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PCM 1.1

STAFF REPORT TO THE
BENTON COUNTY PLANNING COMMISSION

FILE NO:	**OA 2021-002** (Ordinance Amendment to Critical Area Regulations)
MEMO DATE:	March 29, 2021
HEARING DATE:	April 13, 2021
APPLICANT:	Benton County Planning Department
OWNER:	N/A
LOCATION:	Unincorporated Benton County
PROPERTY SIZE:	N/A
AREA TO BE USED:	N/A
LAND USE:	N/A
COMP. PLAN:	N/A
ZONING:	N/A
SUGGESTED STAFF RECOMMENDATION:	Positive recommendation subject to seven findings of fact.

APPLICATION DESCRIPTION

Background:

Since the adoption of the 2018 Critical Area Ordinance (CAO), the County has wanted to further analyze the best available science (BAS) for riparian buffer widths associated with the County's streams, creeks, and portions of rivers that are not within Washington State Shoreline Management Act jurisdiction.

Currently, the County's adopted BAS for riparian buffer widths is from the management recommendations of the Washington State Department of Fish and Wildlife. While beneficial and useful, these recommendations are not site specific or drainage specific recommendations.

In conjunction with the update to the Shoreline Master Program, the County hired Ben Floyd, White Bluffs Consulting, to assist with analyzing the County riparian buffer widths. On September 30, 2020, Ben Floyd's team submitted a Memorandum proposing new riparian widths for the Benton County Critical Areas Code Update.

The Riparian Buffer Analysis memo assesses the riparian conditions in the County and provides a scientific foundation for determining applicable stream buffers for each

stream segment. With the development of the Riparian Buffer Analysis, the County now has site specific analysis for each stream segment to use in development of stream buffer widths that are scientifically appropriate.

Ben Floyd of White Bluffs Consulting will be available, remotely to discuss the Riparian Buffer Analysis and subsequent update to the Critical Area Regulations.

Application:

Benton County is proposing a text amendment to the Critical Area Regulations (Ordinance 609). The amendment involves the following:

BCC 15.02.120 Applicability.
When the Critical Area Ordinance was adopted in 2018 the Voluntary Stewardship Program (VSP) had yet to be finalized and adopted. The proposed amendment clarifies that the VSP for Benton County has been approved by the State:

(a) The provisions of this chapter shall apply to all lands, all land uses and development activity, and all structures and facilities in unincorporated Benton County, whether or not a permit or authorization is required, and shall apply to every person, firm, partnership, corporation, group, governmental agency, or other entity that owns, leases, or administers land within the unincorporated portion of the County, except agricultural activities on agricultural lands, as those terms are defined by RCW 36.70A.703(1) and RCW 90.58.065 as now existing or as hereafter amended, are regulated as set forth below. No person, company, agency, or applicant shall alter a critical area or buffer except as consistent with the purposes and requirements of this chapter.

(1) Benton County has opted into the Voluntary Stewardship Program (VSP), an alternative to the regulatory protection of critical areas on agricultural lands. A working group comprised of agricultural groups, environmental groups, and tribes ((~~is developing~~)) developed and approved a work plan that identifies goals and benchmarks to protect critical areas while maintaining the viability of agriculture through voluntary, incentive based measures (WAC 365-1919-010(1) as now existing and hereafter amended).

(i) ((~~If~~)) ((~~t~~))The work plan developed and approved by the VSP working group ((~~is~~)) was approved by the Washington State Conservation Commission in April 2018, and the provisions ((~~or standards~~)) of this chapter will not apply to agricultural activities on agricultural lands, as those terms are defined ((~~in~~)) by RCW 36.70A.703(1) and RCW 90.58.065, as now existing ((~~and~~)) or as hereafter amended.

(ii) If the ((~~work plan is not approved by the~~)) Washington State Conservation Commission withdraws its approval of the work plan or determines that it ((~~,~~ ~~or~~)) fails to meet goals and benchmarks, the provisions and policies of the chapter will apply to agricultural activities ((~~(RCW 36.70A.735 as now existing and hereafter amended)~~)) on agricultural lands.

(2) The Benton County Shoreline Master Program, adopted pursuant to RCW 90.58 as now existing and hereafter amended, shall apply to all land use and development activities occurring within shoreline jurisdiction. Within shoreline jurisdiction, if critical areas are present where the activities are to take place, compliance with the SMP is required. No further evaluation under this chapter is required.

(b) The County shall not approve any permit or otherwise issue any authorization not expressly exempted by this chapter to alter the condition of any land, water, or vegetation, or to construct or alter any structure or improvement in, over, or on a critical area or associated buffer, without first ensuring compliance with the requirements of this chapter.

(c) Approval of a permit or development proposal pursuant to the provisions of this chapter does not discharge the obligation of the applicant to comply with the provisions of this chapter.

BCC 15.14.040 Fish and Wildlife Conservation Areas- Performance Standards-General Requirements.

When the Critical Area Ordinance was adopted in 2018 the County adopted the state recommended riparian buffer standards for those rivers, lakes, and streams not located with a SMA shoreline environment. In 2020, the County hired White Bluff Consulting (with Anchor QEA) to evaluate riparian buffers in Benton County and propose draft riparian buffer widths based upon Best Available Science (BAS).

This amendment proposes new riparian buffer standards, removes the buffer modification requirement, and adds buffer width averaging standards consistent with state requirements as follows:

(g) Buffers.

(1) Establishment of Buffers. ((~~The Planning Administrator shall require the establishment of~~)) Required buffer areas for activities adjacent to habitat conservation areas ((~~when needed~~)) to protect habitat conservation areas are

as set forth in this section (g). Buffers shall consist of an undisturbed area of native vegetation or areas identified for restoration established to protect the integrity, functions, and values of the affected habitat. Required buffer widths ((~~shall~~)) reflect the sensitivity of the habitat and the type and intensity of human activity proposed to be conducted nearby and shall be consistent with the management recommendations issued by the Washington State Department of Fish and Wildlife.

(2) Rivers, Lakes, Ponds, and Streams. Waterbodies classified by the water typing system specified in WAC 222-16-030 have the following riparian buffer requirements consistent with State Department of Fish and Wildlife recommendations:

(i) Type S (Shorelines of the State) Standard Buffer Width: Type S waters are protected by the Benton County Shoreline Master Program, as existing and hereafter amended, rather than this chapter.

(ii) Type F (Fish) Standard Buffer Width: ((~~200 ft~~)) Seventy-five (75) feet.

(iii) Type Np (Non-Fish Perennial) and type Ns (Non-Fish Seasonal) Standard Buffer Width: ((~~150 ft~~)) One hundred-fifty (150) feet.

((~~(iv) Type Ns (Non-Fish Seasonal) Standard Buffer Width: 150 ft.~~

~~(3) Buffer modification. To manage for site specific conditions, buffer widths established in section (2) (ii-iv) above may be modified, provided:~~

~~(i) The buffer width modification is no greater than 33%;~~

~~(ii) The critical area study shall demonstrate that the proposed buffer width will continue to protect the integrity, functions, and values of the riparian area and habitat;~~

~~(iii) The critical area study shall include a field verification that evaluates actual river, lake, pond, and stream conditions. This shall be completed by a qualified professional and comply with WAC 365-190-130 (4)(f)(ii), as existing or hereafter amended; and~~

~~(iv) Applicant shall complete a request for consultation with the State Department of Fish and Wildlife consistent with BCC 15.14.030(c)(7).~~))

(3) Buffer Width Averaging. With written approval of the Planning Administrator, riparian buffer widths may be modified at various points in accordance with an approved critical area report and the best available science on a case-by-case basis by requesting buffer widths be applied on an averaging basis. Averaging of buffer widths may only be allowed where a qualified professional demonstrates that:

(i) It will not reduce riparian functions or functional performance;

(ii) The riparian area contains variations in sensitivity due to existing physical characteristics or the character of the buffer varies in slope, soils, or vegetation, and the riparian area would benefit from a wider buffer in places and would not be adversely impacted by a narrower buffer in other places;

(iii) The total area contained in the buffer area after averaging is no less than that which would be contained within the standard buffer under subsection (g)(2) above; and

(iv) The buffer width is not reduced at any point to less than seventy-five (75) percent of the standard width or fifteen (15) feet, whichever is less.

(4) Measurement.

(i) Buffers for rivers, lakes, ponds, and streams shall be measured in all directions from the ordinary high-water mark (OHWM) as identified in the field; and

(ii) Buffers for other habitat types shall be measured in all directions from the habitat boundary, as mapped by the Washington State Department of Fish and Wildlife or a qualified professional pursuant to BCC 15.14.030(a).

(5) Seasonal Restrictions. When a species is more

susceptible to adverse impacts during specific periods of the year, seasonal restrictions may apply. Larger buffers may be required and activities may be further restricted during the specified season.

APPENDIX- General References and Best Available Science.
Amend the Appendix to include the new Best Available Science, specifically the 2021 document prepared by Anchor QEA knowns the "Proposed Riparian Buffers within the Benton Critical Aeras Code Update".

SECTION 56. The following section will be known as "APPENDIX A—GENERAL REFERENCES AND BEST AVAILABLE SCIENCE" and will be part of the new Benton County Code Title known as "Environment" but will not be codified.

General References and Best Available Science Sources for Benton County Critical Area Regulations.

This document serves as the General References and Best Available Science produced for the Benton County Critical Area Regulations.

Benton County is mandated by the Growth Management Act of Washington (GMA) to review and update its comprehensive plan and development regulations according to a schedule established in RCW 36.70A.130(5). This review and update includes the critical area regulations per RCW 36.70A.130(1)(c). The review of critical area regulations under RCW 36.70A.172(1) requires the inclusion of best available science (BAS) and consideration given to anadromous fisheries.

The following documents represent a partial list of general references, data and best available science. This list is not meant to be exhaustive and may be added to in the future. This document is intended to provide an index of the science and data that may be reviewed by Benton County.

FISH AND WILDLIFE CONSERVATION AREAS

AC Geospatial, 2020. Riparian Buffer Analysis Summary Memorandum. Prepared for Benton County, May 2020.

Anchor QEA. 2021. Proposed Riparian Buffers within the Benton County Critical Areas Code Update. Prepared for Benton County, January 30,2021.

PUBLIC NOTICE

1. A Notice of Public Hearing was published in the Prosser Record on March 30, 2021 and was put on the County's website on March 26, 2020.

2. The Planning Staff mailed out review packets to Technical Agencies on February 24, 2020.

APPLICABLE STANDARDS/ORDINANCES

1. Comprehensive Plan: 2018 Benton County Comprehensive Plan.

2. Zoning Code: Benton County Code, Title 11, Zoning.

AGENCY COMMENTS

None.

RECOMMENDATION

Benton County Planning Staff will assist the Planning Commission with the determination of findings of fact for - File OA 2020-000.

The Benton County Planning Department recommends that the Planning Commission forward a **recommendation of approval** to the Benton County Board of Commissioners for application OA 2020-000 with the following suggested findings of fact and motion.

