of vegetation or in the alteration of natural site characteristics located within the area of special flood hazard.]Model Washington NFIP-ESA Ordinance D – 9 April 2011

In the RBZ the following uses are allowed: [1] repair or remodel of an existing building in its existing footprint, including buildings damaged by fire or other casualties; [2] removal of noxious weeds; [3] replacement of non-native vegetation with native vegetation; [4] ongoing activities such as lawn and garden maintenance; [5] removal of hazard trees; [6] normal maintenance of public utilities and facilities; and [7] restoration or enhancement of floodplains, riparian areas and streams that meets Federal and State standards

2. Protect fish habitat and flood storage in the remaining 100-year floodplain (outside the RBZ) by either:

a.) Prohibiting development in the 100-year floodplain, OR

b.) Providing compensation for any adverse effects to floodwater storage and fish habitat function within the 100-year floodplain. *[updated per the May 14, 2009, errata letter]*

Any development in the 100-year floodplain must be compensated, for example, through the creation of an equivalent area and volume of floodwater storage and fish habitat through a balanced cut and fill program. The new flood storage/habitat area must be graded and vegetated to allow fish refugia during flood events and return to the main channel as floodwaters recede without creating stranding risks. In addition, equivalent area, if not located on site, must be located in priority floodplain restoration areas identified in the ESU Recovery Plan for listed species.

3. Mitigate for all adverse indirect effects of development in the floodplain (effects to stormwater, riparian vegetation, bank stability, channel migration, hyporheic zones, wetlands, LWD, etc.) such that equivalent or better salmon habitat protection is provided. *[updated per the May 14, 2009, errata letter]*

Stormwater. Reduce flood volumes and stormwater runoff from new development by ensuring that increased volumes of stormwater reach the river at the same frequency, timing, and duration as historical runoff. Low Impact Development (LID) methods are required to treat and infiltrate runoff as described in PSAT 2002. These methods generally include various practices for infiltrating stormwater to provide water quality treatment, match historical runoff durations, and preserve base flows.

Riparian vegetation: Maintain or replace riparian function by providing equivalent area, diversity, and function of riparian vegetation as currently exists on the site (per WDFW riparian management recommendations (Knutson and Naef 1997)).

Bank Stability: Bank stabilization measures along salmonid-bearing streams, channel migration zones, and along estuarine and marine shorelines must be minimized to the maximum extent possible. If bank stabilization measures are necessary, bioengineered armoring of streambanks and shorelines must be used (per the Integrated Streambank Protection Guidelines 2003 (for riverine shorelines) or the State Shorelines Guidelines on bank stabilization (2003) (for estuarine and marine shorelines).

Channel migration. No activity is allowed that limits the natural meandering pattern of the channel migration zone, however, natural channel migration patterns may be enhanced or restored (see Rapp and Abbe 2003, for delineating channel migration zones).

Hyporheic zones. No activity is allowed that interferes with the natural exchange of flow between surface water, groundwater and the hyporheic zone, however, natural hyporheic exchange may be enhanced or restored (see Bolton and Shellberg. 2001 for hyporheic zone issues). Model Washington NFIP-ESA Ordinance D – 10 April 2011

Wetlands. Wetland function must be maintained or replaced by providing equivalent function per Washington State Department of Ecology (McMillan 1998) regulations.

LWD. Any LWD removed from the floodplain must be replaced in kind, replicating or improving the quantity, size, and species of the existing LWD (per WDFW Aquatic Habitat guidelines).