SUGGESTED FINDINGS OF FACT:

1. Benton County is proposing a text amendment to the County Critical Area Regulations, **Ordinance 609** with a focus on the following:

    a. BCC 15.02.120 Applicability. When the Critical Area Ordinance was adopted in 2018 the Voluntary Stewardship Program (VSP) had yet to be finalized and adopted. The proposed amendment clarifies that the VSP for Benton County has been approved by the State:

    b. BCC 15.14.040 Fish and Wildlife Conservation Areas- Performance Standards-General Requirements. When the Critical Area Ordinance was adopted in 2018 the County adopted the state recommended riparian buffer standards for those rivers, lakes, and streams not located with an SMA shoreline environment. In 2020, the County hired White Bluff Consulting (with Anchor QEA) to evaluate riparian buffers in Benton County and propose draft riparian buffer widths based upon Best Available Science (BAS). This amendment proposes new riparian buffer standards, removes the buffer modification requirement, and adds buffer width averaging standards consistent with state requirements as follows:

c. APPENDIX- General References and Best Available Science. Amend the Appendix to include the new Best Available Science, specifically the 2021 document prepared by Anchor QEA knowns the "Proposed Riparian Buffers within the Benton Critical Aeras Code Update".

2. Planning Casefile Application OA 2021-001 is found to be in conformance with the intent of the **Ordinance 611, Section 221** for zoning text amendments.

3. Planning Casefile Application OA 2021-001 is found to be in conformance with the intent of the Benton County Comprehensive Plan.

4. Planning Casefile Application OA 2021-001 was submitted by email to the State of Washington's Department of Commerce on February 24, 2021 for review in compliance with WAC 365-196-630.

5. The legal notification for Planning Casefile Application OA 2021-001 was given on March 30, 2021 pursuant to RCW 36.70.590.

6. Planning Casefile Application OA 2021-001 appeared in an open record virtual public hearing before the County Planning Commission on April 13, 2021 at the Public Services Building, 102206 E. Wiser Parkway, Kennewick WA.

7. At the April 13, 2021 open record hearing, the Planning Commission was available to receive public testimony, exhibits, and answer questions in the public portion of the hearing.

SUGGESTED MOTION-
I move that the Chairman, in conjunction with the Secretary of the Planning Commission, prepare and adopt written findings and conclusions reflecting the Commission's recommendation for approval of the proposed zoning amendment, Casefile OA 2021-001, that articulate and are consistent with the findings, conclusions and recommendations made by the Planning Commission tonight.

ORDINANCE NO._____

AN ORDINANCE relating to critical areas, general provisions and fish and wildlife habitat conservation areas; amending the sections relating to applicability and performance standards-general requirements; amending Ordinance 609, Section 13 and BCC 15.02.120; amending Ordinance 609, Section 54 and BCC 15.14.040; and amending Ordinance 609, Section 56.

BE IT ORDAINED BY THE BOARD OF COUNTY COMMISSIONERS OF BENTON COUNTY, WASHINGTON:

SECTION 1. Ordinance 609, Section 13 and BCC 15.02.120 are hereby amended to read as follows:

APPLICABILITY.

(a) The provisions of this chapter shall apply to all lands, all land uses and development activity, and all structures and facilities in unincorporated Benton County, whether or not a permit or authorization is required, and shall apply to every person, firm, partnership, corporation, group, governmental agency, or other entity that owns, leases, or administers land within the unincorporated portion of the County, except agricultural activities on agricultural lands, as those terms are defined by RCW 36.70A.703(1) and RCW 90.58.065 as now existing or as hereafter amended, are regulated as set forth below. No person, company, agency, or applicant shall alter a critical area or buffer except as consistent with the purposes and requirements of this chapter.

(1) Benton County has opted into the Voluntary Stewardship Program (VSP), an alternative to the regulatory protection of critical areas on agricultural lands. A working group comprised of agricultural groups, environmental groups, and tribes ((~~is developing~~)) developed and approved a work plan that identifies goals and benchmarks to protect critical areas while maintaining the viability of agriculture through voluntary, incentive based measures (WAC 365-1919-010(1) as now existing and hereafter amended).

(i) ((~~If~~)) ((~~t~~))The work plan developed and approved by the VSP working group ((~~is~~)) was approved by the Washington State Conservation Commission in April 2018, and the provisions ((~~or standards~~)) of this chapter will not apply to agricultural activities on agricultural lands, as those terms are defined ((~~in~~)) by RCW 36.70A.703(1) and RCW 90.58.065, as now existing ((~~and~~)) or as hereafter amended.

(ii) If the ((~~work plan is not approved by the~~)) Washington State Conservation Commission withdraws its approval of the work plan or determines that it ((~~, or~~)) fails to meet goals and benchmarks, the provisions and policies of the chapter will apply to agricultural activities ((~~(RCW 36.70A.735 as now existing and hereafter amended)~~)) on agricultural lands.

(2) The Benton County Shoreline Master Program, adopted pursuant to RCW 90.58 as now existing and hereafter amended, shall apply to all land use and development activities occurring within shoreline jurisdiction. Within shoreline jurisdiction, if critical areas are present where the

activities are to take place, compliance with the SMP is required. No further evaluation under this chapter is required.

(b) The County shall not approve any permit or otherwise issue any authorization not expressly exempted by this chapter to alter the condition of any land, water, or vegetation, or to construct or alter any structure or improvement in, over, or on a critical area or associated buffer, without first ensuring compliance with the requirements of this chapter.

(c) Approval of a permit or development proposal pursuant to the provisions of this chapter does not discharge the obligation of the applicant to comply with the provisions of this chapter.

SECTION 2. Ordinance 609, Section 54 and BCC 15.14.040 are hereby amended to read as follows:

PERFORMANCE STANDARDS—GENERAL REQUIREMENTS.

(a) Alterations shall not degrade the functions and values of habitat. A habitat conservation area may be altered only if the proposed alteration of the habitat or the mitigation proposed does not degrade the quantitative and qualitative functions and values of the habitat. All new structures and land alterations shall be prohibited from habitat conservation areas, except in accordance with this chapter.

(b) Nonindigenous Species. No plant, wildlife, or fish species not indigenous to the region shall be introduced into a habitat conservation area unless authorized by a state or federal permit or approval.

(c) Mitigation and Contiguous Corridors. Mitigation sites shall be located to preserve or achieve contiguous wildlife habitat corridors in accordance with a mitigation plan that is part of an approved critical area report to minimize the isolating effects of development on habitat areas, so long as mitigation of aquatic habitat is located within the same aquatic ecosystem as the area disturbed.

(d) Approvals of Activities. The Planning Administrator shall condition approvals of activities allowed within or adjacent to a habitat conservation area or its buffers, as necessary to minimize or mitigate any potential adverse impacts. Conditions shall be based on the best available science and may include, but are not limited to, the following:

(1) Establishment of buffer zones;

(2) Preservation of critically important vegetation and/or habitat features such as snags and downed wood;

(3) Limitation of access to the habitat area, including fencing to deter unauthorized access;

(4) Seasonal restriction of construction activities;

(5) Establishment of a duration and timetable for periodic review of mitigation activities; and

(6) Requirement of a performance bond, when necessary, to ensure completion and success of proposed mitigation.

(e) Mitigation and Equivalent or Greater Biological Functions. Mitigation of alterations to habitat conservation areas shall achieve equivalent or greater biologic and hydrologic functions and shall include mitigation for adverse impacts upstream or downstream of the development proposal site. Mitigation shall address each function affected by the alteration to achieve functional equivalency or improvement on a per-function basis.

(f) Approvals and the Best Available Science. Any approval of alterations or impacts to a habitat conservation area shall be supported by the best available science.

(g) Buffers.

(1) Establishment of Buffers. ((~~The Planning Administrator shall require the establishment of~~)) Required buffer areas for activities adjacent to habitat conservation areas ((~~when needed~~)) to protect habitat conservation areas are as set forth in this section (g). Buffers shall consist of an undisturbed area of native vegetation or areas identified for restoration established to protect the integrity, functions, and values of the affected habitat. Required buffer widths ((~~shall~~)) reflect the sensitivity of the habitat and the type and intensity of human activity proposed to be conducted nearby and shall be consistent with the management recommendations issued by the Washington State Department of Fish and Wildlife.

(2) Rivers, Lakes, Ponds, and Streams. Waterbodies classified by the water typing system specified in WAC 222-16-030 have the following riparian buffer requirements consistent with State Department of Fish and Wildlife recommendations:

(i) Type S (Shorelines of the State) Standard Buffer Width: Type S waters are protected by the Benton County Shoreline Master Program, as existing and hereafter amended, rather than this chapter.

(ii) Type F (Fish) Standard Buffer Width: ((~~200 ft~~)) Seventy-five (75) feet.

(iii) Type Np (Non-Fish Perennial) and type Ns (Non-Fish Seasonal) Standard Buffer Width: ((~~150 ft~~)) One hundred-fifty (150) feet.

((~~(iv) Type Ns (Non-Fish Seasonal) Standard Buffer Width: 150 ft.~~

~~(3) Buffer modification. To manage for site specific conditions, buffer widths established in section (2) (ii-iv) above may be modified, provided:~~

~~(i) The buffer width modification is no greater than 33%;~~

~~(ii) The critical area study shall demonstrate that the proposed buffer width will continue to protect the integrity, functions, and values of the riparian area and habitat;~~

~~(iii) The critical area study shall include a field verification that evaluates actual river, lake, pond,~~

~~and stream conditions. This shall be completed by a qualified professional and comply with WAC 365-190-130 (4)(f)(ii), as existing or hereafter amended; and~~

~~(iv) Applicant shall complete a request for consultation with the State Department of Fish and Wildlife consistent with BCC 15.14.030(c)(7).~~))

(3) Buffer Width Averaging. With written approval of the Planning Administrator, riparian buffer widths may be modified at various points in accordance with an approved critical area report and the best available science on a case-by-case basis by requesting buffer widths be applied on an averaging basis. Averaging of buffer widths may only be allowed where a qualified professional demonstrates that:

(i) It will not reduce riparian functions or functional performance;

(ii) The riparian area contains variations in sensitivity due to existing physical characteristics or the character of the buffer varies in slope, soils, or vegetation, and the riparian area would benefit from a wider buffer in places and would not be adversely impacted by a narrower buffer in other places;

(iii) The total area contained in the buffer area after averaging is no less than that which would be contained within the standard buffer under subsection (g)(2) above; and

(iv) The buffer width is not reduced at any point to less than seventy-five (75) percent of the standard width or fifteen (15) feet, whichever is less.

(4) Measurement.

(i) Buffers for rivers, lakes, ponds, and streams shall be measured in all directions from the ordinary high-water mark (OHWM) as identified in the field; and

(ii) Buffers for other habitat types shall be measured in all directions from the habitat boundary, as mapped by the Washington State Department of Fish and Wildlife or a qualified professional pursuant to BCC 15.14.030(a).

(5) Seasonal Restrictions. When a species is more susceptible to adverse impacts during specific periods of the year, seasonal restrictions may apply. Larger buffers may be required and activities may be further restricted during the specified season.

SECTION 3. Ordinance 609, Section 56 is hereby amended to read as follows and will now be known as "APPENDIX A—GENERAL REFERENCES AND BEST AVAILABLE SCIENCE" but will not be codified:

General References and Best Available Science Sources for Benton County Critical Area Regulations.

This document serves as the General References and Best Available Science produced for the Benton County Critical Area Regulations.

Benton County is mandated by the Growth Management Act of Washington (GMA) to review and update its comprehensive plan and development regulations according to a schedule established in RCW 36.70A.130(5). This review and update includes the critical area regulations per RCW 36.70A.130(1)(c). The review of critical area regulations under RCW 36.70A.172(1) requires the inclusion of best available science (BAS) and consideration given to anadromous fisheries.