In the 100-year floodplain outside the Riparian Buffer Zone the following apply:

- 1) For buildable lots partially in the floodplain, require structures to be located on the portion of the lot outside of the mapped floodplain. Where a buildable lot is fully in the floodplain, structures must be sited in the location that has the least impact on listed salmon, e.g., located as far from the stream or river as possible on the lot, placing structures on the highest land on the lot, orienting structures parallel to flow rather than perpendicular, and avoiding disruption of active hyporheic exchange on a site.
- 2) Require zoning to maintain a low density (e.g., 5-acre lots or greater) of floodplain development to reduce the damage potential within the floodplain to both property and habitat, and help maintain flood storage and conveyance capacity.
- 3) All structures must be set back at least 15 feet from the RBZ and shall be sited as close to the 100-year floodplain boundary as possible.
- 4) In an effort to site structures as far away from the watercourse and RBZ as possible, the applicant will be apprised of the elevations of the 10-year and 50-year floods in detailed study areas at the same time that the (city, county) provides the 100-year elevation as a part of the permit review. The applicant, in addition to plotting the 100-year elevation near the building site, will also plot the 10 and 50-year elevations on the land. The purpose is to show the applicant the significantly lower risk of placing the structure further away from the watercourse.
- 5) Structures built using post, pier, piling or stem wall construction may require less mitigation than structures built on earth fill, but must provide equivalent mitigation for lost fish habitat and indirect effects from development.
- 6) Creation of new impervious surfaces²⁴ shall not exceed 10 percent of the surface area of the portion of the lot in the floodplain unless mitigation is provided.

[Footnote 24: Any material or land alteration (i.e. clearing, grading, etc.) which reduces or prevents absorption of storm water into the ground. That hard surface area which either prevents or retards the entry of water into the soil, water that had entered under natural conditions prior to development; and/or that hard surface area that causes water to run off the surface in greater quantities or at an increased rate of flow from that present under natural conditions prior to development. Common impervious surfaces include, but are not limited to: roof tops, walkways, patios, driveways, parking lots or storage areas, concrete or asphalt paving, gravel roads, and packed earthen materials.]

7) Removal of native vegetation must leave 65 percent of the surface area of the portion of the lot in the floodplain in an undeveloped state; the 65 percent pertains to the entire portion of the lot in the floodplain, including that area in the RBZ, where removal of native vegetation is generally prohibited.

8) The proposed action must be designed and located so that it will not require new structural flood protection (e.g., levees). Model Washington NFIP-ESA Ordinance D – 11 April 2011

9) During the floodplain permit review process, applicants shall be notified that their property contains land within the Riparian Buffer Zone and/or 100-year floodplain, and that the applicant is required to record a Notice on Title on the property before a permit may be issued. Applicants shall be further notified that development in the RBZ and 100-year floodplain can only occur according to the above criteria.

10) New road crossings over streams are prohibited.

11) Concepts of cluster development, density transfer, credits and bonuses, planned unit development, and transfer of development rights shall be employed wherever possible.

12) Any flood information that is more restrictive or detailed than the FEMA data can be used for flood loss reduction and/or fisheries habitat management purposes, including data on channel migration, more restrictive floodways, maps showing future build-out and global climate change conditions, specific maps from watershed or related studies that show riparian habitat areas, or similar maps.

In the RBZ and the floodplain the following re-development criteria apply:

1) Require that expansion to existing buildings in the floodplain be limited to no more than 10 percent of the existing footprint (i.e., when building and other structures such as garages are substantially damaged or expanded in the floodplain), unless mitigation for any adverse effects to floodplain habitat is provided, as described above .

4. Communities choosing to implement the mitigation option (2.b. above) must track the projects for which they issue floodplain development permits, including effects to flood storage, fish habitat, and all indirect direct of development. The expected development effects, the equivalent mitigation provided, and the success of the mitigation in replacing the affected fish habitat and flood storage functions shall be reported to FEMA on a semi-annual basis (according to the monitoring requirements in RPA element 3.D)

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Jessi Roberts

From: Ryan Ericson <Ryan@futurewise.org>
Sent: Thursday, June 18, 2015 4:20 PM
To: Cliff Strong; Erin Page; Amy Dearborn; Wayne Fitch
Subject: Proposed FEMA BiOp Integration Recommendations.docx
Attachments: Proposed FEMA BiOp Integration Recommendations.docx

Here are the suggested integration changes to Title 17 and Title 16