The following documents represent a partial list of general references, data and best available science. This list is not meant to be exhaustive, and may be added to in the future. This document is intended to provide an index of the science and data that may be reviewed by Benton County in the development of the County's Critical Area Ordinance.

GENERAL REFERENCES

Municipal Research and Services Center of Washington. 2018. Website. City and county codes for Washington State jurisdictions available at URL- http://mrsc.org/Home/Research-Tools/Washington-County-Codes.aspx

Washington State Department of Community, Trade, and Economic Development. 2007.

Critical Areas Handbook: Protecting Critical Areas within the Framework of the Washington Growth Management Act.

Benton County Codes, as existing or hereafter amended.

Natural Resource Conservation Service, Field Office Technical Guides. Latest Editions.

RCW 36.70A. Growth Management Act

RCW 36.70A.172 Critical Areas - Designation and Protection - Best Available Science.

WAC 365-190 Critical Areas.

WAC 365-195 Best Available Science.

WAC 222-16-030 Water Typing System

WAC 173-22 Designation of Shorelands and Wetlands

RCW 90.58 Shoreline Management Act

RCW 43.21C State Environmental Policy

RCW 90.44 Regulation of Public Groundwaters

RCW 90.48.020 Waters of the State

RCW 77. Department of Fish and Wildlife

BEST AVAILABLE SCIENCE SOURCES

WETLANDS

Azous, A. and Homer, R. 2010. Wetlands and urbanization: implications for the future. Washington State Department of Ecology; King County Water and Land Resources Division; and University of Washington.

Brinson, M. M. 1993. A hydrogeomorphic classification for wetlands. Technical Report WRP-DE-4, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. NTIS No. AD A270 053.

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Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service. Publ. # FWS/OBS-79/31. 131p.

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Hattermann, F. Krysanova, V., Hesse, C. 2008. Modelling wetland processes in regional applications. Hydrological Sciences Journal 53(5):1001-1012.

Hogan, D. M., and M. R. Walbridge. 2007. Urbanization and nutrient retention in freshwater riparian wetlands. Ecological Applications 17(4):1142-1155.

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Hruby, T. 2014. Washington State Wetland Rating System for Eastern Washington: 2014 Update. Washington State Department of Ecology. Publication #14-06-030. Olympia, WA.

Hunt, R., D. Krabbenhoft, and M. Anderson . 1996. Groundwater inflow measurements in wetland systems. Water Resour. Res. 32(3): 495-507.

Mitsch, W.J. and J. G. Gosselink. 2000. Wetlands, Third Edition. John Wiley & Sons, Inc. New York, New York.

Sheldon, 0., T. Hruby, P. Johnson, K. Harper, A. McMillan, T. Granger, S. Stanley, and E. Stockdale. 2005. Wetlands in Washington State - Volume 1:A Synthesis of the Science. Washington State Department of Ecology. Publication #05-06-006. Olympia, WA.

U.S. Army Corps of Engineers. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0). Environmental Laboratory ERDC/EL TR-08-13, Wetlands Regulatory Assistance Program, U.S. Army Corps of Engineers Engineer Research and Development Center, Vicksburg, Mississippi.

U.S. Army Corps of Engineers. 1987. Corps of Engineers Wetland Delineation Manual: Wetlands Research Program Technical Report Y-87-1 (on-line edition).

U.S. Fish and Wildlife Service. 2018. National Wetlands Inventory. Washington, D.C.: Available at: http://www.fws.gov/wetlands/.

Washington State Department of Ecology, 1997. Washington State Wetlands Identification and Delineation Manual. Ecology Publication No. 96-94.

Washington State Department of Ecology. 2016. Wetland Guidance for CAO Updates, Eastern Washington Version. Publication No. 16-06-002.

Washington State Department of Ecology, U.S. Army Corps of Engineers Seattle District, and U.S. Environmental Protection Agency Region 10. 2006a. Wetland Mitigation in Washington State - Part 1: Agency Policies and Guidance (Version 1). Washington State Department of Ecology Publication #06-06-011a. Olympia, WA.

Washington State Department of Ecology, U.S. Army Corps of Engineers Seattle District, and U.S. Environmental Protection Agency Region 10. 2006b. Wetland Mitigation in Washington State - Part 2: Developing Mitigation Plans (Version 1). Washington State Department of Ecology Publication #06-06-011b. Olympia, WA.

Washington State Department of Natural Resources. 2018. Wetlands of High Conservation Value- Map Viewer [computer file]. Olympia, WA. Available at: https://www.dnr.wa.gov/NHPwetlandviewer

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CRITICAL AQUIFER RECHARGE AREAS

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Bauer, H.H. and Vaccarro, J.J. 1989. Estimates of Ground-Water Recharge to the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho, for Predevelopment and Current Land-Use Conditions. U.S. Geological Survey. Water Resources Investigations Report 88-4108. Tacoma, WA.

Cook, Kirk V. 2000. Guidance Document for the Establishment of Critical Aquifer Recharge Area Ordinances. Washington State Department of Ecology. Water Quality Program. Publication 97-30. Version 4.0. Olympia, WA.

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Drost, B.W., KM. Schurr, and W.E. Lum II. 1989. Selected Ground-Water Information for the Pasco Basin and Adjacent Areas, Washington, 1986-1989. U.S. Geological Survey. Open-File Report 89-228. Tacoma, WA.

Drost, B.W., S.E. Cox, and KM. Schurr. 1997. Changes in Ground-Water Levels and Ground-Water Budgets, from Predevelopment to 1986, in Parts of the Pasco Basin, Washington. U.S. Geological Survey. Water-Resources Investigations Report 96-4086. Tacoma, WA.

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SECTION 4. Severability. If any provision of this Ordinance is declared unconstitutional, or the applicability thereof to any person or circumstance is held invalid, the constitutionality of the remainder of the Ordinance and the applicability thereof to other persons and circumstances shall not be affected thereby.

SECTION 5. Effective Date. This Ordinance shall take effect and be in full force upon its passage and adoption.

ADOPTED AND PASSED this _____ day of _____.

_____
Chairman of the Board.

_____
Chairman Pro-Tem.

_____
Member.

Approved as to Form:

_____
Deputy Prosecuting Attorney

Constituting the Board of
County Commissioners of
Benton County, Washington

Attest: _____
Clerk of the Board

PCM 1.3

May 2020
Benton County

Riparian Buffer Analysis

Summary Memorandum

Prepared for
White Bluffs Consulting
and
Benton County

Prepared by
AC Geospatial LLC

Appendices
Appendix 1: Benton County Stream Maps

Background and Purpose

This memorandum is intended to assist in the development of stream and riparian buffer protections for Benton County's 2020 Critical Area Ordinance (CAO) and Shoreline Master Program update. Riparian conditions were assessed to provide context for stream buffer recommendations. This memorandum describes the methodology used to assess stream buffers and summarizes the results.

Methodology Summary

Riparian areas in Benton County were analyzed based on a series of cross section measurements using GIS and available aerial imagery. For each stream segment, the channel width and riparian vegetation width of each bank were measured, and the average, maximum, and minimum widths were determined. Stream segments were identified based on uniform characteristics and logical breaks, such as road crossings. In total 29 stream segments were analyzed, using over 300 cross section measurements.

Data Sources

The analysis was performed using ESRI ArcGIS Pro and Google Earth Pro software. The data and sources used in the analysis are summarized in Table 1.

Table 1: GIS Data and Data Sources

GIS Data	Source(s)
Aerial imagery	Google, ESRI, and Benton County
Benton County Roads	Benton County GIS, Washington DOT
Cities and UGAs	Benton County GIS
County Boundaries	USDA Geospatial Data Gateway
Named Streams/ topographic lows	Benton County GIS
National Wetlands Inventory	U.S. Fish and Wildlife Service
Public Lands	Washington Recreation and Conservation Office
Shoreline Jurisdiction	Benton County GIS
Streams and waterbodies	WA DNR Hydrography Data

Measured Streams

The analysis focused on naturally-occurring streams with a defined channel and regular annual flows. The analyzed streams included both named and unnamed streams and topographic lows. Stream segments with ephemeral flows, an indistinguishable channel, or existing protections under the Benton County Shoreline Master Program were excluded. Table 2 lists the streams that were included and excluded from the analysis.

Table 2: Included and Excluded Streams

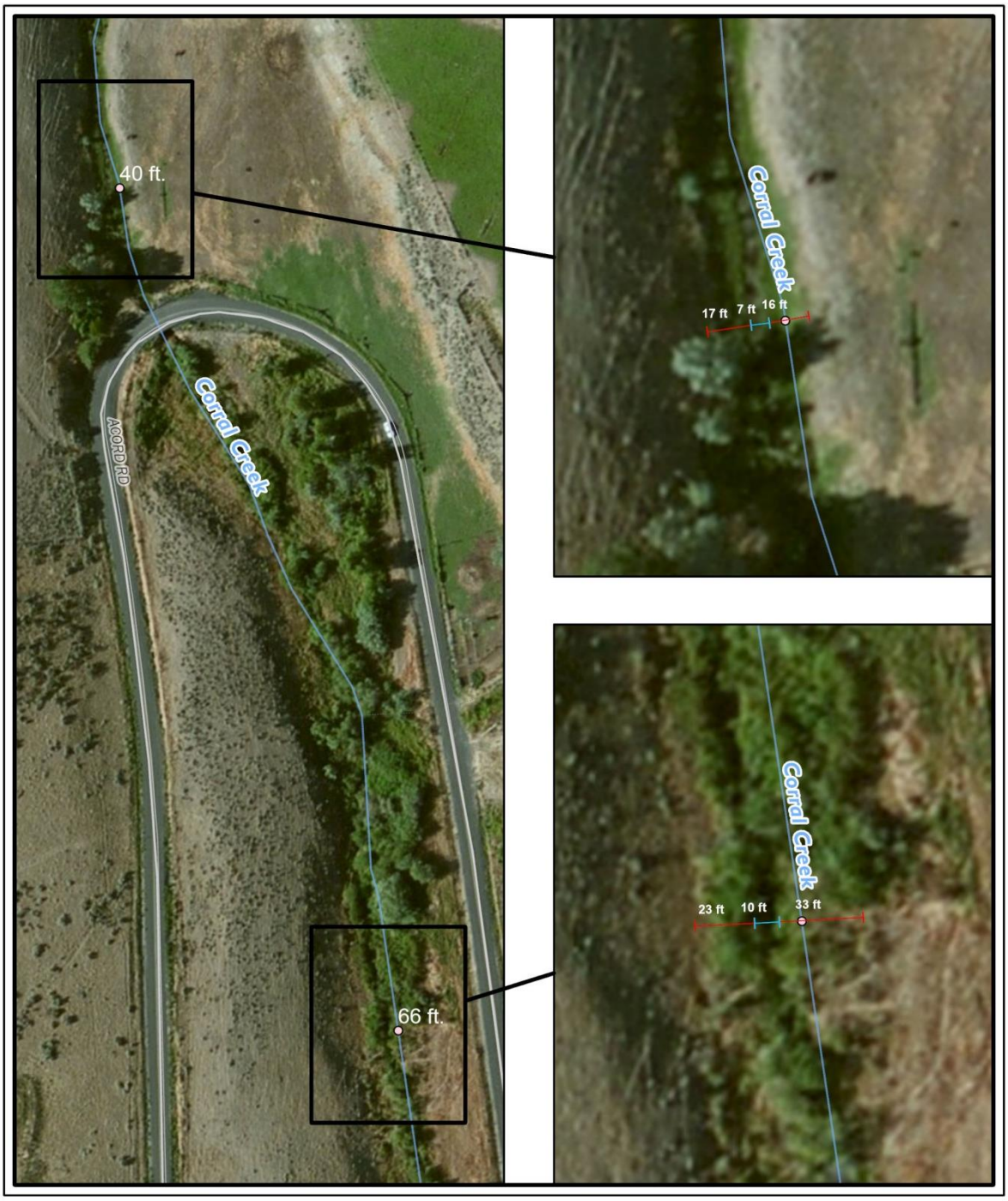
Type	Stream	Comments
Included Streams	CORRAL CREEK	3.5 MI. UPSTREAM FROM CONFLUENCE WITH YAKIMA R.
	EAST BRANCH GLADE CREEK	3.7 MI. UPSTREAM FROM CONFLUENCE WITH GLADE CK.
	GLADE CREEK	7.7 MI. UPSTREAM FROM CONFLUENCE WITH COLUMBIA R.
	SNIPES CREEK	3.9 MI. UPSTREAM FROM CONFLUENCE WITH YAKIMA R.
	SPRING CREEK	9.2 MI. UPSTREAM FROM CONFLUENCE WITH YAKIMA R.
	UNNAMED STREAM #1	2 MI. UPSTREAM FROM CONFLUENCE WITH YAKIMA R.

	UNNAMED STREAM #2	2 MI. UPSTREAM FROM OLD INLAND EMPIRE HWY
	UNNAMED STREAM #3	1.6 MI. UPSTREAM FROM CONFLUENCE WITH SNIPES CK.
	UNNAMED STREAM #4	1.5 MI. FROM KENNEWICK CITY LIMIT TO COLUMBIA R.
	UNNAMED STREAM #5	2.8 MI. UPSTREAM FROM GRIFFIN RD. AND N. RIVER RD.
	UNNAMED STREAM #6	2.5 MI. N. FROM PROSSER UGA BOUNDARY
	UNNAMED STREAM #7	3.5 MI. FROM PIONEER RD. TO HINZERLING RD.
	UNNAMED STREAM #8	2.1 MI. FROM COUNTY BOUNDARY AT HANKS RD. TO GRIFFIN RD.
Included Topo. Lows	BING CANYON	2.5 MI. UPSTREAM STRATING AT SR 14
	DEAD CANYON	4 MI. UPSTREAM FROM JUNCTION OF SONOVA RD AND SR 14
	FOURMILE CANYON	9.4 MI. UPSTREAM FROM SR 14
	SWITZLER CANYON	2.5 MI. UPSTREAM FROM CONFLUENCE WITH COLUMBIA R.
Excluded Streams	COLD CREEK	PORTIONS OUTSIDE FEDERAL LANDS ARE EPHEMERAL
	COLUMBIA RIVER	SHORELINE JURISDICTION
	DRY CREEK	PORTIONS OUTSIDE FEDERAL LANDS ARE EPHEMERAL
	RATTLESNAKE CREEK	PORTIONS OUTSIDE FEDERAL LANDS ARE EPHEMERAL
	SULPHUR CREEK	PORTIONS OUTSIDE FEDERAL LANDS ARE EPHEMERAL
	YAKIMA RIVER	SHORELINE JURISDICTION
Excluded Topo. Lows	AMO CANYON	NO OBSERVABLE FLOWS OR DEFINED BED & BANK
	BADGER CANYON	NO OBSERVABLE FLOWS OR DEFINED BED & BANK
	BAXTER CANYON	NO OBSERVABLE FLOWS OR DEFINED BED & BANK
	BLACK CANYON	NO OBSERVABLE FLOWS OR DEFINED BED & BANK
	BOFER CANYON	NO OBSERVABLE FLOWS OR DEFINED BED & BANK
	CARTER CANYON	NO OBSERVABLE FLOWS OR DEFINED BED & BANK
	COYOTE CANYON	NO OBSERVABLE FLOWS OR DEFINED BED & BANK
	KELLY GULCH	NO OBSERVABLE FLOWS OR DEFINED BED & BANK
	MOORE CANYON	NO OBSERVABLE FLOWS OR DEFINED BED & BANK
	NINE CANYON	NO OBSERVABLE FLOWS OR DEFINED BED & BANK
	PROSPECT CANYON	NO OBSERVABLE FLOWS OR DEFINED BED & BANK
	RANKIN CANYON	NO OBSERVABLE FLOWS OR DEFINED BED & BANK
	SCOUTEN CANYON	NO OBSERVABLE FLOWS OR DEFINED BED & BANK
	SHEEP CANYON	NO OBSERVABLE FLOWS OR DEFINED BED & BANK
	SPRING GULCH	NO OBSERVABLE FLOWS OR DEFINED BED & BANK
	STRAUB CANYON	NO OBSERVABLE FLOWS OR DEFINED BED & BANK
	TAYLOR CANYON	NO OBSERVABLE FLOWS OR DEFINED BED & BANK
	WEBER CANYON	NO OBSERVABLE FLOWS OR DEFINED BED & BANK
	ZINTEL CANYON	NO OBSERVABLE FLOWS OR DEFINED BED & BANK

Buffer Measurement

Points were generated at 1,000 foot intervals along the included stream segments. At each point, the channel width, right and left bank vegetation widths, and vegetation type were recorded. Figure 1 illustrates a stream section with measurement points, and channel, right bank, and left bank measurements.

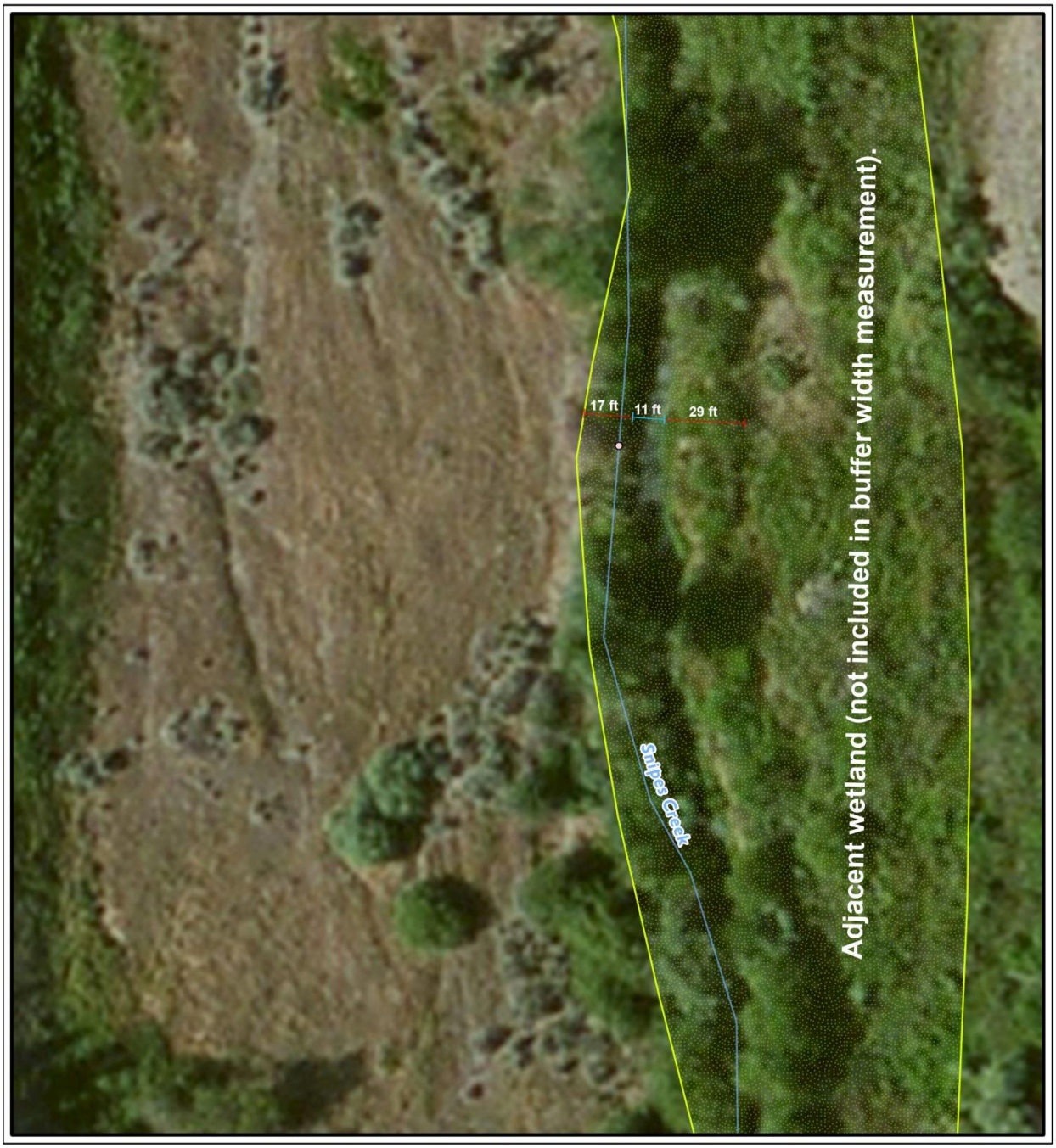
Figure 1: Stream Measurement Example



The analysis is not intended to provide exact buffer widths, but rather to typify average conditions throughout each stream section. Because buffer measurements are taken at specific points along a

continuous stream, there are variations in buffer width that are not captured. In many locations, there are wetlands adjacent to the stream, which increases the apparent width of riparian vegetation. Because wetlands receive separate protections under the Benton County regulations, some mapped wetlands adjacent to riparian buffers were excluded from the buffer measurements, as shown in Figure 2.

Figure 2: Riparian Buffer Measurement with Adjacent Wetlands



Field Verification

A field visit was conducted in April 2020 to verify the buffer measurement methodology at several publicly accessible sites. Actual stream and riparian buffer widths were measured with a tape and compared to widths calculated with aerial imagery. Riparian vegetation types measured in the field were cross referenced with those identified in aerial imagery to verify accuracy.

Corral Creek Channel and Riparian Vegetation – April 9th 2020.

Results

Riparian buffer characteristics were summarized for 29 stream segments. The average, minimum, and maximum values for each stream segment were calculated from the measurement points that fall along that segment. Overall, the measured streams had an average buffer width of 20 feet per side. The average stream channel width was 7 feet, and the average total riparian area width was 47 feet. Riparian buffer data for each stream segment is summarized in Table 3.

Table 3: Existing Riparian Buffer Conditions

Segment Name	Stream Segment ID #	Riparian / Stream Maximum Width	Riparian / Stream Minimum Width	Stream Average Width	Riparian / Stream Average Total Width	Riparian Average Width	Riparian Average Width Per Side	Majority Riparian Vegetation	Segment Description	Comments
CORRAL CREEK # 1	COR-1	114	48	7	75	69	34	TREES & SHRUBS	YAKIMA RIVER TO HIGHLAND EXTENSION RD	
CORRAL CREEK # 2	COR-2	126	41	9	90	81	41	TREES & SHRUBS	HIGHLAND EXTENSION RD TO ACORD RD	WETLANDS ADJACENT TO RIPARIAN AREA
CORRAL CREEK # 3	COR-3	121	26	7	74	67	33	TREES & SHRUBS	FROM ACORD RD 1 MI. UPSTREAM	SEASONAL FLOWS
EAST BRANCH GLADE CREEK	EBG-1	87	25	10	58	49	24	HERBACEOUS	3.7 MI UPSTREAM FROM CONFLUENCE W GLADE CK	HERBACEOUS BUFFER WITH FEW TREES, SEASONAL FLOW
GLADE CREEK #1	GLA-1	132	30	13	77	64	32	SHRUBS & HERBACEOUS	COLUMBIA R. TO E. BRANCH GLADE CK	ADJACENT WETLANDS WITH SEASONAL OPEN WATER
GLADE CREEK #2	GLA-2	68	30	8	50	42	21	SHRUBS & HERBACEOUS	2.5 MI. UPSTREAM FROM E. BRANCH CONFLUENCE	TERRACED RIPARIAN PLANTINGS THROUGH SECTION
SNIPES CREEK #1	SNI-1	72	29	10	43	33	16	TREES & SHRUBS	YAKIMA R. TO MCCREADIE RD	RURAL RESIDENTIAL DEVELOPMENT ADJACENT TO STREAM
SNIPES CREEK #2	SNI-2	102	33	12	61	49	25	TREES & SHRUBS	MCCREADIE RD TO HANKS RD	ADJACENT WETLANDS
SNIPES CREEK #3	SNI-3	74	48	11	58	47	24	TREES & SHRUBS	UPSTREAM 1/2 MILE FROM HANKS RD	
SPRING CREEK #1	SPR-1	47	33	15	40	26	13	HERBACEOUS	YAKIMA R. TO OLD INLAND EMPIRE HWY	RURAL RESIDENTIAL AREA, MOSTLY GRASS BUFFER
SPRING CREEK #2	SPR-2	33	9	10	21	11	5	HERBACEOUS	OLD INLAND EMPIRE HWY TO MCCREADIE RD	MODIFIED CHANNEL, MINIMAL NATURAL BUFFER
SPRING CREEK #3	SPR-3	58	11	5	32	27	14	HERBACEOUS	MCCREADIE RD TO HINZERLING RD	ADJACENT WETLANDS
SPRING CREEK #4	SPR-4	64	9	6	28	22	11	BARE/DEVELOPED	HINZERLING RD TO SNIPES RD	SECTIONS OF STRAIGHTENED CHANNEL WITH NO VEG.
UNNAMED PERENNIAL STREAM #1	UNS-1	115	18	3	53	50	25	TREES & SHRUBS	2 MILES UPSTREAM FROM CONFLUENCE WITH YAKIMA R.	UNNAMED PERENNIAL STREAM DEFINED BED AND BANK
UNNAMED PERENNIAL STREAM #2	UNS-2	72	30	3	53	50	25	TREES & SHRUBS	2 MILES UPSTREAM FROM OLD INLAND EMPIRE HWY	SEASONAL FLOW. DEFINED BED & BANK AND RIPARIAN VEG.
UNNAMED PERENNIAL STREAM #3	UNS-3	34	17	6	27	21	11	HERBACEOUS	UPSTREAM 1/2 MILE FROM CONFLUENCE W/ SNIPES CK	MOSTLY GRASS BUFFER WITH FEW TREES
UNNAMED PERENNIAL STREAM #4	UNS-4	34	25	8	36	28	14	TREES & SHRUBS	KENNEWICK CITY LIMIT E. TO COLUMBIA R.	MODIFIED CHANNEL. RESIDENTIAL AREA.
UNNAMED PERENNIAL STREAM #5.1	UNS-5.1	34	18	6	30	24	12	HERBACEOUS	NORTH RIVER RD TO OLD INLAND EMPIRE HWY	SEASONAL FLOWS
UNNAMED PERENNIAL STREAM #5.2	UNS-5.2	34	18	6	25	19	9	HERBACEOUS	OLD INLAND EMPIRE HWY TO IRRIGATION CANAL	MODIFIED CHANNEL WITH GRASS BUFFER.
UNNAMED PERENNIAL STREAM #6	UNS-6	34	11	4	25	21	11	HERBACEOUS	2.5 MI. N. FROM PROSSER UGA BOUNDARY	MODIFIED CHANNEL. GRASS BUFFER.
UNNAMED PERENNIAL STREAM #7.1	UNS-7.1	34	8	5	18	13	7	HERBACEOUS	PIONEER RD TO BUNN RD.	GRASS BUFFER
UNNAMED PERENNIAL STREAM #7.2	UNS-7.2	34	16	4	59	55	28	SHRUBS & HERBACEOUS	BUNN RD. TO HINZERLING RD.	SEASONAL FLOWS
UNNAMED PERENNIAL STREAM #8	UNS-8	34	22	4	34	30	15	HERBACEOUS	COUNTY BOUNDARY (HANKS RD), TO GRIFFIN RD	IN-CHANNEL IMPOUNDMENTS & ADAJACENT WETLANDS
BING CANYON	BIN-1	34	38	4	57	53	27	SHRUBS & HERBACEOUS	2.5 MI STARTING AT SR 14	SEASONAL FLOW
DEAD CANYON	DEA-1	34	39	7	58	52	26	SHRUBS & HERBACEOUS	JCT SONOVA RD & SR 14 UPSTREAM 4 MI.	SEASONAL FLOWS
FOURMILE CANYON #1	FOU-1	34	29	7	37	30	15	SHRUBS & HERBACEOUS	COLUMBIA RIVER TO SR-14	SEASONAL FLOWS
FOURMILE CANYON #2	FOU-2	34	26	6	48	42	21	TREES & SHRUBS	SR-14 TO PLYMOUTH RD	ADJACENT WETLANDS
FOURMILE CANYON #3	FOU-3	34	16	4	37	33	16	SHRUBS & HERBACEOUS	4 MI. UPSTREAM FROM PLYMOUTH RD	SEASONAL FLOWS
SWITZLER CANYON	SWI-1	34	39	4	66	62	31	SHRUBS & HERBACEOUS	2.5 MI. UPSTREAM FROM CONFLUENCE W. COLUMBIA R.	SEASONAL FLOWS

NOTES:
THE FOLLOWING NAMED STREAMS WERE NOT MEASURED: COLD CREEK, DRY CREEK, RATTLESNAKE CREEK, AND SULPHUR CREEK. THESE STREAMS DID NOT HAVE VISIBLE FLOWS, RIPARIAN VEGETATION, OR A DEFINED CHANNEL IN THE APPLICABLE AREAS FOR THIS STUDY. THE COLUMBIA AND YAKIMA RIVERS WERE NOT INCLUDED BECAUSE THEY ARE ALREADY PROTECED UNDER THE SHORELINE MASTER PROGRAM. OTHER UNNAMED STREAMS AND TOPOGRAPHIC LOWS WERE ALSO REVIEWED, BUT DID NOT HAVE MEASURABLE CHARACTERISTICS TO BE INCLUDED IN THE STUDY.

FINAL

PCM 1.4

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ANCHOR QEA

Memorandum

January 29, 2021

To: Greg Wendt and Donna Hutchinson, Benton County Planning Department

From: Ben Floyd, White Bluffs Consulting; John Small, Anchor QEA, LLC

cc: Nikole Stout, Anchor QEA, LLC

Re: Proposed Riparian Buffers within the Benton County Critical Areas Code Update

Introduction and Purpose

The purpose of this memorandum is to demonstrate how the best available science (BAS) was incorporated in the development of policies and regulations to protect Benton County critical areas outside of shoreline jurisdiction (per Revised Code of Washington 36.70A.172) but based on standards consistent with the County's Shoreline Master Program (SMP). Specifically, this memorandum summarizes how the BAS was used to support the riparian buffers proposed within Benton County's draft update to the Critical Areas Ordinance (CAO), Title 15 Benton County Code (BCC). This memorandum begins with a summary of recent, relevant, peer-reviewed literature on riparian ecological functions, along with associated recommendations for buffer widths or ranges for protecting ecological functions. This information is followed by proposed riparian buffers for the applicable stream types. Attachment 1 includes the *Riparian Buffer Analysis Summary Memorandum* (AC Geospatial, LLC 2020).

This memorandum was written to meet the requirements of Washington Administrative Code (WAC) 365-195-905 (criteria for determining which information is the "best available science") under the Growth Management Act. BAS is required to be included in CAO updates. To "include" BAS means to substantively consider BAS in developing regulations (Whidbey Environmental Action Network v. Island County 2004). In 2012, the Division II Court of Appeals held that "including" BAS does not impose a duty on local governments to describe each step of their deliberative process but rather the local government is required to address on the record the relevant sources of BAS included in their decision-making (Olympic Stewardship Foundation v. Western Washington Growth Management Hearings Board 2012).

As noted, this memorandum focuses on the BAS information for the streams and topographic lows and their associated riparian areas in the unincorporated areas in the County that are outside of shoreline jurisdiction, and that are largely privately owned (Figure 1). Ecological conditions and riparian buffers associated with shorelines of the state have been addressed as part of the Benton County SMP, which includes regulations based on a Shoreline Analysis Report for Shorelines in Benton County: Yakima and Columbia Rivers, developed in 2013.

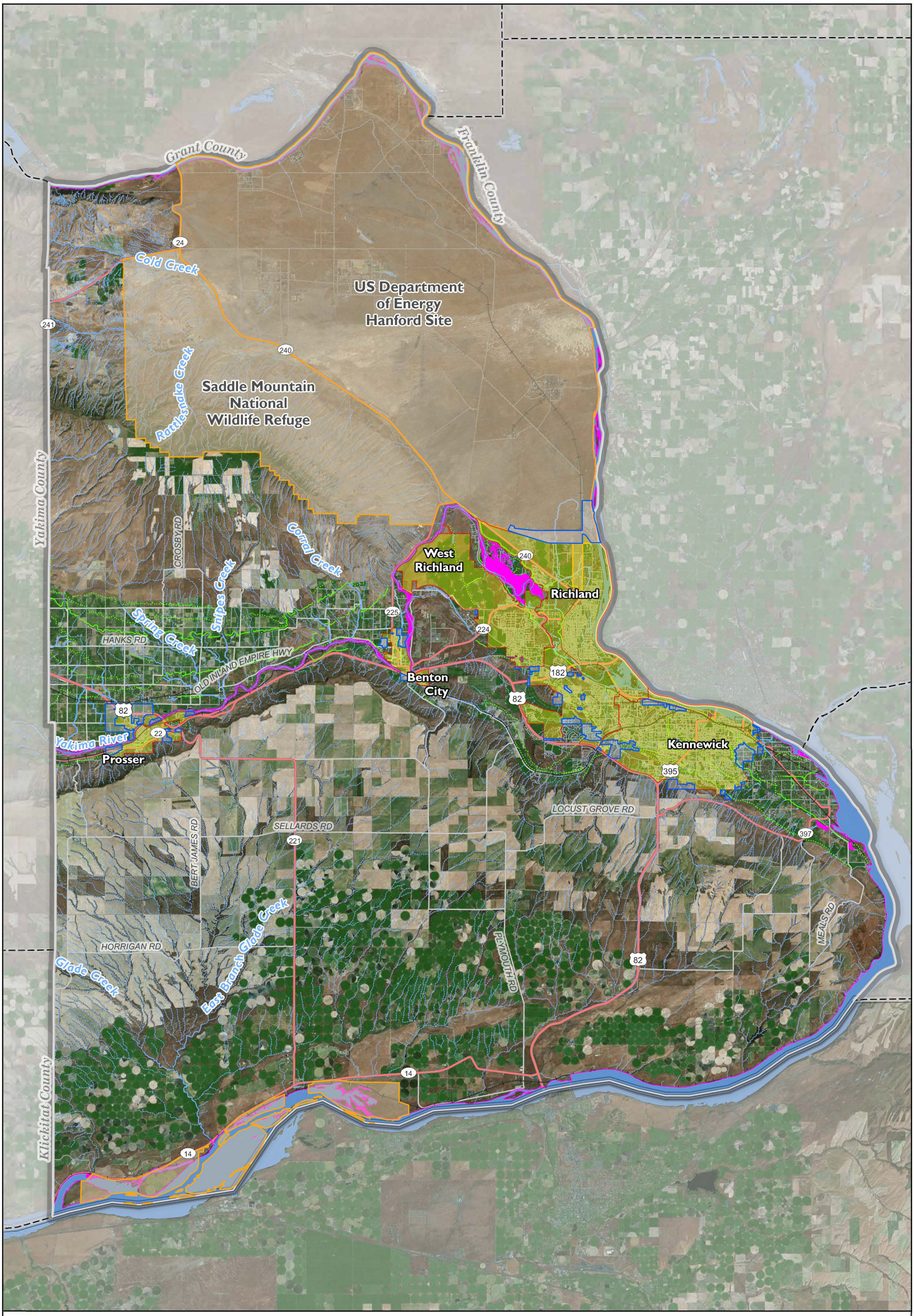

Figure 1. Benton County Streams

Benton County Regional Conditions

Benton County is located in southeastern Washington and encompasses approximately 1,715 square miles. The Columbia River borders the north, east, and south sides of the County and the Yakima River intersects the middle of the County, flowing from Prosser to its confluence with the Columbia River at Richland. The County contains portions of three Water Resource Inventory Areas (WRIAs), including the eastern portion of the Lower Yakima Watershed (WRIA 37), the Rock-Glade Watershed (WRIA 31), and the Alkali-Squilchuck Watershed (WRIA 40).

Benton County is a cold desert climate, mean annual rainfall is generally 10 inches or less per year (Best Places 2020). Most of the drainage of the Columbia River falls as snow in the Rocky Mountains and in the Cascade Range. It is important to note that the 21 dams built on the Columbia and Snake Rivers since 1933 have substantially altered the Columbia River hydrograph. Annual peak discharges for local east slope drainages occur in the late spring (typically in June) and generally results from snowmelt in the interior subbasin. Peak flows are lower and winter flows higher than under natural conditions due to dam and reservoir operations. Mainstem Columbia River flows are primarily determined by fish runs and hydropower.

General Conditions

Benton County has an arid to semi-arid climate, and this is reflected in the dominant habitat cover. Shrub-steppe is the predominant upland native habitat type in Benton County. However, conversion of shrub-steppe habitats to cropland and grazing has left only about 5% of the historical habitat in relatively undisturbed condition. A larger proportion of the remaining native habitat is moderately disturbed by grazing, off-road vehicle use, and other land uses. These areas still provide cover, food, and nesting habitat for many species of wildlife, particularly during winter months when cultivated fields provide no vegetative cover.

Riparian areas exist along the rivers and streams in the County. These water bodies include large river systems, perennial streams with flow enhanced by surface water irrigation and shallow groundwater, and intermittent streams and topographic lows, also often enhanced by upland irrigation. With average rainfall in Benton County at less than 10 inches per year, irrigation water is the primary determinant in stream flow and associated riparian areas based on irrigation operations and upland irrigation areas and practices. The Columbia and Yakima rivers are the largest river systems in Benton County, and the riparian areas associated with their shorelines are regulated under the SMP. All 13 Endangered Species Act (ESA)-listed evolutionary significant units (ESUs) of salmon (*Oncorhynchus spp.*) and steelhead (*O. mykiss*) in the Columbia basin use the mainstem Columbia River for migration to and from freshwater natal areas to the Pacific Ocean (NMFS 2016). Most of the ESA-listed species spawn and incubate in tributaries, but some populations of fall Chinook and chum salmon spawn in the mainstem itself. Summer and fall Chinook salmon spawn in the mainstem Yakima River, and spring Chinook salmon use the mainstem for rearing (WDFW 2020). Generally,

Chinook salmon are the dominant salmonid during the spring period. Non-native fish species that compete with native fish are also present in the Yakima and Columbia Rivers. Generally, riparian buffer widths may influence critical habitat function for endangered salmon and steelhead.

In addition to the Columbia and Yakima rivers, unincorporated Benton County also has Glade, Spring, Snipes, Corral, and Dead Canyon creeks, along with several other unnamed perennial and intermittent streams or topographic lows with regular or occasional surface water flow. Spring, Snipes and Corral Creeks are tributaries to the Yakima and have documented usage by steelhead, fall Chinook salmon, and Coho salmon in the lower reaches of the streams. Additionally, Snipes also has spring Chinook salmon documented usage. Snipes Creek documented fish presence is in the lower 3.7 miles, Corral in the lower 1.7 miles and Spring in the lower 1.0 mile. Flows in each of these streams is annually regulated by irrigation system operations, including spill and/or return flows. Additionally, periodic high precipitation events can also temporarily influence flows.

Glade Creek and Dead Canyon, tributary to the Columbia River, have documented historical usage for Glade by Coho salmon (lower approximate 2.5 miles) and steelhead rearing for Dead Canyon (lower 1.4 miles) (WDFW 2020). Shallow groundwater from upland irrigation and pool elevations in the Columbia River John Day reservoir affect flows in these streams. Additionally, periodic high precipitation events can also temporarily influence flows.

Riparian Ecological Functions in the Semi-arid Environment

Riparian ecosystems in semi-arid regions appear as dense vegetative patches and corridors in a landscape otherwise dominated by shrub-steppe communities (Photo 1). “Riparian systems are therefore uncommon ecosystems in semi-arid regions, making up no more than 3% of the landscape, but are linked hydrologically to the rest of the landscape” (Naiman and Decamps 1997 as cited in Patten 1998). The recent 2020 update to *Riparian Ecosystems, Volume 1: Science Synthesis and Management Implications* (Quinn et al. 2020) includes discussion of non-forested regions of Washington, like the shrub-steppe communities common in Benton County. Recommendations in this document are generally supported by the extended analysis for the Columbia Plateau in Quinn et al (2020).

Photo 1
Typical Shrub-Steppe Riparian Stream Buffer Conditions

The width of the riparian vegetation community can vary from a few feet to a few hundred feet (when associated wetlands also exist). Topography, specifically the depth to groundwater associated with the stream, strongly controls that distance. In areas without wetlands, where subsurface water or wet soils are limited, the riparian vegetation typically does not extend more than 20 feet from the ordinary high water mark of the associated waterbody. Exceptions occur where an upland irrigation source provides surface runoff or shallow ground water return to supplement the stream hydrology and when topography is extremely flat and hyporheic (e.g. subsurface) flows extend laterally from the stream maintaining the alluvial aquifer which the riparian vegetation depend on.

In Benton County, riparian buffer characteristics were summarized for 29 stream segments outside of SMP jurisdiction (F, Np, and Ns streams) (AC Geospatial, LLC 2020). The average, minimum, and maximum values for each stream segment were calculated from the measurement points that fall along that segment. Overall, the measured streams had an average vegetated buffer width of 20 feet

per side. The average stream channel width was 7 feet, and the average cumulative width of the stream and riparian vegetation was 47 feet (average channel width 7 feet). The Riparian buffer data for each stream segment is summarized in Table 1 and described in greater detail in Table 3 of the Riparian Buffer Analysis Summary Memorandum (Attachment 1).

Table 1
Non-Shoreline Stream Riparian Widths

Stream Name	Max Width for Stream and Riparian Areas	Minimum Width for Stream and Riparian Areas	Max Average Riparian Width Per Side	Minimum Average Riparian Width Per Side
Corral Creek	126	26	41	33
East Branch Glade Creek	87	25	33	33
Glade Creek	132	30	32	21
Snipes Creek	102	27	25	16
Spring Creek	64	9	14	5
Unnamed Perennial Stream Segments	115	8	28	7
Dead Canyon	34	39	26	26
Bing Canyon	34	38	27	27
Switzler Canyon	34	39	31	31
Fourmile Canyon	34	16	21	15

Source: (AC Geospatial, LLC 2020)

Wood Recruitment and Organic Inputs

Instream wood provides habitat and hydrology function, especially for rearing fish and other aquatic fauna. Large woody material that creates pools and provides channel complexity is sparse in Benton County, where riparian areas are dominated by shrub and herb species. This vegetation still provides key organic inputs to the stream ecosystems.

Key Functions

Organic Inputs. Riparian vegetation communities are the primary source of organic inputs in most streams and lakes in semi-arid regions. The mesic nature and higher biomass of the riparian community combined with the proximity to the water bodies makes it a crucial source of organic matter.

Large woody debris. The potential size of large wood recruited into streams east of the Cascade Divide is generally less than the size of these features on the west side of the region. Instream wood provides habitat for fish and other aquatic wildlife. Small and large wood both impact channel

morphology through sediment capture, water retention, and create hydraulic complexity. Large wood provides pools and scour for fish-rearing habitat and organic matter storage, as well as shade and refuge for fish.

Key Findings

Sources. Bank erosion and tree mortality contribute the most to instream wood recruitment (Johnston et al. 2011; Murphy and Koski 1989). Litterfall including fallen woody debris can form debris dams that retain organic matter and sediment beneficial for habitat and/or as nutrients for aquatic species (Benke et al. 1985; Gregory et al. 1991; Prochazka et al. 1991; Speaker et al. 1984; Bisson et al. 1987 as cited in Tait et al. 1994). The limited water sources in semi-arid environments for tree and shrub vegetation in riparian habitats reduces the biomass of nutrients through organic input compared to riparian habitats in wetter climates.

Recruitment distances. Less wood is recruited as the distance from the channel increases. In Washington studies, 50% of wood recruited originated within 35 feet of the channel (McDade et al. 1990). Litterfall from shrubby vegetation is primarily input directly adjacent to the channel.

Recommendations

In semi-arid west environments, large woody vegetation can be rare and its presence decreases rapidly with increasing distance of the stream channel from flow patterns of the water table (Malanson 1993 as cited in Buffler 2005). Instream wood used to be more abundant in semi-arid areas, but this is no longer the case (Quinn et al. 2020). Shrub density has increased along streambanks where trees or woodier species may have been in the past. Riparian buffer widths in Benton County on non-shoreline streams average 20 feet, with very limited tree cover as most of the habitat is shrub-steppe (Photo 2). Because most recruitment happens within the adjacent 49 feet of the stream, a buffer of 50 feet would be sufficient to provide wood recruitment in these conditions.

Photo 2
Benton County Non-Shoreline Stream Buffer Vegetation Example

Protection of existing functional riparian vegetation communities should be a priority and protective buffers should be developed based on the width of functional (undisturbed) riparian communities in the reach. In Benton County, the width of this area is typically less than 20 feet, so the recommended 50 feet is conservative.

Stream Temperature

Stream thermal conditions can vary with elevation, channel structure, landscape condition and land use, and the riparian ecosystem adjacent to the stream. The main source of heating in a stream is usual direct solar radiation, which is effectively reduced by the available shade given from vegetation.

Riparian vegetation has an important role in the food web system of streams (Cummins et al. 1989 as cited in Tait et al. 1994). Where it exists, overhanging vegetation can filter and absorb incident

radiation, this affects periphyton primary productivity and, improves water temperatures (Lyford and Gregory 1975, Towns 1981, Bott 1983 as cited in Tait et al. 1998).

Riparian areas with tree cover are most efficient in reducing solar heating of stream water by shading, especially in low order streams (Brown and Krygier 1970). Riparian vegetation also provides cooling through evapotranspiration (Beschta 1984, Theuer et al. 1984, Sinokrot and Stefan 1993 as cited in Tabacchi et al. 1998). Stream temperature can also be moderated by cool groundwater upwellings from deep phreatic sources and from hyporheic zones near stream margins (Stanford et al. 1994 as cited in Tabacchi et al. 1998).

Similar to habitat corridor functions, tree and shrub vegetation canopies adjacent to the shoreline and overhanging the stream banks are required for optimal temperature function. As tree and shrub density decreases near the shoreline the function also decreases. In semi-arid west environments, tree and shrub vegetation is often limited not only through land use activity but also because of natural conditions such as streams in steep sloped ravines and valley systems which typically have limited tree cover. Severe topography dominates many of the smaller order stream systems in Benton County. Many of the riparian habitats in the county also include shrub vegetation with little or no tree cover. Shrub communities in semi-arid riparian habitats typically do not provide the height, density, and overhanging vegetation characteristics that shrub species in wetter environments provide and therefore provide a lesser temperature regulation function than in wetter environments. Herbaceous riparian vegetation provides little or no temperature functional value, except in low-order, low-energy systems that support reed beds and/or forb dominated vegetation.

The findings from AC Geospatial 2020 show that the average width of riparian vegetation in Benton County is only 20 feet with a standard deviation of 9 feet. While this would be highly limiting in larger river systems in Benton County the average stream width was 7 feet, allowing for a large percentage of the stream to be shaded by relatively little vegetation. AC Geospatial (2020) also found that only about a third of reaches supported trees, which can provide shade to a stream even if growing away from the bank. Many riparian zones in Benton County are vegetated only with herbaceous species which provide shade only when very close to the streambank.

Stream water temperatures are also influenced by shallow groundwater inputs, primarily from upland irrigation practices. This groundwater is typically cooler than surface water, particularly in warmer months. Direct runoff from nearby impervious surfaces such as roads primarily occurs in the late fall and winter months when stream temperatures are lower. Thin stemmed vegetation like grasses and herbs tend to be more effective than trees or shrubs for collecting surface runoff to allow infiltration back into the groundwater prior to entering the streams (Hruby 2014).

Key Functions

Tree cover. Riparian areas with tree cover are most efficient in reducing solar heating of stream water by shading, especially in low order streams (Brown and Krygier 1970, as cited in Tabacchi et al. 1998). Riparian vegetation also provides cooling through evapotranspiration (Beschta et al. 1987, Theuer et al. 1984, Sinokrot and Stefan 1993, as cited in Tabacchi et al. 1998).

Groundwater. Stream temperature can also be moderated by cool groundwater upwellings from deep phreatic sources and from hyporheic zones near stream margins (Tabacchi et al. 1998).

Fish. Increasing stream temperatures are detrimental to fish, especially salmonids.

Key Findings

Shading. Shade from riparian cover maintains the cooler stream temperature, provided by groundwater inputs. Stream channel attributes like width, landscape position, flow, and groundwater table depth also influence stream temperatures. The type of riparian community (tree height and density) may have a larger impact on available shade than the width of riparian buffer (DeWalle 2010). Generally, cooler stream temperature is provided and maintained by irrigation spill and returns and the shallow groundwater table in the Yakima River tributaries.

Land use. Compaction can limit new vegetation growth and reduce shade from streambank riparian vegetation (Li et al. 1994), though riparian vegetation is able to recover after disturbance (Zoellick 2004).

In some studies, stream temperature was found to be more influenced by hyporheic exchange and width-to-depth ratio than by the riparian community type (forested or shrub-scrub) (Liquori and Jackson 2001; Maloney et al. 1999). Traditional stream temperature models are limited by the assumption that stream structure stays relatively stable because there is evidence of upslope land use and management affecting channel stability.

Recommendations

As stated in *Riparian Ecosystems, Volume 1* Section 7.4.2, "maximum recruitment distances for large wood will generally be either riparian zone width or site-potential tree height, whichever is smaller." This applies to shading function as well, as the more arid vegetation common in Benton County rarely exceeds a few feet in height. Cristea and Janisch (2007) found that shade on small streams 10 to 20 feet in channel width was 61% to 78% of undisturbed sites when only a 30-foot buffer was protected. Shorter shrub-steppe vegetation only a few feet in height will have the maximum function for shading closer to the stream.

Based on this, a buffer of 50 feet would be sufficient to support stream temperature function in undisturbed riparian areas. It should be noted that a buffer of 50 feet would likely be overprotective

for shade functions in rural or developed areas, as shade function is severely limited or gone in these impacted areas. However, shade is not the only factor that influences stream temperature. The shallow groundwater table and irrigation practices in the county primarily influence stream temperatures for tributaries and topographic lows, as discussed above.

Pollutant Removal

Pollutant removal functions of riparian areas are only applicable in developed or rural areas where there is the potential for human activities that generate polluted runoff. The streams behind evaluated are outside of the more densely urban areas; however, agricultural activities and the occasional runoff from storm events in the rural areas have the potential to introduce pollutants and sediment into the stream.

Key Functions

Runoff. Riparian vegetation intercepts polluted runoff from upland areas and provides some filtration of the contaminants before they enter streams. Soil and hydrology are also large factors in determining how functional the riparian zone is for pollutant removal (WDFW 2018, Quinn et al. 2020).

Vegetation type. Grass buffers can be as effective as dense forested buffers for pollutant removal function (Correll 1997; Hawes and Smith 2004; Dosskey et al. 2010). These grass filter strips are especially valuable in rural areas where forested areas are not present, like in Benton County.

Key Findings

Sediment removal distances. Most sediment removal (up to 90%) happens in the first 10 to 40 feet of a riparian buffer (Leeds et al. 1994; Yuan et al. 2009). These findings are consistent with those of GEI Consultants, Inc. (2002), that reviewed riparian buffer efficiency in agricultural areas. In forested areas, 33 feet is enough of a buffer to reduce sediment transport to a stream (Clinton 2011); whereas in rural areas where quantity of overland flow could be greater, the buffer should be larger. Similarly, Sweeney and Newbold (2014) found that a 33-foot buffer is sufficient to remove approximately 65% of sediments. Zhang et al. (2010) analyzed pollutant removal and concluded that a 100-foot-wide riparian buffer with 10% slope could remove over 85% of pollutants.

This information indicates that to protect stream water quality from erosion a vegetative buffer of 40 to 50 feet should provide adequate protection. This achieves, for example, approximately 90% reduction in sediment for slopes up to 5%, and 80% reduction for slopes between 5 and 15%. This should be viewed as a conservative protection value, based upon the higher rainfall, intensity of rainfall and runoff potential in the geographic areas where most of the referenced studies were conducted. Semi-arid and arid areas experience significantly less precipitation (3 to 15 inches per year) than most of the study areas referenced (e.g., 20 inches [Nebraska] to 45 inches [Georgia]) per

year. It is possible that at these lower precipitation levels and less frequent storm that less sediment overall can be transported. Verification of this assumption with additional information, particularly as it relates to storm intensities, is recommended.

Organics. USDA-NRCS (2000) recommends that pollutants like pesticides and organic compounds could be diffused between 35 and 65 feet.

Recommendations

A buffer of 50 feet would be sufficient to support a majority pollutant removal function in most riparian areas. A minimum buffer of 40 feet would effectively intercept pollutants and minimize sediment input from upland sources. In specific cases where slopes into the stream are greater than 10% and adjacent to cultivated agricultural ground. A buffer up to 100 feet would be needed, but these conditions are too atypical in the county to warrant applying this buffer in all cases.

Nutrient Dynamics

Transport of primary macronutrients between uplands and streams examined in riparian ecology include carbon, nitrogen, and phosphorus.

Riparian vegetation buffers trap and remove sediment and dissolved phosphorus, nitrogen, and other nutrients. Both particulate and dissolved matter can be retained by growing riparian vegetation and decomposing organic detritus. These biological processes reduce the potential for eutrophication (Horowitz 2009).

Riparian vegetation allows for suspended sediment removal, along with dissolved nutrients from surface runoff of stormwater (Peterjohn and Correll 1986, Chescheir et al. 1991, Klarer and Millie 1989, Lowrance et al. 1986, Mitsch et al. 1979, Parsons et al. 1994; as cited in Tabacchi et al. 1998) and flood waters entering (Brunet et al. 1994, Hart et al. 1987, Hupp and Morris 1990, Hupp et al. 1993, Johnston 1993, Kleiss et al. 1989; as cited in Tabacchi et al. 1998). Riparian vegetation facilitates the removal or storage of particulates. Increased friction with the soil surfaces can reduce water flow velocity and increase sedimentation of particulates. Riparian vegetation and organic detrital layers on the soil surfaces and bottom sediments are also very effective in slowing the velocity of the surface waters. The roots of the plants, which are on or near the surface, and the microbial communities on surfaces of soil, organic litter, and above ground vegetation can also assimilate dissolved nutrients from surface waters (Peterjohn and Correll 1986 as cited in Tabacchi et al. 1998).

In agricultural areas, dissolved phosphorus can be attached and exported in suspended sediments. Several studies have demonstrated the effectiveness of the riparian zones in controlling phosphorus inputs from agricultural lands to the aquatic systems (Omernik et al. 1981, Peterjohn and Correll 1986, Cooper and Gilliam 1987, as cited in Tabacchi et al. 1998) and produced equivocal results. Therefore, depending on the soil texture and the form of phosphorus, riparian forest soils can be

considered "either as a source or a sink of phosphorus" (Fabre et al. 1996 as cited in Tabacchi et al. 1998).

Within the hyporheic zone riparian vegetation roots reduce subsurface pollution, particularly nitrogen (Peterjohn and Correll 1986). Nitrogen buffering in the riparian zone occurs through plant uptake and microbial denitrification. This buffering is most effective where the surface contact between riparian wetland and the adjacent agricultural land is maximized along low order streams (Haycock et al. 1993, Brinson 1990 as cited in Tabacchi et al. 1998). However, this function of regulating subsurface nitrogen is often limited by a riparian zone's geomorphic character, which determine the groundwater flow path and thus influences transported nitrate availability. Thus the efficiency of the attenuation of nitrogen or other pollutants is dependent not only on the area of riparian vegetation but also on the area of length of hydrologic contact with vegetation in riparian areas. (Tabacchi et al. 1998).

In addition to their nutrient uptake properties, riparian areas also serve to reduce toxin inputs into aquatic environments. Since the character of vegetation corridors (width, density, type of vegetation) directly influence the amount of soil and sediment lost to the river this also influences the rate of immobilization of fertilizers, pesticides, and spilled contaminants found on the surface and subsurface of soils (Patten 1998).

Key Functions

Nutrient input. Riparian vegetation buffers trap and remove sediment and dissolved phosphorus, nitrogen, and other nutrients. Both particulate and dissolved matter can be retained by growing riparian vegetation and decomposing organic detritus. These biological processes reduce the potential for eutrophication (Horowitz 2009).

Riparian trees and other vegetation provide inputs of detrital particulate matter (e.g., leaves, pollen grains and terrestrial insects) to aquatic ecosystems. These organic materials comprise major sources of nutrients and energy source for food webs that sustain production of various consumers like fish and beaver (Tait et al. 1994).

Key Findings

Nitrogen removal. Nitrogen removal is most effective on wider bands of vegetation that allow for subsurface movement of water, from 80 to 150 feet wide (Sweeney et al. 2004; Mayer et al. 2007; Sweeney and Newbold 2014). Buffler et al. 2005 concluded that nitrogen "attenuation requires a buffer of as little as 30 feet to 60 feet in slopes up to 15%, and up to 100% removal of nitrogen with a buffer of 65 feet."

Phosphorus retention. Phosphorus retention is influenced by hydrologic flow paths and soil structure more than by riparian area width (Hoffmann et al. 2009; Schechter et al. 2013).

Nutrient cycling. A riparian buffer width with a high function for nutrient cycling is 100 feet where there has been harvest or land use changes, and a 33-foot buffer would produce moderate function (Lecerf and Richardson 2010; Sweeney and Newbold 2014). Undisturbed areas would produce higher function with a smaller buffer width.

Recommendations

There are currently no Category 4 or 5 303(d) listing for nitrogen or phosphorus in the county (Ecology 2020). A buffer of 50 feet is sufficient to support nutrient dynamics function in riparian areas in Benton County.

Peak Flow Conveyance

Peak flow conveyance and channel migration is influenced by sediment supply, riparian vegetation, and transport capacity. Channel forms and varied substrates influence the quality of fish and wildlife habitat available in a stream system. Vegetation in the riparian zone strengthens the bank and contributes runoff to the stream. Inversely, channel morphology and hydrology affect the species composition and age structure of riparian vegetation.

Generally, streams in Benton County are controlled by irrigation practices, which also control peak flows. Because many of the streams are incised with severe topography, channel migration does not usually occur in the F, Ns and Np streams regulated under GMA.

Key Functions

Channel complexity. Channel forms are influenced by water flow, channel slope, sediment transport, and other factors the affect the stream shape and the quantity, quality, and type of habitat available to aquatic and terrestrial species using riparian areas (Leopold and Wolman 1957; Schumm 1977). These geomorphic processes contribute to the development of various stream habitats. Habitats useful to aquatic species, including shallow-water and off-channel refugia, gravel bars, pools, riffles, and the transport of organic material, including large woody debris.

Vegetation. Riparian vegetation slows flows during peak runoff events (greater than bankfull) and reduces peak discharge coming off of floods (Tabacchi et al. 2000). Vegetation along streambanks also traps and stores sediment from flow upslope (Naiman et al. 2010).

Key Findings

Sedimentation. For control of excessive sedimentation in rural or urban areas, Sweeney and Newbold (2014) concluded that a buffer of 100 feet is needed to remove approximately 85% of sediments from overland flow. A buffer of only 33 feet is needed to remove approximately 65% of excessive sediments. Buffler et al. 2005 found that a 3 to 10 meter-wide grass buffer was found to be sufficient to remove most particulates from overland flow.

Recommendations

Peak flow conveyance and channel migration processes are site specific, as each system has a unique set of geomorphic controls and natural disturbance regime. For Benton County non-shoreline streams, flood events are less common and peak flows are controlled (Photo 3). A buffer of 33 feet would be sufficient to support peak flow conveyance and channel migration function in most streams, as vegetation becomes less effective at stabilizing the bank as distance from the bank increases (Roering et al. 2003; Sweeney and Newbold 2014). In geomorphically unstable reaches, with a history of channel migration would require additional setback. Development should generally be kept out of the historic channel migration zone in locations where channel migration has not been arrested by levees or revetments.

Photo 3
Typical Controlled Stream in Benton County

Summary of Recommendations

In reviewing the reference documents, much of the available technical information is geographically broadly based and does not provide site-specific details for identifying specific widths of riparian protections to maintain the various types of semi-arid riparian ecological functions found in Benton County. Caution must be used in applying or relating these prescriptions for wetland, riparian, and floodplain protection from other geographic areas to these features in the County. This caution is tied to the variability in riparian functions and the area in which these functions occur in a semi-arid environment. In many cases, the intent of the prescriptions found in the literature is to protect vegetation types that are relatively rare or absent within the greater Columbia Basin Plateau region, and that may or may not be applicable to the streams in Benton County addressed in this memorandum.

Tree and shrub vegetation adjacent to the shoreline and overhanging stream banks is necessary for optimally functioning aquatic habitat. Functional quality provided by herbaceous riparian habitat with no tree or shrub canopy generally provides less function in terms of food web support, thermal regulation, and soil stabilization. Riparian habitat in the semi-arid west can have limited or no tree or shrub vegetation due to both land use activities, natural environmental conditions, or both. *Riparian Ecosystems Volume 1* (Quinn et al. 2020) recently analyzed ecosystem functions on the Columbia Plateau and concluded that tree height is not a driving factor for determining riparian buffer width; pollutant removal distances would be more appropriate when looking at the efficacy of buffers in the region.

Table 2 summarizes the recommended buffer distances based on the conclusions drawn from sources reviewed in the section above. The recommended buffers include an additional 10 feet to provide for facilities maintenance and for consistency with the County's draft SMP for similar functioning streams and associated habitat areas in the rural setting.

Table 2
Summary of Riparian Width to Provide Key Functions

Function	Minimum Distance Recommended by BAS (feet)	Type F Proposed Buffer in CAC	Type Np/Ns Proposed Buffer in CAC	Efficacy with Source from Above
Wood	20	50	50	Because most recruitment happens within the adjacent 49 feet of the stream, a buffer of 50 feet would be sufficient to provide wood recruitment in these conditions.
Stream Temperature	30	50	50	A buffer of 50 feet would be sufficient to support stream temperature function in undisturbed riparian areas. It should be noted that a buffer of 50 feet would be overprotective for shade functions in areas with moderate land use, as shade function is severely limited or gone in these impacted areas.
Pollutant Removal	40/100 (>10% slope)	40/100 (>10% slope)	50	A buffer of 40 feet would be sufficient to support pollutant removal function in riparian areas. 100 feet for areas with slope greater than 10% and significant ground disturbances directly upland.
Nutrient Dynamics	33	50	50	A buffer of 50 feet is sufficient to support nutrient dynamics function in riparian areas in Benton County.
Peak Flow Conveyance and Channel Migration	33	50	50	A buffer of 50 feet would be sufficient to support peak flow conveyance and channel migration function in most streams, as vegetation becomes less effective at stabilizing the bank as distance from the bank increases.

F: Fish
Np: Non-Fish
Ns: Non-Fish Seasonal

Table 3 provides the recommended riparian buffer widths for streams and topographic lows under the CAO. As a special consideration for anadromous species, the recommended buffer width for the documented anadromous fish-bearing streams is 75 feet.

Table 3
Recommended CAO Riparian Buffers

Stream Name, Type	Recommended Riparian Buffer
Corral Creek, F	75 feet
East Branch Glade Creek, Np	50 feet
Glade Creek, F	75 feet
Snipes Creek, F	75 feet
Spring Creek, F	75 feet
Unnamed Perennial Stream Segments, Np	50 feet
Dead Canyon, Ns	50 feet
Bing Canyon, Ns	50 feet
Switzler Canyon, Ns	50 feet
Fourmile Canyon, Ns	50 feet

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PCM 1.5

NOTICE OF OPEN RECORD HEARINGS

NOTICE IS GIVEN that the following application will be considered by the Benton County Planning Commission at public hearings on Tuesday, April 13, 2021, at **6 p.m.** via a virtual meeting format (see below for more information).

OA 2021-002 -AN ORDINANCE relating to critical areas,· general provisions and fish and wildlife habitat conservation areas; ·amending the sections· relating to applicability and performance standards-general requirements;· amending Ordinance 609, Section 13 and BCC 15.02.120; amending Ordinance 609, Section 54 and BCC 15.14.040; and amending Ordinance 609, Section 56. This amendment updates references within the Applicability portion of the ordinance; amends the buffer requirements; and amends and changes the title to Section 56 to read "Appendix A - General References and Best Available Science" and adds the words "general references" when referring to the list of data and best available science.

SUB 2021-002 - The preliminary plat of Highland Vineyards for the subdivision of 16.86 acres into 60 lots with an average lot size of 9,580 square feet. The site is located East of the Columbia Irrigation District canal at the intersection of S. Washington Street and East 27th Avenue and is located on both the north and south side of East 27th Avenue in Kennewick WA on Parcel #'s 10780-300-0039-001, 1-1880-201-0466-002, 1-1880-201-0466-003, 1-1880-201-0466-004 Project Applicant: RJ and Diane Hoch, Kennewick WA 99337

NOTICE IS FURTHER GIVEN that the proposed ordinance amendment and Subdivision have been reviewed under the requirements of the State Environmental Policy Act and a Determination of Non-Significance (DNS) was issued on February 24, 2021 for the ordinance amendment and a Mitigated Determination of Non Significance was issued on March 25, 2021 for the subdivision. Accordingly, an Environmental Impact Statement was not required on either proposal. Any comments regarding these determinations and the environmental impacts of the proposals can be made at the Planning Commission Hearing using the method noted below or in writing to the Benton County Planning Department by 5 p.m. on Monday April 13, 2021.

Due to Governor's "Stay Home, Stay Healthy" order the County Offices are closed to in person visits from the public at this time. In an effort to continue to provide public access to the Planning Commission meetings, Benton County will be providing telephonic and video access for the public to view and provide testimony at the Planning Commission meetings. If you choose to join the meeting telephonically, we ask that you please limit background noise or mute your line to prevent any unnecessary interruption to the meeting. To find information on virtual attendance options, including streaming video, Webex video conferencing and telephone, please visit www.tinyurl.com/BCPublicNotice.

If you wish to provide comments on any of the actions before the Planning Commission, we ask that you please fill out our online form (found at https://tinyurl.com/testifyform) and submit your request to our office. **You must submit a request form to participate for each hearing that you wish to attend.** If you prefer to make the request by phone, please call our office at 786-5612 and we can add you to the list for providing testimony. At the meeting the names of

those wishing to testify will be called out and at that time you will be able to present your comments/concerns regarding the specific agenda item.

At this hearing, the Planning Commission may recommend approval, conditional approval, or disapproval of the applications to the Benton County Board of Commissioners. All parties concerned may present any support or objections for the application per the phone in instructions above. Information concerning the applications can be obtained at the Benton County Planning Department, by calling 736-3086 (Tri-Cities) or 786-5612 (Prosser).

Dated at Prosser, Washington on this 19th day of March 2021.

Martin Sheeran, Chairman
BENTON COUNTY PLANNING COMMISSION

Greg Wendt, Director
COMMUNITY DEVELOPMENT DEPT.

PUBLISH ON: March 31, 2021